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# ECOLOGICAL IMPACT ASSESSMENT REPORT

FOR

PROPOSED STRATEGIC HOUSING  
DEVELOPMENT


AT


LANDS AT BLACKGLEN ROAD AND  
WOODSIDE ROAD, SANDYFORD,  
DUBLIN 18.


ON BEHALF OF

ZOLBURY LIMITED.

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## TABLE OF CONTENTS

<b>TABLE OF CONTENTS.....</b>	<b>3</b>
<b>LIST OF TABLES .....</b>	<b>5</b>
<b>LIST OF FIGURES.....</b>	<b>5</b>
<b>1 INTRODUCTION .....</b>	<b>1</b>
1.1 QUALITY ASSURANCE AND COMPETENCE .....	1
<b>2 RELEVANT LEGISLATION .....</b>	<b>3</b>
2.1 NATIONAL LEGISLATION.....	3
2.1.1 <i>Wildlife Act 1976 and amendments</i> .....	3
2.1.2 <i>EU Habitats Directive 1992 and EC (Birds and Natural Habitats) Regulations 2011</i> .....	3
2.1.3 <i>Flora (Protection) Order, 2015</i> .....	4
2.1.4 <i>Invasive Species Legislation</i> .....	4
2.2 INTERNATIONAL LEGISLATION .....	4
2.2.1 <i>EU Birds Directive</i> .....	4
2.2.2 <i>EU Habitats Directive</i> .....	5
2.2.3 <i>Water Framework Directive</i> .....	5
2.2.4 <i>Bern and Bonn Convention</i> .....	5
2.2.5 <i>Ramsar Convention</i> .....	5
<b>3 DESCRIPTION OF THE PROPOSED DEVELOPMENT.....</b>	<b>6</b>
3.1.1 <i>Proposed Drainage</i> .....	7
<b>4 METHODOLOGY .....</b>	<b>10</b>
4.1 SCOPE OF ASSESSMENT.....	10
4.2 DESK STUDY .....	10
4.3 FIELD SURVEYS .....	11
4.3.1 <i>Habitat and Invasive flora Surveys</i> .....	11
4.3.2 <i>Bat Surveys</i> .....	11
4.3.3 <i>Bird Surveys</i> .....	13
4.3.4 <i>Mammal Surveys</i> .....	13
4.3.5 <i>Other Fauna</i> .....	13
4.4 ASSESSMENT .....	14
4.5 LIMITATIONS .....	14
<b>5 BASELINE ECOLOGICAL CONDITIONS .....</b>	<b>15</b>
5.1 GENERAL SITE OVERVIEW .....	15
5.2 DESIGNATED SITES .....	15
5.2.1 <i>European Sites</i> .....	16
5.2.2 <i>Nationally Designated Sites</i> .....	17
5.3 HABITATS .....	24
5.3.1 <i>Scrub (WS1) and Bracken (HD1)</i> .....	24
5.3.2 <i>Recolonising bare Ground (ED3) &amp; Exposed Siliceous Rock (ER1)</i> .....	25
5.3.3 <i>Acid Grassland (GS3) &amp; Wet Grassland (GS4)</i> .....	25
5.3.4 <i>Treelines (WL2) &amp; Hedgerows (WL1)</i> .....	27
5.3.5 <i>Stone walls (BL1) and Drainage Ditches (FW4)</i> .....	27
5.4 FLORA AND FAUNA.....	30



5.4.1	<i>Rare and Protected Flora</i> .....	30
5.4.2	<i>Invasive Plant Species</i> .....	30
5.4.3	<i>Mammals (excl. bats)</i> .....	33
5.4.4	<i>Bats</i> .....	34
5.4.5	<i>Birds</i> .....	35
5.4.6	<i>Amphibians</i> .....	37
5.4.7	<i>Other species and species groups</i> .....	38
5.5	SUMMARY OF ECOLOGICAL EVALUATION .....	38
<b>6</b>	<b>POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT</b> .....	<b>40</b>
6.1	IMPACTS ON DESIGNATED SITES .....	40
6.1.1	<i>Natural Heritage Areas</i> .....	40
6.2	IMPACTS ON HABITATS AND FLORA .....	41
6.2.1	<i>Increase in habitat quality</i> .....	41
6.3	IMPACTS ON MAMMALS EXC. BATS .....	41
6.4	IMPACTS ON BATS .....	42
6.5	IMPACTS ON BIRDS .....	42
6.6	IMPACTS ON COMMON FROG .....	43
6.7	DO NOTHING IMPACT .....	43
6.8	CUMULATIVE IMPACTS .....	43
6.8.1	<i>Existing Granted Developments</i> .....	43
6.8.2	<i>Relevant Policies and Plans</i> .....	45
<b>7</b>	<b>MITIGATION MEASURES</b> .....	<b>46</b>
7.1	HABITATS .....	46
7.2	BIRDS .....	46
7.2.1	<i>Controlled Vegetation Removal</i> .....	46
7.2.2	<i>Noise Control</i> .....	46
7.3	MAMMALS .....	47
7.3.1	<i>Construction Best Practise</i> .....	47
7.3.2	<i>Mitigation 4: Mammal Access Routes</i> .....	48
7.4	BATS .....	48
7.4.1	<i>Bat-friendly Night-time lighting</i> .....	48
7.4.2	<i>Tree removal</i> .....	50
7.5	INVASIVE PLANT SPECIES MANAGEMENT .....	50
7.6	SCHEDULE OF MITIGATION .....	52
<b>8</b>	<b>ENHANCEMENT MEASURES</b> .....	<b>55</b>
8.1	BAT HABITAT ENHANCEMENT .....	55
8.2	BIRD HABITAT ENHANCEMENT .....	55
8.3	AMPHIBIAN HABITAT ENHANCEMENT .....	55
8.4	INVERTEBRATE HABITAT ENHANCEMENT .....	55
8.5	MAMMAL HABITAT ENHANCEMENT .....	56
<b>9</b>	<b>MONITORING</b> .....	<b>56</b>
9.1	CONSTRUCTION PHASE MONITORING .....	56
9.1.1	<i>Ecological Clerk of Works</i> .....	56
9.1.2	<i>Bat Ecologist</i> .....	57
9.2	POST-CONSTRUCTION MONITORING .....	57
9.2.1	<i>Bat Ecologist</i> .....	57

9.2.2	<i>Ecologist Surveys</i> .....	57
9.3	SCHEDULE OF ECOLOGICAL MONITORING .....	58
<b>10</b>	<b>RESIDUAL IMPACTS</b> .....	<b>61</b>
<b>11</b>	<b>CONCLUSION</b> .....	<b>65</b>
<b>12</b>	<b>REFERENCES</b> .....	<b>66</b>
<b>APPENDIX I – VALUATION AND IMPACT CRITERIA FOR ASSESSING ECOLOGICAL RESOURCES</b> .....		<b>69</b>
<b>APPENDIX II – BAT SURVEY REPORT</b> .....		<b>73</b>

## LIST OF TABLES

Table 1. Proposed Natural Heritage Areas located within the precautionary 15km ZOI of the Proposed Development. Sites with identified Source-Pathway-Receptor impact linkage are highlighted in green. ....	17
Table 2. Bird species recorded within the vicinity of the Site during the breeding bird survey. ....	36
Table 3. Evaluation of potential ecological sensitivities within the vicinity of Site of the Proposed Development. ....	38
Table 4. Granted developments within the vicinity of the Proposed Development considered for cumulative effects. ....	43
Table 5. Schedule of Ecological Mitigation for the Proposed Development. ....	52
Table 6. Schedule of Ecological Monitoring for the Proposed Development.....	58
Table 7. Summary of potential impacts on the identified Key Ecological Receptors KER(s) associated with the Proposed Development, mitigation proposed, and residual impacts. ....	62

## LIST OF FIGURES

Figure 1. Indicative proposed site layout and landscape masterplan (Adapted from OMP drawing 20006-OMP-00-ZZ-DR-A-1001 dated August 2022) .....	9
Figure 2. European Sites within 15km of the Proposed Development .....	22
Figure 3. Natural Heritage Areas within 15km of the Site of the Proposed Development. ....	23
Figure 4. Image facing west showing Bracken (HD1) and gorse scrub (WS1) habitats. ....	25
Figure 5. Example of ED3 and ER1 habitats present at the Site. ....	25
Figure 6. A patch of wet grassland (GS4) habitat in the south of the Site (Photo taken facing west). .	26
Figure 7. Acid Grassland (GS3) habitat along the southern boundary of the Site (Image take facing north). ....	26
Figure 8. Treeline (WL2) along the Site's southern boundary with private residential lands. ....	27
Figure 9. Example of BL1 stone wall habitat along eastern site boundary. ....	28
Figure 10. Drainage ditch (FW4) located along boundary with Woodside Road to the south. ....	28
Figure 11. Habitat Map of the Site of the Proposed Development (Codes as per Fossitt, 2000). ....	29
Figure 12. Locations of invasive flora at the Site of the Proposed Development. ....	32
Figure 13. Internal Lighting Guidance Diagram adapted from ILP (2018). ....	49

## 1 INTRODUCTION

Enviroguide Consulting was commissioned by Zolbury Limited, to undertake an Ecological Impact Assessment for a proposed Strategic Housing Development at Lands at Blackglen Road and Woodside Road, Sandyford, Dublin 18.

An Ecological Impact Assessment (EclA) assesses the potential effects of the Proposed Development on habitats and species; particularly those protected by national and international legislation or considered to be of particular nature conservation importance. This report will describe the ecology of the Site of the Proposed Development with emphasis on habitats, flora, and fauna, and will assesses the potential effects of both the Construction and Operational Phases of the Proposed Development on these ecological receptors. The report follows Guidelines for Ecological Impact Assessment in the UK and Ireland, by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018).

### 1.1 Quality assurance and competence

Synergy Environmental Ltd., T/A Enviroguide Consulting, is a wholly Irish Owned multi-disciplinary consultancy specialising in the areas of Environment, Waste Management and Planning. All consultants have scientific or technical qualifications and have a wealth of experience working within the Environmental Consultancy sectors, having undergone extensive training, and continued professional development.

Enviroguide Consulting as a company remains fully briefed in European and Irish environmental policy and legislation. Enviroguide's staff members are highly qualified in their field. Professional memberships include the Chartered Institution of Wastes Management (CIWM), the Irish Environmental Law Association and Chartered Institute of Ecology and Environmental Management (CIEEM).

All surveying and reporting have been carried out by qualified and experienced ecologists and environmental consultants. Liam Gaffney Senior Ecologist with Enviroguide undertook the on-site surveys, desktop research and report writing for this report. Enviroguide Senior Ornithologist Eric Dempsey and Bat Ecologist Dr Tina Aughney, respectively, undertook the breeding bird and bat surveys that inform this assessment.

Liam Gaffney has a M.Sc. Hons. (Wildlife Conservation and Management) and a B.Sc. Hons (Zoology) from University College Dublin, and a wealth of experience in desktop research, literature scoping-review, and report writing, as well as abundant practical field experience (Habitat surveys, Wintering bird surveys, large mammals, fresh water macro-invertebrates etc.). Liam is also a Qualifying member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

Eric Dempsey is an Environmental Consultant and Ornithologist who has worked on a wide range of conservation, research and ecological monitoring projects across Ireland. Eric is the author of the best-selling books, The Complete Field Guide to Ireland's Birds and Finding Birds in Ireland and is experienced in coordinating and undertaking surveys along with being highly proficient in report writing and data management. Eric is very experienced with all survey methodology and has provided expert input to numerous Environmental Impact Assessment

Reports, Environmental Assessments and Appropriate Assessments. Eric is currently part of the team of field ornithologists undertaking the long-term Dublin Bay Wetlands Survey.

Dr Tina Aughney has worked as a Professional Bat Ecologist since 2000 and is director of Bat Eco Services, an independent, professional environmental consultancy. Dr Aughney has a wealth of academic qualification having studied both a B.Sc. Hons. in Environmental Science from NUI Galway and a PhD in Environmental Science. A member of The Heritage Council Bat Panel, Dr Aughney is also the co-ordinator of large-scale bat monitoring projects e.g. The All-Ireland Daubenton's Bat Waterways Survey. Bat Eco Services operatives are fully licenced by the NPWS to survey, capture and handle all Irish Bat Species.

## 2 RELEVANT LEGISLATION

An Ecological Impact Assessment (EclA) is a process of identifying, quantifying, and evaluating potential effects of development-related, or other actions, on habitats, species and ecosystems (CIEEM, 2016). The Proposed Development that is the focus of this report, is sub-threshold for an Environmental Impact Assessment (EIA) under Schedule 5, Part 2 10, (b) of the Planning and Development Regulations 2001 – 2018.

When an EclA is undertaken as part of an EIA process it is subject to the EIA Regulations (under the EU Planning and Development [Environmental Impact Assessment] Regulations 2001-2018). An EclA is not a statutory requirement, however it is a best practise evaluation process. This EclA has been undertaken to support and assess the Proposed Development planning application and assesses the potential impact that the Proposed Development may have on the ecology of the site and its environs. Where a potential risk to the environment is identified, measures are proposed on the basis that by deploying such measures the risk is eliminated or reduced to an insignificant level. This EclA is provided to assist the relevant Competent Authority with its decision making in respect of the Proposed Development.

### 2.1 National Legislation

#### 2.1.1 *Wildlife Act 1976 and amendments*

The Wildlife Act 1976 was enacted to provide protection to birds, animals, and plants in Ireland and to control activities which may have an adverse impact on the conservation of wildlife. In regard to the listed species, it is an offence to disturb, injure or damage their breeding or resting place wherever these occur without an appropriate licence from National Parks and Wildlife Service (NPWS). This list includes all birds along with their nests and eggs. Intentional destruction of an active nest from the building stage up until the chicks have fledged is an offence. This includes the cutting of hedgerows from the 1<sup>st</sup> of March to the 31<sup>st</sup> of August.

The Act also provides a mechanism to give statutory protection to Natural Heritage Areas (NHAs) from the date they are proposed for designation i.e., at a time they become proposed Heritage Areas (pNHAs). The Wildlife Amendment Act 2000 widened the scope of the Act to include most species, including the majority of fish and aquatic invertebrate species which were excluded from the 1976 Act.

#### 2.1.2 *EU Habitats Directive 1992 and EC (Birds and Natural Habitats) Regulations 2011*

The EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive 1992) provides protection to particular species and habitats throughout Europe. The Habitats Directive has been transposed into Irish law through the EC (Birds and Natural Habitats) Regulations 2011 and the Planning and Development Act 2000, as amended.

Annex IV of the EU Habitats Directive provides protection to a number of listed species, wherever they occur. Under Regulation 23 of the Habitat Directive any person who, in regard to the listed species; “Deliberately captures or kills any specimen of these species in the wild, deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration, deliberately takes or destroys the eggs from the wild, or damages or destroys a breeding site or resting place of such an animal shall be guilty of an offence.”

### **2.1.3 Flora (Protection) Order, 2015**

The Flora (Protection) Order (S.I. No. 356/2015) affords protection to several species of plant in Ireland, including 68 vascular plants, 40 mosses, 25 liverworts, 1 stonewort and 1 lichen. This Act makes it illegal for anyone to uproot, cut or damage any of the listed plant species and it also forbids anyone from altering, interfering, or damaging their habitats. This protection is not confined to within designated conservation sites and applies wherever the plants are found.

### **2.1.4 Invasive Species Legislation**

Certain plant species and their hybrids are listed as Invasive Alien Plant Species in Part 1 of the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulations 2011* (SI 477 of 2011, as amended). In addition, soils and other material containing such invasive plant material, are classified in Part 3 of the Third Schedule as vector materials and are subject to the same strict legal controls.

Failure to comply with the legal requirements set down in this legislation can result in either civil or criminal prosecution, or both, with very severe penalties accruing. Convicted parties under the Act can be fined up to €500,000.00, jailed for up to 3 years, or both.

Extracts from the relevant sections of the regulations are reproduced below.

*“49(2) Save in accordance with a licence granted [by the Department of Arts, Heritage and the Gaeltacht], any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in anyplace [a restricted non-native plant], shall be guilty of an offence.*

*49(3) ... it shall be a defence to a charge of committing an offence under paragraph (1) or (2) to prove that the accused took all reasonable steps and exercised all due diligence to avoid committing the offence.*

*50(1) Save in accordance with a licence, a person shall be guilty of an offence if he or she [...] offers or exposes for sale, transportation, distribution, introduction, or release—*

*(a) an animal or plant listed in Part 1 or Part 2 of the Third Schedule,*

*(b) anything from which an animal or plant referred to in subparagraph (a) can be reproduced or propagated, or*

*(c) a vector material listed in the Third Schedule, in any place in the State specified in the third column of the Third Schedule in relation to such an animal, plant or vector material.”*

## **2.2 International Legislation**

### **2.2.1 EU Birds Directive**

The Birds Directive provides a level of general protection for all wild birds throughout the European Union. Annex I of the Birds Directive includes a total of 194 bird species that are considered rare, vulnerable to habitat changes or in danger of extinction within the European Union. Article 4 establishes that there should be a sustainable management of hunting of listed species, and that any large scale non-selective killing of birds must be outlawed. The Directive requires the designation of Special Protection Areas (SPAs) for: listed and rare species, regularly occurring migratory species and for wetlands which attract large numbers

of birds. There are 25 Annex I species that regularly occur in Ireland and a total of 154 Special Protection Areas have been designated.

### **2.2.2 EU Habitats Directive**

The Habitats Directive aims to protect 220 habitats and approx. 1000 species through-out Europe. The habitats and species are listed in the Directives annexes where Annex I covers habitats and Annex II, IV and V cover species. There are 59 Annex I habitats in Ireland and 33 Annex IV species which require strict protection wherever they occur. The Directive requires the designation of Special Areas of Conservation for areas of habitat deemed to be of European interest. The SACs together with the SPAs from the Birds Directive form a network of protected sites called Natura 2000.

### **2.2.3 Water Framework Directive**

The EU Water Framework Directive (WFD) 2000/60/EC is an important piece of environmental legislation which aims to protect and improve water quality. It applies to rivers, lakes, groundwater, estuaries, and coastal waters. The Water Framework Directive was agreed by all individual EU member states in 2000, and its first cycle ran from 2009 – 2015. The Directive runs in 6-year cycles, so the second (current) cycle runs from 2016 – 2021. The aim of the WFD is to prevent any deterioration in the existing status of water quality, including the protection of good and high water quality status where it exists. The WFD requires member states to manage their water resources on an integrated basis to achieve at least 'good' ecological status, through River Basin Management Plans (RBMP), by 2027.

### **2.2.4 Bern and Bonn Convention**

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982) was enacted to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was introduced in order to give protection to migratory species across borders in Europe.

### **2.2.5 Ramsar Convention**

The Ramsar Convention on Wetlands is an intergovernmental treaty signed in Ramsar, Iran, in 1971. The treaty is a commitment for national action and international cooperation for the conservation of wetlands and their resources. In Ireland there are currently 45 Ramsar sites which cover a total area of 66,994ha.



### 3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

Zolbury Limited intend to apply to An Bord Pleanála for planning permission for a Strategic Housing Development on a site of c. 3.7 ha at Blackglen Road and Woodside Road, Sandyford, Dublin 18. The development shall consist of a new residential scheme comprising 360 no. residential units, associated resident amenity facilities and a childcare facility in the form of 9 no. new apartment buildings (A1 – C3) as follows:

- Block A1 (4 storeys) comprising 18 no. apartments (3 no. 1 bed units and 15 no. 2 bed units); a crèche facility of approx. 401 sq. m with associated outdoor play space of approx. 20 sq. m; and resident amenity facilities of approx. 30 sq. m.
- Block A2 (3-4 storeys) comprising 24 no. apartments (2 no. 1 bed units and 22 no. 2 bed units) and resident amenity facilities of approx. 39 sq.m.
- Blocks B1 and B2 (2-6 storeys) comprising 69 no. apartments (30 no. 1 bed units, 34 no. 2 bed units, 5 no. 3 bed units).
- Blocks B3 and B4 (2-6 storeys) comprising 62 no. apartments (30 no. 1 bed units, 27 no. 2 bed units and 5 no. 3 bed units).
- Blocks C1, C2 and C3 (3-6 storeys) comprising 187 no. apartments (58 no. 1 bed units, 126 no. 2 bed units and 3 no. 3 bed units); and resident amenity facilities of approx. 187.5 sq. m.

Each residential unit is afforded with associated private open space in the form of a terrace / balcony.

Total Open space (approx. 22,033 sq. m) is proposed in the form of public open space (approx. 17,025 sq. m), and residential communal open space (approx. 5,008 sq. m).

Podium level / basement level areas are proposed adjacent to / below Blocks A2, B1, B2, B3, B4, C1, C2 and C3 (approx. 12,733 sq. m GFA). A total of 419 no. car parking spaces (319 no. at podium/basement level and 100 no. at surface level); to include 80 no. electric power points and 26 no. accessible parking spaces); and 970 no. bicycle spaces (740 no. long term and 230 no. short term), and 19 no. Motorcycle spaces are proposed. 10 no. car spaces for creche use are proposed at surface level.

Vehicular/pedestrian and cyclist access to the development will be provided via Blackglen Road to tie in with the Blackglen Road Improvement Scheme. A second access is also proposed via Woodside Road but this access will be for emergency vehicles and pedestrian and cyclist access only.

The proposal also provides for Bin Storage areas and 4 No. ESBN substations to supply the development. 3 no. sub-stations shall be integrated within the building structures of Blocks B and Blocks C. In addition, one Sub-station shall be classed as a unit sub-station mounted externally on a dedicated plinth.



The associated site and infrastructural works include provision for water services; foul and surface water drainage and connections; attenuation proposals; permeable paving; all landscaping works; green roofs; boundary treatment; internal roads and footpaths; electrical services; and all associated site development works.

### **3.1.1 Proposed Drainage**

Stormwater and foul water from the Proposed Development will be completely separate. A pre-connection enquiry was submitted to Irish Water prior to the completion of the Site services design. In response, Irish Water has confirmed that the Proposed Development can be accommodated by the Irish Water subject to upgrades to the existing network.

The following is extracted from the Engineering Services Report submitted as part of this application (OSCS, June 2022).

#### **3.1.1.1 Proposed Stormwater management**

*'The Proposed Development is to be served by a gravity surface water network comprising a single catchment as a result of the natural topography'*. Surface water from the Proposed Development will be discharged, once attenuated and treated on Site, to the public surface water network on Blackglen Road. Surface water discharge from the Site will be restricted to below the greenfield equivalent runoff rate of 15.9l/s.

Sustainable Drainage Systems integrated into the surface water management plan includes the following:

- Permeable paving will be provided within all car parking spaces within the Proposed Development.
- Green roofs on buildings within the Proposed Development, over 60% of roof area is proposed as green roof.
- All road gullies serving the Proposed Development are to be trapped, which will help prevent sediment and gross pollutants from entering the surface water network.
- A silt trap which will be located upstream of the attenuation system.
- Filter drains to be provided along roads where possible to intercept and treat polluted water.
- Interception storage will be provided below the development's primary attenuation. This will temporarily store and treat the first 5mm rainfall on the development. The interception storage is to be allowed to drain naturally, which will reduce the volume of discharging to the existing network while increasing the quality of the water infiltrating to the ground
- A flow control device will be provided immediately downstream of the attenuation system, restricting the surface water discharge from the Site.
- A Class 1 bypass fuel separator will be located prior to outfall to the public water network.

Surface water drainage design is carried out in accordance with the recommendations of the Greater Dublin Strategic Development Study (GSDSDS) and the Regional Drainage Policies Volume 2 – New Development.

### *3.1.1.2 Proposed Foul water management*

The foul water management design for the Proposed Development has been carried out in accordance with Irish Water's Code of Practice for Wastewater Infrastructure.

There is an existing foul water sewer on Blackglen Road, north of the Proposed Development. This sewer is to be upgraded as part of the planned upgrade works on Blackglen Road. Foul water arising from the Proposed Development will be discharged by gravity to the foul sewer on Blackglen Road. As suggested in the Confirmation of Feasibility Letter received from Irish Water, it is proposed to provide a temporary Wastewater Pumping System (WWPS) within the confines of the Site of Proposed Development. This temporary WWPS will limit development flows to a maximum of 5 l/s, until such a stage that the planned upgrade works to the local infrastructure have been completed. On completion of the upgrade works, the connection to the temporary WWPS will be bypassed, to allow for it to be decommissioned and removed, with a gravity connection to the public network facilitated

According to the Greater Dublin Strategic Drainage Study, the Proposed Development is within the West Pier West Sewer Catchment, as such foul water from the Proposed Development will ultimately be treated at Ringsend Wastewater Treatment Plant (WwTP) (GDSDS, 2005).

### *3.1.1.3 Proposed Landscaping*

The proposed landscape plan for the Site aims to complement its location at the foothills of the Dublin Mountains; by accentuating the transition between the lowland vegetative palette of nearby Fitzsimon's Woods, and the more upland mountainous flora of Three Rock Mountain. The plan entails a gradual change in planting at the Site to reflect this transition, from the lower southern half to the higher ground in the north of the Site. As such, tree planting at the Site moves from a largely Oak, Holly, Birch woodland in the north, to upland Gorse, Heather and Scot's Pine in the south.

A native woodland trail also will run through the wooded outer margin of the Site and will contain a variety of native trees including Scot's Pine, Oak, Mountain Ash, Whitebeam and Larch and associated ground cover flora. Existing hedgerows at the Site will be supplemented with a native mix of Hawthorn, Blackthorn, Holly Dog rose and Hazel. The Landscape Plan also provides green spaces scattered throughout the Site, comprising areas of parkland/street tree planting, ornamental planting and meadow and lawn areas. The Proposed Development will see a significant increase in tree cover at the Site, with native species making up the bulk of this through the proposed wooded margins of the development.

Local ecology and wildlife has been incorporated into the proposed design of the landscaping plan, with various areas of different habitat types proposed; including wildlife ponds for local amphibian populations to adopt, wildflower meadow areas for local pollinator species and potential mammal habitat in the wooded western corner of the Site. The proposed landscaping of the Site will continue to provide, and add to the habitat connectivity between the wilder uplands to the south and the Fitzsimon's Woods to the north, as well as the various gardens, treelines and hedgerows in the surrounding area.



Figure 1. Indicative proposed site layout and landscape masterplan (Adapted from OMP drawing 20006-OMP-00-ZZ-DR-A-1001 dated August 2022)

## 4 METHODOLOGY

This section details the steps and methodology employed to undertake an Ecological Impact Assessment of the Proposed Development. The proposed methodology provides a robust and detailed assessment of the potential impacts on the ecology of the Site likely to occur as a result of the Proposed Development. Appropriate mitigation measures are then recommended, where deemed necessary, to negate and minimise to negligible any predicted impacts.

### 4.1 Scope of assessment

The specific objectives of the study were to:

- Undertake baseline ecological surveys and evaluate the nature conservation importance of the Site of the Proposed Development.
- Identify and assess the direct, indirect, and cumulative ecological implications or impacts of the Proposed Development during its lifetime.
- Where possible, propose measures to remove or reduce those impacts at the appropriate stage of the development.

### 4.2 Desk study

A desktop study was carried out to collate and review available information, datasets and documentation sources pertaining to the site's natural environment. The desk study, completed June 2022, relied on the following sources:

- Information on species records<sup>1</sup> and distributions, obtained from the National Biodiversity Data Centre (NBDC) at [maps.biodiversityireland.ie](https://maps.biodiversityireland.ie)
- Information on waterbodies, catchment areas and hydrological connections obtained from the Environmental Protection Agency (EPA) at [gis.epa.ie](https://gis.epa.ie)
- Information on bedrock, groundwater, aquifers and their status, obtained from Geological Survey Ireland (GSI) at [www.gsi.ie](https://www.gsi.ie)
- Information on the network designated conservation sites, site boundaries, qualifying interests and conservation objectives, obtained from the National Parks and Wildlife Service (NPWS) at [www.npws.ie](https://www.npws.ie)
- Satellite imagery and mapping obtained from various sources and dates including Google, Digital Globe, Bing and Ordnance Survey Ireland
- Information on the existence of permitted development, or developments awaiting decision, in the vicinity of the Proposed Development from the National Planning Applications Database (NPAD) available to view through MyPlan.ie, and Dún

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<sup>1</sup> The Site of the Proposed Development lies within the 10km grid square O12 and the 2km grid square O12S. Records from the last 30 years from available datasets are given in the relevant sections of this report.

Laoghaire Rathdown Online Planning Search, available at <https://dlrcocouncil.maps.arcgis.com/apps/webappviewer/index.html?id=af21eeb123224c4c877f410139ed1e69>.

- Information on the extent, nature and location of the Proposed Development, provided by the applicant and/or their design team.
- Information on the construction methods to be followed as part of the Proposed Development, taken from the Outline Construction Management Plan (OCMP) prepared by Muir Associates Limited Consulting Engineers (MAL) and submitted with this application.
- The current conservation status of birds in Ireland taken from Gilbert, Stanbury & Lewis (2021).

Other ecology reports from relevant planning applications and schemes in the vicinity of the Proposed Development were reviewed including:

- Mary Tubridy & Associates (2006). Biodiversity Audit of Fitzsimons Wood, Sandyford, Co.
- D'arcy, D. (2021). Ecologist. Ecological Impact Assessment for a Proposed Mixed-use Residential Development, Lamb's Cross, Sandyford, Dublin 16.
- RPS. (2015). Part 8: Blackglenn Road/Harold's Grange Road Improvement Scheme, Screening for Appropriate Assessment.

A comprehensive list of all the specific documents and information sources consulted in the completion of this report is provided in Section 12, References.

## 4.3 Field Surveys

### 4.3.1 Habitat and Invasive flora Surveys

Habitat and Invasive Flora surveys of the Site of the Proposed Development were conducted by Enviroguide on the 16<sup>th</sup> of September 2021. Habitats were categorised according to the Heritage Council's '*A Guide to Habitats in Ireland*' (Fossitt, 2000) to level 3. The habitat mapping exercise had regard to the 'Best Practice Guidance for Habitat Survey and Mapping' (Smith *et al.*, 2010) published by the Heritage Council. Habitats within the surrounding area of the Proposed Development were classified based on views from the Site and satellite imagery where necessary (Google Earth, Digital Globe and OSI).

No Invasive Flora species listed in Part 1 of the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulations* 2011 (SI 477 of 2011, as amended) were recorded onsite.

### 4.3.2 Bat Surveys

All bat surveys were conducted within the optimal survey period as per the Bat Conservation Trust Guidelines (Collins, 2016), and Marnell *et al.* (2022). The survey requirements for the Site were determined based on the information contained in these guidelines and are detailed in detail in the Bat Survey Report attached in Appendix II of this report.



#### *4.3.2.1 Dusk & Dawn Bat Surveys*

Dusk Emergence Surveys were completed on the 6<sup>th</sup> and 11<sup>th</sup> August 2021, from 10 minutes before sunset to 110 minutes post sunset. The surveyors positioned themselves within the Site of the Proposed Development to determine the general bat activity at the Site. A dawn survey was completed on the 12<sup>th</sup> of August 2021, and this was completed 100 minutes before sunrise to 10 minutes after. A walking transect of the local area was completed post dusk survey on the nights of the 6<sup>th</sup> and 11<sup>th</sup> August 2021. Surveys completed on 6<sup>th</sup> August are referred to as Night 1, and surveys completed on 11<sup>th</sup> and 12<sup>th</sup> August are referred to as Night 2.

Bat detector surveys were completed on 06/8/2021 (Dusk Survey - Weather conditions: 16oC, full cloud cover, light wind and dry), 11/8/2021 (Dusk Survey – Weather conditions: 15oC, clear skies, calm and dry) and 12/8/2021 (Dawn Survey - Weather conditions: 12oC, full cloud cover, dry and light breeze).

The following equipment was used:

Surveyor 1: Anabat Walkabout Full Spectrum Bat Detector and Pettersson D200 Heterodyne Bat Detector.

Surveyor 2: Bat Logger M2 Full Spectrum Bat Detector and Pettersson D200 Heterodyne Bat Detector.

#### *4.3.2.2 Passive Static Bat Detector Survey*

Three ‘Wildlife Acoustics SongMeter Mini Bat’ static units (Mini Bat 5,6 and 10) were deployed at various locations throughout the Site during this static bat detector survey (covering period 6<sup>th</sup> to 12<sup>th</sup> August 2021) (See figure 5 in the appended Bat Report).

A Passive Static Bat Survey involves leaving a static bat detector unit (with ultrasonic microphone) in a specific location and set to record for a specified period of time (i.e., a bat detector is left in the field, there is no observer present and bats which pass near enough to the monitoring unit are recorded and their calls are stored for analysis post surveying). The bat detector is effectively used as a bat activity data logger. This results in a far greater sampling effort over a shorter period of time. Bat detectors with ultrasonic microphones are used as the ultrasonic calls produced by bats cannot be heard by human hearing. The recordings are collected by the monitor and, in this case, then analysed using Wildlife Acoustics Kaleidoscope Pro. Each sequence of bat pulses are noted as a bat pass to indicate level of bat activity for each species recorded. This is either expressed as the number of bat passes per hour or per survey night.

#### *4.3.2.3 Potential Bat Roost and Habitat Suitability Survey*

At the request of DLR CoCo, as outlined in the DLR Biodiversity Report (dated 30<sup>th</sup> November 2021) submitted as part of the council’s opinion to the pre-application submission, an additional bat survey was carried out in relation to the ruined cottage present along the Site’s eastern boundary and outside of the planning application Site. This structure was inspected during the day for roosting bats and roost potential on the 5<sup>th</sup> of May 2022.

Trees along the Site boundaries were assessed for Potential Roost Features (PRFs) were used to determine the potential bat roost (PBR) value of trees.

Trees identified as PBRs were inspected during the daytime, where possible, for evidence of bat usage. Evidence of bat usage is in the form of actual bats (visible or audible), bat droppings, urine staining, grease marks (oily secretions from glands present on stonework) and claw marks. In addition, the presence of bat fly pupae (bat parasite) also indicated that bat usage of a crevice, for example, has occurred in the past.

Daytime inspections were undertaken of all of the trees within the Site of the Proposed Development. These inspections followed the Phase 1 guidance (Collins, 2016) in order to make a list of trees within the Site that may be suitable as roosting sites for bats. Inspections were undertaken visually, from the ground, with the aid of a strong torch beam (LED Lenser P14.2) during the daytime search for PRFs.

The Site was assessed during daytime walkabout surveys (6<sup>th</sup> August 2021), in relation to potential bat foraging habitat and potential bat commuting routes. Hedgerows were classified according to BATLAS 2020 classification (Bat Conservation Ireland, 2015) (Appendix 1, Table 1.A). Bat habitats and commuting routes identified were considered in relation to the wider landscape to determine landscape connectivity for local bat populations through the examination of aerial photographs.

Please see Appended Bat Survey Report for further detail.

#### **4.3.3 Bird Surveys**

A breeding bird survey was completed at the Site of the Proposed Development on 23<sup>rd</sup> of July 2021; at the height of the summer and during the optimal period for breeding bird surveys. Due to the limited habitat types (largely scrub and open land) present at the Site and the absence of any buildings on site, one survey was deemed sufficient to assess the breeding bird activity therein. The survey methodology followed the British Trust for Ornithology's (BTO) *Common Bird Census* (CBS) technique (Bibby *et al*, 1992). The site was walked with particular focus given to Scrub sections, and hedgerows and treelines that run along the Site's boundaries. All bird species encountered were recorded on field sheets, along with location (on 1:500 field maps), behaviour and numbers.

#### **4.3.4 Mammal Surveys**

Mammal surveys of the Site were carried out in conjunction with the habitat survey on 16<sup>th</sup> September 2021. This survey was conducted during an appropriate period for mammal surveys and, due to the limited habitats present on site and its open nature, one mammal survey was deemed sufficient to assess mammal activity therein. The Site was searched for tracks, scat and other signs of mammals. The habitat types recorded throughout the survey area were used to assist in identifying the fauna considered likely to utilise the area. During this survey, the Site was searched for tracks and signs of mammals as per Bang and Dahlstrom (2001).

#### **4.3.5 Other Fauna**

During the course of all surveys at the Site of the Proposed Development, other species of fauna were noted when found to be present, and these are included in the report where applicable.

#### **4.4 Assessment**

The value of the ecological resources, i.e., the habitats and species present or potentially present, was determined using the ecological evaluation guidance given in the National Roads Authority's Ecological Assessment Guidelines (NRA, 2009), presented in Appendix I. This evaluation scheme, with values ranging from locally important to internationally important, seeks to provide value ratings for habitats and species present that are considered ecological receptors of impacts that may ensue from a proposal. Any habitats or species evaluated as being of Local Importance (higher value) or greater and considered to be at risk of significant effects as a result of the Proposed Development, are selected as potential key ecological receptors (KERs) and assessed further.

The assessment of the potential effect or impact of the Proposed Development on the identified key ecological receptors was carried out with regard to the criteria outlined in the EPA Guidelines (EPA, 2022), presented in Appendix I. These guidelines set out a number of parameters such as quality, magnitude, extent and duration that should be considered when determining which elements of the Proposed Development could constitute impact or sources of impacts.

#### **4.5 Limitations**

An extensive search of available datasets for records of rare and protected species within proximity of the Site of the Proposed Development has been undertaken as part of this assessment. However, the records from these datasets do not constitute a complete species list. The absence of species from these datasets does not necessarily confirm an absence of species in the area.

It is noted that although a thorough search of the Site lands was carried out in September 2021, this survey was not conducted during the optimal survey period for surveying flowering plant species, and as such, some species may have been missed. However, the Site of the Proposed Development was noted to be largely dominated by gorse scrub and bracken, having been partially cleared in the recent past. Any areas of grassland present also showed signs of deer grazing. Therefore, the presence of rare flora at the Site is considered unlikely based on its current condition and recent disturbance.



## 5 BASELINE ECOLOGICAL CONDITIONS

### 5.1 General Site Overview

The Site of the Proposed Development is located at Blackglen Road, Sandyford, Dublin 18, 710m south of the M50 and 3km west of Leopardstown Golf Course. The Site is bounded to the north partially by Blackglen Road, with the remainder of the northern boundary, along with the east, south and western boundaries, bounded by residential dwellings and their associated gardens. The Site is also abutted by the Woodside Road to the south-west and the Carrickmines stream along the south-east. The surrounding landscape is comprised of residential estates, agricultural land and areas of woodland.

#### Hydrogeology and Hydrology

The Site of the Proposed Development is situated on Wicklow groundwater body, which has a WFD status of *Good* and the risk of not meeting its WFD objectives is currently *Under Review*. The groundwater vulnerability to contamination via human activities is classed as *Extreme – Rock at or Near Surface*. The Site is on a Poor aquifer, namely PI, *Bedrock which is Generally Unproductive except for Local Zones*. The groundwater rock units underlying the aquifer are classified as *Granites and other Igneous Intrusive Rocks*. (GSI, 2021). The subsoil beneath the Site is classified as *bedrock outcrop or subcrop* (EPA, 2021).

The Site of the Proposed Development is within the Ovoca-Vartry Water Framework Directive (WFD) Catchment, the Dargle\_SC\_010 WFD sub catchment, the Carrickmines\_010 River Subbasin (IE\_EA\_10C040350) and the Ovoca-Vartry Hydrometric Area (EPA, 2021).

The Carrickmines stream (EPA Code: 10C04) flows along part of the south-eastern boundary of the Site, flowing through Brides Glen, Loughlinstown and discharging to the Irish Sea at Shanganagh, 10.7 river km downstream of the Site. The Carrickmines stream has a WFD status of *Moderate* and the waterbody is *At Risk* of not meeting its WFD objectives. Water quality in the Carrickmines stream is monitored downstream of the Site between Glenamuck Road and Loughlinstown, water quality was *Moderate* (Q3-4) at all stations monitored in 2018 (EPA, 2021). The status of the Irish Sea at Killiney Bay is *High* and the coastal waterbody is *Not At Risk* of not meeting its WFD status objectives.

The Slang River (EPA Code:09S04) flows 0.4 km west of the Site in a northern direction. The waterbody has a WFD status of *Moderate* and is *At Risk* of not meeting its WFD objectives (EPA, 2021). The Slang River is a tributary of the River Dodder (EPA Code:09D01) and flows into the Liffey Estuary Lower 10.2 river km north of the Site. The status of the Liffey Estuary Lower is currently *Good* and the transitional waterbodies risk is currently *Under Review* (EPA, 2021).

### 5.2 Designated Sites

The methodology used to identify relevant designated sites comprised the following:

- Use of up-to-date GIS spatial datasets for European and nationally designated sites and water catchments – downloaded from the NPWS website ([www.npws.ie](http://www.npws.ie)) and the EPA website ([www.epa.ie](http://www.epa.ie)) to identify designated sites which could potentially be affected by the Proposed Development;

- The catchment data were used to establish or discount potential hydrological connectivity between the Project Boundary and any designated sites.
- All designated sites within an initial precautionary zone of influence (within 15km of the Proposed Development Site) were identified and are presented in Figure 2 & Figure 3 below.
- The potential for connectivity with designated sites at distances of greater than 15km from the Proposed Development was also considered in this initial assessment. In this case, there is no potential connectivity between the Proposed Development Site and designated sites located at a distance greater than 15km from the Proposed Development.
- Table 1 provides details of all relevant designated sites as identified in the preceding steps. The potential for pathways between designated sites and the Proposed Development Site was assessed on a case-by-case basis using the Source-Pathway-Receptor framework. Those designated sites where a pathway was identified are highlighted in green. Pathways considered included:
  - a. Direct pathways e.g., proximity, water bodies, air (for both air and noise emissions).
  - b. Indirect pathways e.g., disruption to migratory paths, 'Sightlines' where noisy or intrusive activities may result in disturbance to shy species, increased human activity etc.
- The site synopses and conservation objectives of these sites, as per the NPWS website ([www.npws.ie](http://www.npws.ie)), were consulted and reviewed at the time of preparing this report.

The result of this preliminary screening concluded that there is a total of 9 SACs, 4 SPAs and 27 pNHAs located within the precautionary Zone of Influence of the Proposed Development Site. The distances to each site listed are taken from the nearest possible point of the Proposed Development Site boundary to nearest possible point of each European site or pNHA.

### **5.2.1 European Sites**

The EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive 1992) provides protection to particular species and habitats throughout Europe. The Habitats Directive has been transposed into Irish law through the EC (Birds and Natural Habitats) Regulations 2011. The Directive requires the designation of Special Areas of Conservation (SACs) for areas of habitat deemed to be of European interest, and the designation of Special Protection Areas (SPAs) for: listed and rare species, regularly occurring migratory species, and for wetlands which attract large numbers of birds. The SACs together with the SPAs form a network of protected sites called Natura 2000.

No European Sites are located within, or directly adjacent to, the Site of the Proposed Development. The nearest European Site to the Proposed Development is the Wicklow Mountains SAC located ca.4.2km to the south-west. As detailed in the Appropriate Assessment Screening Report for this Proposed Development, submitted with this application under separate cover, the Proposed Development maintains no significant impact pathway with this SAC or any other European Site, and likely significant impacts are therefore not envisaged.

### 5.2.2 Nationally Designated Sites

Natural Heritage Areas (NHAs) are areas considered important at a national level for the habitats present, or which hold species of plants and animals whose habitat needs protection. Proposed NHAs (pNHAs) are areas which were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. These sites are deemed to be of significance for wildlife and habitats. Some pNHAs occupy a relatively small area, such as a roosting place for rare bats, while others are relatively large e.g., a woodland or a lake. Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation.

No NHAs are located within, or directly adjacent to, the Site of the Proposed Development. The nearest pNHA to the Proposed Development is the Fitzsimon's Woods pNHA located ca.110m to the north. The Proposed Development maintains no significant impact pathway with this pNHA, hydrological or otherwise, however, increased recreational use of the Fitzsimon's Woods pNHA is likely to occur as a result of the increase in population in the area as a result of the Proposed Development. As such, Fitzsimon's Woods pNHA is included in the precautionary Zone of Influence (ZOI) of the Proposed Development.

There is a tenuous hydrological link connecting the Proposed Development and the Loughlinstown Woods pNHA and Dalkey Coastal Zone and Killiney Hill pNHA, via the Carrickmines Stream, which runs along the Site's south-eastern boundary and eventually outflows into Killiney Bay as the Shanganagh River ca. 8.4km to the east of the Site. As a result, these pNHAs are included in the precautionary Zone of Influence (ZOI) of the Proposed Development.

No other pNHAs are deemed to maintain potential impact pathways linking them to the Proposed Development. Table 1 below summarises the screening in of Sites which maintain potential impact pathways with the Proposed Development. These Sites are assessed further in this report.

*Table 1. Proposed Natural Heritage Areas located within the precautionary 15km ZOI of the Proposed Development. Sites with identified Source-Pathway-Receptor impact linkage are highlighted in green.*

Site Name & Code (Receptor)	Distance to Proposed Development	Potential Pathway to receptors
<b>Proposed Natural Heritage Area</b>		
Fitzsimon's Wood (001753)	110m north	Indirect impact pathway through increased recreational usage by new residents of the Proposed Residential Development.
Loughlinstown Woods (001211)	7 km south-east	Indirect pathway through weak hydrological link provided by proximity of Site to Carrickmines Stream to the south-east.
Dalkey Coastal Zone And Killiney Hill (001206)	7 km east	
Grand Canal (002104)	7.4 km north	None - Significant distance between the Site and these pNHAs no hydrological connectivity.
Boosterstown Marsh (001205)	5.6 km north-east	
Royal Canal (002130)	9 km north	
Dolphins, Dublin Docks (000201)	8.9 km north-east	
North Dublin Bay (000206)	9.9 km north-east	

Site Name & Code (Receptor)	Distance to Proposed Development	Potential Pathway to receptors
South Dublin Bay (000210)	5.6 km north-east	
Dodder Valley (000991)	6.7 km north-west	
Liffey Valley (000128)	12.5 km north-west	
Dingle Glen (001207)	4.3 km south-east	
Santry Demesne (000178)	14.7 km north	
Ballybetagh Bog (001202)	4.6 km south-east	
Glenasmole Valley (001209)	8.6 km west	
Howth Head (000202)	14.7 km north-east	
Knocksink Wood (000725)	5.9 km south	
Lugmore Glen ( 001212)	11.2 km west	
Ballyman Glen (000713)	7.6 km south-east	
Powerscourt Woodland (001768)	8.8 km south-east	
Powerscourt Waterfall (001767)	12.1 km south-east	
Glencree Valley (001755)	8.5 km south	
Slade Of Saggart And Crooksling Glen (000211)	13.7 km west	
Great Sugar Loaf (001769)	10.8 km south-east	
Bray Head (000714)	12.3 km south-east	
Kilmacanogue Marsh (000724)	12.6 km south-east	
Dargle River Valley (001754)	10.1 km south-east	

### **Fitzsimon's Wood pNHA (001753)**

The pNHA site synopsis for Fitzsimon's Wood (NPWS, 2009) provides a description of the ecology and threats affecting this site.

*“Fitzsimon’s Wood occupies an area of approximately 8ha near Lamb’s Cross in Sandyford, Co. Dublin. The woodland consists of mature birch (Betula spp.) with some oak (Quercus spp.), together with a well developed understorey of Holly (Ilex aquifolium). Natural regeneration is occurring and there is a profuse growth of young birch, Ash (Fraxinus excelsior), oak and other species. Some marshy areas also occur within the woodland. An area of heath, dominated by Gorse (Ulex europaeus) scrub is also included in the site. The underlying rock of the area is granite and where this outcrops it is often covered with ferns and mosses.*

*Fitzsimon’s Wood is directly adjacent to a housing estate and is subject to significant recreational pressure. Dumping of cars and rubbish is a problem. The sporadic removal of wood,*

*coupled with camp fires, also poses a threat to the site. These activities will need to be controlled if the gradual attrition of the wood is to be prevented.*

*Nonetheless, the basic woodland structure remains intact and as birch woodland is very rare in Co. Dublin, Fitzsimon's Wood continues to be of ecological importance."*

### **Loughlinstown Wood pNHA (01211)**

The pNHA site synopsis for Loughlinstown Wood (NPWS, 2009) provides a description of the ecology and threats affecting this site.

*"This site is located about 4km north of Bray, on the east side of the main Dublin-Bray road. It is on the north bank of the Shanganagh River at Loughlinstown.*

*The wood was originally planted but following substantial regeneration, has produced woodland of natural character in age structure and form. The western end retains a high canopy of Beech (*Fagus sylvatica*), Sycamore (*Acer pseudoplatanus*) and some elm (*Ulmus spp.*), with Holly (*Ilex aquifolium*) and Cherry Laurel (*Prunus laurocerasus*) below. There is little regeneration in this part of the wood. There is a gradation into a dense thicket of bramble (*Rubus spp.*), and trees such as Ash (*Fraxinus excelsior*), Blackthorn (*Prunus spinosa*) and Hazel (*Corylus avellana*) occur here. A stand of Gorse (*Ulex europaeus*) occurs at the eastern end of the site.*

*The valley floor has much Alder (*Alnus glutinosa*) and some willows (*Salix spp.*). The introduced Giant Hogweed (*Heracleum mantegazzianum*) has spread along the banks of the river.*

*The site is used for amenity purposes, with signposting and information leaflets available. Dumping and littering is a problem within the site.*

*This site is a good example of demesne-type mixed woodland. It is now used chiefly for amenity purposes."*

### **Dalkey Coastal Zone and Killiney Hill pNHA (001206)**

The pNHA site synopsis (NPWS, 2009) provides a description of the ecology and overall interest of this site.

*"This site includes the coastal stretch from Scotman's Bay to south of White Rock, the Dalkey Island group and Dalkey Sound, and Killiney Hill. Killiney Hill is at the edge of the Wicklow mountain intrusion and so it is formed of a mixture of granite and mica schist. It provides one of the best exposed junctions of these rock types, on the beach at White Rock, at which mineralisation has taken place due to contact metamorphism. The minerals include biotite, andalusite and garnet, with aplite and pegmatite veins also exposed. The seaward parts of Killiney Hill have in addition a covering of calcareous glacial drift. The rocky shore is mainly of granite.*

*Dalkey Sound and its environs have been highly regarded as a valuable marine collecting area for many years. The Sound is especially noteworthy for the occurrence of west and south coast invertebrates. Species taken include squat lobsters (*Galathea spp.*), swimming crabs (*Portunus spp.*) and the crawfish *Palinurus vulgaris*. The area is also noted for the occurrence of gymnoblastic hydroids, with the rare *Antedon bifida* being taken regularly. Some rare European species which occur are members of the Order Nudibranchia and the Spiny Starfish (*Marthasterias glacialis*).*



*Dalkey Island lies c. 400m off Sorrento Point. The island is low-lying, the highest point at c. 15m is dominated by a Martello Tower. Soil cover consists mainly of a thin peaty layer, though in a few places there are boulder clay deposits. Vegetation cover is low, consisting mainly of grasses. No woody plants have become established, probably due to constant grazing by goats. Dense patches of bracken (*Pteridium aquilinum*) and Hogweed (*Heracleum sphondylium*) occur in places.*

*Lamb Island lies to the north of Dalkey Island, attached at low-tide by a line of rocks. It has a thin soil cover and some vegetation, mainly grasses, Common Nettle (*Urtica dioica*) and Hogweed. Further north lies Maiden Rock, a bare angular granite rock up to 5m high. There is no vegetation cover. Muglins, a small granite rock, lies about 1km north-east of Dalkey Island. A small lighthouse is on the rock.*

*Herring Gulls nest on Dalkey Island (17 pairs in 1986), Lamb Island (29 pairs in 1986) and Muglins (207 nests in 1982). Great Black-backed Gull nests on Dalkey Island (maximum 62 nests in 1982-88), and two pairs of Lesser Black-backed Gull nested there in 1981.*

*Common Terns breed annually on Maiden Rock, with a maximum of 54 nests between 1980 and 1986. One pair of Arctic Tern bred on Maiden Rock in several years and in 1986 two pairs of Roseate Terns nested but were unsuccessful. Manx Shearwater is suspected of breeding on Dalkey Island.*

*Shelduck, Mallard and Oystercatcher nest on Dalkey and Lamb Island. Meadow and Rock Pipits breed on Dalkey Island. Maiden Rock is an important autumn roosting site for up to 2,000 terns, including Roseates from the Rockabill colony. In autumn and winter Dalkey Island is an evening roosting site for Cormorants, Shags, Curlew and large gulls. Up to 50 Turnstones and 15 Purple Sandpipers occur in winter.*

*Killiney Hill is a complex of coastal heath and mixed woodland. The woods are mostly planted and include Sycamore (*Acer pseudoplatanus*), Horse Chestnut (*Aesculus hippocastanum*), some oak (*Quercus* spp.), Ash (*Fraxinus excelsior*) and Holly (*Ilex aquifolium*). The ground flora is mainly Ivy (*Hedera helix*) and bramble (*Rubus* spp.) but there are some areas with more typical woodland species such as Wood-sorrel (*Oxalis acetosella*) and Herb-Robert (*Geranium robertianum*).*

*Many of the rock surfaces on the open and bushy areas on the east side of the summit of the hill are roches moutonnées while near the summit spodumene is found in a small scarp exposure. This results in an interesting flora, with Wood Vetch (*Vicia sylvatica*), Climbing Corydalis (*Corydalis claviculata*) and Wild Madder (*Rubia peregrina*) growing amongst the Gorse (*Ulex europaeus*). The shallow soils overlying the rock support a community of winter annuals and early flowering perennials such as Spring Squill (*Scilla verna*) and Wild Onion (*Allium vineale*).*

*The drift banks above and below the railway have warm shallow soils. Here grow scarce plants such as Bloody Crane's-bill (*Geranium sanguineum*), Bee Orchid (*Ophrys apifera*), Sea Stork's-bill (*Erodium maritimum*) and clovers (*Trifolium ornithopodioides*, *T. striatum* and *T. scabrum*). The naturalised Silver Ragwort (*Senecio cineraria*) is widespread.*

*Up to five pairs of Fulmar breed on the cliffs below the railway line. Kestrel breeds in the area, as well as Stonechat.*

*This site represents a fine example of a coastal system with habitats ranging from the sub-littoral to coastal heath. The flora is well developed and includes some scarce species. The islands are important bird sites. The site also has geological importance.”*

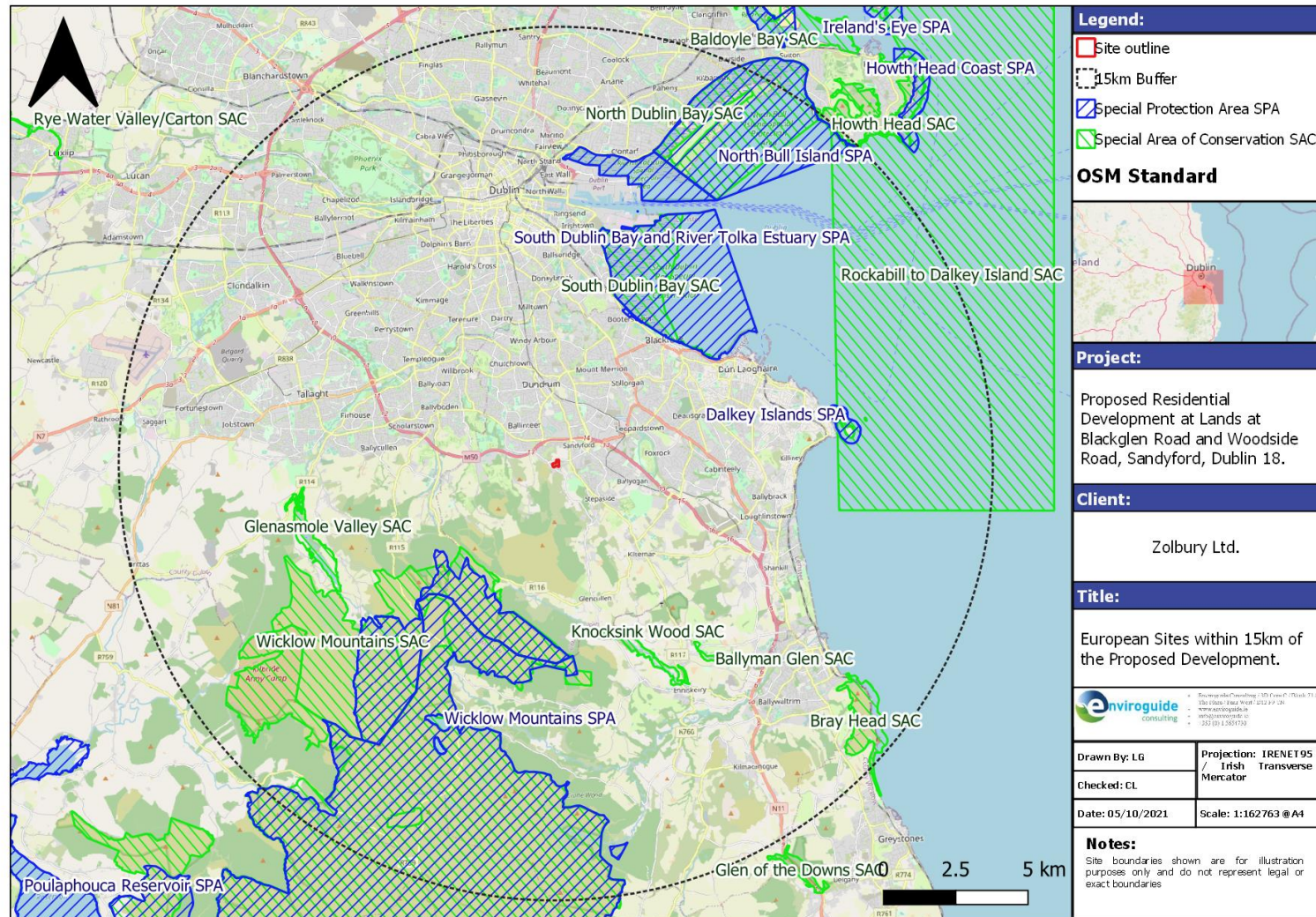


Figure 2. European Sites within 15km of the Proposed Development



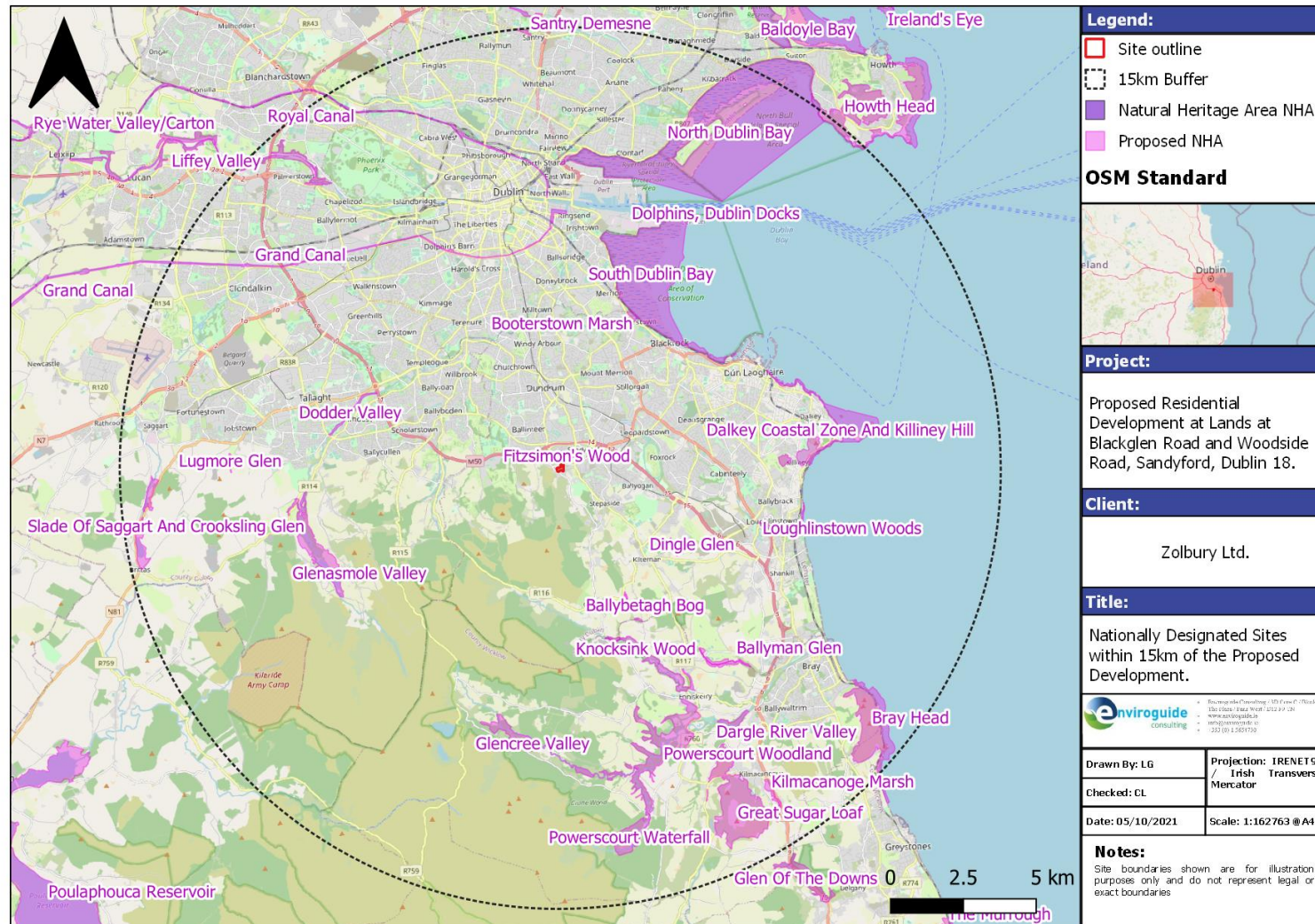


Figure 3. Natural Heritage Areas within 15km of the Site of the Proposed Development.

### 5.3 Habitats

The habitats within the Site of the Proposed Development are coded and categorised to level 3 according to Fossitt (2000).

The Site was surveyed on the 16<sup>th</sup> of September 2021 and presented an uneven, undulating topography, with rocky granite outcrops present towards the centre of the Site at its highest point. The Site slopes down northwards to the Blackglen Road from this high point, sloping down to the east and south-east also. The land cover at the Site comprises of a mosaic of bracken and gorse scrub, broken up by sections of both grazed and more overgrown grassland, and recolonising bare ground. The Site appears to have been cleared partially in the recent past, as evidenced by the islands of gorse and woody debris, and areas of exposed earth and recolonising vegetation. Treelines and hedgerows made up the majority of the boundaries of the Site, with old stone walls in poor repair also present in places. A section of drainage ditch was identified in the south-west of the Site along the Woodside Road.

The following habitats were identified within the redline boundary of the Site:

- Scrub (WS1)
- Recolonising bare Ground (ED3)
- Exposed Siliceous Rock (ER1)
- Wet Grassland (GS4)
- Bracken (HD1)
- Acid Grassland (GS3)
- Hedgerows (WL1)
- Treelines (WL2)
- Stone Walls and other stonework (BL1)
- Drainage Ditches (FW4)

#### 5.3.1 Scrub (WS1) and Bracken (HD1)

Islands of scrub habitat of varying sizes are present across the Site, largely comprised of gorse (*Ulex europaeus*), Butterfly-bush (*Buddleja davidii*), and bramble (*Rubus fruticosus* agg.). In some places this habitat is very dense and forms scrubby stands, particularly in the south along the Woodside Road, in the western corner of the Site, and in the north where the land slopes down to the Blackglen Road; and along the north-eastern boundary of the Site. Butterfly-bush is particularly prominent in these northern stands of scrub. This habitat forms a mosaic with the dominant bracken (*Pteridium aquilinum*) ground cover, which likely occupied the bare ground exposed during the recent clearance of some areas of scrub. Occasional herb species such as Broad leaf dock (*Rumex obtusifolius*), Great Mullein (*Verbascum thapsus*), Nettle and Creeping thistle are also present in patches.





Figure 4. Image facing west showing Bracken (HD1) and gorse scrub (WS1) habitats.

### 5.3.2 Recolonising bare Ground (ED3) & Exposed Siliceous Rock (ER1)

Likely a result of previous clearance of the Site and movement of plant machinery, recolonising bare ground habitat is present across the Site in a mosaic with Exposed Siliceous Rock (ER1) and Scrub (WS1) habitats. Common species recorded in these patches of disturbed ground included juvenile gorse plants, Foxglove (*Digitalis purpurea*), Creeping thistle (*Cirsium arvense*), Common nettle (*Urtica dioica*), Sheep's sorrel (*Rumex acetosella*), Pineapple weed (*Matricaria discoidea*), and Common Ragwort (*Senecio jacobaea*). Sheep's bit scabious (*Ja-sione montana*) was also recorded in one location.



Figure 5. Example of ED3 and ER1 habitats present at the Site.

### 5.3.3 Acid Grassland (GS3) & Wet Grassland (GS4)

Present in one location in the south of the Site, wet grassland habitat was recorded in a slight depression in the ground where waters from the Site likely drain to. This habitat grades into



scrub (WS1) and Bracken (HD1) habitat, with a strip of Acid Grassland (GS3) also emerging along the Site's southern boundary treeline. Common species indicative of wet/damp ground were present such as Soft rush (*Juncus effusus*), Hard rush (*Juncus inflexus*) and Hairy bittercress (*Cardamine hirsuta*); as well as common grassland species such as Creeping buttercup (*Ranunculus repens*), Sheep's sorrel and Creeping thistle.

Acid grassland habitat with evidence of grazing (likely deer) occurs in various patches at the Site, with a short to medium sward containing species such as Creeping buttercup, Trailing tormentil (*Potentilla anglica*), Yorkshire Fog (*Holcus lanatus*), Sweet vernal grass (*Anthoxanthum odoratum*), Common Bent (*Agrostis capillaris*), Wood sage (*Teucrium scorodonia*) and Bush Vetch (*Vicia sepium*).



Figure 6. A patch of wet grassland (GS4) habitat in the south of the Site (Photo taken facing west).



Figure 7. Acid Grassland (GS3) habitat along the southern boundary of the Site (Image taken facing north).

#### 5.3.4 Treelines (WL2) & Hedgerows (WL1)

Treelines are present along the majority of the eastern and southern boundaries of the Site, associated with private residential dwellings and gardens. A prominent treeline comprising large conifers such as Leyland Cypress (*Cupressus × leylandii*) and Pines (*Pinus spp*), along with broadleaf species including Sycamore (*Acer pseudoplatanus*), Lime (*Tilia sp.*) and Holly (*Ilex aquifolium*). Non-native invasive Cherry Laurel (*Prunus laurocerasus*) was also present emerging from the understory of this treeline.

Along the eastern Site boundary, a treeline comprised of Hawthorn (*Crataegus monogyna*), Sycamore, and Holly is present, with a gapped section made up of gorse hedgerow. Hedgerows running along the majority of the eastern and north-eastern boundaries of the Site were ornamental and monotypic in nature comprising of Leylandii. Along the northern site boundary with Blackglenn Road a broken hedgerow is present comprised of Hawthorn, Gorse, Willow (*Salix sp.*) and Brambles. Non-native species Himalayan Honeysuckle (*Leycesteria formosa*) was recorded along this hedgerow, particularly in the north-easternmost corner of the Site.



Figure 8. Treeline (WL2) along the Site's southern boundary with private residential lands.

#### 5.3.5 Stone walls (BL1) and Drainage Ditches (FW4)

Remnants of old stone walls were observed at the Site in both the south; running along part of the boundary scrub vegetation along Woodside Road, and along the eastern boundary vegetation. The southern example of stone wall habitat was highly overgrown and covered with earth and vegetation, with little stonework visible. A section of drainage ditch (FW4) habitat runs along the base of this structure. This ditch contained some water at time of survey and likely collects run-off from Woodside Road. The water was observed to flow along a manmade channel into the private residence which bounds the Site to the south.

Vegetation along the wall habitat is limited with Ivy (*Hedera helix*), Holly saplings and occasional Hard fern (*Blechnum spicant*) and Hart's tongue (*Asplenium scolopendrum*) located along the wetter southern example.





*Figure 9. Example of BL1 stone wall habitat along eastern site boundary.*



*Figure 10. Drainage ditch (FW4) located along boundary with Woodside Road to the south.*





Figure 11. Habitat Map of the Site of the Proposed Development (Codes as per Fossitt, 2000).

## 5.4 Flora and Fauna

The Site of the Proposed Development is located within the Ordnance Survey National Grid 10km grid square O12 and 2km grid square O12S. Species records from the last 30 years from the National Biodiversity Data Centre (NBDC) online database for these grid squares were studied for the presence of rare/protected/invasive flora and fauna species.

### 5.4.1 Rare and Protected Flora

No records of rare flora, e.g., those classified as ‘critically endangered’, ‘endangered’, or ‘vulnerable’ on the *Ireland Red List No. 10: Vascular Plants* (Wyse-Jackson *et al.*, 2016) or the *Ireland Red List No. 8: Bryophytes* (Lockhart *et al.*, 2012), were identified during a review of the relevant 2km grid square, nor were they noted during field surveys of the Site of the Proposed Development. A review of the 10km grid O22 provide two species records conforming to the above criteria:

- Blue Fleabane (*Erigeron acer*) - Endangered
- Wood Bitter-vetch (*Vicia orobus*) - Endangered

The Site does not contain any species listed on the Flora (Protection) Order 2015 (FPO). A search of the NPWS FPO Bryophyte Map Viewer provided no records of protected species within the vicinity of the Site of the Proposed Development, with the nearest records located in the mountains to the south-west.

### 5.4.2 Invasive Plant Species

There are records for 4 species of flora considered to be invasive within the 2km (O22S) grid square within which the Site of the Proposed Development is located:

- Water Fern (*Azolla filiculoides*) (Medium Impact/**Amber listed**<sup>2</sup>)
- Butterfly-bush (*Buddleja davidii*) (Medium Impact/ **Amber listed**)
- Himalayan Honeysuckle (*Leycesteria formosa*) (Medium Impact/ **Amber listed**)
- Sycamore (*Acer pseudoplatanus*) (Medium Impact/ **Amber listed**)

All of the above with the exception of Water fern were observed at the Site during field surveys. In addition, the following invasive non-native flora were observed at the Site:

- Cherry Laurel (*Prunus laurocerasus*) (High impact/ **Red listed**)
- Simon's/Himalayan Cotoneaster (*Cotoneaster simonsii*) (Low impact)
- Winter Heliotrope (*Petasites pyrenaicus*) (Low impact)
- Lesser Knotweed (*Persicaria campanulata*) (Low impact)

A single Cherry Laurel bush was noted as present along the Site's southern treeline boundary. Butterfly-bush was noted to be widely distributed across the scrubby sections of the Site. Winter heliotrope was identified along the south-western boundary of the Site, along the Woodside road. Simon's Cotoneaster was noted in the southern scrub section of the Site. Lesser knotweed was identified along the banks of the Carrickmines stream in the south-east of the Site.

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<sup>2</sup> Impact status based on the 2013 Invasive Species in Ireland risk assessment. See report: Kelly, J., O'Flynn, C., and Maguire, C. 2013. Risk analysis and prioritisation for invasive and non-native species in Ireland and Northern Ireland. <http://invasivespeciesireland.com/wp-content/uploads/2013/03/Risk-analysis-andprioritization-29032012-FINAL.pdf>



Himalayan Honeysuckle was present along the Blackglen Road in the north of the Site, particularly the north-eastern corner. Sycamore was present along the various treelines along the Site's margins. See Figure 12 for invasive flora locations at the Site of the Proposed Development.

No species of plant listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded at the Site of the Proposed Development during site surveys.

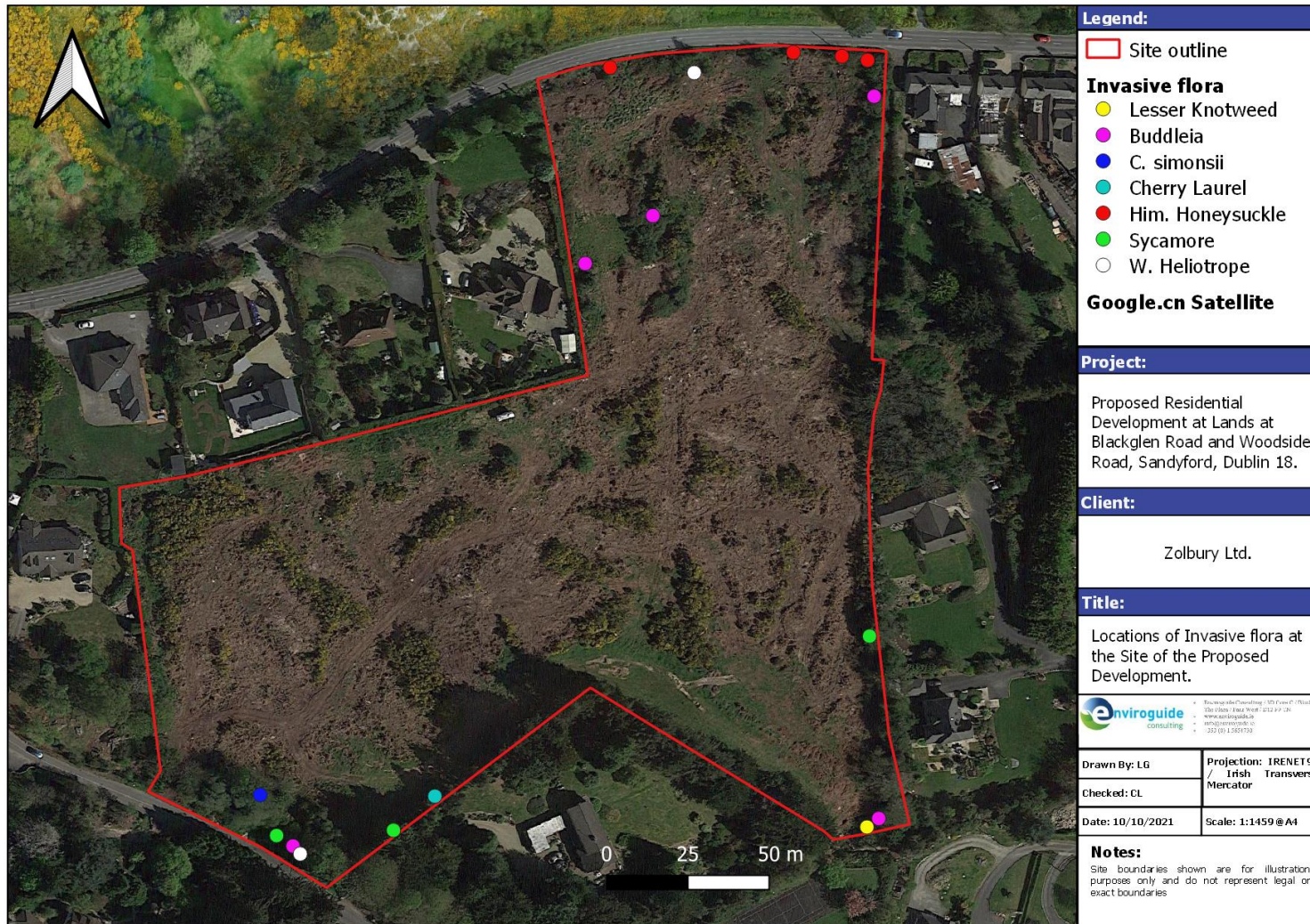


Figure 12. Locations of invasive flora at the Site of the Proposed Development.

### 5.4.3 Mammals (excl. bats)

Records for terrestrial mammals recorded in the surrounding 2km grid square were retrieved from the NBDC online database. The following protected species were included in these results:

- Eurasian Badger (*Meles meles*)
- Eurasian Pygmy Shrew (*Sorex minutus*)
- Western European Hedgehog (*Erinaceus europeaus*)
- Red Squirrel (*Sciurus vulgaris*)
- Irish Stoat (*Mustela erminea subsp. hibernica*)

Two further species classed as non-native invasives: Fallow deer (*Dama dama*) and Sika deer (*Cervus nippon*), are also offered a level of protection under the Wildlife Act 1976 as amended. Sika deer was observed during site surveys, with a doe and young male recorded separately grazing in the north of the Site on 16<sup>th</sup> September 2021.

Additional commonly occurring protected mammal species were also considered in the context of the Site of the Proposed Development and its environs.

#### Badger

Badgers are a protected species under the Wildlife Act 1976 as amended. It is an offence to intentionally cause harm or wilfully interfere with an active or inactive breeding or resting place of a protected wild animal.

No evidence of Eurasian Badger (*Meles meles*) i.e., Setts, latrines, hair, or foraging signs, was recorded at the Site during surveys. The thin soils and exposed bedrock present at the Site may indicate a lack of suitability for Badger sett creation, however, this common countryside mammal is likely to be present in the locality and setts are known to exist in Fitzsimon's Woods across the road to the north of the Site (D'arcy, 2021).

#### Small Mammals

Western European Hedgehog and Pygmy Shrew have potential to utilise the Site lands in their current condition. These small, relatively widespread species inhabit both urban and rural landscapes, and may inhabit the Site and surrounding gardens. No evidence of either species was recorded during the site surveys.

Red Squirrel are limited to more rural parts of the country with higher tree cover e.g., woodland, commercial forestry plantations etc., (Lawton et al., 2020), and may utilise suitable habitats in the lands surrounding the Site of the Proposed Development. The Site itself provides limited habitat potential in its current state and no evidence of this species was recorded during site visits.

Irish Stoat and Pine marten (*Martes martes*) have the potential to utilise wooded habitat in the lands surrounding the Site, although little suitable habitat currently exists onsite and no evidence of these species was recorded at the Site.

#### Otter

It is deemed that Otter (*Lutra lutra*) would not utilise the Site of the Proposed Development due to the lack of suitable habitat for this species within the Site itself and its immediate surroundings. The Carrickmines Stream is a very small, narrow overgrown upland stream as it



passes the Site of the Proposed Development, but Otter may utilise downstream sections as the stream becomes larger. In addition, no signs or evidence of Otter was recorded during the surveys.

Red Fox (*Vulpes vulpes*) is a common species in both urban and rural environments and may be present in the surrounding lands. No dens were recorded onsite during surveys and this species is not considered a protected species.

#### **5.4.4 Bats**

Five species of bat have been recorded within the 2km grid square O12S which encompass the Site of the Proposed Development.

- Lesser Noctule/Leisler's Bat (*Nyctalus leisleri*)
- Common Pipistrelle (*Pipistrellus pipistrellus*)
- Nathusius's Pipistrelle (*Pipistrellus nathusii*)
- Natterer's Bat (*Myotis nattereri*)
- Soprano Pipistrelle (*Pipistrellus pygmaeus*)

##### **5.4.4.1 Potential Bat Roost Survey - Trees**

The majority of tall vegetation within the Site consisted of scrub and hedgerows along the boundaries. There are large mature trees along the southern boundary, but these are located outside of the Site and within private residential lands. The remaining boundaries were either linear habitat with individual hawthorn trees (e.g., northern boundary along Blackglen Road) or *Leyandii* linear hedgerows (e.g., north-western boundaries with residential lands). No potential bat roosts were noted at the Site, with some boundary treelines and hedgerows showing moderate levels of commuting and foraging activity by potentially six bat species.

##### **5.4.4.2 Potential Bat Roost Survey - Ruined Cottage**

At the request of DLR CoCo, as outlined in the Biodiversity Report (dated 30<sup>th</sup> November 2021) submitted as part of the council's opinion to the pre-application submission, an additional bat survey was carried out in relation to the ruined cottage present along the Site's eastern boundary. This structure was inspected for roosting bats and roost potential on the 5<sup>th</sup> of May 2022.

The Bat Report (Bat Eco Services, 2022) concludes the following:

*"A derelict structure is located along the eastern boundary of the proposed development site. This was inspected on 5th May 2022 and deemed to have a low-medium value for roosting bats. The structure is in a dilapidated condition while the walls of the structure provides some small crevices for potential roosts for individual bats. There is a large amount of ivy growth on the walls and remaining section of the roof of the building."*

Two static bat detectors were deployed in 2022, one of which; Mini 2, was located on one of the walls of the derelict building located along the eastern boundary of the proposed development site (ITM 717728,725235). This unit was deployed for seven nights (5<sup>th</sup> May-11<sup>th</sup> May) and five bat species were recorded; Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat, Brown Long-eared Bat and a *Myotis sp.*

Due to the open structure of the building, the bat species recorded are not indicative of roosting bats (echolocation call structure is indicative of commuting and foraging bats). Leisler's bat

was the most frequently recorded bat species (low level of bat activity) while all other bat species were recorded in lower level numbers.

#### 5.4.4.3 Activity Surveys

##### **Dusk/Dawn Activity Surveys**

On 06/09/2021 the bats survey focused on the eastern and southern sections of the Site. Leisler's bat activity was recorded from 21.32 hrs with bats commuting through the Site from the south-west (17 bat passes recorded). Common pipistrelle activity was recorded along the southern boundary with continuous foraging/commuting activity observed from 22.29hrs (33 bat passes recorded). A single Soprano pipistrelle was noted commuting along the eastern boundary of the Site at 21.50hrs.

On 11/09/2021 (dusk) and 12/09/2021 (dawn) the surveyors focused along the Sites northern boundaries during the dusk survey and the southern boundary during the dawn survey. A total of 9 Leisler's bat passes were recorded during the dusk survey, with bats commuting and foraging along the roads nearby, while no activity was noted during the dawn survey. Higher Common pipistrelle activity was recorded during these surveys, with a total of 62 bat passes recorded; 42 during the dusk survey and 20 during the dawn survey. Individuals were recorded primarily foraging along the southern boundary and along the Blackglen Road and the Woodside Road. Soprano pipistrelle activity was also higher, with a total of 26 bat passes recorded; 4 during the dusk Survey and 22 during the dawn Survey.

##### **Passive Static Detectors**

Over the course of the surveillance period, the level of bat activity was recorded on the static units. Common pipistrelle was the most frequently recorded bat species and the level of bat activity ranged from Low to High. The southern boundary (Boundary 2 and 3) of the proposed development site was recorded as an important foraging and commuting route for this bat species. All other bat species were recorded at a low level of bat activity but the number of bat species recorded indicates that the Site is used by six bat species.

#### 5.4.5 Birds

Results from the bird survey carried out at the Site of the Proposed Development on the 23<sup>rd</sup> of July 2021 are shown in Table 2 below.

A total of 23 species were identified within the vicinity of the Site of the Proposed Development. These were either associated with the treelines and hedgerows that run along the Site boundaries or observed foraging across the Site lands.

##### **Red-listed Bird Species**

No species listed on the BoCCI<sup>3</sup> Red List were recorded at the Site of the Proposed Development during the survey.

##### **Amber-listed Bird Species**

Five species which are on the BoCCI Amber List were recorded during the survey.

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<sup>3</sup> Birds of Conservation Concern in Ireland 2020-2026 (Gilbert, Stanbury and Lewis, 2021).

- **Swallow** – up to 10 birds were feeding over area
- **Willow Warbler** – one heard in song
- **Starling** – feeding in the area
- **Goldcrest** – present along hedgerows and mature deciduous woodlands
- **Linnet** – small party feeding in the scrubland areas

Table 2. Bird species recorded within the vicinity of the Site during the breeding bird survey.

Species	BoCCI Status	EU Designation	Notes
<b>Goldcrest</b> ( <i>Regulus regulus</i> )	Amber	N/A	Several recorded throughout the site
<b>Coal Tit</b> ( <i>Periparus ater</i> )	Green	N/A	Two in the conifer trees on south side
<b>Wren</b> ( <i>Troglodytes troglodytes</i> )	Green	N/A	Several recorded throughout the site
<b>Robin</b> ( <i>Erithacus rubecula</i> )	Green	N/A	Several recorded throughout the site
<b>Dunnock</b> ( <i>Prunella modularis</i> )	Green	N/A	Several recorded throughout the site
<b>Blue Tit</b> ( <i>Cyanistes caeruleus</i> )	Green	N/A	Several recorded throughout the site
<b>Great Tit</b> ( <i>Parus major</i> )	Green	N/A	Several recorded throughout the site
<b>Chaffinch</b> ( <i>Fringilla coelebs</i> )	Green	N/A	Several recorded throughout the site
<b>Goldfinch</b> ( <i>Carduelis carduelis</i> )	Green	N/A	Up to six feeding on scrubland
<b>Blackbird</b> ( <i>Turdus merula</i> )	Green	N/A	Common
<b>Linnet</b> ( <i>Linaria cannabina</i> )	Amber	N/A	Small party of birds feeding on scrubland
<b>Siskin</b> ( <i>Carduelis spinus</i> )	Green	N/A	Two in mature trees along the western section
<b>Jackdaw</b> ( <i>Corvus monedula</i> )	Green	N/A	Common
<b>Rook</b> ( <i>Corvus frugilegus</i> )	Green	N/A	Common
<b>Magpie</b> ( <i>Pica pica</i> )	Green	N/A	Common



<b>Hooded Crow</b> ( <i>Corvus cornix</i> )	Green	N/A	Common
<b>Song Thrush</b> ( <i>Turdus philomelos</i> )	Green	N/A	Several recorded throughout the site
<b>Wood pigeon</b> ( <i>Columba palumbus</i> )	Green	N/A	Common
<b>Willow Warbler</b> ( <i>Phylloscopus trochilus</i> )	Amber	N/A	One in song on northern section
<b>Blackcap</b> ( <i>Sylvia atricapilla</i> )	Green	N/A	One heard along Woodside Road boundary
<b>Chiffchaff</b> ( <i>Phylloscopus collybita</i> )	Green	N/A	One calling along Woodside Road section
<b>Starling</b> ( <i>Sturnus vulgaris</i> )	Amber	N/A	Common
<b>Swallow</b> ( <i>Hirundo rustica</i> )	Amber	N/A	Feeding over the area

On a precautionary basis, the site is considered to be of local ecological importance for breeding birds, with five Amber-listed species recorded and possibly nesting onsite.

#### 5.4.6 Amphibians

Common frog (*Rana temporaria*) is listed in Annex V of the EU Habitats Directive and protected by the Wildlife Acts 1976 and amendments. Frog have been recorded in the 2km grid square O12S as recently as 2011 (NBDC: *Amphibians and reptiles of Ireland*). Smooth newt (*Lissotriton vulgaris*), also a protected species under the Wildlife Acts, has also been recorded in 2011 (NBDC: *Newt Survey 2010-2014*). Smooth newt are also known to be present in newt ponds within the 'Gorse Hill' area adjacent to Fitzsimon's Woods (D'Arcy, 2021).

Common frog are widespread and likely to be present onsite or within the surrounding lands. Possible frogspawn was recorded by the applicant in the south-eastern corner of the Site on January 26<sup>th</sup> 2022; within an area of wet grassland. This indicates that Common frog may be breeding in wet areas of the Site and, as such, the NPWS will need to be consulted should works require the removal/relocation of frogspawn during the spawning season.

The absence of any suitable ponds within or within close proximity to the Site of the Proposed Development represents a general lack of Smooth newt breeding habitat and, as such, a breeding population of this species is not likely to occur at the Site.

#### 5.4.7 Other species and species groups

The presence of stone walls, bracken, scrub, and some rocky outcrops, would indicate that the site is suitable for the Common lizard (*Lacerta vivipara*) and this species may be present, however, no evidence of this species was recorded during the site surveys..

### 5.5 Summary of Ecological Evaluation

The habitats present, and species likely to utilise the Site, have been evaluated below in Table 3 for their conservation importance based on the NRA evaluation scheme (NRA, 2009b). Those selected as key ecological receptors (KERs) are those which are evaluated to be of at least local importance (higher value) and deemed to be at risk of significant effects resulting from the Proposed Development. The impacts of the Proposed Development on these receptors are assessed below in section 6. The summary in the table below indicates the evaluation rating assigned to each receptor and the rationale behind these evaluations.

Table 3. Evaluation of potential ecological sensitivities within the vicinity of Site of the Proposed Development.

Ecological Receptor	Evaluation	Rationale	Key Ecological Receptor (KER)?
Designated Sites			
Fitzsimon's Woods pNHA	National Im- portance	Indirect impact pathway through increased recreational usage as a result of the Pro- posed Development.	Yes
Loughlinstown Woods pNHA		Tenuous hydrological connection via Car- rickmines stream in the southeast of the Site.	
Dalkey Coastal Zone and Killiney Hill pNHA			
Habitats			
Scrub (WS1) Recolonising bare Ground (ED3) Exposed Siliceous Rock (ER1) Wet Grassland (GS4) Bracken (HD1) Acid Grassland (GS3) Stone Walls and other stonework (BL1)	Local Importance (Lower Value)	Vegetated habitats provide some cover and foraging habitat for Common frog, small mammal and nesting birds. Non-na- tive Sika deer also observed foraging on- site. Stone wall habitat may provide habitat for Common lizard.  These habitats are common in the sur- rounding lands and are deemed to be im- portant only at the local scale.	No

Ecological Receptor	Evaluation	Rationale	Key Ecological Receptor (KER)?
<b>Hedgerows (WL1)</b> <b>Treelines (WL2)</b>	Local Importance (Higher Value)	Vegetated boundaries of the Site observed to provide valuable commuting foraging habitat for Bats, particularly southern mature treelines. Part of wider connectivity with surrounding lands.	<b>Yes</b>
<b>Fauna</b>			
<b>Badger</b>	Local Importance (Lower Value)	No Badger setts recorded on site.	<b>No</b>
<b>Hedgehog, Pygmy Shrew, Red Squirrel, Pine Marten, Irish stoat.</b>		Vegetated habitats provide some cover and foraging habitat for small mammals. Non-native Sika deer also observed foraging on-site.	
<b>Otter</b>		Limited tree cover on site provides little habitat for Pine marten and Red squirrel. No suitable Otter habitat on site.	
<b>Bat assemblage</b>	Local Importance (Higher Value)	Six species of bat recorded within the vicinity of the Site of the Proposed Development. Important for commuting/ foraging.	<b>Yes</b>
<b>Bird assemblage (Amber listed)</b>	Local Importance (Higher Value)	Five amber listed species noted on site. Relatively common species recorded at the Site. Site provides nesting/foraging habitat in scrub and boundary vegetation.	<b>Yes</b>
<b>Bird assemblage (Green listed)</b>	Local Importance (Lower Value)		
<b>Common Frog</b>	Local Importance (Higher Value)	Little potential habitat within the Site of the Proposed Development, or links to potential habitat. Possible frog spawn was observed on Site by a third party, however, and so this species could be affected during proposed works if present.	<b>Yes</b>
<b>Smooth Newt</b>	Local Importance (Lower Value)	No potential habitat e.g., ponds, within the Site of the Proposed Development, or links to potential habitat.	<b>No</b>
<b>Common Lizard</b>	Local Importance (Lower Value)	A small population of Common lizard may occur on the site. Common lizard are listed as Least concern on the Red List (King et al., 2011). The removal of existing habitats on site is not anticipated to have a significant effect on the conservation status of local lizard population. There is suitable habitat available for this species in the surrounding lands.	<b>No</b>

## 6 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

### 6.1 Impacts on Designated Sites

The Appropriate Assessment Screening Report prepared by Enviroguide Consulting, containing information for the purposes of Stage 1 Screening for AA, is presented in a separate document with this application.

Based on the assessment detailed in the above report, it has been ascertained that there is no risk of any significant impacts to European Sites, in light of the sites conservation objectives, as a result of the Proposed Development on its own or in combination with other plans or projects.

#### 6.1.1 *Natural Heritage Areas*

No NHAs are located within, or directly adjacent to, the Site of the Proposed Development. The nearest pNHA to the Proposed Development is the Fitzsimon's Woods pNHA located ca.110m to the north.

##### 6.1.1.1 *Fitzsimon's Wood pNHA*

The Proposed Development maintains no significant impact pathway with this pNHA, hydrological or otherwise. Increased recreational use of the Fitzsimon's Woods pNHA has the potential to occur, as a result of the additional population brought to the area by the Proposed Development.

It is noted that there are existing established walking trails throughout the pNHA woodland and as such, no significant soil erosion or increased disturbance to flora and fauna is anticipated from any increased footfall at the pNHA. Badgers are known to be resident in the woodland with several setts recorded within or adjacent to the pNHA (D'Arcy, 2021). Badger are nocturnal species and thus unlikely to be significantly impacted by any increased footfall at this pNHA.

An area adjacent and south of the pNHA, known as Gorse Hill, contains four ponds (D'Arcy, 2021), of which Smooth newt are known to breed in at least one of them (Tubridy, 2006). These ponds are located outside of the pNHA and largely off the walking trails, and would not be susceptible to significant disturbance relating to increase usage of the woods by residents of the Proposed Development.

In addition, the Proposed Development entails the creation and provision of an extensive internal woodland walk and associated amenities for future residents, which will lessen somewhat the extent of the usage of Fitzsimon's Woods pNHA.

##### 6.1.1.2 *Downstream pNHAs*

There is a tenuous hydrological link connecting the Proposed Development and the Loughlinstown Woods pNHA and Dalkey Coastal Zone and Killiney Hill pNHA, via the Carrickmines Stream, which runs along the Site's south-eastern boundary and eventually outflows into Killiney Bay as the Shanganagh River ca. 8.4km to the east of the Site. As a result, these pNHAs are included in the precautionary Zone of Influence (ZOI) of the Proposed Development

Loughlinstown Woods pNHA, located ca.7km to the east of the Site, is designated for its woodland habitats and its value as an educational amenity. Dalkey Coastal Zone and Killiney Hill

pNHA lies at its closest ca.7km to the east of the Proposed Development, running down along the east coast to Shanganagh. This pNHA is designated as a pNHA due to the range of coastal habitats it supports, from sub-littoral to coastal heath, with several Islands supporting various colonies of bird species (NPWS, 2009). This section of the east coast is also of geological interest and supports various scarce plant species.

It is considered extremely unlikely that any surface waters generated by the construction or operation of the Proposed Development will have the potential to cause any significant effects at these pNHAs, which are largely designated for woodland and coastal cliff habitats respectively. It is also noted that a 10m natural buffer has been included within the proposed project design, between the nearest construction activities at the Site and the Carrickmines Stream itself, wherein no works will take place and the existing dense bracken habitat will be retained. This natural vegetative buffer will further ensure no run-off from the Site will reach the stream and cause downstream nuisances.

It is therefore deemed that there is no possibility for significant impacts on water quality at any pNHA sites, or any other adverse impact, as a result of the Proposed Development.

## 6.2 Impacts on Habitats and Flora

### 6.2.1 Increase in habitat quality

The Proposed Development will result in the loss and replacement of the majority of the scrub, bracken and grassland currently present within the Site of the Proposed Development. This habitat type is common and widespread in the surrounding upland area, and as such, is considered to be of low value at a local scale. Its loss will not constitute a significant negative impact as a result of the Proposed Development.

A significant increase in native tree cover is proposed at the Site. The landscape plan entails retention of the majority of treelines and boundary habitats at the Site, along with a native woodland margin proposed for the boundary of the Site.

It is therefore concluded that the Proposed Development will result in an overall positive impact through the increase in native tree cover at the Site. This general increase in the quality and provision of habitats at the Site of the Proposed Development represents a considerable **positive, permanent** impact overall.

There is also the opportunity for further biodiversity enhancement through the extensive planting of pollinator friendly flower and shrub species where possible; that will benefit bees and suburban pollinator species, along with birds and local bats through an increased availability of prey.

## 6.3 Impacts on Mammals exc. Bats

### Construction Waste

Small mammals have the potential to become entangled in construction waste materials e.g., plastic, netting etc., and as such this represents a **negative, short-term, slight** impact at a **local** scale should it occur.

### Noise Disturbance

Noise generated during the Construction Phase has the potential to cause **negative, short-term, moderate** impacts in the form of disturbance to mammals in the locality.

#### Fragmentation of Habitat

The Proposed Development has the potential to result in the fragmentation of the habitats currently available to small mammals in particular, through impenetrable fencing if included in the proposed boundary design of the Site. This would represent a **negative, permanent, moderate** impact at a **local** scale.

### 6.4 Impacts on Bats

No bat roosts were recorded at the Site and limited tree cover exists on site. There was overall moderate bat usage of the Site of the Proposed Development observed during the on-site activity survey, with the most bat activity that was recorded focused along the vegetation in the south of the Site. Potential impacts to bats have been identified via the following:

#### Light spill

Excess light spill from the Proposed Development on to hedgerows and treelines at the Site could render normally dark commuting and foraging routes unsuitable for bats, and negatively impact on their foraging commuting behaviours. This is considered to represent a **negative, permanent, moderate** impact at a **local** level in the absence of suitable mitigatory measures.

Regarding collisions with proposed structures at the Site, it is noted that bats commute and forage largely using echolocation and as such are capable of navigating buildings unless largely made of smooth reflective metal or glass. In this regard, due to the heterogenous composition of the proposed building façades, collisions are not deemed to represent a significant risk, and light spill is the more likely obstruction to bat movements that may arise.

### 6.5 Impacts on Birds

The species recorded in the vicinity of the Site of the Proposed Development were common hedgerow species either flying overhead or foraging across the Site. The below impacts to these bird species have the potential to occur.

#### Noise Disturbance

The Construction Phase of the Proposed Development will likely involve elevated noise levels associated with the proposed excavation and construction works. As a result, there is a potential risk of noise disturbance to birds in the vicinity of the Site, representing a **negative, short-term, moderate** impact at a **local** level in the absence of suitable mitigation.

#### Loss of Habitat

The Proposed Development will result in a loss of potential nesting, foraging habitat at the Site through the clearance of gorse scrub and bracken. It is noted however, that the proposed landscape plan will entail a notable increase in native tree cover at the Site, along with native shrub planting. This will offset the loss of the existing habitats and as such the loss of habitat represents a **negative, short-term, moderate** impact at a **local** scale.

#### Injury/mortality during Site Clearance



Should vegetation clearance occur during the nesting season there is the potential for the destruction of nests and eggs, as well as the mortality of young birds prior to fledging. This would represent a **negative, short-term, significant** impact at a **local** scale, in the absence of mitigation measures.

## 6.6 Impacts on Common Frog

If frog or their spawn are present at the Site during the proposed works there is the potential for a **negative, short-term, significant** impact at a **local** scale, in the absence of mitigation measures; through the loss of a breeding population at the Site during the works.

## 6.7 Do Nothing Impact

If the Proposed Development were not to go ahead, the Site would likely continue to develop, with scrub cover increasing and the land potentially transitioning to mixed woodland in the long-term as it is seeded by trees along the boundaries and in the locality of the Site.

## 6.8 Cumulative Impacts

### 6.8.1 Existing Granted Developments

A search of planning applications located within the vicinity of the Site of the Proposed Development was conducted using online planning resources such as the National Planning Application Database (NPAD) (MyPlan.ie) and DLR CoCo's Planning Application Map. Any planning applications listed as granted or decision pending from within the last five years were assessed for their potential to act in-combination with the Proposed Development and cause likely significant effects on local ecological sensitivities. Long-term developments granted outside of this time period were also considered where applicable.

There are very few developments meeting the above criteria located in the vicinity of the Site at time of writing this report. The majority of granted developments are noted to be one-off extensions or garage conversions and do not have the capacity to act in combination with the Proposed Development and cause significant effects in terms of ecology. Several more recent applications located adjacent or near to the Site of the Proposed Development are included below for reference. No significant impacts are likely to occur due to the small scale and nature of these developments.

*Table 4. Granted developments within the vicinity of the Proposed Development considered for cumulative effects.*

Planning Ref.	Address	Date Granted	Proximity to PD	Description
D19A/0769	Plot 'B' at 'Barrogue' & 'The Nook', Woodside Road, Sandyford, Dublin 18	15/01/2020	50m west	Permission for development. The development will consist of the demolition of 2 no. dwellings known as 'Barrogue' & 'The Nook', Construction of 1 no. two storey detached dwelling (232m.sq.), alterations to front boundary treatment including vehicular entrance and associated site works.

D17A/0400	Cuinne Geal, Slate Cabin Lane, Sandyford, Dublin 18	28/03/2018	23m south-east	Permission for the construction of a new 2 bedroom detached bungalow with car parking to the front and patio areas, new effluent treatment system, entrance gates and gate pillars, and new boundary fencing/native hedging and all ancillary site works.
D19A/0744	Site to the east of Sandyford Road (Coolkill), Sandyford, Dublin 18	02/09/2020	655m north-east	Permission for development. The development will consist of: the construction of 15 no. dwellings comprising 1 no. 1.5 storey 3-bedroom detached dwelling (Type A), 1 no. 1.5 storey 3-bedroom detached dwelling (Type E), 1 no. 1.5 storey 3-bedroom detached dwelling (Type F), 1 no. 1.5 storey 4-bedroom detached dwelling (Type D), 1 no. 2.5 storey 5-bedroom detached dwelling (Type B), 2 no. 2.5 storey 5-bedroom detached dwellings (Type C), 2 no. 2.5 storey 5-bedroom detached dwellings (Type H) and 6 no. duplex units in a single 3 storey block (Type G), consisting of 3 no. 2 bedroom ground floor and 3 no. 3 bedroom upper floors units with vehicular and pedestrian access from the Sandyford Road (Coolkill), including all associated on and off site development works, car parking, soft and hard landscaping pedestrian/cycle link to south-eastern boundary, boundary treatments and 225 mm dia. outfall foul sewer of circa 180 m, which will discharge into the existing foul manhole at Kilcross housing estate to the west of the subject site all on overall application site circa 0.49ha.
D17A/1003; ABP ref: ABP-302954-18	Site known as Whinsfield, Sandyford, Dublin 18	27/03/2019	365m north-east	Permission for a residential development consisting of the demolition of the existing dwelling house and sheds and the construction of 67 no. apartments in 3 no. three storey plus penthouse blocks (Blocks A, B & C) containing in total 5 no. one bed units, 48 no. two bed units and 14 no. three bed units. The development will also include a basement (under blocks B & C), on surface car parking, the construction of a new site entrance from the public road and all associated site

				and landscaping works on a 1.09 hectare site.
D20A/0525 ABP-302954-18	Sliding Rock, Blackglen Road, Sandyford, Co. Dublin	22/10/2020	Adjacent north	Permission for a proposed development comprising of the proposed conversion of an existing detached garage into an accessible bedroom & en-suite bathroom including minor alterations to elevations together with a single storey link to the main dwelling house.
D17A/0511; ABP ref: PL06D.249074	Site between Corrie and Rathanna House, Blackglen Road, Sandyford, D. 18	20/11/2017	Adjacent north	Permission is sought for the construction of a part single, part two storey dwelling, replacement entrance gates to existing vehicular entrance, re-connection to existing wastewater services and all associate site works.
ABP 313321-22	Blackglen Road, Balally and Woodside, Sandyford, Dublin 18.	Awaiting decision	60m east	This application is currently being reviewed by An Bord Pleanála and awaits a decision. The proposal consists of the demolition of the existing structures on site, construction of 101 no. residential units (32 no. houses, 69 no. apartments), creche and associated site works
ABP 313443-22	'Karuna' and 'Glenina' at Sandyford Road, Dublin 18, D18 C2H6 and D18 X5T7	Awaiting decision	100m north-east	This application is currently being reviewed by An Bord Pleanála and awaits a decision. The proposal consists of the demolition of dwellings known as 'Glenina' and 'Karuna'. construction of 137 no. apartments and associated site works.

### 6.8.2 Relevant Policies and Plans

In addition, the following Policies and Plans were reviewed and considered for possible in-combination effects with the Proposed Development.

- Dún Laoghaire Rathdown County Development Plan 2022-2028
- Deansgrange Local Area Plan 2010-2020
- Dún Laoghaire Rathdown Biodiversity Plan 2009-2013 (New plan in progress)

The Dun Laoghaire-Rathdown Blackglen Road/Harrold's Grange Road Improvement Scheme includes proposals for footpaths and cycle lanes along Blackglen Road and a realignment of the Enniskerry Road at Lamb's Cross along with other additional works. An Appropriate Assessment screening report was submitted with the scheme (RPS, 2015) and concluded that there would be no significant impacts on any European Site as a result of the proposed works.

The scheme is proposed to be completed on a phase basis and is expected to be completed in 2023. However, negative effects as a result of the Road Improvement scheme are not anticipated given the remote distance to the European Sites within Dublin Bay.

It is noted that there is potential for proposed plans and projects within the DLR County Development Plan 2022 - 2028 land area, to have cumulative, negative impacts on conditions in South Dublin Bay and other coastal areas, via rivers, other surface water features, and foul waters treated at waste water treatment plants (WWTP). However, such developments are required to conform to the relevant regulatory provisions for the prevention of pollution, nuisance or other environmental effects likely to significantly affect downstream ecological sensitivities. In addition, sustainable development, including SUDS measures for all new developments, is inherent in the objectives of all development plans within the Greater Dublin Area, as per the Greater Dublin Regional Code of Practice for Drainage Works. Therefore, upon examination of the above listed plans and projects within the general vicinity of the Proposed Development, and the above information regarding current Greater Dublin drainage policy and requirements; it is concluded that there is **no possibility for any significant cumulative effects** on downstream ecological sensitivities involving the Proposed Development.

## 7 MITIGATION MEASURES

A suitably qualified Ecological Clerk of Works (ECoW) will be employed for the duration of the Construction Phase to advise the Construction Team as detailed in section 9.1.1.

### 7.1 Habitats

The Proposed Development will have a net positive impact on the habitat make-up at the Site of the Proposed Development, increasing the biodiversity value of the Site, therefore no mitigation is necessary.

### 7.2 Birds

#### 7.2.1 *Controlled Vegetation Removal*

To ensure compliance with the Wildlife Act 2000 as amended, the removal of areas of vegetation will not take place within the nesting bird season (March 1<sup>st</sup> to August 31<sup>st</sup> inclusive) to ensure that no significant impacts (i.e., nest/egg destruction, harm to juvenile birds) occur as a result of the Proposed Development. Where any removal of vegetation within this period is deemed unavoidable, a qualified Ecologist will be instructed to survey the vegetation prior to any removal taking place. Should nesting birds be found, then the area of habitat in question will be noted and suitably protected until the Ecologist confirms the young have fledged, or a derogation licence is obtained from the NPWS.

Vegetation will be cleared maintaining a **clear sweep of 1 foot off the ground** with the digger bucket to prevent direct harm to small mammals, hedgehogs, pygmy shrews, adult amphibians and common lizard and to give them an opportunity to escape harm if present.

#### 7.2.2 *Noise Control*

A number of measures will be included in the CMP as set out in *BS 5228-1: A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*, that will

be put in place during the Construction Phase of the Proposed Development. These will ensure that the level of noise caused by the proposed works will be controlled/reduced where possible so as to minimise the potential disturbance impact on local bird species.

These measures will include but are not limited to:

- Selection of plant with low inherent potential for generating noise.
- Avoid unnecessary revving of engines and switch off plant items when not required.
- Keep plant machinery and vehicles adequately maintained and serviced.
- Proper balancing of plant items with rotating parts.
- Keep internal routes well maintained and avoid steep gradients.
- Minimise drop heights for materials or ensure a resilient material underlies.
- Use of alternative reversing alarm systems on plant machinery.
- Where noise becomes a source of resonating body panels and cover plates, additional stiffening ribs or materials will be safely applied where appropriate.
- Limiting the hours during which site activities likely to create high levels of noise are permitted.
- Appointing a site representative responsible for matters relating to noise.
- Monitoring typical levels of noise during critical periods and at sensitive locations.

These measures will ensure that any noise disturbance to local birds or any other fauna species in the vicinity of the Site of the Proposed Development will be reduced to a minimum.

## **7.3 Mammals**

### **7.3.1 Construction Best Practise**

#### Waste management

As best-practise all construction-related rubbish on site e.g., plastic sheeting, netting etc. will be kept in a designated area and kept off ground level so as to prevent small mammals such as hedgehogs from entrapment and death.

#### Excavations & Pipes

Trenches/pits must be either covered at the end of each working day, or include a means of escape for any animal falling in e.g., a plank or objects placed in the corner of an excavation. (Badgers will continue to use established paths across a site even when construction work has started) (NatureScot).

Any temporarily exposed open pipe system will be capped in such a way as to prevent badgers gaining access as may happen when contractors are off site.

### **7.3.2 Mitigation 4: Mammal Access Routes**

In order to maintain access to the Site for local mammals, and to prevent the loss or fragmentation of habitat, a number of access points will be provided along the boundary fencing at the Site for the duration of the Proposed Development's operational lifetime. These access points will range in size to provide access to hedgehog and badger to the wooded margins of the Site. The design and location of these access points will be discussed and decided in conjunction with an ecologist.

## **7.4 Bats**

### **7.4.1 Bat-friendly Night-time lighting**

The impact of increased night-time lighting as a result of the Proposed Development will be mitigated through the incorporation of bat-friendly lighting measures into the project design and associated lighting plan.

In order to minimise disturbance to bats commuting/foraging in the vicinity of the Site, lighting will be designed to minimise light-spill onto boundary vegetation at the Site, which were observed to provide important and well-used bat foraging commuting habitat during the bat surveys of the Site in 2021. The southern boundary treelines are of particular importance and every effort will be made to preserve these as unlit bat routes in the proposed project design.

This can be achieved by ensuring that the design of lighting adheres to the guidelines presented in the Bat Conservation Trust & Institute of Lighting Engineers '*Bats and Lighting in the UK - Bats and Built Environment Series*', (ILP, 2018) the Bat Conservation Trust '*Artificial Lighting and Wildlife Interim Guidance*' and the Bat Conservation Trust '*Statement on the impact and design of artificial light on bats*'.

The following lighting measures have been agreed with OCSC's Lighting consultant, and will be incorporated into the lighting plan for the Proposed Development, subject to agreement with DLRCC:

- The minimisation of night-time lighting emitted during both the Construction and Operational Phases of the Proposed Development (once health and safety requirements are met).
- The avoidance of direct lighting of existing or proposed treelines and hedgerows at the Site, as well as areas of planting.
- LED luminaires will be used as they have low UV output, sharp cut-off, lower intensity, good colour rendition and dimming capability.
- Luminaires will be mounted horizontally, ensuring minimal/no up-light.
- Where possible luminaires will be mounted on poles less than 8m (preferably 6m and less). Lighting columns on the primary road into the development will be at 8m, whilst columns around the pedestrian routes will be at 5m.
- Where possible the LEDs used will be 2700K. Preferably 2,200 Kelvin luminaires are recommended for the southern boundaries of the Site to reduce potential lighting impact on local bat populations. This will be subject to DLRCC public lighting approval.



- Motion sensor lighting will be considered for the private pathways where possible and safe to do so. It is noted that, according to OCSC the fittings proposed have a 50% power reduction from 12am to 05am. The usage and application of motion sensor lighting at the site will be subject to DLRCC public lighting approval and health and safety requirements.
- Glare shields will be utilized where required in order to minimise any unnecessary light spill onto bat routes along the boundary of the site.
- On examination of the horizontal luminance map the predicted LUX levels means that glare shields are essential to further reduce light spillage along important linear habitats (i.e., the treelines along the southern boundary in particular).

Incorporation of the appropriate luminaire specifications as advised by a lighting professional can have a considerable input in mitigating the potential impact of night-time lighting on local bats.

Night-time lighting across the Site of the Proposed Development will be kept to a minimum during both the Construction and Operational Phases of the Proposed Development through the reduction of light spill from the building interior via windows/entrances, and the reduction of spill/glare from outdoor lighting in place on the building exterior and throughout the Site (see Figure 13 below).

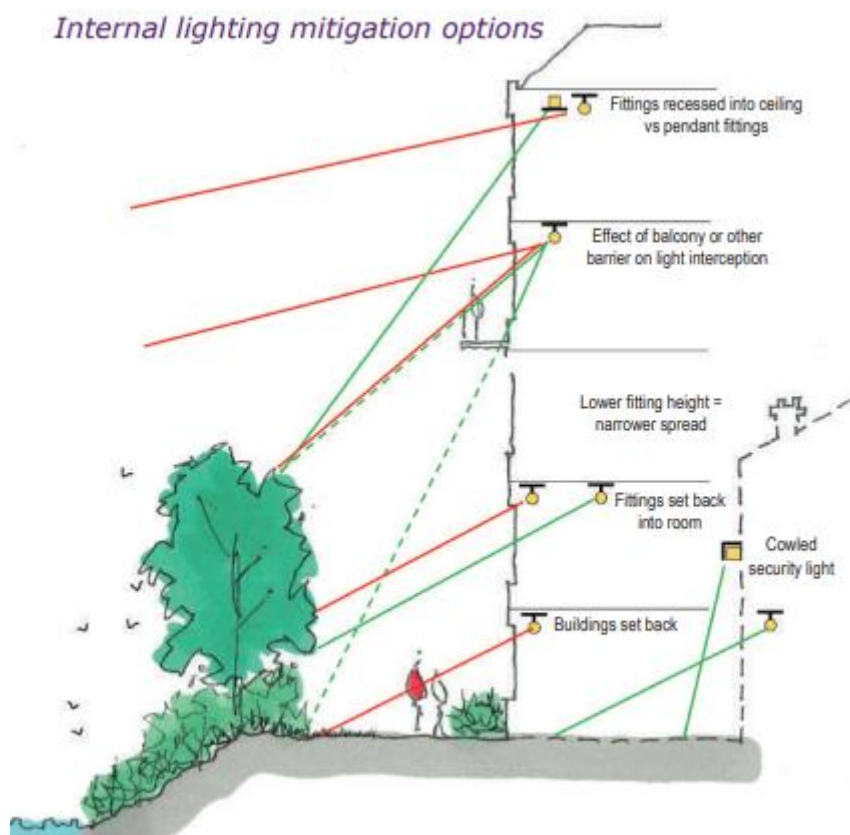


Figure 13. Internal Lighting Guidance Diagram adapted from ILP (2018).

#### **7.4.2 Tree removal**

Limited tree removal is planned as part of the proposed works and no potential bat roosts were noted during the surveys of the Site. However, where tree felling is required, the following general protocol will be followed:

- Tree-felling will be undertaken in the months of September and October. During this period bats are capable of flight and are more likely to avoid risks associated with tree-felling, while this approach will also avoid the nesting bird season.
- Felling during the winter months will be avoided as this creates the additional risk that bats may be in hibernation and thus unable to escape from a tree that is being felled. Additionally, disturbance during winter may reduce the likelihood of survival as bat body temperature is too low and they may have to consume too much body fat to survive.
- Tree-felling will be undertaken using heavy plant and chainsaw. There is a wide range of machinery available with the weight and stability to safely fell a tree. Normally trees are pushed over, with a need to excavate and sever roots in some cases. In order to ensure the optimum warning for any roosting bats that may still be present, an affected tree will be pushed lightly two to three times, with a pause of approximately 30 seconds between each nudge to allow bats to become active. Any affected trees should then be pushed to the ground slowly and will remain in place for a period of at least 24 hours, and preferably 48 hours to allow bats to escape.
- A derogation licence from the National Parks and Wildlife Services (NPWS) may be required for felling if during tree removal works bats are found to be roosting in any affected trees.

#### **7.5 Invasive plant species management**

No species of plant listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 were recorded at the Site of the Proposed Development during site surveys.

As such, no significant risk of impacts relating to the spread of invasive plant species exists at the Site. Nevertheless, efforts should be made to remove such plants and minimise any risk of spread offsite.

A single Cherry Laurel bush was noted as present along the Site's southern treeline boundary. Butterfly-bush was noted to be widely distributed across the scrubby sections of the Site. Winter heliotrope was identified along the south-western boundary of the Site, along the Woodside road. Simon's Cotoneaster was noted in the southern scrub section of the Site. Lesser knotweed was identified along the banks of the Carrickmines stream in the south-east of the Site. Himalayan Honeysuckle was present along the Blackglen Road in the north of the Site, particularly the north-eastern corner. Sycamore was present along the various treelines along the Site's margins.

All of the above are medium-low impact invasives except for Cherry Laurel. Their respective distributions at the Site are not significant and their removal will not be an issue.

The following measures will ensure that Cherry Laurel is removed from the Site and will not reoccur:

### **Physical Removal:**

Due to the limited presence of this species at the Site of the Proposed Development, and the scale of the works to be carried out at the Site, removal by physical means is the preferred method of managing Cherry Laurel in this case. Removal will take place as follows:

- 1) All above ground plant material will be removed by cutting the stems as low to the ground as possible. All cut material will be maintained off the ground during works, and during storage, to prevent regeneration through suckers produced by the cut stems (e.g., place on plastic sheeting).
- 2) Cut material will be removed off-site and disposed of by a qualified professional at a suitably licensed waste facility.
- 3) Root stumps can then be dug up with all viable root matter removed as much as possible to limit the potential for Cherry Laurel regeneration. Stumps will be stored off the ground as mentioned above while on site, placed upside down and with soil removed from roots. Soil from roots will also be disposed of along with the plant material as viable root matter may remain.
- 4) Any regrowth of younger plants can be pulled by hand (attempt to remove as much of root network as possible) and/or treated with chemical herbicides as described below.

### **Chemical Control:**

Further control of any regrowth of young plants can be achieved using glyphosate or similar, chemicals which will only be used in accordance with the approved application method by appropriately authorised Professional Users in line with Department of Agriculture, Food and Marine requirements.

- When using these herbicides, a handheld 'spray and lance' application technique will be used, allowing targeted application to the offending plant matter. This will reduce collateral poisoning of the soil/plants surrounding the Laurel and is good environmental practise. Appendix 3 of TII (2010) provides a guide on herbicide application.
- Herbicide will be applied in target doses, only wetting each leaf of the young plant. Note that this method of chemical leaf wetting will not work for mature, uncut plants, and is only effective as a control measure when used on young regrowth post cutting.
- All herbicides will be used in accordance with the product label and with Good Plant Protection Practice as prescribed in the European Communities (Authorization, Placing on the Market, Use and Control of 'Plant Protection Products') Regulations, 2003 (S.I. No. 83 of 2003). It is an offence to use herbicides in a manner other than that specified on the label.

## 7.6 Schedule of Mitigation

At the request of DLR CoCo, as outlined in the Biodiversity Report (dated 30<sup>th</sup> November 2021) submitted as part of the council's opinion on the pre-application submission, a schedule of ecological mitigation measures has been compiled in the following table, which will also be included as part of the CEMP and OCEMP for this project where applicable.

Table 5. Schedule of Ecological Mitigation for the Proposed Development.

Ecological Receptor	Relevant stage of the Proposed Development	Mitigation Measure	Details
Birds	Construction Phase	Timing of vegetation clearance	To ensure compliance with the Wildlife Act 2000 as amended, the removal of areas of vegetation <u>will not take place within the nesting bird season</u> (March 1 <sup>st</sup> to August 31 <sup>st</sup> inclusive) to ensure that no significant impacts (i.e., nest/egg destruction, harm to juvenile birds) occur as a result of the Proposed Development. Where any removal of vegetation within this period is deemed unavoidable, a qualified Ecologist will be instructed to survey the vegetation prior to any removal taking place. Should nesting birds be found, then the area of habitat in question will be noted and suitably protected until the Ecologist confirms the young have fledged, or a derogation licence is obtained from the NPWS.
Habitats	Construction Phase	Invasive plant species removal	<p>A single Cherry Laurel bush is present along the Site's southern treeline boundary (see EclA Report for detailed location). Due to the limited presence of Cherry Laurel at the Site of the Proposed Development removal by physical means is the preferred method of managing this species. Removal should take place as follows:</p> <ol style="list-style-type: none"> <li>5) All above ground plant material should be removed by cutting the stems as low to the ground as possible. All cut material should be maintained <u>off the ground</u> during works, and during storage, to prevent regeneration through suckers produced by the cut stems.</li> <li>6) Cut material should be removed off-site and disposed of by a qualified professional at a suitably licensed waste facility.</li> <li>7) Root stumps can then be dug up with all viable root matter removed as much as possible to limit the potential for Cherry Laurel regeneration. Stumps should be stored off the ground as mentioned above</li> </ol>



			<p>while on site, placed upside down and with soil removed from roots. Soil from roots should also be disposed of along with the plant material as viable root matter may remain.</p> <p>8) Any regrowth of younger plants can be pulled by hand (attempt to remove as much of root network as possible) and/or treated with chemical herbicides as described below.</p> <p><b>Chemical Control (if required):</b></p> <p>Further control of any regrowth of young plants can be achieved using glyphosate or similar, chemicals which should only be used in accordance with the approved application method by appropriately authorised Professional Users in line with Department of Agriculture, Food and Marine requirements.</p> <ul style="list-style-type: none"> <li>When using these herbicides, a handheld 'spray and lance' application technique should be used, allowing targeted application to the offending plant matter. This will reduce collateral poisoning of the soil/plants surrounding the Laurel and is good environmental practise. Appendix 3 of TII (2010) provides a guide on herbicide application (see EcIA report for detail).</li> <li>Herbicide should be applied in target doses, only wetting each leaf of the young plant. Note that this method of chemical leaf wetting will not work for mature, uncut plants, and is only effective as a control measure when used on young regrowth post cutting.</li> <li>All herbicides should be used in accordance with the product label and with Good Plant Protection Practice as prescribed in the European Communities (Authorization, Placing on the Market, Use and Control of 'Plant Protection Products') Regulations, 2003 (S.I. No. 83 of 2003). It is an offence to use herbicides in a manner other than that specified on the label.</li> </ul>
Birds & other animals	Construction Phase	Noise Control	<p>A number of measures will be included in the CEMP as set out in <i>BS 5228-1: A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise</i>, that will be put in place during the Construction Phase of the Proposed Development. These will ensure that the level of noise caused by the proposed works will be controlled/reduced where possible so as to minimise the potential disturbance impact on local fauna species.</p>
Mammals	Construction Phase	Construction waste management	<p>As best-practise all construction-related rubbish on site e.g., plastic sheeting, netting etc. should be kept in a designated area and kept off ground level so as to prevent small mammals such as hedgehogs from entrapment and death.</p>

		Mammal escape measures	<p>Trenches/pits must be either covered at the end of each working day, or include a means of escape for any animal falling in e.g., a plank or objects placed in the corner of an excavation. (Badgers will continue to use established paths across a site even when construction work has started).</p> <p>Any temporarily exposed open pipe system should be capped in such a way as to prevent badgers gaining access as may happen when contractors are off site.</p>
Bats	Construction Phase	Bat friendly construction lighting	Construction Phase lighting will avoid any lighting of the Sites boundary tree-lines and hedges, and will be assessed by a bat ecologist; with recommendations to be made to ensure no impact on local populations due to night-time lighting during the works, where required.
		Tree felling	Tree felling will be undertaken in September/October where possible.
		Rocket Bat Box scheme	<p>As recommended in the Bat Survey Report (See EcIA Report for detail), 3no. 'Rocket Box' Bat boxes will be erected around the Site.</p> <p>The rocket bat boxes are to be installed under the supervision and guidance of the bat ecologist, and will be erected on a 5m pole fixed in 1m<sup>3</sup> of 40 newton strength concrete (Please see appendices of Bat Report for details). Four possible locations are suggested in the report, with 3 of these to be chosen.</p>
Amphibians	Construction Phase	Wildlife pond provision	Wildlife ponds to be constructed under the supervision and consultation of an experienced ecologist, as per Baker <i>et al.</i> (2011) guidelines (see EcIA report for detail).
Mammals	Operational Phase	Mammal access to the margins of the Site	In order to maintain access to the Site for local mammals, and to prevent the loss or fragmentation of habitat, a number of access points will be provide along the boundary fencing at the Site for the duration of the Proposed Development's operational lifetime. These access points will range in size to provide access to hedgehog and badger to the wooded margins of the Site. The design and location of these access points will be discussed and decided in conjunction with an ecologist.
Bats	Operational Phase	Bat friendly lighting	<p>A suite of Operational Phase bat friendly lighting measures have been agreed between the lighting consultant and bat ecologist.</p> <p>A bat ecologist will assess the lighting of the Site once the Proposed Development is operational, with recommendations to be made to ensure no impact on local populations due to night-time lighting, where required.</p>

## 8 ENHANCEMENT MEASURES

### 8.1 Bat habitat enhancement

As recommended in the Bat Survey Report appended to this document, 3no. 'Rocket Box' Bat boxes will be erected around the site, during the operational phase of the Proposed Development, to provide novel habitat for local bat species. A qualified bat ecologist will be consulted with regards the appropriate type and placement/location of these Rocket boxes. The rocket bat boxes are to be installed under the supervision and guidance of the bat ecologist, and will be erected on a 5m pole fixed in 1m<sup>3</sup> of 40 newton strength concrete (Please see appendices of Bat Report for details). Four possible locations are suggested in the report, with 3 of these to be chosen.

This provision of roosting habitat at the Site will complement the increased foraging opportunities that will be provided at the Site, in the form of the proposed landscape planting included in the project design.

### 8.2 Bird habitat enhancement

10 no. bird boxes will be erected on suitably sized trees across the Site's woodland margins once the tree planting has been completed. The bird boxes will be chosen and installed as per the guidance of a suitably qualified ecologist, and will be suitable for a range of small passerine species.

### 8.3 Amphibian habitat enhancement

To offset any impacts to local amphibians species resulting from the loss of habitat associated with the Proposed Development, several natural wildlife ponds are proposed to be located along part of the Site's southern boundary (See Landscape Plan prepared by Gannon & Associates), within the woodland margin. The ponds will be constructed as per Baker *et al.* (2011) the *Amphibian Habitat Management Handbook. Amphibian and Reptile Conservation with best practice ecological guidance*. Section 4: Pond Creation, on page 19 of this document provides detail on best-practise when creating amphibian pond habitat. The construction of these ponds will take cognisance of this guide and will be supervised by a suitably qualified Ecological Clerk of Works.

### 8.4 Invertebrate habitat enhancement

At least 5 no. 'Bug hotels' will be installed at various suitable locations across the Site. These structures will be placed as per the instruction of the ECoW, within areas of wildflower or woodland planting.

Pollinator friendly wildflower meadow areas are proposed in the west and east of the Site. Meadow/wildflower areas will be mown on a reduced mowing regime; to maximise their biodiversity value: once a year in September if possible with the cuttings removed to encourage wildflower growth as per the All Ireland Pollinator Plan (AIPP) ([Pollinator-friendly grass cutting guide](#) ).

## 8.5 Mammal habitat enhancement

An area in the western corner of the Site has been ear-marked for the creation of earthen mounds within the proposed woodland margin of the Site. These mounds will provide potential habitat for local mammals to forage and potentially create resting places e.g. badger sett, Irish Stoat etc.

Piles of logs and other woody vegetation arising from the operational management of the woodland margin can also be left in suitable secluded corners/margins of the Site; to provide habitat for small mammals such as Hedgehog and Pygmy Shrew. These areas of woody debris will also benefit local invertebrate species through provision of shelter and food sources.

## 9 MONITORING

The following ecological monitoring schedule will be followed with regard the Construction and Operational Phases of the Proposed Development:

### 9.1 Construction Phase Monitoring

#### 9.1.1 Ecological Clerk of Works

A suitably qualified ECoW will be employed before commencement and for the duration of the Construction Phase; to provide ecological advise and input to the construction team.

**NOTE:** The ECoW will be employed several weeks before commencement of works on site; to allow time for the scope of ECoW works to be reviewed by the ecologist and any necessary pre-construction surveys to be carried out.

- The ECoW will be required to work closely with the Site Manager; to arrange to carry out **pre-clearance surveys** of any vegetation present on Site, especially if clearance during the period March 1<sup>st</sup> – August 1<sup>st</sup> (i.e., the breeding bird nesting season) is required. It is noted that clearance will be avoided during this period wherever possible through good management of the construction timeline.
- The ECoW will also be required to carry out **mammal surveys** of the Site prior to the commencement of works on site; to ensure that no change in mammal activity at the Site has occurred since the surveys conducted as part of this EclA, e.g., badger sett creation.
- As part of the mitigation recommended in relation to mammals, the ECoW will liaise with the Site Manager to ensure that an adequate level of **site tidiness** is being maintained, i.e., that construction materials such as netting, plastic sheeting etc., are being stored securely and above ground.
- The ECoW will also liaise with the Site Manager to ensure that **mammal escape measures** are in place across the construction site in terms of excavations such as trenches, basements, foundations i.e., that planks or objects are being left in place at a suitable corner of any excavations each night.
- The ECoW will be required to carry out **amphibian surveys** of the Site prior to and during the Construction Phase as required; to ensure that no change in amphibian activity at the Site has occurred since the surveys conducted as part of this EclA. If amphibians are



found, the NPWS will be consulted by the ECoW as to the most appropriate protection/re-location approach.

- The ECoW will be consulted by the Site Manager with regard the **locations and layout of the wildlife ponds** proposed for the Site. The ECoW will advise on the habitat measures to be in place at the pond to make it most suited to amphibian usage such as Common frog and Smooth newt.

### 9.1.2 Bat Ecologist

- It is recommended that a **pre-construction bat survey of the derelict buildings** located along the eastern site boundary be undertaken at least 3 months prior to the commencement of the proposed construction works. This is to determine the potential changing roosting status of the structure and to allow time to prepare potential mitigation measures and consultation with NPWS.
- A suitable qualified bat ecologist will be required to **assess the lighting measures in place for the Construction Phase**; to ensure that they will not cause any impacts to local bats during the night time. The ECoW will consult the Bat Report (Bat Eco Services, 2022) provided with this application to understand the priority areas for bat commuting/foraging at the Site and make recommendations where required.
- The bat ecologist will **supervise the installation of the Bat Box Scheme** at the Site, advising on the location and orientation of the 3no. rocket boxes to be installed on site.

## 9.2 Post-construction Monitoring

### 9.2.1 Bat Ecologist

- Once the development has been completed a suitably qualified bat ecologist will be required **to assess the night-time lighting in place** at the Site and will make recommendations where required to mitigate any impacts to local bats. The bat ecologist will consult the Bat Report provided with this application to understand the priority areas for bat commuting/foraging at the Site. The southern boundary conifer treelines are of particular importance to local bats and lighting of these should be avoided. It is recommended in that Bat Report that a level of <1 Lux is achieved along the boundaries of the Site of the Proposed Development.
- **Inspection of bat boxes within one year of installation** of the bat box scheme will be conducted. The bat box scheme will be registered with Bat Conservation Ireland. This should be undertaken for a minimum of 2 years.
- Monitoring of any other bat mitigation measures. All mitigation measures should be checked to determine that they were successful. **A full summer bat survey** will be conducted post-works.

### 9.2.2 Ecologist Surveys

A suitably qualified ecologist will survey the Site within the first amphibian breeding season (February - May) after the creation of the wildlife ponds; to ensure that the ponds are in suitable condition and to check for Common frog and Smooth newt usage.

### 9.3 Schedule of Ecological Monitoring

At the request of DLR CoCo, as outlined in the Biodiversity Report (dated 30<sup>th</sup> November 2021) submitted as part of the council's opinion on the pre-application submission, a schedule of ecological monitoring has been compiled in the following table, which will also be included as part of the CEMP and OCEMP for this project where applicable.

Table 6. Schedule of Ecological Monitoring for the Proposed Development

Ecological Receptor	Relevant stage of the Proposed Development	Monitoring Type	Details
Bats	Pre-Construction Phase	Bat Ecologist	It is recommended that a <b>pre-construction bat survey of the derelict buildings</b> located along the eastern site boundary be undertaken by a bat ecologist <u>at least 3 months prior</u> to the commencement of the proposed construction works. This is to determine the potential changing roosting status of the structure and to allow time to prepare potential mitigation measures and consultation with NPWS.
Mammals	Pre-Construction Phase	Ecological Clerk of Works (ECoW)	The ECoW will be required to carry out <b>mammal surveys</b> of the Site prior to the commencement of works on site; to ensure that no change in mammal activity at the Site has occurred.
Birds	Construction Phase	ECoW	The ECoW will be required to work closely with the Site Manager; to arrange to carry out <b>pre-clearance surveys</b> of any vegetation present on Site, especially if clearance during the period March 1 <sup>st</sup> – August 1 <sup>st</sup> (i.e., the breeding bird nesting season) is required. It is noted that clearance <u>will be avoided</u> during this period wherever possible through good management of the construction timeline
Amphibians	Pre and during Construction Phase	ECoW	The ECoW will be required to carry out <b>amphibian surveys</b> of the Site prior to and during the Construction Phase as required; to ensure that no change in amphibian activity at the Site has occurred since the surveys conducted as part of this EclA. If amphibians are found, the NPWS will be consulted by the ECoW as to the most appropriate protection/relocation approach.

	Construction Phase	ECoW	The ECoW will be consulted by the Site Manager with regard the <b>locations and layout of the wildlife ponds</b> proposed for the Site. The ECoW will advise on the habitat measures to be in place at the pond to make it most suited to amphibian usage such as Common frog and Smooth newt
Mammals	Construction Phase	ECoW	The ECoW will also liaise with the Site Manager to ensure that <b>mammal escape measures</b> are in place across the construction site in terms of excavations such as trenches, basements, foundations i.e., that planks or objects are being left in place at a suitable corner of any excavations each night
Bats	Construction Phase	Bat Ecologist	A suitable qualified bat ecologist will be required to <b>assess the lighting measures in place for the Construction Phase</b> ; to ensure that they will not cause any impacts to local bats during the night time. The ECoW will consult the Bat Report (Bat Eco Services, 2022) provided with this application to understand the priority areas for bat commuting/foraging at the Site and make recommendations where required.
	Construction Phase	Bat Ecologist	The bat ecologist will <b>supervise the installation of the Bat Box Scheme</b> at the Site, advising on the location and orientation of the 3no. rocket boxes to be installed on site.
	Operational Phase	Bat Ecologist	Once the development has been completed a suitably qualified bat ecologist will be required <b>to assess the high-time lighting in place</b> at the Site and will make recommendations where required to mitigate any impacts to local bats. The bat ecologist will consult the Bat Report provided with this application to understand the priority areas for bat commuting/foraging at the Site.  The southern and southern boundary conifer treelines are of particular importance to local bats and lighting of these should be avoided. It is recommended in that Bat Report that a level of <1 Lux is achieved along the boundaries of the Site of the Proposed Development
	Operational Phase	Bat Ecologist	<b>Inspection of bat boxes within one year of installation</b> of the bat box scheme will be conducted. The bat box scheme will be registered with Bat Conservation Ireland. This should be undertaken for a minimum of 2 years
	Operational Phase	Bat Ecologist	Monitoring of any other bat mitigation measures. All mitigation measures should be checked to determine that they were successful. <b>A full summer bat survey will be conducted post-works.</b>

Amphibian	Operational Phase	Ecologist	A suitably qualified ecologist will survey the Site within the first amphibian breeding season (February - May) after the creation of the wildlife ponds; to ensure that the ponds are in suitable condition and to check for Common frog and Smooth newt usage.
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## 10 RESIDUAL IMPACTS

Residual impacts are impacts that remain once mitigation has been implemented or impacts that cannot be mitigated. Table 7 below provides a summary of the impact assessment for the identified Key Ecological Resources (KERs) and details the nature of the impacts identified, mitigation proposed and the classification of any residual impacts.

Standard Construction Phase control measures have been outlined to ensure that the Proposed Development does not impact on any species or habitats of conservation importance or designated sites. It is essential that these mitigation measures are complied with, in order to ensure that the Proposed Development complies with National conservation legislation.

Provided all mitigation and enhancement measures are implemented in full and remain effective throughout the lifetime of the Proposed Development, no significant negative residual impacts on the local ecology or on any designated nature conservation sites, are expected from the Proposed Works.

Table 7. Summary of potential impacts on the identified Key Ecological Receptors KER(s) associated with the Proposed Development, mitigation proposed, and residual impacts.

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation/ Mitigating Factors/ Enhancement	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
Designated Sites								
Proposed Natural Heritage Areas	No significant impacts envisaged and therefore no mitigation required.							
Habitats and Flora								
Treelines and hedgerows	Local Importance (Higher Level)	Proposed Development will result in an overall increase in the biodiversity value of the Site, through considerable native tree planting.	Positive	Local	Permanent	Considerable	- N/A	Positive; Permanent; Considerable.
Mammals								
Mammals (Small mammals & Badger)	Local Importance (Higher Level)	Possible harm/entrapment due to construction waste and excavations. Noise disturbance during the Construction Phase. Loss/fragmentation of habitat.	Negative Negative Negative	Local	Short-term Short-term Permanent	Slight Moderate Moderate	<ul style="list-style-type: none"><li>- Best practise construction methods to be followed in terms of waste management and excavations and to be included in CEMP.</li><li>- Noise control measures to be in place as per CEMP.</li><li>- Provision of mammal access points along boundary fencing at the Site</li></ul>	Neutral. Negative, short-term, slight. Neutral.

							<p>during operational life-time of the Proposed Development.</p> <ul style="list-style-type: none"> <li>- <b>Habitat enhancement:</b> Provision of new habitat through proposed woodland planting, along with provision of earthen mounds for potential sett building in the western corner of the Site.</li> </ul>	
<b>Bat assemblage</b>	Local Importance (Higher Level)	Reduction in foraging/ commuting habitat due to increased night-time lighting as a result of the Proposed Development.	Negative	Local	Permanent	Moderate	<ul style="list-style-type: none"> <li>- Incorporation of Bat friendly lighting measures, as laid out in Mitigation section and Bat Report, into the final Project Design.</li> <li>- Bat ecologist to assess Construction Phase lighting and make amendments if required.</li> <li>- <b>Habitat enhancement:</b> Provision of new roosting habitat in the form of 3no. Rocket bat boxes to be suitably located under the supervision of a bat ecologist as part of the Proposed Development.</li> </ul>	<p><b>Neutral.</b></p> <p><b>Positive; Permanent; Moderate.</b></p>
<b>Birds</b>								

<b>Bird assemblage</b> (Green-listed)	Local Importance (Higher Level)	Disturbance due to noise during Construction Phase.  Mortality during vegetation clearance.  Loss of habitat.	Negative Negative Negative	Local	Short-term Short-term Short-term	moderate Significant Moderate	<ul style="list-style-type: none"> <li>- Construction related noise control/minimisation measures to be included in CEMP.</li> <li>- Avoidance of vegetation clearance during the nesting season March 1<sup>st</sup> – August 31<sup>st</sup> and supervision of clearance by an ECoW.</li> <li>- Provision of extensive woodland planting in the landscape plan.</li> <li>- <b>Habitat enhancement:</b> Provision of 10 no. Bird boxes across the Site.</li> </ul>	<b>Negative, Short-term, Slight.</b>  <b>Neutral.</b>  <b>Positive, permanent, Moderate.</b>
<b>Amphibians</b>								
<b>Common Frog</b>	Local Importance (Higher Level)	Loss of individuals or frog-spawn/tadpoles if present during construction works.	Negative	Local	Short-term	Significant	<ul style="list-style-type: none"> <li>- Pre-construction amphibian survey of Site during the appropriate survey season by an ecologist.</li> <li>- NPWS consulted as to the relocation approach if amphibians found to be on site.</li> <li>- <b>Habitat enhancement:</b> New habitat proposed in the form of several wildlife ponds at the Site; to be constructed through consultation with an ecologist and as per Baker <i>et al.</i> (2011).</li> </ul>	<b>Neutral.</b>  <b>Positive, permanent, moderate.</b>



## **11 CONCLUSION**

It is considered that, provided the mitigation and enhancement measures proposed are implemented in full, there will be no significant negative impact to any valued habitats, designated sites or individual or group of species as a result of the Proposed Development. Furthermore, it is deemed that the Proposed Development will have an overall positive impact on the ecology of the Site; through the increased provision and enhancement of habitats onsite e.g., increased native woodland and tree cover; and more species specific habitat creation such as wildlife ponds.

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## APPENDIX I – VALUATION AND IMPACT CRITERIA FOR ASSESSING ECOLOGICAL RESOURCES

The criteria outlined in the table below, taken from the *Guidelines for Assessment of Ecological Impacts of National Road Schemes* published by the NRA, were used for assigning value to designated sites, habitats and species within the Site of the Proposed Development and surrounding area.

**TABLE A. DESCRIPTION OF VALUES FOR ECOLOGICAL RESOURCES BASED ON GEOGRAPHIC HIERARCHY OF IMPORTANCE (NRA, 2009B).**

Importance	Criteria
<b>International Importance</b>	<ul style="list-style-type: none"> <li>- 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.</li> <li>- Proposed Special Protection Area (pSPA). - Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).</li> <li>- Features essential to maintaining the coherence of the Natura 2000 Network.</li> <li>- Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.</li> <li>- Resident or regularly occurring populations (assessed to be important at the national level) of the following: <ul style="list-style-type: none"> <li>o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or</li> <li>o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive</li> </ul> </li> <li>- Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).</li> <li>- World Heritage Site (Convention for the Protection of World Cultural &amp; Natural Heritage, 1972).</li> <li>- Biosphere Reserve (UNESCO Man &amp; The Biosphere Programme)</li> <li>- Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).</li> <li>- Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).</li> <li>- Biogenetic Reserve under the Council of Europe.</li> <li>- European Diploma Site under the Council of Europe.</li> <li>- Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).</li> </ul>
<b>National Importance</b>	<ul style="list-style-type: none"> <li>- Site designated or proposed as a Natural Heritage Area (NHA).</li> <li>- Statutory Nature Reserve.</li> <li>- Refuge for Fauna and Flora protected under the Wildlife Acts.</li> <li>- National Park.</li> <li>- Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.</li> <li>- Resident or regularly occurring populations (assessed to be important at the national level) of the following: <ul style="list-style-type: none"> <li>o Species protected under the Wildlife Acts; and/or</li> <li>o Species listed on the relevant Red Data list.</li> <li>o Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive</li> </ul> </li> </ul>
<b>County Importance</b>	<ul style="list-style-type: none"> <li>- Area of Special Amenity.</li> <li>- Area subject to a Tree Preservation Order.</li> </ul>



	<ul style="list-style-type: none"> <li>- Area of High Amenity, or equivalent, designated under the County Development Plan.</li> <li>- Resident or regularly occurring populations (assessed to be important at the County level) of the following: <ul style="list-style-type: none"> <li>o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive.</li> <li>o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.</li> <li>o Species protected under the Wildlife Acts; and/or</li> <li>o Species listed on the relevant Red Data list.</li> <li>o Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance.</li> </ul> </li> <li>- County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP, if this has been prepared.</li> <li>- Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county.</li> <li>- Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.</li> </ul>
<b>Local Importance (higher value)</b>	<ul style="list-style-type: none"> <li>- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared.</li> <li>- Resident or regularly occurring populations (assessed to be important at the Local level) of the following: <ul style="list-style-type: none"> <li>o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive.</li> <li>o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.</li> <li>o Species protected under the Wildlife Acts.</li> <li>o Species listed on the relevant Red Data list.</li> <li>o Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality.</li> </ul> </li> <li>- Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.</li> </ul>
<b>Local Importance (lower value)</b>	<ul style="list-style-type: none"> <li>- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife.</li> <li>- Sites or features containing non-native species that is of some importance in maintaining habitat links.</li> </ul>

### *Criteria used to Define Quality of Effects*

In line with the EPA Guidelines (EPA, 2022), the following terms are defined when quantifying the quality of effects. See Table B below.

**TABLE B. DEFINITION OF QUALITY OF EFFECTS.**

Quality	Definition
Positive Effects	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error

Negative / adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
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### *Criteria used to Define Significance of Effects*

In line with the EPA Guidelines (EPA, 2022), the following terms are defined when quantifying significance of impacts. See Table C below.

**TABLE C. DEFINITION OF SIGNIFICANCE OF EFFECTS.**

Significance of Effects	Definition
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment
Very Significant	An effect which, by its character, magnitude, duration, or intensity significantly alters most of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics

### *Criteria Used to Define Duration of Effects*

In line with the EPA Guidelines (EPA, 2022), the following terms are defined when quantifying duration and frequency of effects. See Table D below.

**TABLE D. DEFINITION OF DURATION OF EFFECTS.**

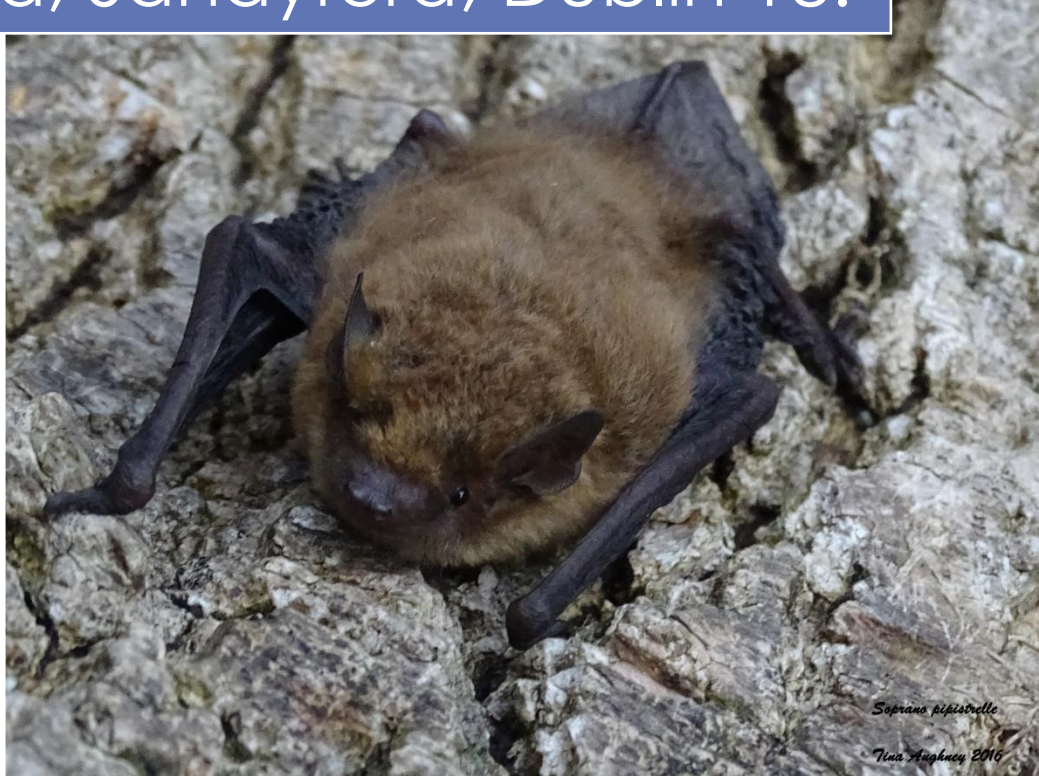
Quality	Definition
Momentary Effects	Effects lasting from seconds to minutes
Brief Effects	Effects lasting less than a day
Temporary Effects	Effects lasting less than a year
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years
Permanent Effects	Effects lasting over sixty years

Reversible Effects	Effects that can be undone, for example through remediation or restoration
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## **APPENDIX II – BAT SURVEY REPORT**

# 2022

## Bat Assessment: Blackglen Rd & Woodside Rd, Sandyford, Dublin 18.



Dr Tina Aughney  
Bat Eco Services



**Bat Eco Services, Ulex House, Drumheel, Lisduff, Virginia, Co. Cavan. A82 XW62.**

**Licensed Bat Specialist:** Dr Tina Aughney ([tina@batecoservices.com](mailto:tina@batecoservices.com), 086 4049468)

NPWS licence C13/2020 (Licence to handle bats, expires 31<sup>st</sup> December 2022);

NPWS licence 08/2020 (Licence to photograph/film bats, expires 31<sup>st</sup> December 2022) ;

NPWS licence DER/BAT 2022-36 (Survey licence, expires 24<sup>th</sup> March 2025).

**Statement of Authority:** Dr Aughney has worked as a Bat Specialist since 2000 and has undertaken extensive survey work for all Irish bat species including large scale development projects, road schemes, residential developments, wind farm developments and smaller projects in relation to building renovation or habitat enhancement. She is a monitoring co-ordinator and trainer for Bat Conservation Ireland. She is a co-author of the 2014 publication *Irish Bats in the 21<sup>st</sup> Century*. This book received the 2015 CIEEM award for Information Sharing. Dr Aughney is a contributing author for the Atlas of Mammals in Ireland 2010-2015.

All analysis and reporting is completed by Dr Tina Aughney. Data collected and surveying is completed with the assistance of a trained field assistant.

Mr. Shaun Boyle (Field Assistant) NPWS licence DER/BAT 2022-37 (Survey licence, expires 24<sup>th</sup> March 2025).

**Client:** Enviroguide Consulting on behalf of Zolbury Limited.

**Project Name & Location:** Blackglen Road and Woodside Road, Sandyford, Dublin 18.

### Report Revision History

Date of Issue	Draft Number	Issued To (process of issuing)
5 <sup>th</sup> October 2021	Draft 1	By email to Enviroguide Consulting
13 <sup>th</sup> October 2021	Draft 2	By email to Enviroguide Consulting
8 <sup>th</sup> June 2022	Draft 1 & Draft 2	By email to Enviroguide Consulting
11 <sup>th</sup> June 2022	Draft 3	By email to Enviroguide Consulting
26 <sup>th</sup> July 2022	Final	By email to Enviroguide Consulting

### Purpose

This document has been prepared as a Report for Enviroguide Consulting. Only the most up to-date report should be consulted. All previous drafts/reports are deemed redundant in relation to the named site.

Bat Eco Service accepts no responsibility or liability for any use that is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

### Carbon Footprint Policy

It is the policy of Bat Eco Services to provide documentation digitally in order to reduce carbon footprint. Printing of reports etc. is avoided, where possible.

### Bat Record Submission Policy

It is the policy of Bat Eco Services to submit all bat records to Bat Conservation Ireland database one year post-surveying. This is to ensure that a high level bat database is available for future desktop reviews. This action will be automatically undertaken unless otherwise requested, where there is genuine justification.

## Executive Summary

**Project Name & Location:** Blackglan Road and Woodside Road, Sandyford, Dublin 18.

**Proposed work:** Residential Development.

### Bat Survey Results - Summary

Bat Species	Roosts	Foraging	Commuting
Common pipistrelle <i>Pipistrellus pipistrellus</i>		√	√
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>		√	√
Nathusius' pipistrelle <i>Pipistrellus nathusii</i>		√	√
Leisler's bat <i>Nyctalus leisleri</i>		√	√
Brown long-eared bat <i>Plecotus auritus</i>		√	√
Daubenton's bat <i>Myotis daubentonii</i>		√	√
Natterer's bat <i>Myotis nattereri</i>			
Whiskered bat <i>Myotis mystacinus</i>			
Lesser horseshoe bat <i>Rhinolophus hipposideros</i>			

### Bat Survey Duties Completed (Indicated by red shading)

Tree PBR Survey	●	Daytime Building Inspection	●
Static Detector Survey	●	Daytime Bridge Inspection	○
Dusk Bat Survey	●	Dawn Bat Survey	●
Walking Transect	●	Driving Transect	○
Trapping / Mist Netting	○	IR Camcorder filming	○
Endoscope Inspection	●	Other	○
		Thermal Imagery filming	

**Citation:** Bat Eco Services (2022) Bat Assessment: Blackglan Road & Woodside Road, Sandyford, Dublin 18. Unpublished report prepared for Enviroguide Consulting.

# Contents

<b>1. Introduction.....</b>	<b>5</b>
1.1 Relevant Legislation & Bat Species Status in Ireland .....	5
1.1.1 Irish Statutory Provisions.....	5
1.1.2 EU Legislation .....	5
1.1.3 IUCN Red Lists.....	6
1.1.4 Irish Red List - Mammals .....	6
1.1.5 Irish Bat Species.....	6
1.2 Relevant Guidance Documents .....	8
1.2.1 Bat Survey Requirements & Timing.....	9
1.2.2 Evaluation & Assessment Criteria .....	12
1.2.3 Bat Mitigation Measures .....	18
1.3 Project Description.....	27
1.3.1 Site Location .....	27
1.3.2 Proposed Project .....	27
<b>2. Bat Survey Methodology .....</b>	<b>29</b>
2.1 Daytime Inspections.....	29
2.1.1 Building & Structure Inspection .....	29
2.1.2 Tree Potential Bat Roost (PBRs) Inspection.....	30
2.1.3 Bat Habitat & Commuting Routes Mapping.....	31
2.2 Night-time Bat Detector Surveys.....	31
2.2.1 Dusk & Dawn Bat Surveys .....	31
2.2.2 Passive Static Bat Detector Survey .....	31
2.3 Desktop Review .....	32
2.3.1 Bat Conservation Ireland Database.....	32
2.3.2 Bat Conservation Ireland Bat Landscape Favourability Model.....	32
<b>3. Bat Survey Results .....</b>	<b>34</b>
3.1 Daytime Inspections.....	34
3.1.1 Building & Structure Inspection .....	34
3.1.2 Tree Potential Bat Roost (PBRs) Inspection.....	34
3.1.3 Bat Habitat & Commuting Routes Mapping.....	34
3.2 Night-time Bat Detector Surveys.....	35
3.2.1 Dusk & Dawn Bat Surveys .....	35
3.2.2 Passive Static Bat Detector Survey .....	41
3.3 Desktop Review .....	45
3.3.1 Bat Conservation Ireland Database.....	45
3.3.2 Bat Conservation Ireland Bat Landscape Favourability Model.....	46
3.4 Survey Effort, Constraints & Survey Assessment .....	47
<b>4. Bat Ecological Evaluation .....</b>	<b>48</b>
4.1 Bat Species Recorded & Sensitivity .....	48
4.2 Bat Foraging Habitat & Commuting Routes.....	49
4.3 Zone of Influence – Bat Landscape Connectivity.....	50
4.4 Landscape Plan .....	50
4.5 Lighting Plan.....	51
<b>5. Impact Assessment &amp; Mitigation.....</b>	<b>53</b>
5.1 Bat Mitigation Measures .....	54
5.1.1 Lighting Plan.....	54

5.1.2	Landscaping .....	56
5.1.3	Bat Conservation Measures .....	56
5.1.4	Monitoring .....	57
<b>6.</b>	<b>Survey Conclusions .....</b>	<b>58</b>
<b>7.</b>	<b>Bibliography .....</b>	<b>59</b>
<b>8.</b>	<b>Appendices .....</b>	<b>63</b>
8.1	Appendix 1 Bat Habitat & Commuting Route Classifications .....	63
8.2	Appendix 2 Rocket Bat Boxes .....	65
8.3	Appendix 3 Bat Assessment Tables .....	66
8.4	Appendix 4 – Static Surveillance .....	0
<b>9.</b>	<b>Bat Species Profile .....</b>	<b>68</b>
9.1	Leisler’s bat .....	68
9.2	Common pipistrelle .....	68
9.3	Soprano pipistrelle .....	69
9.4	Brown long-eared Bat .....	69
9.5	Daubenton’s bat .....	70
9.6	Bat Conservation Ireland Bat Species Maps .....	71
	Bat records for County Dublin (Source: <a href="http://www.batconservationireland.org">www.batconservationireland.org</a> ) .....	71

## 1. Introduction

Bat Eco Services was commissioned by Enviroguide Consulting to undertake a bat survey of a proposed development site located at Blackglen Road and Woodside Road, Sandyford, Dublin 18 and this entailed daytime inspection, dusk and dawn surveys, static surveillance and walking transects.

Additional survey work was undertaken in 2022 along with an update of the report to take into consideration Version 2 of the NPWS Mitigation Guidelines (Marnell *et al.*, 2022).

### 1.1 Relevant Legislation & Bat Species Status in Ireland

#### 1.1.1 Irish Statutory Provisions

A small number of animals and plants are protected under Irish legislation (Nelson, *et al.*, 2019). The principal statutory provisions for the protection of animal and plant species are under the Wildlife Act 1976 (as amended) and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. The Flora (Protection) Order 2015 (S.I. no. 356 of 2015) lists the plant species protected by Section 21 of the Wildlife Acts. See [www.npws.ie/legislation](http://www.npws.ie/legislation) for further information.

The codes used for national legislation are as follows:

- WA = Wildlife Act, 1976, Wildlife (Amendment) Act, 2000 and other relevant amendments
- FPO = Flora (Protection) Order, 2015 (S.I. No. 356 of 2015)

#### 1.1.2 EU Legislation

The Birds Directive (Directive 2009/147/EC) and Habitats Directive (Council Directive 92/43/EEC) are the legislative instruments which are transposed into Irish law, *inter alia*, by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) ('the 2011' Regulations), as amended.

The codes used for the Habitats Directive (Council Directive 92/43/EEC) are:

- Annex II Animal and plant species listed in Annex II
- Annex IV Animal and plant species listed in Annex IV
- Annex V Animal and plant species listed in Annex V

The main aim of the Habitats Directive is the conservation of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favourable conservation status. These annexes list habitats (Annex I) and species (Annexes II, IV and V) which are considered threatened in the EU territory. The listed habitats and species represent a considerable proportion of biodiversity in Ireland and the Directive itself is one of the most important pieces of legislation governing the conservation of biodiversity in Europe.

Under Article 11 of the Directive, each member state is obliged to undertake surveillance of the conservation status of the natural habitats and species in the Annexes and under Article 17, to report to the European Commission every six years on their status and on the implementation of the measures taken under the Directive. In April 2019, Ireland submitted the third assessment of conservation status for 59 habitats and 60 species. There are three volumes with the third listing details of the species assessed.



Article 12 of the Habitats Directive requires Member States to take measures for the establishment of a strict protection regime for animal species listed in Annex IV(a) of the Habitats Directive within the whole territory of Member States. Article 16 provides for derogation from these provisions under defined conditions. These provisions are implemented under Regulations 51 and 54 of the 2011 Regulations.

### *1.1.3 IUCN Red Lists*

The International Union for the Conservation of Nature (IUCN) coordinates the Red Listing process at the global level, defining the categories so that they are standardised across all taxa. Red Lists are also produced at regional, national and subnational levels using the same IUCN categories (IUCN 2012, 2019). Since 2009, Red Lists have been produced for the island of Ireland by the National Parks and Wildlife Service (NPWS) and the Northern Ireland Environment Agency (NIEA) using these IUCN categories. To date, 13 Red Lists have been completed. The Red Lists are an assessment of the risk of extinction of each species and not just an assessment of their rarity. Threatened species are those species categorised as Critically Endangered, Endangered or Vulnerable (IUCN, 2019) – also commonly referred to as ‘Red Listed’.

### *1.1.4 Irish Red List - Mammals*

Red Lists in Ireland refer to the whole island, i.e. including Northern Ireland, and so follow the guidelines for regional assessments (IUCN, 2012, 2019). The abbreviations used are as follows:.

- RE Regionally Extinct
- CR Critically Endangered
- EN Endangered
- VU Vulnerable
- NT Near Threatened
- DD Data Deficient
- LC Least Concern
- NA Not Assessed
- NE Not Evaluated

There are 27 terrestrial mammals species in Ireland, which includes the nine resident bat species listed. The terrestrial mammal, according to Marnell *et al.*, 2019, list for Ireland consists of all terrestrial species native to Ireland or naturalised in Ireland before 1500. The IUCN Red List categories and criteria are used to assess that status of wildlife. This was recently completed for the terrestrial mammals of Ireland. Apart from the two following two mammal species (grey wolf *Canis lupus* (regionally extinct) and black rat *Rattus rattus* (Vulnerable)), the remaining 25 species were assessed as least concern in the most recent IUCN Red List publication by NPWS (Marnell *et al.*, 2019).

### *1.1.5 Irish Bat Species*

All Irish bat species are protected under the Wildlife Act (1976) and Wildlife Amendment Acts (2000 and 2010). Also, the EC Directive on The Conservation of Natural habitats and of Wild Fauna and Flora (Habitats Directive 1992), seeks to protect rare species, including bats, and their habitats and requires that appropriate monitoring of populations be undertaken. All Irish bats are listed in Annex IV of the Habitats Directive and the lesser horseshoe bat *Rhinolophus hipposideros* is further listed under Annex II. Across Europe, they are further protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), which, in relation to bats, exists to conserve all species and their habitats. The Convention on the Conservation of Migratory Species

of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries. The Irish government has ratified both these conventions.

Also, under existing legislation, the destruction, alteration or evacuation of a known bat roost is an offence. The most recent guidance document is “Guidance document on the strict protection of animal species of Community interest under the Habitats Directive (Brussels, 12.10.2021 C(2021) 7391 final”.

Regulation 51(2) of the 2011 Regulations provides –

*“(2) Notwithstanding any consent, statutory or otherwise, given to a person by a public authority or held by a person, except in accordance with a licence granted by the Minister under Regulation 54, a person who in respect of the species referred to in Part 1 of the First Schedule—*

*(a) deliberately captures or kills any specimen of these species in the wild, (b) deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration,*

*(c) deliberately takes or destroys eggs of those species from the wild,*

*(d) damages or destroys a breeding site or resting place of such an animal, or*

*(e) keeps, transports, sells, exchanges, offers for sale or offers for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Habitats Directive,*

*shall be guilty of an offence.”*

The grant of planning permission does not permit the commission of any of the above acts or render the requirement for a derogation licence unnecessary in respect of any of those acts.

Any works interfering with bats and especially their roosts, may only be carried out under a derogation licence granted by National Parks and Wildlife Service (NPWS) pursuant to Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011 (which transposed the EU Habitats Directive into Irish law).

There are eleven recorded bat species in Ireland, nine of which are considered resident on the island. Eight resident bat species and one of the vagrant bat species are vesper bats and all vespertilionid bats have a tragus (cartilaginous structure inside the pinna of the ear). Vesper bats are distributed throughout the island. Nathusius’ pipistrelle *Pipistrellus nathusii* is a recent addition while the Brandt’s bat has only been recorded once to-date (Only record confirmed by DNA testing, all other records has not been genetically confirmed). The ninth resident species is the lesser horseshoe bat *Rhinolophus hipposideros*, which belongs to the Rhinolophidae and has a complex nose leaf structure on the face, distinguishing it from the vesper bats. This species’ current distribution is confined to the western seaboard counties of Mayo, Galway, Clare, Limerick, Kerry and Cork. The eleventh bat species, the greater horseshoe bat, was only recorded for the first time in February 2013 in County Wexford and is therefore considered to be a vagrant species. A total of 41 SACs have been designated for the Annex II species lesser horseshoe bat (1303), of which nine have also been selected for the Annex I habitat ‘Caves not open to the public’ (8310).

Irish bat species list is presented in Table 1 along with their current status.

Table 1: Status of the Irish bat fauna (Marnell *et al.*, 2019).

Species: Common Name	Irish Status	European Status	Global Status
<b>Resident Bat Species ^</b>			
Daubenton's bat <i>Myotis daubentonii</i>	Least Concern	Least Concern	Least Concern
Whiskered bat <i>Myotis mystacinus</i>	Least Concern	Least Concern	Least Concern
Natterer's bat <i>Myotis nattereri</i>	Least Concern	Least Concern	Least Concern
Leisler's bat <i>Nyctalus leisleri</i>	Least Concern	Least Concern	Least Concern
Nathusius' pipistrelle <i>Pipistrellus nathusii</i>	Least Concern	Least Concern	Least Concern
Common pipistrelle <i>Pipistrellus pipistrellus</i>	Least Concern	Least Concern	Least Concern
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	Least Concern	Least Concern	Least Concern
Brown long-eared bat <i>Plecotus auritus</i>	Least Concern	Least Concern	Least Concern
Lesser horseshoe bat <i>Rhinolophus hipposideros</i>	Least Concern	Least Concern	Least Concern
<b>Possible Vagrants ^</b>			
Brandt's bat <i>Myotis brandtii</i>	Data deficient	Least Concern	Least Concern
Greater horseshoe bat <i>Rhinolophus ferrumequinum</i>	Data deficient	Near threatened	Near threatened

^ Roche *et al.*, 2014

## 1.2 Relevant Guidance Documents

This report will draw on guidelines already available in Europe and will use the following documents:

- National Roads Authority (2006) Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes
- Collins, J. (Editor) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3<sup>rd</sup> edition). Bat Conservation Trust, London
- McAney, K. (2006) A conservation plan for Irish vesper bats, Irish Wildlife Manual No. 20 National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- Marnell, F., Kelleher, C. & Mullen, E. (2022) Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland (Version 1: Kelleher & Marnell, 2006).
- The status of EU protected habitats and species in Ireland: Conservation status in Ireland of habitats and species listed in the European Council Directive on the Conservation of Habitats, Flora and Fauna 92/43/EEC. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government.
- Bat Conservation Trust (2018) Bats and artificial lighting in the UK: bats and the built environment series. Guidance Note 08/2019. BCT, London.
- Guidance document on the strict protection of animal species of Community interest un the Habitats Directive (Brussels, 12.10.2021 C(2021) 7391 final.
- EPA (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports. EPA, Ireland.

Collins (2016) is the principal document used to provide guidance in relation to bat survey effort required but the level of surveying is assessed on a case-by-case basis taking into consideration the historical bat records for the survey area, presence of built, structures and trees potentially suitable for roosting bats and the presence of suitable bat habitats for foraging and commuting. Additional reference is made to this document in relation to determining the value of buildings, trees etc. as bat roosts. The tables referred to from this document are described in the following section and in the section on methodology.

Marnell *et al.* (2022) is referred to for guidance in relation to survey guidance (timing and survey design), derogation licences and mitigation measures.

### *1.2.1 Bat Survey Requirements & Timing*

With reference to Collins (2016) and Marnell *et al.* (2022), the information presented in this section is used to determine the bat survey requirements for the proposed development site. Collins (2016) provides a trigger list in relation to determining if a bat survey is required and this is presented Appendix 3 (Figure B) for reference. In addition, Chapter 2 of Collins (2016) discusses that a bat survey is required when proposed activities are likely to impact on bats and their habitats. The level of surveying is to be determined by the ecologist and these are influenced by the following criteria:

- Likelihood of bats being present;
- Type of proposed activities;
- Scale of proposed activities;
- Size, nature and complexity of the site;
- Species concerned;
- No. of individuals.

Collins (2016) also provides the following table detailing when different survey components should be undertaken.

Table 2.2 Recommended UK survey times for survey types described in these guidelines.												
Survey type	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Preliminary ecological appraisal – fieldwork												
Preliminary roost assessment – structures <sup>a</sup>												
Emergence/re-entry survey for maternity or summer roosts <sup>b</sup>												
Emergence/re-entry <sup>c</sup> survey for transitional roosts <sup>b</sup>												
Emergence survey for mating roosts <sup>b</sup>												
Hibernation survey – structures <sup>a</sup>												
Preliminary ground level roost assessment – trees <sup>d</sup>												
Potential roost feature (PRF) inspection survey – trees												
Ground level bat activity survey – transects and automated/static												
Pre-, during and post-hibernation – automated/static bat activity survey												
Swarming survey												
Back-tracking survey												
Trapping survey <sup>e</sup>												
Radio tagging and tracking survey <sup>e</sup>												

= optimal period
  = sub-optimal period

= weather or location dependent (i.e. may not be suitable due to spring and autumn conditions in any one year or in more northerly latitudes). Note that October surveys are not acceptable in Scotland.

**Figure 1a:** Table 2.2 reproduced from Collins (2016).

### 1.2.1.1 Buildings & Structures

In Marnell *et al.* (2022), Table 3 (The applicability of survey methods) provides information on the type of surveys that can be undertaken according to the different seasons.

Marnell *et al.* (2022) states that it is more suitable to survey buildings in the summer months. The following is a summary of the principal points:

1. The presence of a significant bat roost (invariably a maternity roost) can normally be determined on a single visit at any time of year, provided that the entire structure is accessible and that any signs of bats have not been removed by others. However, a visit during the summer or autumn has the advantage that bats may be seen or heard.
2. Roosts used by a small number of bats, as opposed to maternity sites, can be particularly difficult to detect and may require extensive searching backed up (in summer) by bat detector surveys or emergence counts.
3. If the entire building is not accessible or signs of bats may have been removed by others, or by the weather, bat detector or exit count methodologies may be required to back up a limited search.



**Table 3.** The applicability of survey methods.

Season	Roost type	Inspection	Bat detectors and emergence counts
Spring (Mar – May)	Building	Suitable (signs, perhaps bats)	Limited, weather dependent
	Trees	Difficult (best for signs before leaves appear)	Rarely useful
	Underground	Suitable (signs only)	Static detectors may be useful
Summer (June–August)	Building	Suitable (signs and bats)	Suitable
	Trees	Difficult	Limited; use sunrise survey
	Underground	Suitable (signs only)	Rarely useful
Autumn (September–November)	Building	Suitable (signs and bats)	Limited, weather dependent
	Trees	Difficult	Rather limited weather dependent; use sunrise survey?
	Underground	Suitable (signs, perhaps bats)	Static detectors may be useful
Winter (December–February)	Building	Suitable (signs, perhaps bats))	Rarely useful
	Trees	Difficult (best for signs after leaves have gone)	Rarely useful
	Underground	Suitable (signs and bats)	Static detectors may be useful

**Figure 1b:** Table 3 reproduced from Marnell *et al.* (2022).

The following table is used to determine the level and timing of surveys for buildings/structures with reference to the surrounding habitat. Buildings are assessed to determine their suitability as a bat roost and are described using the parameters Negligible, Low, Medium or High suitability in view of Table 2 from Marnell *et al.* (2022). The level of suitability informs the level of surveying and timing of surveys required based on Table 7.3 of Collins, 2016 (Note: These two tables are presented in Appendix 1 but a summary is provided in the table below).

**Table 2a: Building Bat Roost Classification System & Survey Effort (Adapted from Collins, 2016 and Marnell *et al.*, 2022).**

Suitability Category	Description (examples of criteria)	Survey Effort (Timings)
<b>Negligible</b>	Building have no potential as a roost site Urban setting, heavily disturbed, building material unsuitable, building in poor condition etc.	No surveys required.
<b>Low</b>	Building has a low potential as a roost site. No evidence of bat usage (e.g. droppings)	One dusk or dawn survey.
<b>Medium</b>	Building with some suitable voids / crevices for roosting bats. Some evidence of bat usage Suitable foraging and commuting habitat present.	At least one survey in May to August, minimum of two surveys (one dusk and one dawn).
<b>High</b>	Building with many features deemed suitable for roosting bats. Evidence of bat usage. Largely undisturbed setting, rural, suitable foraging and commuting habitat, suitable roof void and building material.	At least two surveys in May to August, with a minimum of three surveys (at least one dusk survey and one dawn survey).

### 1.2.1.2 Trees

Marnell *et al.* (2022) recommends the following in relation to detecting roosts in trees:

- “The best time to carry out surveys for suitable cavities is between November and April, when the trunk and branches are not obscured by leaves. If inspection suggests that the tree has suitable cavities or roost sites, a bat detector survey at dusk or dawn during the summer may help to produce evidence of bats, though the nomadic nature of most tree-dwelling species means that the success rate is very low.
- It can also be difficult to pinpoint exactly which tree a bat emerged from. A dawn survey is more likely to be productive than a dusk one as swarming bats returning to the roost are much more visible than those leaving the roost. Because tree-dwelling bats move roosts frequently, a single bat-detector survey is unlikely to provide adequate evidence of the absence of bats in trees that contain a variety of suitable roosting places.
- Several dawn or dusk surveys spread over a period of several weeks from June to August will greatly increase the probability of detecting significant maternity roosts and is recommended where development proposals will involve the loss of multiple trees”.

As a consequence, the BTHK (2018) Potential Roost Features (PRFs) list and the classification system adapted from Collins (2016) is recommended as part of the daytime inspection of trees to determine their PBR or Potential Bat Roost value. Details of the methodology followed is presented in Section 3.2.2.

### 1.2.1.3 Underground Structures

Marnell *et al.* (2022) recommends the following in relation to underground structures:

1. Underground structures are used mainly for hibernation, so surveys should generally be carried out during the winter.

## 1.2.2 Evaluation & Assessment Criteria

Based on the information collected during the desktop studies and bat surveys, an ecological value is assigned to each bat species recorded based on its conservation status at different geographical scales (Table 2b). For example, a site may be of national ecological value for a given species if it supports a significant proportion (e.g. 5%) of the total national population of that species.

**Table 2b: The six-level ecological valuation scheme used in the CIEM Guidelines (2016) Ecological Value**

Ecological Value	Geographical Scale of Importance
International	International or European scale
National	The Republic of Ireland or the island of Ireland scale (depending on the bat species)
Regional	Province scale: Leinster
County	County scale: County Dublin
Local	Proposed development and immediate surroundings
Negligible	None, the feature is common and widespread

If bat roosts are recorded, their roost status is determined using Figure 20 from Marnell *et al.* (2022). This figure is presented below (Figure 1c). This figure is also used to determine the conservation significance of the roost in order to prepare appropriate bat mitigation measures.

Impacts on bats can arise from activities that may result in:

- Physical disturbance of bat roosts e.g. destruction or renovation of buildings
- Noise disturbance e.g. increase human presence, use of machinery etc.
- Lighting disturbance
- Loss of roosts e.g. destruction or renovation of buildings
- Modifications of commuting or foraging habitats
- Severance or fragmentation of commuting routes
- Loss of foraging habitats.

It is recognised that any development will have an impact on the receiving environment, but the significance of the impact will depend on the value of the ecological features that would be affected. Such ecological features will be those that are considered to be important and potentially affected by the proposed development.

The guidelines consulted recommend that the potential impacts of a proposed development on bats are assessed as early as possible in the design stage to determine any areas of conflicts. In particular the Table 4 (presented as Figure 1d below) and Figure 20 (presented as Figure 1c) from Marnell *et al.* (2022) are referenced during this process.

<div>Low</div> <div>Conservation significance</div> <div>High</div>	<b>Roost status</b>	<b>Mitigation/compensation requirement (depending on impact)</b>
	Feeding perches of common/rarer species	Flexibility over provision of bat- boxes, access to new buildings etc. No conditions about timing or monitoring
	Individual bats of common species	
	Small numbers of common species. Not a maternity site	
	Feeding perches of Annex II species	Provision of new roost facilities where possible. Need not be exactly like-for-like, but should be suitable, based on species' requirements. Minimal timing constraints or monitoring requirements
	Small numbers of rarer species. Not a maternity site	Timing constraints. More or less like-for-like replacement. Bats not to be left without a roost and must be given time to find the replacement. Monitoring for 2 years preferred.
	Hibernation sites for small numbers of common/rarer species	
	Maternity sites of common species	
	Maternity sites of rarer species	Timing constraints. Like-for-like replacement as a minimum. No destruction of former roost until replacement completed and usage demonstrated. Monitoring for at least 2 years.
	Significant hibernation sites for rarer/rarest species or all species assemblages	Oppose interference with existing roosts or seek improved roost provision. Timing constraints. No destruction of former roost until replacement completed and significant usage demonstrated. Monitoring for as long as possible.
Sites meeting SAC guidelines		
Maternity sites of rarest species		

**Figure 20** Guidelines for proportionate mitigation. The definition of common, rare and rarest species requires regional interpretation.

**Figure 20** Guidelines for proportionate mitigation. The definition of common, rare and rarest species requires regional interpretation.

**Figure 1c:** Figure 20 (p 46) Reproduced from Marnell *et al.* (2022).

**Table 4** The scale of main impacts at the site level on bat populations. [NB This is a general guide only and does not take into account species differences. Medium impacts, in particular, depend on the care with which any mitigation is designed and implemented and could range between high and low.]

Roost type	Development effect	Scale of impact		
		Low	Medium	High
Maternity	Destruction			✓
	Isolation caused by fragmentation			✓
	Partial destruction; modification		✓	
	Temporary disturbance outside breeding season	✓		
	Post-development interference			✓
Major hibernation	Destruction			✓
	Isolation caused by fragmentation			✓
	Partial destruction; modification		✓	
	Temporary disturbance outside hibernation season	✓		
	Post-development interference			✓
Minor hibernation	Destruction			✓
	Isolation caused by fragmentation			✓
	Partial destruction, modification		✓	
	Modified management		✓	
	Temporary disturbance outside hibernation season	✓		
	Post-development interference		✓	
	Temporary destruction, then reinstatement	✓		
Mating	Destruction		✓	
	Isolation caused by fragmentation		✓	
	Partial destruction	✓		
	Modified management	✓		
	Temporary disturbance	✓		
	Post-development interference	✓		
	Temporary destruction, then reinstatement	✓		
Night roost	Destruction	✓		
	Isolation caused by fragmentation	✓		
	Partial destruction	✓		
	Modified management	✓		
	Temporary disturbance	✓		
	Post-development interference	✓		
	Temporary destruction, then reinstatement	✓		

**Figure 1d:** Table 4 (p 44) Reproduced from Marnell *et al.* (2022).



Different parameters are considered for the overall assessment of the potential impact(s) of a proposed development on local bat populations.

The overall impacts of the proposed project on local bat populations is assessed using the following criteria:

- Impact Quality using the parameters Positive, Neutral or Negative Impact (based on EPA, 2022, Table 3.4)

**Table 2c: Criteria for assessing impact quality based on EPA, 2022,**

Quality of Effect	Criteria
<b>Positive</b>	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
<b>Neutral</b>	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
<b>Negative</b>	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

- Impact Significance of potential impact parameters on specific bat species in relation to particular elements (e.g. roosting sites, foraging area and commuting routes) are assessed with reference to the following:
  - o Table 4 of Marnell *et al.* (2022) (Figure 1a);
  - o the known ecology and distribution of the bat species in Ireland;
  - o bat survey results including type of roosts (if any recorded), pattern of bat usage of the survey area, level of bat activity recorded etc.
  - o and bat specialist experience.
- Impact Significance of the proposed development on local bat populations maybe determine, where applicable, using the parameters listed in Table 2d (based on EPA, 2022, Table 3.4).

**Table 2d: Criteria for assessing significance of effects based on EPA, 2022.**

Significance of Effects	Definition
<b>Imperceptible</b>	An effect capable of measurement but without significant consequences.
<b>Not significant</b>	An effect which causes noticeable changes in the character of the environment but without significant consequences.
<b>Slight</b>	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
<b>Moderate</b>	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
<b>Significant</b>	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
<b>Very Significant</b>	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
<b>Profound</b>	An effect which obliterates sensitive characteristics

The following terms will be used, where possible and applicable, when quantifying the probability and duration of the potential effects (selected from EPA, 2022, Table 3.4):

<b>Describing the Probability of Effects</b> Descriptions of effects should establish how likely it is that the predicted effects will occur so that the CA can take a view of the balance of risk over advantage when making a decision.	<b>Likely Effects</b> The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	<b>Unlikely Effects</b> The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
<b>Describing the Duration and Frequency of Effects</b> 'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	<b>Momentary Effects</b> Effects lasting from seconds to minutes.
	<b>Brief Effects</b> Effects lasting less than a day.
	<b>Temporary Effects</b> Effects lasting less than a year.
	<b>Short-term Effects</b> Effects lasting one to seven years.
	<b>Medium-term Effects</b> Effects lasting seven to fifteen years.
	<b>Long-term Effects</b> Effects lasting fifteen to sixty years.
	<b>Permanent Effects</b> Effects lasting over sixty years.
	<b>Reversible Effects</b> Effects that can be undone, for example through remediation or restoration.
	<b>Frequency of Effects</b> Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).

Figure 1e: Criteria for assessing significance of effects based on EPA, 2022 (Taken from Table 3.4),

This table continues to provide terminology in relation to “Describing the Types of Effects” as presented below.

<b>Describing the Types of Effects</b>	<b>Indirect Effects (a.k.a. Secondary or Off-site Effects)</b> Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	<b>Cumulative Effects</b> The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
	<b>'Do-nothing Effects'</b> The environment as it would be in the future should the subject project not be carried out.
	<b>'Worst-case' Effects</b> The effects arising from a project in the case where mitigation measures substantially fail.
	<b>Indeterminable Effects</b> When the full consequences of a change in the environment cannot be described.
	<b>Irreversible Effects</b> When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	<b>Residual Effects</b> The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	<b>Synergistic Effects</b> Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SO <sub>x</sub> and NO <sub>x</sub> to produce smog).

Figure 1f: Criteria for assessing significance of effects based on EPA, 2022 (Taken from Table 3.4).

### 1.2.3 Bat Mitigation Measures

#### 1.2.3.1 Bats & Lighting

All European bat species, including Irish bat species, are nocturnal. Light levels as low as typical full moon levels, i.e. around 0.1 LUX, can alter the flight activity of bats (Voigt *et al.* 2018). Any level of artificial light above that of moonlight can mask the natural rhythms of lunar sky brightness and, thus, can disrupt patterns of foraging and mating and might, for instance, interfere with entrainment of the circadian system.

Artificial light pollution is an increasing global problem (Rich and Longcore, 2006) and Artificial light at night (ALAN) is considered a major threat to biodiversity, especially to nocturnal species. As urbanisation expands into the landscape, the degree of street lighting also expands. Its ecological impacts can have a profound effect on the behaviour of nocturnal animals including impacts on reproductive behaviours, orientation, predator-prey interaction and competition among others, depending on the taxon and ecosystem in question (Longcore and Rich 2004). It is considered by Hölker *et al.* (2010) to be a key biodiversity threat to biodiversity conservation. In relation to bats, the potential impacts of artificial night lighting can result in habitat fragmentation (Hanski, 1998), delay in roost emergence (Downs *et al.*, 2003) and a reduction in prey items.

In the context of behavioural ecology, lights can work to attract or repel certain animals. Many groups of insects, including moths, lacewings, beetles, bugs, caddisflies, crane flies, midges, hoverflies and wasps, can be attracted to artificial light (Eisenbeis and Hassel 2000; Frank 1988; Kolligs 2000). Attraction depends on the spectrum of light. In the context of street lights, white (mercury vapour) lamps emit a white light that includes ultraviolet. High pressure sodium lights (yellow) emit some ultraviolet, while low pressure sodium lamps (orange) emit no ultraviolet light (e.g. Rydell 2006). As a result of the attractiveness of lights to aerial invertebrates, swarms of insects often occur in and around street lights and, particular bat species such as aerial insect predators, can exploit the swarming insects to their advantage. Such attraction can also take prey items away from dark zones where light sensitive species are foraging, thus reducing their likelihood of feeding effectively.

Rydell (2006) divides bats into four categories in terms of their characteristic behaviours at street lamps. The four categories are based on bat size, wing morphology and echolocation call characteristics which were highlighted by Norberg and Rayner (1987) to determine flight speed, manoeuvrability, and prey detection capabilities of bats. Rydell (2006) stated that the large, fast flying bats, which are confined to open airspace, fly high over lit areas and are rarely observed near ground level. None of these, typically large free-tailed bats (e.g. large species of the family Molossidae), are found in Ireland. The second category are the medium-sized fast flying species, including the *Nyctalus* species, which patrol the street well above the lights and can be seen occasionally as they dive for prey into the light cone. This group includes the Leisler's bat, which is found in Ireland. Rydell's third category describes the small but fast flying bats that are manoeuvrable enough to forage around light posts or under the lights, and includes the small *Pipistrellus* species of the old world, three of which are found in Ireland. The fourth category includes broad-winged slow flyers, most of which are seldom or never observed at lights. Slow flying bat species may be more vulnerable to predation by diurnal birds of prey and this may restrict their exploitation of insects around artificially illuminated areas (e.g. Speakman 1991). There are also the concerns that some bat species are more light sensitive and therefore actively avoid lit up areas. This is particularly relevant for lesser horseshoe bats. Therefore from this, we can categorise the suite of Irish bats species as follows (please note that the sensitivity category is the author's description):

**Table 3: Potential light sensitivity of the Irish bat fauna using categories described by Rydell, 2006.**

<b>Species: Common Name</b>	<b>Rydell Category</b>	<b>Sensitivity</b>
<b>Daubenton's bat <i>Myotis daubentonii</i></b>	Category 4	Light sensitive
<b>Whiskered bat <i>Myotis mystacinus</i></b>	Category 4	Light sensitive
<b>Natterer's bat <i>Myotis nattereri</i></b>	Category 4	Light sensitive
<b>Leisler's bat <i>Nyctalus leisleri</i></b>	Category 2	Light tolerant
<b>Nathusius' pipistrelle <i>Pipistrellus nathusii</i></b>	Category 3	Semi-tolerant
<b>Common pipistrelle <i>Pipistrellus pipistrellus</i></b>	Category 3	Semi-tolerant
<b>Soprano pipistrelle <i>Pipistrellus pygmaeus</i></b>	Category 3	Semi-tolerant
<b>Brown long-eared bat <i>Plecotus auritus</i></b>	Category 4	Light sensitive
<b>Lesser horseshoe bat <i>Rhinolophus hipposideros</i></b>	Category 4	Light sensitive

The ability of different bat species to exploit insects gathered around street lights varies greatly. Gleaning species such as *Myotis* bats rarely forage around street lights (Rydell and Racey, 1995). The ecological effects of illuminating aquatic habitats are also poorly known. Moore *et al.* (2006) found that light levels in an urban lake, subject simply to sky glow and not direct illumination from lights, reached the same order of magnitude as full moonlight.

All European bat species, including Irish bat species, are nocturnal. As a consequence, the scientific literature provides evidence that artificial lighting does impacts on bats. The degree of impact depends on the light sensitivity of the bat species and the type of luminaire. Lesser horseshoe bats are light sensitive and therefore adversely effected by the presence of lighting in all aspects of their life strategies (e.g. foraging, commuting, drinking and roosting).

The potential impacts of street lighting can be summarised as follows:

- Attracting Prey Items

Lights can work to attract or repel certain animals. Many groups of insects can be attracted to artificial light and this attraction depends on the spectrum of light. As a result of the attractiveness of lights to aerial invertebrates, swarms of insects often occur in and around street lights. Such attraction can also take prey items away from dark zones where light sensitive species, such as lesser horseshoe bats, are foraging, thus reducing their likelihood of feeding effectively.

- Reducing Foraging Habitat

The research documents state that there is less bat species diversity foraging in habitats lit up by artificial lighting. Only bat species considered to be light tolerant are generally able to exploit habitats with lighting present, but overall, all bat species activity tends to be less in lit up habitats compared to non-lit up habitats.

- Fragmenting The Landscape

Scientific evidence shows that lighting is a barrier to the movement of light sensitive bat species, such as lesser horseshoe bats. Light sensitive bat species will actively seek dark corridors to commute along and therefore the presence of lighting in commuting habitats will restrict their movement of such species in the landscape.

- Reducing Drinking Sites

There is increasing evidence that drinking sites for bats is an essential component for local bat population survival and that the presence of artificial lighting at waterbodies prevents bats from availing of this resource.

Lighting, including street lights come in an array of different types but for street lights they typically include High Pressure Sodium, Low Pressure Sodium, Mercury Vapour and the more modern Light Emitting Diodes (LED). An array of field-based research has been undertaken to document the potential impact of lighting on bat flight activity. LED lighting is predicted to constitute 70% of the outdoor and residential lighting markets by 2020. While the use of LEDs promotes energy and cost savings relative to traditional lighting technologies, little is known about the effects these broad-spectrum “white” lights will have on wildlife, human health, animal welfare, and disease transmission. As a consequence, a large array of research has been undertaken recently on the potential impact of LED on bats.



Stone *et al.* (2012) undertook research in relation to “Cool” LED street lights on an array of local bat species in England. Overall the presence of LED street lights had a significant negative impact on lesser horseshoe bats and *Myotis* spp. for all light treatments investigated while there was no sign impact of light treatment type on *Pipistrellus pygmaeus* (soprano pipistrelle – a common Irish bat species) or *Nyctalus* (Leisler’s bats is part of this bat family and is a common Irish bat species)/*Eptesicus* species. This research paper also documented behavioural changes for the different bat species. Lesser horseshoe bats and *Myotis* spp. did not avoid lights by flying along the other side of the hedge but altered their commuting behaviour altogether. It was concluded that LEDs can fragment commuting routes causing bats to alter their behaviour with potentially negative conservation consequences. Lesser horseshoe bat activity was significantly lower during high intensity treatment than medium, but at all treatment levels (even as low as 3.6 LUX), activity was significantly lower than unlit control (LUX level measurements were taken at 1.7m at the hedge below the light).

Russo *et al.* (2017) investigated the impact of LED lighting on drinking areas for bats in Italy. Drinking sites are considered to be important components for the survival of local bat populations. Drinking sites were illuminated with a portable LED outdoor light emitting (48 high-power LEDs generated a light intensity of 6480 lm (4000–4500 K) at 25°C, two peaks of relative luminous flux at 450 and 590 nm). *Plecotus auritus* (brown long-eared bat – resident in Ireland), *Pipistrellus pygmaeus* (soprano pipistrelle – resident in Ireland) and *Rhinolophus hipposideros* (lesser horseshoe bat – resident in Ireland) did not drink when troughs were illuminated.

Rowse *et al.* (2018) researched the impacts of LED lights (portable lights, 97W 4250K LED on 10m high poles) in England on local bat populations. Treatments were either 100% light intensity; dimmed (using pulse width modulation) at 50% or 25% light intensity; and unlit. Sites were in suburban areas along busy roads but with vegetation and tree lines adjacent. High light levels (50% & 100% light treatments) increased activity of opportunistic *Pipistrellus pipistrellus* (common pipistrelle – resident in Ireland) but reduced activity of *Myotis* species group. Conversely 25% and unlit sites had no difference from each other. The research paper conclude that dimming could be an effective strategy to mitigate ecological impacts of street lights.

Wakefield *et al.* (2017) stated that an important factor to be aware of in relation to LED is the direction of the light projected. Therefore it is recommended that highly focused/shielded LEDS designed to filter out short wavelengths of light should be used as they attract relatively fewer insects. Less insects attracted to street lights means less insects leaving dark zones where light sensitive bat species primarily feed.

Martin *et al.* (2021) showed that LED street lights lead to a reduction in the total number of insects captured with light traps in a wide range of families. Coleoptera and Lepidoptera orders were the most sensitive groups to ecological light pollution in the study area. The paper suggested that LED was the least attractive light system for most of the affected groups both because of its very little emitted short-wavelength light and because of its lower light intensity. They also concluded that reduction in insect attraction to LED could be even larger with current LED technologies emitting warmer lights, since other research showed that LED emitting “warmer white” colour light (3000 K) involves significantly lower attraction for insects than “colder white” LED (6000 K).

Wilson *et al.* (2021) investigate the impact of LED on biting insects and concluded because LED is highly malleable with regard to spectral composition, they can be tailored to decrease or increase insect catches, depending on situation. Therefore this design control of LED could greatly assist in reducing impact of street lighting on local bat populations.

Stone *et al.* (2015) reviewed the impacts of ALAN on bat roosts and flight paths in order to provide recommendations in relation to street lighting. The principal recommendations were to avoid lighting places where bats are present and to ensure that there are interconnected light exclusion zones and variable light regimes with reduced intensity of light in specific areas (e.g. important foraging and commuting habitats) as responses to street lighting may vary between species. It recommends that there should be a 'light threshold'.

#### *1.2.3.1.1 Lighting Guidelines – Effective Mitigation Measures*

As a consequence of this extensive amount of research there are two principal guideline documents available for best practice for effective mitigation relating to outdoor lighting.

EUROBATS (Voigt *et al.*, 2018) guidelines recommends the following:

- ALAN should be strictly avoided, and artificial lighting should be installed only where and when necessary coupled with the following:
  - o Dynamic lighting schemes, where possible.
  - o Use a minimal number of lighting points and luminaires on low positions in relation to the ground for minimising light trespass to adjacent bat habitats or into the sky.
  - o Use focused light, e.g. by using LED or shielded luminaires which limit the light flux only to the required areas and prevent light trespass into adjacent bat habitats.
  - o Create screens, either by erecting walls or by planting hedgerows or trees, to prevent light trespass, e.g. from illuminated roads, to surrounding bat habitats.
  - o Exits of bat roosts and a buffer zone around them should be protected from direct or indirect lighting to preserve the natural circadian rhythm of bats.

This BCT (2018) guidelines provides a list of recommendations in relation to luminaire design, which is based on the extensive research completed to-date on the potential impact of lighting on bats, and therefore provides best practice mitigation measures. These recommendations are the basis of mitigation measures pertaining to bats listed in this report and are summarised as follows:

- All luminaires used should lack UV/IR elements to reduce impact.
- A warm white spectrum (<2700 Kelvins should be used to reduce the blue light component of the LED spectrum).
- Luminaires should have a peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- Only luminaires with an upward light ratio of 0% and with good optical control should be used.
- Luminaires should be mounted on the horizontal, i.e. no upward tilt.
- Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible.
- Bollard lighting should be considered for pedestrian, parks and greenway areas, if deemed necessary.

#### **1.2.3.2 Bat Box Schemes**

Bat Boxes are frequently used as part of bat mitigation to retain local bat populations within an area proposed to be development. The NPWS Bat Mitigation Guidelines (Marnell *et al.* 2022) considers that where roosts of low conservation significance (Figure 20, Marnell *et al.* (2022)) are to be lost due to a development, bat boxes may provide an appropriate form of mitigation and the effectiveness depends on the type of bat box provided, which should be appropriate to the bat species (Figure 1g).

**Table 7** The types of bat box used by different species.

Species	Summer/ maternity	Summer/non breeding	Hibernation*	Notes
<i>Rhinolophus hipposideros</i>	N/A	N/A	N/A	Horseshoe bats cannot use bat boxes
<i>Myotis daubentonii</i>	H	H		
<i>Myotis mystacinus</i>	H	H		
<i>Myotis nattereri</i>	H	?		
<i>Pipistrellus nathusii</i>	H	H		
<i>Pipistrellus pipistrellus</i>	C	C/H	C	H are rarely used as maternity roosts.
<i>Pipistrellus pygmaeus</i>	C	C/H	C	
<i>Nyctalus leisleri</i>	H	H	H?	
<i>Plecotus auritus</i>	H	H		Maternity roosts
Key				
* Large well-insulated hibernation boxes may be more successful				
N/A -not applicable; bat boxes should not be considered as replacement roosts				
H – tree hollow-type box, providing a void in which bats can cluster				
C – tree crevice-type box, with 25-35mm crevices				
? – few data on which to base an assessment				

**Figure 1g:** Table 7 (p 58) Reproduced from Marnell *et al.* (2022).

#### 1.2.3.2.1 Effectiveness of Bat Boxes as a Mitigation Measure

Two publications that provide good scientific advice in relation to the effectiveness of bat boxes are presented below. McAney & Hanniffy (2015) reviewed the use of bat boxes in Ireland in relation to the bat usage of the following bat box schemes: 62 Schwegler boxes of three models erected in Portumna Forest Park (Bat box scheme consisted of 30x 1FF design, 30x 2FN design and 2x 1FW design); 50 2FN boxes erected in Coole-Garryland Nature Reserve and 50 2FN boxes erected in Knockma Nature Reserve of which 40 were later transferred to Glengarriff Nature Reserve County Cork. The bat box schemes were set up in March 1999 and data was collected up to 2015. Eight of the nine resident bat species were recorded roosting in bat boxes (lesser horseshoe bats cannot use bat boxes due to their need to fly, rather than crawl, into roosts). The main summary points are as follows:

- Leisler's, brown long-eared and *Pipistrellus* spp. were recorded in boxes at all three Galway woods, Daubenton's bat was only recorded in Garryland, Natterer's bat was only recorded in Glengarriff and whiskered/Brandt's was recorded just twice.
- There was a 31% chance of encountering a bat at Portumna Forest Park compared to 11.5% and 10% at Coole-Garryland Nature Reserve and Knockma Nature Reserve respectively.
- *Pipistrellus* spp. preferred 1FF boxes as this bat box design offer crevice-like roosting conditions. This species group also showed a seasonal preference with more bats present later in the season (visual observations confirmed the bats were using the boxes as mating roosts) and their numbers increased from the time that the bat box scheme was originally established.
- Brown long-eared bats preferred 2FN boxes that mimic holes in trees, the natural roosting sites for this species. This species also showed no seasonal pattern to their occurrence in the boxes. However one aspect of 2FN boxes that this report mentions is the high occupancy

by birds which can be an issue in relation to nesting material reducing the availability of bat boxes for roosting bats.

- Leisler's bat showed no preference for box model but showed a seasonal preference with more bats present later in the season.
- Aspect was not a significant factor for occupancy but most boxes received dappled sunshine for part of the day.
- The other factor that proved significant was the length of time the boxes were in place, with occupancy rates increasing for all three species, although in the case of pipistrelles this increase appears to have stabilised. So, although the boxes were occupied very quickly, it took several years before they were regularly occupied and before clusters of bats were formed and breeding was confirmed.

Collins *et al.* (2020) investigated the implementation and effectiveness of bat roost mitigation, which included bat boxes, in building developments completed between 2006 and 2014 in England and Wales. The bat species studied were: common and soprano pipistrelle, brown long-eared bat and *Myotis* species, all of which are present in Ireland. A summary of the main points relating to bat boxes are as follows:

- Bat boxes were the most frequently deployed roosting provision (i.e. alternative roosts), being installed at 64% (n = 71) of sites surveyed as a compensation or enhancement measure.
- Box frequencies ranged from 1 to 41 at sites where they were installed, with an average of 6.6 boxes per site.
- Bats, or evidence of bats, were recorded in 20% of these bat boxes.
- Bat boxes mounted externally on buildings showed the highest occupation rate regardless of species while Common pipistrelle showed a preference for these over tree mounted boxes; the opposite was true for soprano pipistrelle.
- The four most popular bat box models used by consultants in the study were all Schwegler woodcrete bat boxes. Bat presence was highest in the 1FF bat box design (32%, n = 53) and lowest for birds (8%). The tree-mounted 2F and wall-integrated 1FR/2FR models both demonstrated similar bat presence rates of 23% (n = 43) and 25% (n = 32) respectively. The 2FN tree-mounted model showed the lowest presence rate for bats (11%, n = 19) and the highest for birds (58%). There were also 26 timber bat boxes, none of which were used by bats.

The author has also erected a number of bat box schemes and, where possible, has completed occasional monitoring visits. One such example is a bat box scheme erected in Kileshandra, Co. Cavan which consists of 8 Schwegler woodcrete bat boxes of various designs. The bat boxes were erected on mature trees located in a linear woodland adjacent to a river. This bat box scheme was erected in 2012 as part of mitigation for the demolition of a large derelict building where small satellite roosts were recorded for *Pipistrellus* spp. and Daubenton's bat. Two site visits have been completed since 2012 and during these visits the bat boxes were checked for evidence of bat usage. The first site visit was on 25/8/2015 and one bat box was occupied by a single Leisler's bat while the additional seven bat boxes had evidence of bat droppings (*Pipistrellus* spp. and *Myotis* spp.). During the second site visit (27/7/2019) four bat boxes were occupied by bats (Soprano pipistrelle x1 individual (adult male), Leisler's bat x1 individual (adult male) and two bat boxes with x16 Daubenton's bats and x10 Daubenton's bats respectively). Biometrics was recorded for the 12 of the bats (which included 10 of the Daubenton's bats recorded in the bat box with 16 individuals) and five of these Daubenton's bats were lactating females with the remaining five Daubenton's bats recorded as juveniles, thereby indicating that this bat box was used as a maternity roost. The remaining four bat boxes all had droppings within for *Pipistrellus* spp and Leisler's bats. This bat box scheme, while

just one example, demonstrates that when bat boxes are erected in an area with good bat habitat (bat survey documented a high level of bat activity for the named bat species), a high level of occupancy of bat boxes will occur.

In relation to bat boxes, Marnell *et al.* (2022), a document that provides guidelines that are considered to be practical and effective based on past experience, recommends that the design life of potential bat boxes, including essential maintenance, should be about 10 years, as this would be comparable with the lifespan of the tree roosts that bat boxes are designed to mimic. The guidelines continues by stating that the “This lifespan can be achieved with good quality wooden boxes and exceeded by woodcrete bat boxes or other types of construction that ensure any softwoods are protected from the weather and attack by squirrels” (note – this includes woodstone bat boxes).

In relation to the number of bat boxes recommended to be erected, Lintott & Mathews (2018) found that the greater the number of bat boxes deployed, the greater the probability of at least one of the boxes becoming occupied and that the odds of bats occupying at least one box increased by approximately 7% with each additional bat box that was deployed. Bat boxes are erected, as part of this proposed development, to mitigate for the loss of potential roosts in trees. Therefore the number of bat boxes are calculated according to the number of trees with additional boxes added for greater bat conservation value.

Therefore Schwegeler woodcrete bat boxes are recommended as a bat mitigation measure and the authors preference to use 1FF designs as this box is open at the bottom which reduces build-up of droppings (i.e. it is a self-cleaning bat box). Both McAney & Hannify (2015) and Collins *et al.* (2020) demonstrated that usage of this bat box design by bat species recorded in this survey report. This bat box is also less likely to be used by birds and therefore retaining it for bat usage between monitoring visits. To increase occupancy of bat boxes by bats it is important to erect bat boxes 4m or higher (to ensure that bat boxes are out of reach from disturbance by humans and predation by other mammals) and that they should be located where bats have been documented foraging and commuting. The aspect of the bat box is not an influencing factor in relation to occupancy. These recommendations have all been included in this report.

### **1.2.3.3 Landscaping For Bats**

Bats depend on the landscape for foraging, roosting and commuting. Different bat species will travel different distances, to and from their principal roosting sites, depending on their morphology, life stage and preferred foraging areas. Bats in Ireland are insect eating mammals and feed on an array of insects, whose populations are ultimately supported by vegetation. Areas of rich vegetation habitat tend to support higher abundances of insect populations and therefore a higher abundance of bats. In addition, many bat species rely on continuous linear habitats (e.g. treelines and hedgerows) to commute along. As a consequence landscaping as part of a proposed development project is an important element to the goal of retaining local bat populations.

The Bat Conservation Trust publication “Landscape and Urban Design for bats and biodiversity” (Gunnell *et al.*, 2012) is a resource for planning landscape design in our urban areas. This resource encourages measures to enhance existing bat foraging habitat, create water features such as ponds (drinking sites for bats and as a source of emerging insects), manage species rich grassland and planting of tall vegetation to ensure that exiting treelines and hedgerows are linked. It also recommends that use of landscaping as a means to creating dark zones or dark corridors for this mammal group to fly along in our lit urban areas. This is also support by the BCT Lighting Guidelines (BCT, 2018) where landscape design can be utilised to buffer potential light spillage from developments.



#### 1.2.3.4 Seasonality of Bat Mitigation Measures

The NPWS Bat Mitigation Guidelines (Marnell *et al.* 2022) provides best practice guidance in relation to the timing of bat mitigation measures. It states that the most common and effective method of avoiding potential harm to a bat is to carry out the work at an appropriate time of the year. The following table provides a summary of timings.

Table 5 Optimum season for works in different types of roosts.	
Bat usage of site	Optimum period for carrying out works (some variation between species)
Maternity	1 <sup>st</sup> October – 1 <sup>st</sup> May
Summer (not a proven maternity site)	1 <sup>st</sup> September – 1 <sup>st</sup> May
Hibernation	1 <sup>st</sup> May – 1 <sup>st</sup> October
Mating/swarming	1 <sup>st</sup> November – 1 <sup>st</sup> August

**Figure 1h:** Table 5 (p 50) Reproduced from Marnell *et al.* (2022).

Timing of bat mitigation measures is relevant to the proposed tree felling of Potential Bat Roosts (PBRs). Felling is recommended outside the principal maternity season and during mild weather conditions (to avoid cold weather that would encourage bats to hibernate). This coupled with dusk/dawn surveys and additional daytime inspections is best practice to ensure that tree felling is completed without causing harm to potentially roosting bats. The preferred tree felling months also avoids the bird nesting season.

## 1.3 Project Description

### 1.3.1 Site Location

The proposed development site is located. There are no buildings within the proposed development area.



Figure 2a: Location of proposed development (Supplied by Enviroguide Consulting).

### 1.3.2 Proposed Project

Zolbury Limited intend to apply to An Bord Pleanála for planning permission for a Strategic Housing Development on a site of c. 3.7 ha at Blackglan Road and Woodside Road, Sandyford, Dublin 18. The development shall consist of a new residential scheme comprising 360 no. residential units, associated resident amenity facilities and a childcare facility in the form of 9 no. new apartment buildings (A1 – C3) as follows:

- Block A1 (4 storeys) comprising 18 no. apartments (3 no. 1 bed units and 15 no. 2 bed units); a crèche facility of approx. 401 sq. m with associated outdoor play space of approx. 20 sq. m; and resident amenity facilities of approx. 30 sq. m.
- Block A2 (3-4 storeys) comprising 24 no. apartments (2 no. 1 bed units and 22 no. 2 bed units) and resident amenity facilities of approx. 390m2.
- Blocks B1 and B2 (2-6 storeys) comprising 69 no. apartments (30 no. 1 bed units, 34 no. 2 bed units, 5 no. 3 bed units).
- Blocks B3 and B4 (2-6 storeys) comprising 62 no. apartments (30 no. 1 bed units, 27 no. 2 bed units and 5 no. 3 bed units).
- Blocks C1, C2 and C3 (3-6 storeys) comprising 187 no. apartments (58 no. 1 bed units, 126 no. 2 bed units and 3 no. 3 bed units); and resident amenity facilities of approx. 187.5 sq. m.

Each residential unit is afforded with associated private open space in the form of a terrace / balcony.

Total Open space (approx. 22,033 sq. m) is proposed in the form of public open space (approx. 17,025 sq. m), and residential communal open space (approx. 5,008 sq. m).

Podium level / basement level areas are proposed adjacent to / below Blocks A2, B1, B2, B3, B4, C1, C2 and C3 (approx. 12,733 sq. m GFA). A total of 419 no. car parking spaces (319 no. at podium/basement level and 100 no. at surface level); to include 80 no. electric power points and 26 no. accessible parking spaces); and 970 no. bicycle spaces (740 no. long term and 230 no. short term), and 19 no. Motorcycle spaces are proposed. 10 no. car spaces for creche use are proposed at surface level.

Vehicular/pedestrian and cyclist access to the development will be provided via Blackglenn Road to tie in with the Blackglenn Road Improvement Scheme. A second access is also proposed via Woodside Road for emergency vehicles, pedestrian and cyclist access only.

The proposal also provides for Bin Storage areas and 4 No. ESBN substations to supply the development. 3 no. sub-stations shall be integrated within the building structures of Blocks B and Blocks C. In addition, one Sub-station shall be classed as a unit sub-station mounted externally on a dedicated plinth.

The associated site and infrastructural works include provision for water services; foul and surface water drainage and connections; attenuation proposals; permeable paving; all landscaping works; green roofs; boundary treatment; internal roads and footpaths; electrical services; and all associated site development works.



Figure 2a: Layout of proposed development (Supplied by Enviroguide Consulting).

## 2. Bat Survey Methodology

### 2.1 Daytime Inspections

One purpose of daytime inspections is to determine the potential of bat roosts within the survey area. Due to the transient nature of bats and their seasonal life cycle, there are a number of different type of bat roosts. Where possible, one of the objectives of the surveys is to be able to identify the types of roosts present, if any. However, the determination of the type of roost present depends on the timing of the survey and the number of bat surveys completed. Consequently, the definition of roost types, in this report, will be based on the following:

**Table 5a: Bat Roost Types (adapted from Collins 2016).**

Roost Type	Definition	Time of Survey
<b>Day Roost</b>	A place where individual bats or small groups of males, rest or shelter in the daytime but are rarely found by night in the summer.	Anytime of the year
<b>Night Roost</b>	A place where bats rest or shelter in the night but are rarely found in the day. May be used by a single bat on occasion or it could be used regularly by the whole colony.	Anytime of the year
<b>Feeding Roost</b>	A place where individual bats or a few bats rest or feed during the night but are rarely present by day.	Anytime of the year
<b>Transitional Roost</b>	A place used by a few individuals or occasionally small groups for generally short periods of time on waking from hibernation or in the period prior to hibernation.	Outside the main maternity and hibernation periods.
<b>Swarming Site</b>	Where large numbers of males and females gather. Appear to be important mating sites.	Late summer and autumn
<b>Mating Site</b>	Where mating takes place.	Late summer and autumn
<b>Maternity Site</b>	Where female bats give birth and raise their young to independence.	Summer months
<b>Hibernation Site</b>	Where bats are found, either individually or in groups in the winter months. They have a constant cool temperature and humidity.	Winter months in cold weather conditions
<b>Satellite Roost</b>	An alternative roost found in close proximity to the main nursery colony and is used by a few individuals throughout the breeding season.	Summer months

#### 2.1.1 Building & Structure Inspection

Structures, buildings and other likely places that may provide a roosting space for bats are inspected during the daytime for evidence of bat usage. Evidence of bat usage is in the form of actual bats (visible or audible), bat droppings, urine staining, grease marks (oily secretions from glands present on stonework) and claw marks. In addition, the presence of bat fly pupae (bat parasite) also indicated that bat usage of a crevice, for example, has occurred in the past. Inspections are undertaken visually



with the aid of a strong torch beam (LED Lenser P14.2) and endoscope (General DC5660A Wet / Dry Scope).

Buildings were assessed to determine their suitability as a bat and described using the parameters Negligible, Low, Medium or High suitability in view of Table 2a presented in the previous section.

### **Survey Dates: 5<sup>th</sup> & 11<sup>th</sup> May 2022**

#### *2.1.2 Tree Potential Bat Roost (PBRs) Inspection*

Trees that may provide a roosting space for bats were classified using the Bat Tree Habitat Key (BTHK, 2018) and the classification system adapted from Collins (2016). The Potential Roost Features (PRFs) listed in this guide were used to determine the PBR value of trees.

Trees identified as PBRs were inspected during the daytime (6<sup>th</sup> August 2021), where possible, for evidence of bat usage. Evidence of bat usage is in the form of actual bats (visible or audible), bat droppings, urine staining, grease marks (oily secretions from glands present on stonework) and claw marks. In addition, the presence of bat fly pupae (bat parasite) also indicated that bat usage of a crevice, for example, has occurred in the past.

Daytime inspections were undertaken of all of the trees within the proposed development site. These inspections followed the Phase 1 guidance (Collins, 2016) in order to make a list of trees within the proposed development site that may be suitable as roosting sites for bats. Inspections were undertaken visually, from the ground, with the aid of a strong torch beam (LED Lenser P14.2) during the daytime searching for PRFs.

Phase 2 inspections are, generally, recommended once a complete list of trees that have been identified as PBRs, and are marked for felling in order for the proposed development to be undertaken. The Phase 2 inspection will generally involve a closer examination of individual trees using a strong torch beam (LED Lenser P14.2) and endoscope (General DC5660A Wet / Dry Scope) and where required (and/or possible), height surveys are completed using a ladder. If a tree is deemed to be a roost site then further surveying involving dusk and dawn surveys of the actual trees may be recommended to determine what bat species are present etc.

**Table 5b: Tree Bat Roost Category Classification System (adapted from Collins, 2016).**

<b>Tree Category</b>	<b>Description</b>
<b>1 High</b>	Trees with multiple, highly suitable features (Potential Roosting Features = PRFs) capable of supporting larger roosts
<b>2 Moderate</b>	Trees with definite bat potential but supporting features (PRFs) suitable for use by individual bats;
<b>3 Low</b>	Trees have no obvious potential although the tree is of a size and age that elevated surveys may result in cracks or crevices being found or the tree supports some features (PRFs) which may have limited potential to support bats;
<b>4 Negligible</b>	Trees have no potential.



### *2.1.3 Bat Habitat & Commuting Routes Mapping*

The survey site was assessed during daytime walkabout surveys (6<sup>th</sup> August 2021), in relation to potential bat foraging habitat and potential bat commuting routes. Such habitats were classified according to Fossit, 2000 (Appendix 1, Table 1.B) while hedgerows were classified according to BATLAS 2020 classification (Bat Conservation Ireland, 2015) (Appendix 1, Table 1.A). Bat habitats and commuting routes identified were considered in relation to the wider landscape to determine landscape connectivity for local bat populations through the examination of aerial photographs.

## **2.2 Night-time Bat Detector Surveys**

### *2.2.1 Dusk & Dawn Bat Surveys*

Dusk Emergence Surveys were completed on the 6<sup>th</sup> and 11<sup>th</sup> August 2021 from 10 minutes before sunset to 110 minutes post sunset and the surveyors position themselves within the proposed development site to determine the general bat activity of the proposed development site. A dawn survey was completed on the 12<sup>th</sup> August 2021 and this was completed 100 minutes before sunrise to 10 minutes thereafter. A walking transect was complete post dusk survey on the 6<sup>th</sup> and 11<sup>th</sup> August 2021 of the local area. Surveys completed on 6<sup>th</sup> August is referred to as Night 1 and surveys completed on 11<sup>th</sup> and 12<sup>th</sup> August are referred to a Night 2. In 2022, a dusk survey was completed on 11<sup>th</sup> May 2022 followed by a walking transect of the local area.

The following equipment was used:

Surveyor 1: Anabat Walkabout Full Spectrum Bat Detector and Pettersson D200 Heterodyne Bat Detector.

Surveyor 2: Bat Logger M2 Full Spectrum Bat Detector and Pettersson D200 Heterodyne Bat Detector.

### *2.2.2 Passive Static Bat Detector Survey*

A Passive Static Bat Surveys involves leaving a static bat detector unit (with ultrasonic microphone) in a specific location and set to record for a specified period of time (i.e. a bat detector is left in the field, there is no observer present and bats which pass near enough to the monitoring unit are recorded and their calls are stored for analysis post surveying). The bat detector is effectively used as a bat activity data logger. This results in a far greater sampling effort over a shorter period of time. Bat detectors with ultrasonic microphones are used as the ultrasonic calls produced by bats cannot be heard by human hearing.

The microphone of the unit was positioned horizontally to reduce potential damage from rain. Bat Logger A+ units and Wildlife Acoustics Song Meter SM2, SM2 BAT+ SM4 Bat FS and SM3 BAT Platform Units use Real Time recording as a technique to record bat echolocation calls and using specific software, the recorded calls are identified. It is these sonograms (2-d sound pictures) that are digitally stored on the SD card (or micro SD cards depending on the model) and downloaded for analysis. These results are depicted on a graph showing the number of bat passes per species per hour/night. Each bat pass does not correlate to an individual bat but is representative of bat activity levels. Some species such as the pipistrelles will continuously fly around a habitat and therefore it is likely that a series of bat passes within a similar time frame is one individual bat. On the other hand, Leisler's bats tend to travel through an area quickly and therefore an individual sequence or bat pass is more likely to be indicative of individual bats.

The recordings are analysed using Wildlife Acoustics Kaleidoscope Pro. Each sequence of bat pulses are noted as a bat pass to indicate level of bat activity for each species recorded. This is

either expressed as the number of bat passes per hour or per survey night. The following static units were deployed during this static bat detector survey (6<sup>th</sup> to 12<sup>th</sup> August 2021) and repeated in 2022 (5<sup>th</sup> to 11<sup>th</sup> May 2022):

**Table 6: Static Bat Detectors deployed during Static Bat Detector Surveys.**

Static Unit Code	Bat Detector Type	Recording Function	Microphone
<b>Mini Bat 2, 5, 6, 9 and 10</b>	Wildlife Acoustics SongMeter Mini Bat	Passive Full Spectrum	SMM-U2

## 2.3 Desktop Review

### 2.3.1 Bat Conservation Ireland Database

Bat Conservation Ireland acts as the central depository for bat records for the Republic of Ireland. Its' bat database is comprised of >60,000 bat records. The database primarily contains bat records from the following datasets:

- Irish Bat Monitoring Programme

The Irish Bat Monitoring Programme is comprised of four surveys (Car-based Bat Monitoring Scheme (2003-), All Ireland Daubenton's Bat Waterways Survey (2006-), Brow Long-eared Bat Roost Monitoring Scheme (2007-) and Lesser Horseshoe Bat Monitoring Scheme (1980s-). Apart from the latter survey, all monitoring data is stored on the BCIreland database.

- BATLAS 2020 & 2010

BCIreland has undertaken two all-Ireland species distribution surveys (2008-2009 for BATLAS 2010 and 2016-2019 for BATLAS 2020) of four target bat species (Common and soprano pipistrelle, Leisler's bats and Daubenton's bat).

- Ad Hoc Bat Records

Ad hoc bat records from national bat groups, ecological consultants and BCIreland members are also stored on the BCIreland database.

- Roost Records

These records are only report at a 1km level to protect the location of private dwellings and to protect such important bat records.

A 1km radius search was requested for the Irish Grid Reference O1768925202.

### 2.3.2 Bat Conservation Ireland Bat Landscape Favourability Model

Bat Conservation Ireland produced a landscape conservation guide for Irish bat species using their database of species records collated during the 2000 - 2009 survey seasons. An analysis of the habitat and landscape associations of all bat species deemed resident in Ireland was undertaken and reported in Lundy *et al.*, 2011. The geographical area suitable for individual species was used to identify the core favourable areas of each species. This was produced as a GIS layer for local authorities and planners in order to provide a guide to the consideration of bat conservation. The island is divided into 5km squares and the landscape favourability of each 5km square for each

species of bat was modelled. A caveat is attached to the model and it is that the model is based on records held on the BCIreland database, while core areas have been identified, areas outside the core area should not be discounted as unimportant as bats are a landscape species and can travel many kilometres between roosts and foraging areas nightly and seasonally. This model was used as part of the desktop study for this report.

### 3. Bat Survey Results

#### 3.1 Daytime Inspections

##### 3.1.1 Building & Structure Inspection

A derelict structure is located along the eastern boundary of the proposed development site (but outside the proposed development area). This was inspected on 5<sup>th</sup> May 2022 and deemed to have a low-medium value for roosting bats. The structure is in a dilapidated condition while the walls of the structure provides some small crevices for potential roosts for individual bats. There is a large amount of ivy growth on the walls and remaining section of the roof of the building.

##### 3.1.2 Tree Potential Bat Roost (PBRs) Inspection

The majority of tall vegetation within the proposed development site consisted of scrub and hedgerows along the boundaries (Boundaries 1 and 5 – with reference to Tree Survey Report). There are large mature trees along Boundaries 2 and 3 but these are located outside the proposed development site. The remaining boundaries were either linear habitat with individual hawthorn trees (e.g. Boundary 6) or *Leyandii* linear feature (e.g. Boundary 7 and 8).

##### 3.1.3 Bat Habitat & Commuting Routes Mapping

The habitat types, with reference to Fossit (2000) were recorded both within the survey area and adjacent to the survey area. This proposed development site is predominately a green field site with scrub and grassland areas surrounded by mature treelines. There are large mature trees along Boundaries 2 and 3. The remaining boundaries were either linear habitat with individual hawthorn trees (e.g. Boundary 6) or *Leyandii* linear feature (e.g. Boundary 7 and 8).

**Table 7a: Habitat types present within survey area.**

Habitat	Yes	Habitat	Yes	Habitat	Yes	Habitat	Yes
Cultivated land		Salt marshes		Exposed rock	√	Fens/flushes	
Built land		Brackish waters		Caves		Grasslands	√
Coastal structures		Springs		Freshwater marsh		Scrub	√
Shingle/gravel		Swamps		Lakes/ponds		Hedges/treelines	√
Sea cliffs/islets		Disturbed ground	√	Heath		Conifer plantation	
Sand dunes		Watercourse	√	Bog		Woodland	

The surrounding landscape is primarily rural with some individual houses with large gardens. There are large areas of woodland and forest to the south-east and south-west (e.g. Ticknock Forest).

**Table 7b: Habitat types present adjacent to survey area.**

Habitat	Yes	Habitat	Yes	Habitat	Yes	Habitat	Yes
Cultivated land		Salt marshes		Exposed rock	√	Fens/flushes	
Built land	√	Brackish waters		Caves		Grasslands	√
Coastal structures		Springs		Freshwater marsh		Scrub	√
Shingle/gravel		Swamps		Lakes/ponds		Hedges/treelines	√
Sea cliffs/islets		Disturbed ground	√	Heath		Conifer plantation	√
Sand dunes		Watercourse	√	Bog		Woodland	√

## 3.2 Night-time Bat Detector Surveys

The primary purpose of the night-time surveys were to determine the bat activity usage of the survey area. While there was no access to adjacent private buildings, where possible the surveyors (1-2 surveyors, depending on survey, see Table 10 for more details) located themselves at different accessible points within the survey area to determine direction of commuting bats from possible roosting sites in local buildings. It should also be noted that there is a high level of scrub and therefore the degree of walking around the survey site in the hours of darkness was limited to accessible tracts. The boundary numbers listed below are in reference to Environguide Consulting Sheet 1-3 tree survey figures (Please consult original documents for more information).

### 3.2.1 Dusk & Dawn Bat Surveys

Bat detector surveys were completed on 6/8/2021 (Dusk Survey - Weather conditions: 16oC, full cloud cover, light wind and dry), 11/8/2021 (Dusk Survey – Weather conditions: 15oC, clear skies, calm and dry) and 12/8/2021 (Dawn Survey - Weather conditions: 12oC, full cloud cover, dry and light breeze). In 2022, one dusk survey was undertaken on the 11<sup>th</sup> May 2022 (Weather conditions: 10oC, partial cloud cover, dry and light breeze).

#### 3.2.1.1 Dusk Survey 6/8/2021 (Night 1)

The surveyors (x2) were located along the eastern boundary (Boundary 5 in relation to tree survey plan mentioned above) of the proposed development site to determine if bats are commuting from this direction into the survey area.

The following is a synopsis of the bat activity recorded during the Dusk Survey on Night 1:

21:32 hrs      First Leisler's bat was recorded at 21:32 hrs commuting through the survey area from a south-western direction. Some foraging was recorded along the treelines and over the scrub area. A total of 17 bat passes were recorded during the dusk survey.

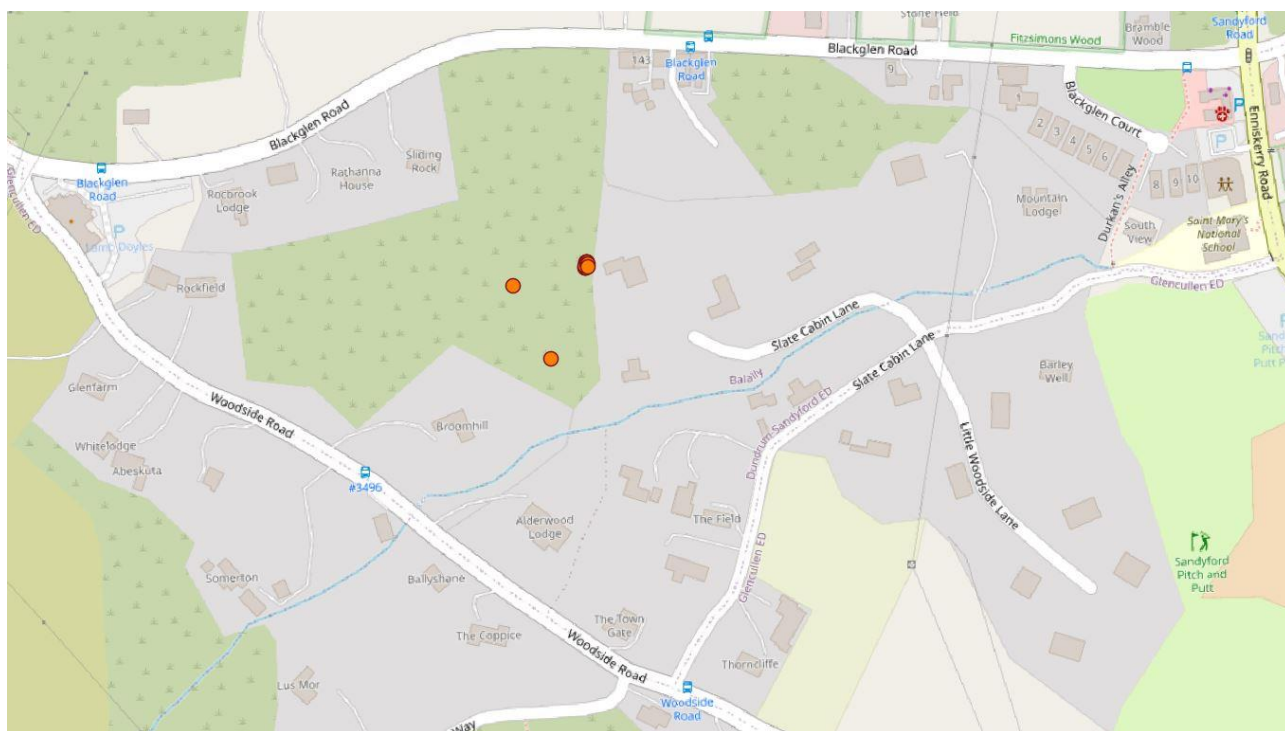


Figure 3a: Leisler's bat encounters during dusk survey and walking transect (OpenSource Maps).



22:29 hrs First common pipistrelle was detected late into the survey period and this individual was foraging within the survey area. Additional individuals of this species commuting and foraged within the proposed development site. The southern boundary (Boundaries 1, 2, 3 and 4) of the proposed development site provided a foraging habitat for this species with a number of individuals continuously foraging for the remaining 30-40 minutes of the survey. A total of 33 bat passes were recorded.

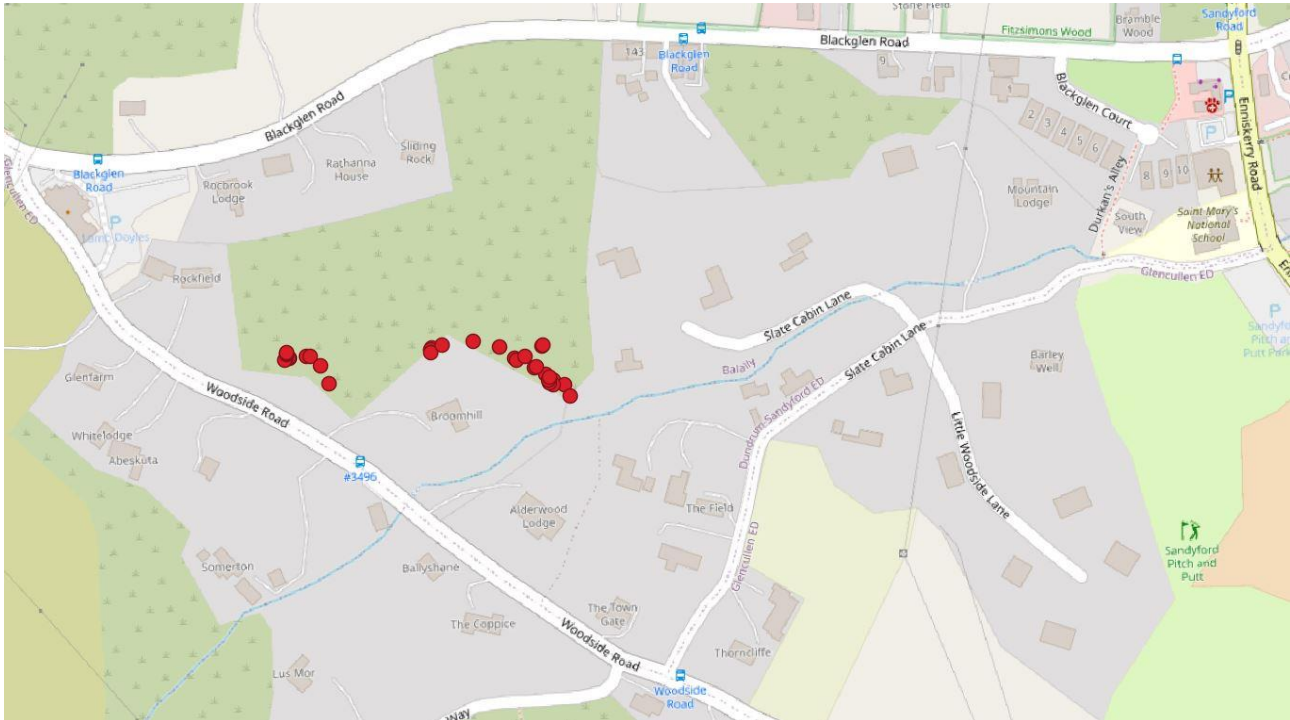


Figure 3b: Common pipistrelle bat encounters during dusk survey and walking transect (OpenSource Maps).

21:50 hrs Only one soprano pipistrelle was detected during the dusk survey and this individual was commuting through the survey site. This was detected along the eastern boundary (Boundary 5).

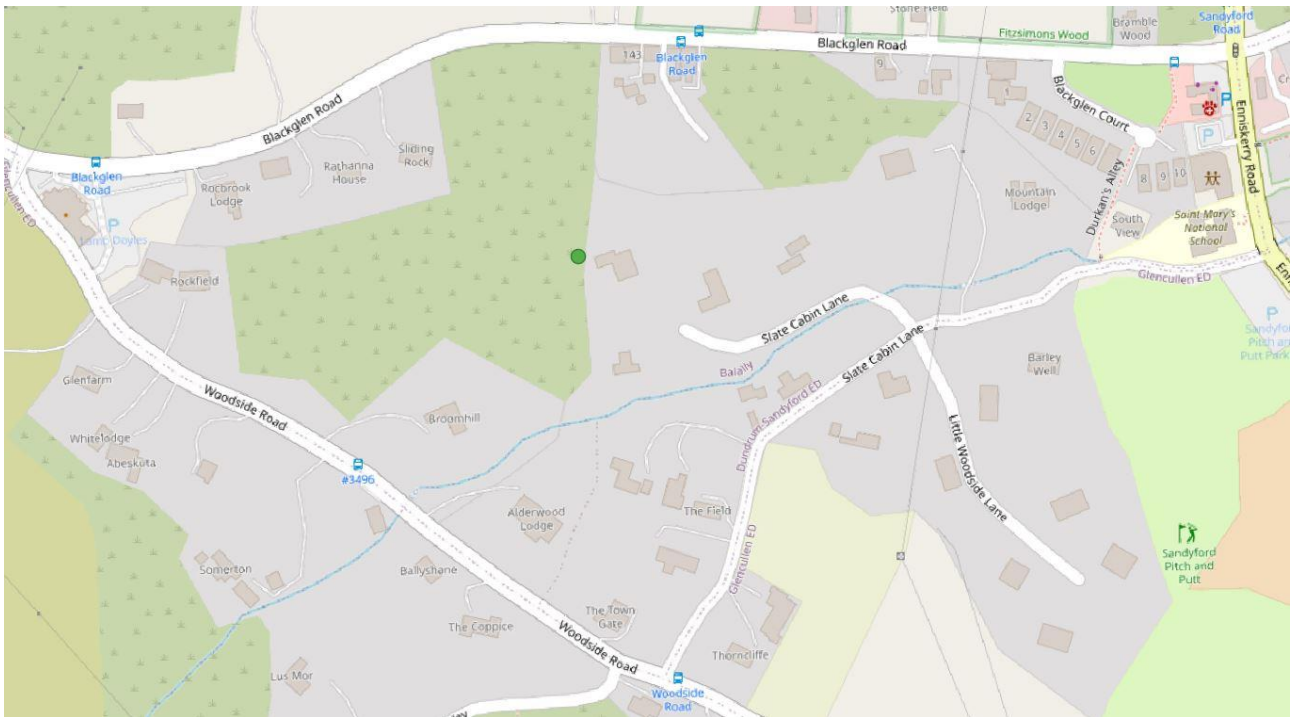


Figure 3c: Soprano pipistrelle bat encounters during dusk survey and walking transect (OpenSource Maps).

### 3.2.1.2 Dusk Survey and Walking Transect 11/8/2021 & Dawn Survey 12/8/2021 – Night 2

During the Dusk Survey, the surveyors (x2) were located along the northern boundaries (Boundaries 6, 7, and 8) of the proposed development site and during the Dawn Survey, the surveyor (x1) was located along the mature treeline of the southern boundary (Boundary 3).

#### Leisler's Bat

Less bat activity of this bat species was recorded during Night 2 compared to Night 1. A total of 9 Leisler's bat passes were recorded during the Dusk Survey and the Walking Transects while no Leisler's bat activity was recorded during the Dawn Survey. Leisler's bats were recorded foraging along the Blackglen Road and the Woodside Road as well as commuting through the survey area.

#### Common pipistrelle

A much greater amount of common pipistrelle bat activity was recorded during Night 2 surveys. A total of 62 bat passes were recorded, 42 during the Dusk Survey and Walking Transects and 20 during the Dawn Survey. Individuals were recorded primarily foraging along the southern boundary (Boundaries 1, 2, 3 and 4) of the proposed development site and along the Blackglen Road and the Woodside Road.

#### Soprano Pipistrelle

A much greater amount of soprano pipistrelle bat activity was recorded during Night 2 surveys. A total of 26 bat passes were recorded, 4 during the Dusk Survey and Walking Transects and 22 during the Dawn Survey. Individuals were recorded primarily foraging along the southern boundary (Boundaries 1, 2, 3 and 4) of the proposed development site and along the Blackglen Road and the Woodside Road.

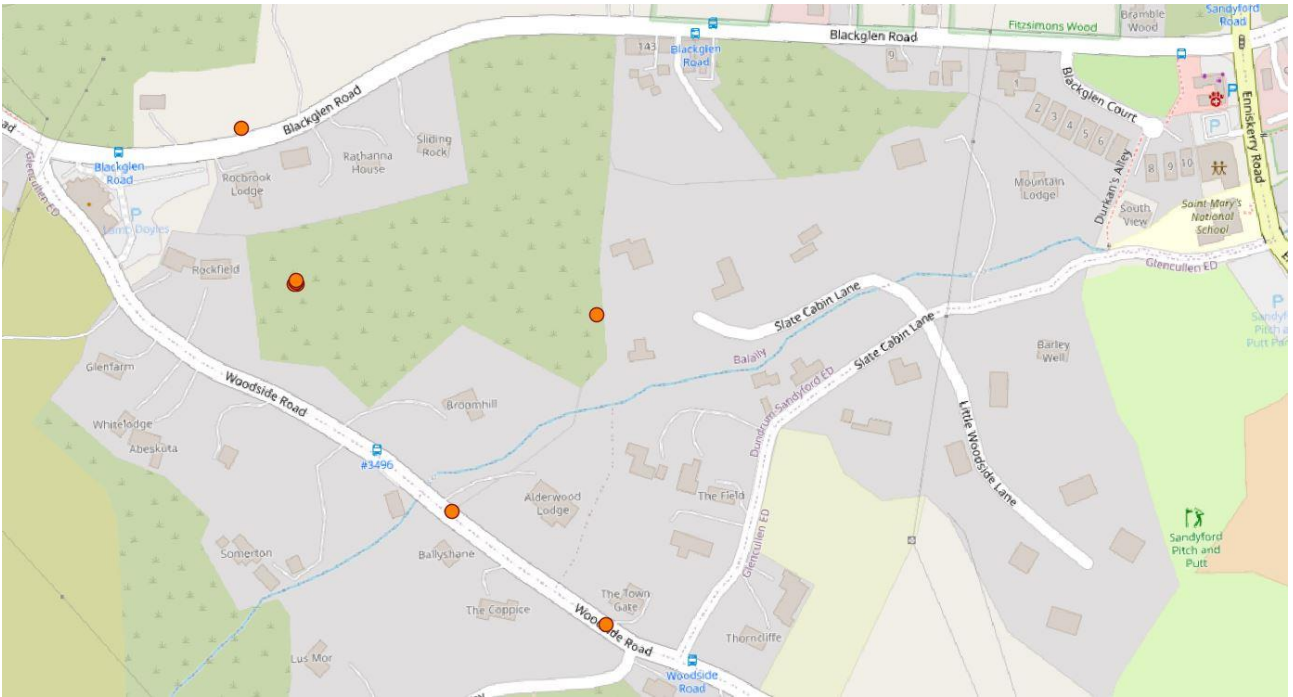


Figure 4a: Leisler's bat encounters during dusk survey and walking transect (OpenSource Maps).

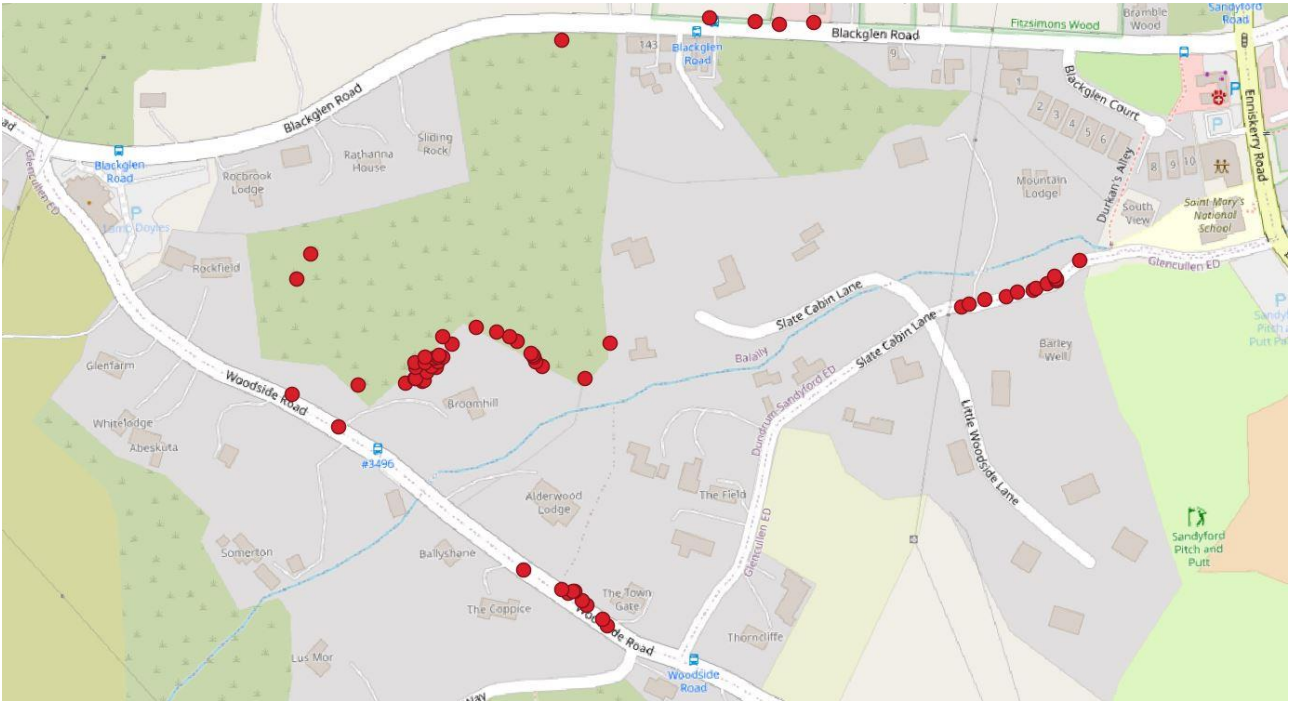


Figure 4b: Common pipistrelle bat encounters during dusk survey and walking transect (OpenSource Maps).

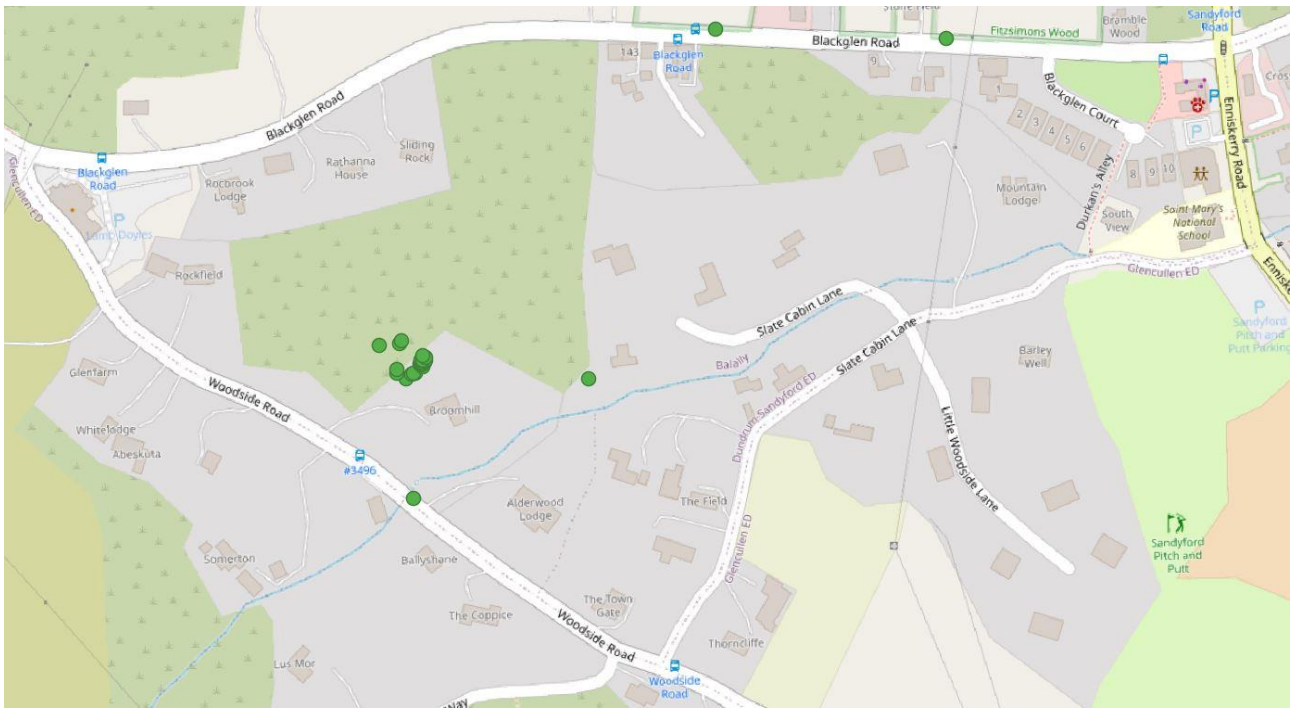


Figure 4c: Soprano pipistrelle bat encounters during dusk survey and walking transect (OpenSource Maps).



### 3.2.1.3 Night 3 – Dusk Survey & Walking Transect

Surveying started at 21:00 hrs in vicinity of the derelict building (11<sup>th</sup> May 2022). During the dusk survey of the building only two species bat was recorded: Leisler's bat and soprano pipistrelle. Leisler's bats were recorded first at 21:28 hrs and three individuals were recorded commuting from a southerly direction along the eastern boundary. The first soprano pipistrelle was recorded at 21:48 hrs, again along the eastern boundary. No bats were recorded emerging from the building during the dusk survey. All individuals of bat recorded were commuting and foraging within the immediate survey area.

Post dusk survey, a walking transect was undertaken. Again two species of bat was recorded during this survey but a different set of bat species to those recorded during the dusk survey of the derelict building: common pipistrelle and *Myotis* species. The location of these bat encounters are presented on the figure below.

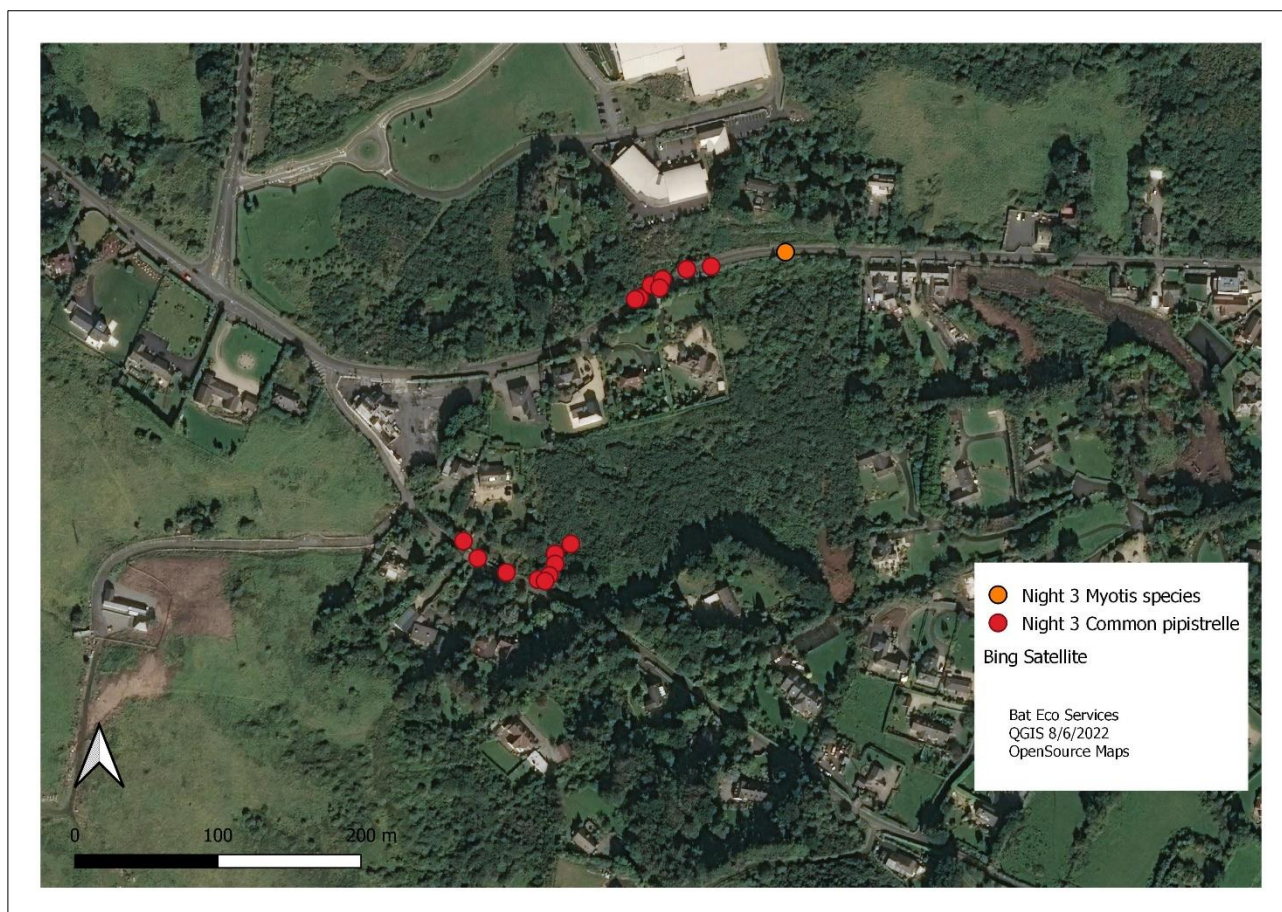


Figure 4d: Common pipistrelle and *Myotis* species bat encounters during walking transect completed on 11<sup>th</sup> May 2022 (OpenSource Maps).



### 3.2.2 Passive Static Bat Detector Survey

#### 3.2.2.1 2021 Static Surveillance

The following tables provides details with regards to the static units deployed in 2021 (Please see Figure 5 for locations) during the bat survey. Three static units were deployed for six nights and were located on trees in treelines or within scrub areas to document foraging and commuting bats. A full break down of the static surveillance results are presented in the Appendices but these results are also presented as graphs below for each static unit.



Figure 5: Location of static units during static surveillance.

Table 8a: Results of Static Bat Detectors deployed during Static Bat Detector Surveys.

Static Code	Location Description	Survey Period	Results
Mini 5	ITM 7171791 725115 Along treeline (southern boundary)	6/8/2021 to 12/8/2021 (6 nights)	Leisler's bat, common pipistrelle, soprano pipistrelle, brown long-eared bat, Nathusius' pipistrelle, Daubenton's bat and <i>Myotis</i> spp.
Mini 6	ITM 717630 725229 Scrub area	6/8/2021 to 12/8/2021 (6 nights)	Leisler's bat, common pipistrelle, soprano pipistrelle, brown long-eared bat and Nathusius' pipistrelle
Mini 10	ITM 717506 725141 South-western boundary	6/8/2021 to 12/8/2021 (6 nights)	Leisler's bat, common pipistrelle, soprano pipistrelle, brown long-eared bat, Daubenton's bat and <i>Myotis</i> spp.

Static Unit Mini 5 was located on a mature tree within the mature treeline along the southern boundary (Boundary 3) of the proposed development site. A total of six bat species were recorded as well as echolocation calls identified as *Myotis* species. This is a bat species rich section of the proposed development site with a medium level of common pipistrelle bat activity.

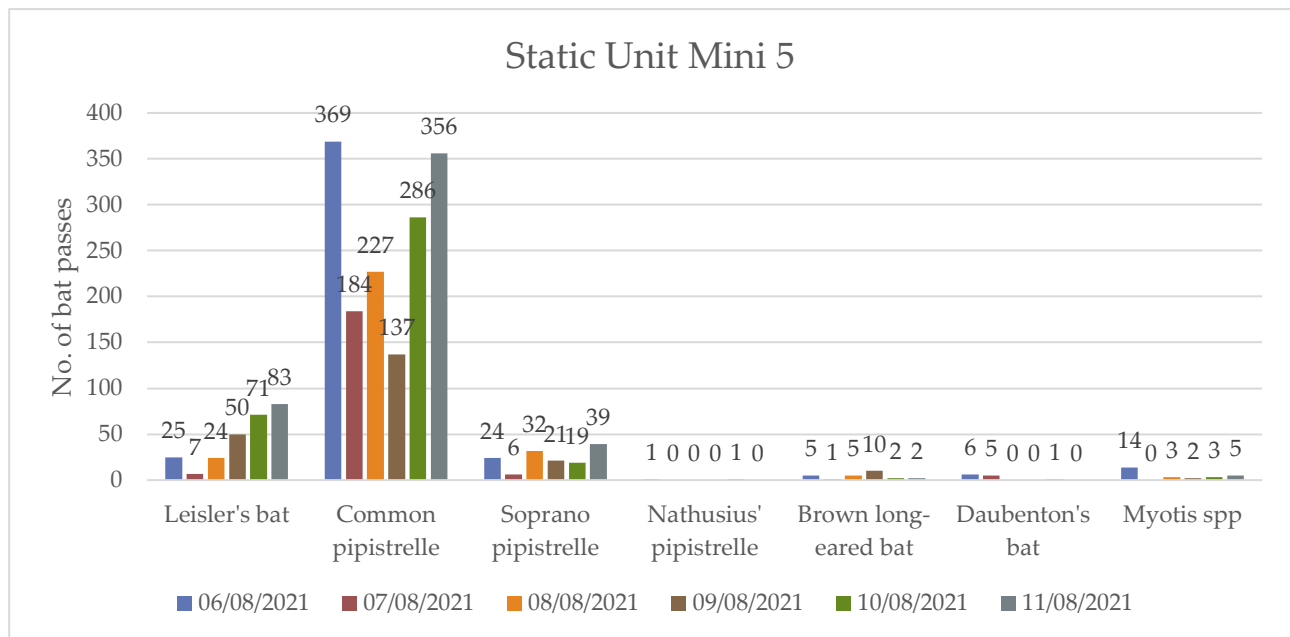


Figure 6a: Static surveillance results for each bat species recorded on Static Unit Mini 5.

Static Unit Mini 6 was located within the scrub habitat of the proposed development site. A total of five bat species were recorded with a low level of bat activity recorded.

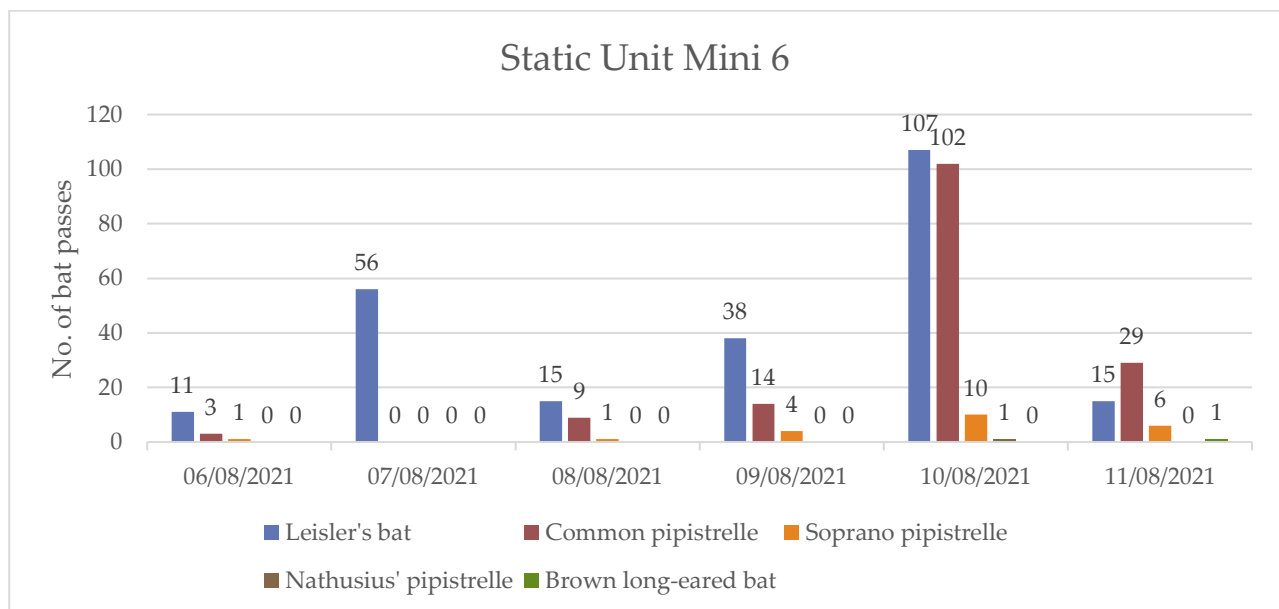


Figure 6b: Static surveillance results for each bat species recorded on Static Unit Mini 6.

Static Unit Mini 10 was located within the scrub habitat of the proposed development site along the south-western boundary which is comprised of a hedgerow. A total of five bat species were recorded as well as echolocation calls identified as *Myotis* species. This is a bat species rich section of the proposed development site with a highest level of common pipistrelle bat activity compared to the other two static units.

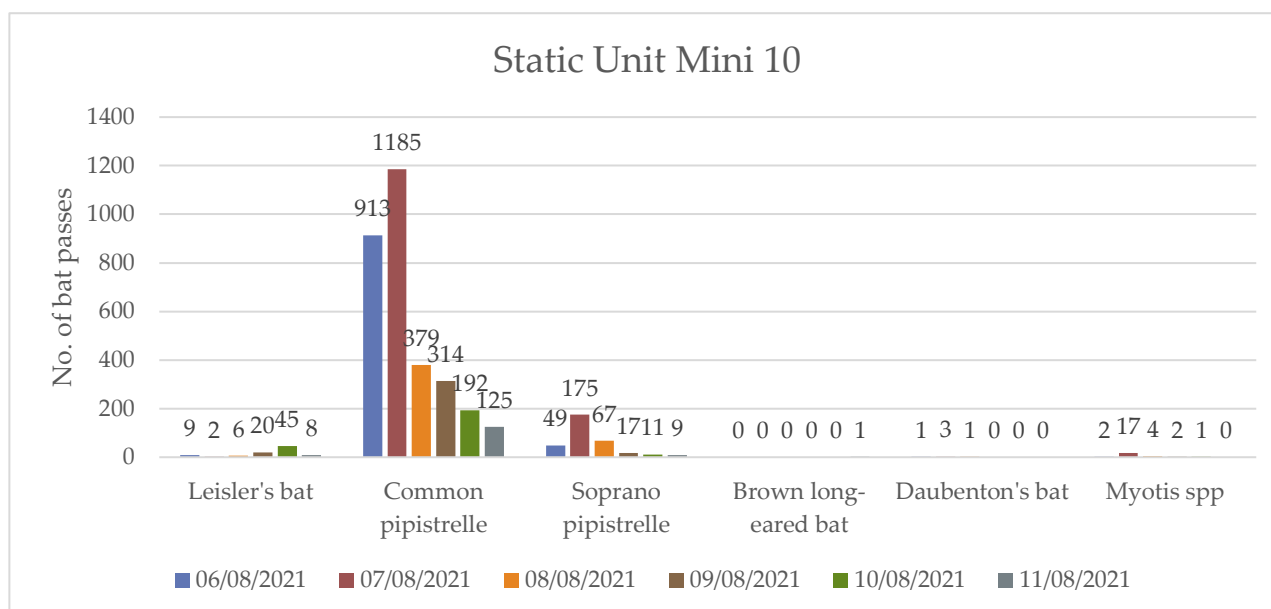


Figure 6c: Static surveillance results for each bat species recorded on Static Unit Mini 10.

As a general guide, activity level is determined by the author as follows: Low = <10 bat passes/hr; Medium = >10 - <50 bat passes/hr; High = >50 bat passes/hr). At this time of the year, 6 hours per night are available to foraging bats (22:00 hrs to 04:00 hrs). (Please see tables in Appendices for nightly breakdown of activity).

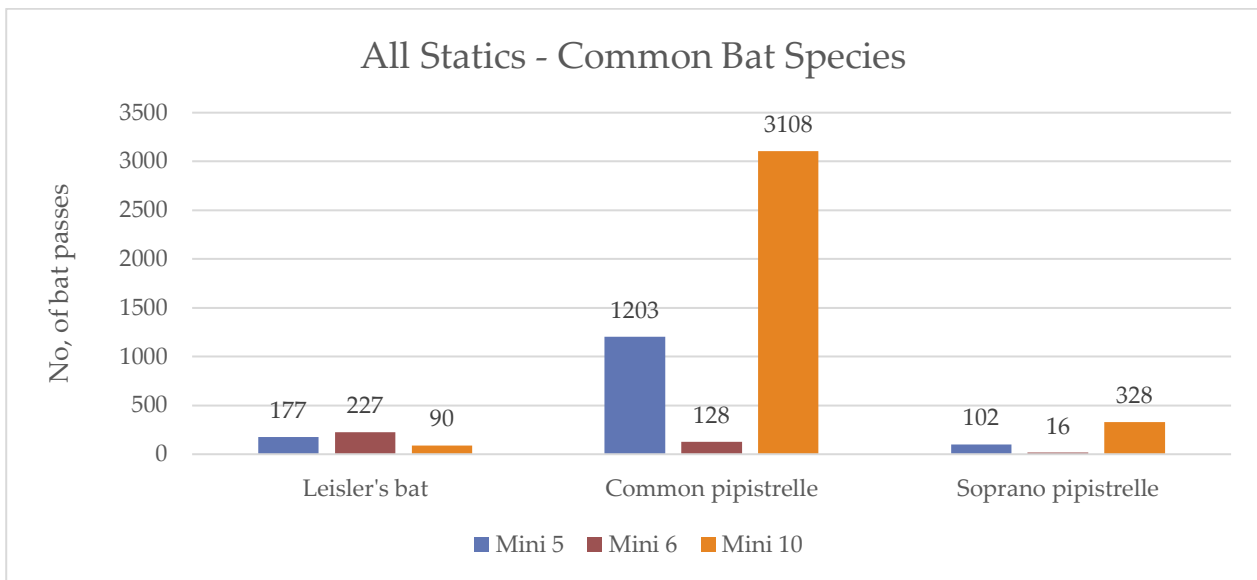
*NOTE: The behaviour of bats during commuting and foraging greatly influences the level of bat passes recorded on static units. The number of bat passes do not equate to the number of bats flying past the static unit. Pipistrellus species tended to foraging as they commute and therefore are regularly observed flying up and down a treeline or hedgerow before moving on in the landscape. Leisler's bats fly high in the sky and therefore can be observed flying fast through the landscape, occasionally foraging over treetops as they commute. As a consequence, Pipistrellus species bat activity tends to result in a higher number of bat passes recorded on static units compared to Leisler's bats. In relation to other bat species recorded, as they tend to be less common in the landscape compared to common pipistrelles, soprano pipistrelles and Leisler's bats, their recorded presence is notable. Exceptions to this would include Daubenton's bats on a waterway or a static located adjacent to a known bat roost.*

Over the course of the surveillance period, the level of bat activity was recorded on the static units. Common pipistrelle was the most frequently recorded bat species and the level of bat activity ranged from Low to High. The southern boundary (Boundary 2 and 3) of the proposed development site was recorded as an important foraging and commuting route for this bat species.

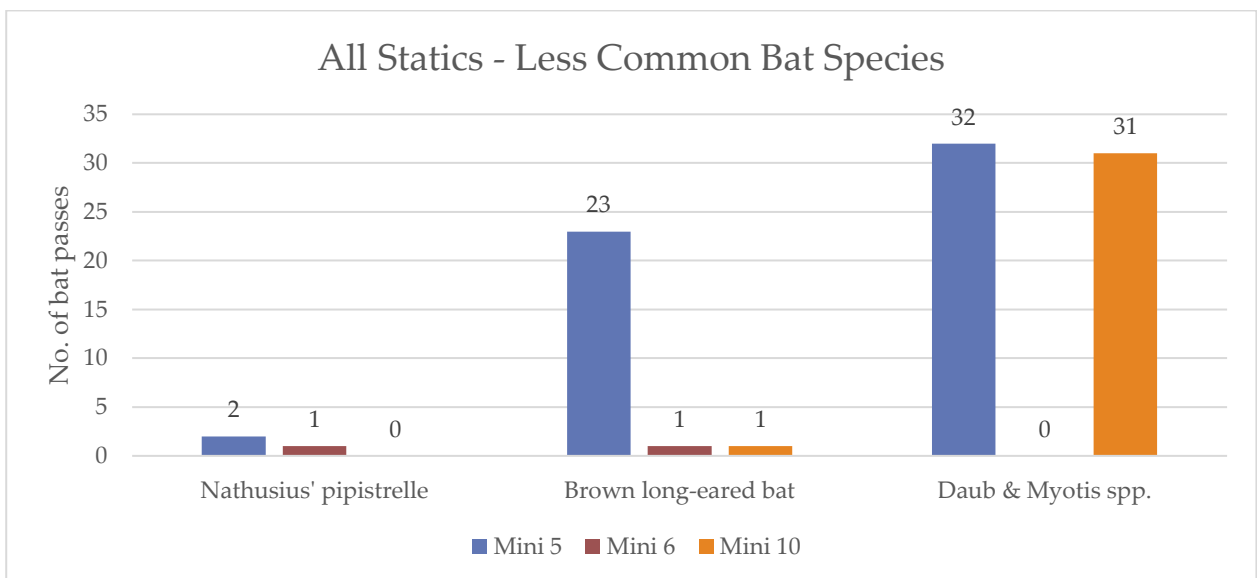
All other bat species were recorded at a low level of bat activity but the number of bat species recorded indicates that the proposed development site is used by six bat species.

**Table 8b: Level of bat activity recorded on Static Bat Detectors deployed during Static Bat Detector Surveys.**

	Leisler's bat	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Brown long-eared bat	<i>Daubenton's bat &amp; Myotis spp.</i>
<b>Mini 5</b>	Low	Medium	Low	Low	Low	Low
<b>Mini 6</b>	Low	Low	Low	Low	Low	None
<b>Mini 10</b>	Low	High	Low	None	Low	Low



**Figure 6d: Static surveillance results for common bat species.**



**Figure 6e: Static surveillance results for less common bat species.**

### 3.2.2.2 2022 Static Surveillance

Two static units were deployed in 2022. However, static unit Mini 9 failed to record. Therefore, static unit Mini 2 will only be reported here. This was located on one of the walls of the derelict building located along the eastern boundary of the proposed development site (ITM 717728,725235). This unit was deployed for seven nights and five bat species were recorded. Due to the open structure of the building, the bat species recorded is not indicative of roosting bats (echolocation call structure is indicative of commuting and foraging bats). Leisler's bat was the most frequently recorded bat species (low level of bat activity) while all other bat species were recorded in lower level numbers.

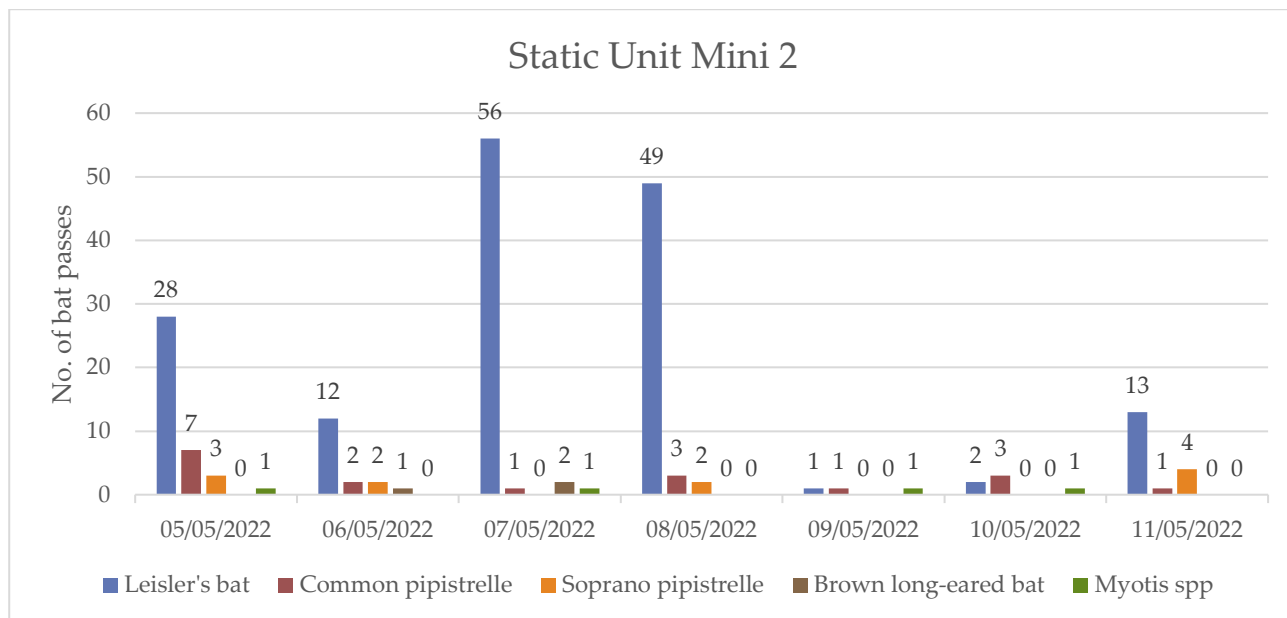


Figure 6f: Static surveillance results for less common bat species.

## 3.3 Desktop Review

### 3.3.1 Bat Conservation Ireland Database

A total of three roost records and two Ad Hoc bat records are listed within a 1km radius of the proposed development on the Bat Conservation Ireland database. The number of records for each species is as follows:

Lesser horseshoe bat	0 records;
Common pipistrelle	3 records (2 roost records);
Soprano pipistrelle	2 records;
<i>Pipistrellus</i> species	0 records;
Leisler's bat	2 records;
<i>Myotis</i> species	0 records;
Daubenton's bat	1 records;
Natterer's bat	0 records;
Whiskered bat	0 records;
Brown long-eared bat	2 records (1 roost record) and
Nathusius' pipistrelle	0 records.

The bat survey undertaken for this proposed development site provides additional bat species records for the 1km zone with new bat records for Nathusius' pipistrelle.



### 3.3.2 Bat Conservation Ireland Bat Landscape Favourability Model

Figure 7 depicts the BCIreland Bat Landscape Favourability Model (Lundy *et al.*, 2011) for all bat species (individual species values are presented in the table below). The county is divided into 5km squares and the darker the shading of the square, the higher favourability of the 5km square for bats. This GIS layer is hosted on the NBDC website [www.biodiversityireland.ie](http://www.biodiversityireland.ie). The proposed development site is approximately located in the Red Box. The 5km square has a low-medium favourability for bats. For the bat species recorded during this bat survey, the 5km square has a medium favourability value for two recorded bat species: common pipistrelle and Leisler's bat. For the remaining three bat species (brown long-eared bat and soprano pipistrelle) the 5km square has a Low-Medium favourability while a Low favourability for Daubenton's bats.



Figure 7: Bat Landscape Favourability Model (All Bats) (Source: NBDC) – Red Box = proposed development area.

**Table 9: Survey Effort, Constraints & Survey Assessment Results.**

Bat species	5km Square
Common pipistrelle	32% (Medium)
Soprano pipistrelle	30% (Low to Medium)
Nathusius' pipistrelle	10% (Low to Medium)
Leisler's bat	34% (Medium)
Brown long-eared bat	23% (Low to Medium)
Daubenton's bat	3% (Low)
Natterer's bat	11% (Low)
Whiskered bat	14% (Low to Medium)
Lesser horseshoe bat	0% (Not suitable)

### 3.4 Survey Effort, Constraints & Survey Assessment

The following table details any Survey Constraints encountered and a summary of Scientific Assessment completed.

**Table 10: Survey Effort, Constraints & Survey Assessment Results.**

Category	Discussion																								
<b>Timing of surveys</b>  <b>Surveying meets Collins, 2016 guidelines.</b>	2021 Summer bat survey: 6 <sup>th</sup> to 12 <sup>th</sup> August 2021 (appropriate survey period for summer bat surveys).  2022 Summer bat survey: 5 <sup>th</sup> to 11 <sup>th</sup> May 2022 appropriate survey period for summer bat surveys).																								
<b>Survey Type</b>  Full suite of surveys completed to ensure sufficient information was collated for bat assessment.  Surveys completed according Collins, 2016 guidelines.	Bat Survey Duties Completed (Indicated by red shading)  <table><tr><td>Tree PBR Survey</td><td>■</td><td>Daytime Building Inspection</td><td>■</td></tr><tr><td>Static Detector Survey</td><td>■</td><td>Daytime Bridge Inspection</td><td>○</td></tr><tr><td>Dusk Bat Survey</td><td>■</td><td>Dawn Bat Survey</td><td>■</td></tr><tr><td>Walking Transect</td><td>■</td><td>Driving Transect</td><td>○</td></tr><tr><td>Trapping/Mist Netting</td><td>○</td><td>IR Camcorder filming</td><td>○</td></tr><tr><td>Endoscope Inspection</td><td>■</td><td>Other (Thermal Imagery)</td><td>○</td></tr></table>	Tree PBR Survey	■	Daytime Building Inspection	■	Static Detector Survey	■	Daytime Bridge Inspection	○	Dusk Bat Survey	■	Dawn Bat Survey	■	Walking Transect	■	Driving Transect	○	Trapping/Mist Netting	○	IR Camcorder filming	○	Endoscope Inspection	■	Other (Thermal Imagery)	○
Tree PBR Survey	■	Daytime Building Inspection	■																						
Static Detector Survey	■	Daytime Bridge Inspection	○																						
Dusk Bat Survey	■	Dawn Bat Survey	■																						
Walking Transect	■	Driving Transect	○																						
Trapping/Mist Netting	○	IR Camcorder filming	○																						
Endoscope Inspection	■	Other (Thermal Imagery)	○																						
<b>Weather conditions</b>	Suitable weather conditions for bat surveys.																								
<b>Survey Constraints</b>	Limited access through the proposed development site during the hours of darkness due to dense scrub.																								
<b>Survey effort</b>  Daytime – 3 hrs  Bat surveys – 13 hrs  Static surveillance – 193 hrs  <b>TOTAL = 209 hrs</b>	2021 - Summer bat survey: Daytime inspection – 2 hrs Dusk Surveys (x2, 2 surveyors) – 7 hrs Dawn Surveys (x1, 1 surveyor) – 2 hrs Static Surveillance (x6 units, 6 nights) – 144 hrs  2022 - Summer bat survey: Daytime inspection – 1 hr Dusk Surveys (x2, 1 surveyor) – 4 hrs Static Surveillance (x2 units, 7 nights) – 49 hrs																								
<b>Extent of survey area</b>	Summer bat survey: proposed development area																								
<b>Equipment</b>	Mini 9 failed to record in 2022. All other equipment in good working order.																								

The extent of the surveys undertaken has achieved to determine:

- Presence / absence of bat within the survey area;
- A bat species list for the survey area;
- Extent and pattern of usage by bats within the survey area.

It is therefore deemed that the Scientific Assessment completed is Appropriate in order to completed the aims of the bat survey.

## 4. Bat Ecological Evaluation

### 4.1 Bat Species Recorded & Sensitivity

Six species of bat was recorded within the survey area: Leisler's bat, soprano pipistrelle, common pipistrelle, Nathusius' pipistrelle, Daubenton's bat, brown long-eared bat and *Myotis* species (this species is likely to be Daubenton's bat). The first three species were recorded during bat detector surveys and static surveillance bat activity levels were indicative of commuting and foraging individuals. The latter three bat species were only recorded during static surveillance and were recorded in a low level of bat passes. A single *Myotis* species bat encounter was recorded during the walking transect on Night 3 (11/5/2022).

The treeline and hedgerow boundaries are an active bat commuting and foraging linear features and is located in a well-connected landscape. Overall a Low to High level of bat activity was recorded for common pipistrelles while all other bat species were recorded in a Low level of bat activity. The variable level of bat activity recorded for common pipistrelle provides an insight into what areas are important for local bat populations. The static unit located in the centre of the proposed development site recorded low level of bat activity while static units located within the boundary habitats recorded Medium to High levels of common pipistrelle bat activity. Therefore, the boundary habitats are important for commuting and foraging bats. Overall medium level of bat activity was recorded.

The proposed development site is used as a foraging and commuting habitat for local bat populations. While the level of bat activity and the number of bat encounters do not indicate that the proposed development site is an important area for local bat populations, the treeline boundaries are important commuting routes.

The derelict building was not recorded as a bat roosting site but it has a low-medium value for roosting bats. The structure is in a dilapidated condition but the walls of the structure provides has small crevices that have potential as a roosting site for individual bats. There is also a large amount of ivy growth on the walls which can provide cover for roosting bats.

#### Leisler's bat

- Leisler's bat is an Annex IV bat species under the EU Habitats Directive. The status of this bat species is listed as Least Concern. The national Leisler's bat population is considered to be significantly increasing trend (Aughney *et al.*, 2021).
- The modelled Core Area for Leisler's bats is a relatively large area that covers much of the island of Ireland (52,820km<sup>2</sup>). The Bat Conservation Ireland Irish Landscape Model indicated that the Leisler's bat habitat preference has been difficult to define in Ireland. Habitat modelling for Ireland shows an association with riparian habitats and woodlands (Roche *et al.*, 2014). The landscape model emphasised that this is a species that cannot be defined by habitats preference at a local scale compared to other Irish bat species but that it is a landscape species and has a habitat preference at a scale of 20.5km.

#### Common pipistrelle

- Common pipistrelle is an Annex IV bat species under the EU Habitats Directive. The status of this bat species is listed as Least Concern. The national common pipistrelle population is considered to be significantly increasing trend (Aughney *et al.*, 2021).
- The modelled Core Area for common pipistrelle is a relatively large area that covers much of the island of Ireland (56,485km<sup>2</sup>). The Bat Conservation Ireland Irish

Landscape Model indicated that the Common pipistrelle selects areas with broadleaf woodland, riparian habitats and low density urbanization (<30%) (Roche *et al.*, 2014).

### **Soprano pipistrelle**

- Soprano pipistrelle is an Annex IV bat species under the EU Habitats Directive. The status of this bat species is listed as Least Concern. The national soprano pipistrelle population is considered to be significantly increasing trend (Aughney *et al.*, 2021).
- The modelled Core Area for soprano pipistrelle is a relatively large area that covers much of the island of Ireland (62,020km<sup>2</sup>). The Bat Conservation Ireland Irish Landscape Model indicated that the soprano pipistrelle selects areas with broadleaf woodland, riparian habitats and low density urbanisation (Roche *et al.*, 2014).

### **Brown long-eared bat**

- Brown long-eared bat is an Annex IV bat species under the EU Habitats Directive. The status of this bat species is listed as Least Concern. The national brown long-eared bat population is considered to be stable (Aughney *et al.*, 2021).
- The modelled Core Area for brown long-eared bat is a relatively large area that covers much of the island of Ireland (49,929 km<sup>2</sup>). The Bat Conservation Ireland Irish Landscape Model indicated that the brown long-eared bat habitat preference is for areas with broadleaf woodland and riparian habitats on a small scale of 0.5km emphasising the importance of local landscape features for this species (Roche *et al.*, 2014).

### **Daubenton's Bat**

- Daubenton's bat is an Annex IV bat species under the EU Habitats Directive. The status of this bat species is listed as Least Concern. The national Daubenton's bat population is considered to be stable (Aughney *et al.*, 2021).
- The modelled Core Area for Daubenton's bat is (41,285 km<sup>2</sup>) reflecting the distribution of sizeable river catchments. The Irish Landscape Model indicated that the Daubenton's bat habitat preference is for areas with broadleaf woodland, riparian habitats and low density urbanisation (Roche *et al.*, 2014).

No Annex II bat species are known to occur in County Dublin (i.e. lesser horseshoe bat) and were not recorded within the survey.

There are no recorded bat roosts within the proposed development site and therefore no assessment is completed for bat roosts.

The proposed development site is a small area and an overall medium level of bat activity was recorded and the results indicate that the boundaries of the proposed development site are important commuting and foraging habitat for local bat populations.

## **4.2 Bat Foraging Habitat & Commuting Routes**

The treeline boundary of the proposed development site (Boundary 2 and 3) is an active bat commuting and foraging habitat. This is reflected by the Low to High level of bat activity recorded during the bat surveys for common pipistrelle during the static surveillance. But in addition, a medium level of commuting and foraging activity was recorded during dusk and dawn surveys.



### 4.3 Zone of Influence – Bat Landscape Connectivity

The proposed development site is located in the rural area of Dublin 18. The treeline boundaries of the proposed development site (Boundaries 2 and 3 in particular) are an active bat commuting and foraging linear feature. This is reflected by the Low to High level of bat activity recorded during the static surveillance bat surveys for common pipistrelle and a medium level of commuting and foraging activity was recorded during dusk and dawn surveys.

As a consequence there is landscape connectivity for local bat populations to move to and from the proposed development site.

### 4.4 Landscape Plan

The landscape plan recognises that the proposed development site is an important area for wildlife. While the tree component of the main treeline boundaries (Boundary 2 and 3) is located in adjacent properties, it is important that these important commuting and foraging for local bat populations are protected from the construction and operation of the proposed development. This can be achieved by buffering planting and to ensure that a bat friendly lighting regime is in place.



Figure 8a: Proposed landscape plan.



## 4.5 Lighting Plan

The proposed lighting plan indicates that there will be lighting along Boundary 2. The horizontal illuminance map indicated that the LUX range is 2.21 to 63.91 LUX with an average of 9.35 LUX. While the lower range of LUX will be tolerated by light tolerant or semi-tolerant bat species (Please see Table 3: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle and Leisler's bats), the entire range of LUX will prevent light-sensitive bat species from utilising the area. As this is an important boundary for local bat populations, additional steps are required to reduce the potential impact on local bat populations.



Figure 8b: Proposed lighting plan – horizontal illuminance.

To minimise impact on bat life, the lighting design will need to incorporate the following:

- LED luminaires will be used as they have low UV output, sharp cut-off, lower intensity, good colour rendition and dimming capability.
- Luminaire is a fixture that is mounted horizontally, ensuring minimal up-light.
- As per BCI recommendations luminaires should be mounted on poles less than 8m (preferably 6m and less).
- The LEDs used are 2700K, which is deemed acceptable by the BCT guidelines to preserve bat life. Preferably 2,200 Kelvin luminaires is recommended for Boundary 1, 2 ,3 and 4 to reduce potential lighting impact on local bat populations.
- As per BCT guidelines section 'Dimming and part-night lighting' a control management system will be put in place for the private pathways where the lights are turned off during night hours. In the event of someone using these paths at night, a local presence detection will pick up movement sending a signal on the lamps to increase output to meet minimum lighting requirements. After a fixed period of no movement of 5 minutes, the lights turn off.
- Glare shields will be utilized in order to minimise any unnecessary light spill onto bat routes along the boundary if this site.

On examination of the horizontal luminance map (Figure 7b), the LUX means that glare shields are essential to further reduce light spillage along these linear habitats.

## 5. Impact Assessment & Mitigation

Six species of bat was recorded within the survey area: Leisler's bat, soprano pipistrelle, common pipistrelle, Nathusius' pipistrelle, Daubenton's bat, brown long-eared bat and *Myotis* species (this species is likely to be Daubenton's bat). The first three species were recorded during bat detector surveys and static surveillance bat activity levels were indicative of commuting and foraging individuals. The latter three bat species were only recorded during static surveillance and were recorded in a low level of bat passes.

The treeline and hedgerow boundaries are an active bat commuting and foraging habitats. Overall a Low to High level of bat activity was recorded for common pipistrelles while all other bat species were recorded in a Low level of bat activity. An overall medium level of bat activity was recorded.

The derelict building was not recorded as a bat roosting site but it has a low-medium value for roosting bats. The structure is in a dilapidated condition but the walls of the structure provides has small crevices that have potential as a roosting site for individual bats. There is also a large amount of ivy growth on the walls which can provide cover for roosting bats.

The proposed development site is used as a foraging and commuting habitat for local bat populations. While the level of bat activity and the number of bat encounters do not indicate that the proposed development site is an important area for local bat populations, the treeline boundaries are important commuting routes.

Due to the fact that bats are nocturnal mammals outdoor lighting will impact on local bat populations. Therefore, the lighting plan is an important element of the proposed development that needs to consider its potential impact on commuting and foraging bats. Consultation was undertaken and measures have been agreed to reduce this potential impact of outdoor lighting on commuting and foraging bats, especially lighting located adjacent to boundary habitats.

There will be an increase in human activity (noise and light levels) (Operational Operations) as a result of the proposed development and due to the medium level of bat biodiversity and low-medium bat activity, it is considered that this will impact on local bat populations.

Therefore the potential impact of the proposed development is, overall, considered to have a scale of impact of Moderate impact on named bat species (according to criteria set out in Tables 2c and d, Section 1.2.2). This is primarily in relation to the lighting plan for the proposed development scheme and the presence of light-sensitive bat species.

Bat mitigation measures are presented in order to reduce the potential impact of the lighting scheme for the proposed development. If the mitigation measures presented below are strictly implemented, the scale of impact is likely to be reduced to Minor impact on local bat populations.

## 5.1 Bat Mitigation Measures

### 5.1.1 Lighting Plan

This element of the proposed planning application is an important aspect in relation to local bat populations. All European bat species, including Irish bat species, are nocturnal. They usually hide in roosts during the daytime, while fly to feeding areas or drinking sites using commuting routes during the night. Annually bats will hibernate in the winter, swarm in the autumn and give birth in the summer months. In all aspects of the bat lifestyle, Artificial Light at Night (ALAN) may significantly change their natural behaviour in relation to roosting, commuting and feeding. While bats are naturally exposed only to very low lighting levels produced by moonlight, starlight and low intensity twilight, light levels greater than natural light levels can impact on the lifestyle of bats.

Bats are light sensitive bat species, hence their nocturnal activities. The three bat species recorded commuting and foraging within the survey area are Light Tolerant or Semi-tolerant bat species. However, it is still important that strict lighting guidelines are required to reduce the potential impact of the proposed development on local bat populations as standard best practice.

Luminaire design is extremely important to achieve an appropriate lighting regime. Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following should be considered when choosing luminaires. This is taken from the most recent BCT Lighting Guidelines (BCT, 2018).

- All luminaires used will lack UV/IR elements to reduce impact.
- LED luminaires will be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (<2700 Kelvins will be used to reduce the blue light component of the LED spectrum).
- Luminaires will feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible.
- Only luminaires with an upward light ratio of 0% and with good optical control will be used.
- Luminaires will be mounted on the horizontal, i.e. no upward tilt.
- Any external security lighting will be set on motion-sensors and short (1min) timers.
- As a last resort, accessories such as baffles, hoods or louvres will be used to reduce light spill and direct it only to where it is needed.

Any external lighting for the proposed development should strictly follow the above guidelines and these should be strictly implemented during construction and operation phase of the proposed development. The following table provides details of which of the BCT, 2018 measures will be implemented as part of the proposed lighting plan.

**Table 11: Lighting Recommendations to be implemented to reduce impact on local bat populations.**

<b>BCT, 2018 Guidelines</b>	<b>Included in Lighting Plan</b>	<b>Action</b>
All luminaires used will lack UV/IR elements to reduce impact	YES	Yes
LED luminaires will be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability	YES	LED will be used
A warm white spectrum (<2700 Kelvins will be used to reduce the blue light component of the LED spectrum).	Yes  2700 Kelvins is proposed with 2200 Kelvins along Boundary 1, 2, 3 and 4.	2,700 Kelvins will be used with an aim for 2,200 kelvins along boundaries listed.  (Subject to local authority approval)
Luminaires will feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats	YES	Yes
Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible	8m poles and 5m poles	8m poles along roadways and 5m poles within the house estate – to meet local authority guidelines.
Only luminaires with an upward light ratio of 0% and with good optical control will be used.	YES	Yes
Luminaires will be mounted on the horizontal, i.e. no upward tilt.	YES	Yes
Any external security lighting will be set on motion-sensors and short (1min) timers	No external security lighting proposed	No action required
As a last resort, accessories such as baffles, hoods or louvres will be used to reduce light spill and direct it only to where it is needed	For luminaires where <1 LUX level is not achieved along bat commuting routes, this is required.	Glare shields will be utilized in order to minimise any unnecessary light spill onto bat routes along the boundary if this site.  Monitoring is recommended to determine this.  Please see Appendix B for a visible representation of the glare shield that shall be utilized – Lighting Plan Report.



<p>Additional features</p> <p>Dimming and part-night lighting</p>	<p>A control management system will be put in place for the private pathways where the lights are turned off during night hours. In the event of someone using these paths at night, a local presence detection will pick up movement sending a signal on the lamps to increase output to meet minimum lighting requirements. After a fixed period of no movement of 5 minutes, the lights turn off. – This is subject to approval by local authority.</p>
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As a consequence of consultation, the proposed lighting plan meets the recommendations of the guidelines BCT, 2018.

#### 5.1.2 Landscaping

It is recommended that native tree, shrub and plant species are included in the landscaping plan. It is recommended that night-scented planting is also undertaken to encourage foraging areas for local bat populations.

It is recommended that a native hedgerow within individual trees (Alder, Birch, Crab apple, Rowan etc.) is planted along Boundary 1 and 2 linked in with the current landscaping measures. This additional planting will act as a buffer zone to ensure that there is dark zone along the specified boundaries.

#### 5.1.3 Derelict Building

It is recommended that a pre-construction bat survey of the derelict buildings is undertaken at least 3 months prior to construction of the proposed development works. This is to determine the potential changing roosting status of the structure and to allow time to prepare potential mitigation measures and consultation with NPWS.

#### 5.1.4 Bat Conservation Measures

It is recommended that a bat box scheme should be erected within the landscaping plan for the proposed development. This is in the form of three rocket bat boxes to be erected within the boundary habitat.

Bat boxes scheme be sited carefully and this will be undertaken by a bat specialist. The rocket bat boxes are to be erected on a 5m pole fixed in 1m<sup>3</sup> of 40 newton strength concrete (Please see appendices for details). Four possible locations are presented, with 3 of these to be chosen.

It is recommended to position the rocket bat boxes in the locations specified on the figure below.



Figure 8c: Proposed Layout - potential of location of rocket bat boxes (Orange Xs).

#### 5.1.5 Monitoring

Monitoring is recommended post-construction works. This monitoring should involve the following aspects:

- Inspection of bat boxes within one year of erection of bat box scheme/rocket box. Register bat box scheme with Bat Conservation Ireland. This should be undertaken for a minimum of 2 years.
- Monitoring of any other bat mitigation measures. All mitigation measures should be checked to determine that they were successful. A full summer bat survey is recommended post-works.
- Specific monitoring is recommended in relation to the proposed lighting scheme to determine that a level of <1 Lux is achieved along the boundaries of the proposed development site.

## 6. Survey Conclusions

Six species of bat was recorded within the survey area: Leisler's bat, soprano pipistrelle, common pipistrelle, Nathusius' pipistrelle, Daubenton's bat, brown long-eared bat and *Myotis* species (this species is likely to be Daubenton's bat). The first three species were recorded during bat detector surveys and static surveillance bat activity levels were indicative of commuting and foraging individuals. The latter three bat species were only recorded during static surveillance and were recorded in a low level of bat passes.

The treeline and hedgerow boundaries are an active bat commuting and foraging linear features and is located in a well-connected landscape. Overall a Low to High level of bat activity was recorded for common pipistrelles while all other bat species were recorded in a Low level of bat activity. Therefore an overall medium level of bat activity was recorded.

The proposed development site is used as a foraging and commuting habitat for local bat populations. While the level of bat activity and the number of bat encounters do not indicate that the proposed development site is an important area for local bat populations, the treeline boundaries are important commuting routes.

Therefore the potential impact of the proposed development is, overall, considered to have a scale of impact of Moderate impact on named bat species (according to criteria set out in Section 1.2.2). This is primarily in relation to the lighting plan for the proposed development scheme and the presence of light-sensitive bat species.

As a consequence, consultation was undertaken with the lighting and landscape teams and mitigation measures, particularly in relation to lighting have been agreed. These measures will greatly reduce the impact of the lighting plan on local bat populations and the lighting plan meets the BCT guidelines (BCT, 2018).

Bat mitigation measures are presented in order to reduce the potential impact of the lighting scheme for the proposed development. If the mitigation measures presented below are strictly implemented, the scale of impact is likely to be reduced to Minor impact on local bat populations.

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## 8. Appendices

### 8.1 Appendix 1 Bat Habitat & Commuting Route Classifications

Table 1.A: Hedgerow Category (Bat Conservation Ireland, 2015)

Type of Hedgerow / Treeline	Code	Description / Bat Potential
<b>Small Hedgerow</b>	<b>SH</b>	<p>Hedgerow is less than approximately 1.5 m high, there are no, or very few, protruding bushes or trees. This type of hedgerow would provide little shelter to bats.</p> 
<b>Medium Hedgerow</b>	<b>MH</b>	<p>Hedgerow is approximately 1.5 to 3 m high. This type of hedgerow will provide foraging and commuting potential for bats.</p> 
<b>Sparse Treeline Hedgerow</b>	<b>ST</b>	<p>Hedgerow, low or medium in height, with individual trees (where tree canopies, for the most part, do not touch).</p>

		
<b>Dense Treeline Hedgerow</b>	<b>DT</b>	<p>Large uncut hedgerows or treelines, dominated by mainly large tree or very tall scrub species (e.g. tall hawthorn, blackthorn or hazel), where the canopies are mostly touching.</p> 

**Table 1.B: Habitat Classification (Bat Conservation Ireland, 2015, based on Fossit, 2000)**

Cultivated land		Salt marshes		Exposed rock		Fens/flushes	
Built land		Brackish waters		Caves		Grasslands	
Coastal structures		Springs		Freshwater marsh		Scrub	
Shingle/gravel		Swamps		Lakes/ponds		Hedges/treelines	
Sea cliffs/islets		Disturbed ground		Heath		Conifer plantation	
Sand dunes		Watercourse		Bog		Woodland	



## 8.2 Appendix 2      Rocket Bat Boxes

An Irish supplier of this type of bat box is:

[Shop - Eire Ecology](#) – Rocket Bat Box





## 8.3 Appendix 3 Bat Assessment Tables

Table 4.1 Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape, to be applied using professional judgement.		
Suitability	Description Roosting habitats	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	<p>A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions<sup>a</sup> and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation<sup>b</sup>).</p> <p>A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.<sup>c</sup></p>	<p>Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat.</p> <p>Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.</p>
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions <sup>a</sup> and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	<p>Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.</p> <p>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.</p>
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions <sup>a</sup> and surrounding habitat.	<p>Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge.</p> <p>High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.</p> <p>Site is close to and connected to known roosts.</p>

<sup>a</sup> For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

<sup>b</sup> Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten *et al.*, 2015). This phenomenon requires some research in the UK but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in large buildings in highly urbanised environments.

<sup>c</sup> This system of categorisation aligns with BS 8596:2015 Surveying for bats in trees and woodland (BSI, 2015).

Figure A: Table 4.1 (p 35) Reproduced from Collins (2016).

<p><b>(1) Conversion, modification, demolition or removal of buildings (including hotels, schools, hospitals, churches, commercial premises and derelict buildings) which are:</b></p> <ul style="list-style-type: none"> <li>○ agricultural buildings (e.g. farmhouses, barns and outbuildings) of traditional brick or stone construction and/or with exposed wooden beams;</li> <li>○ buildings with weather boarding and/or hanging tiles that are within 200m of woodland and/or water;</li> <li>○ pre-1960 detached buildings and structures within 200m of woodland and/or water;</li> <li>○ pre-1914 buildings within 400m of woodland and/or water;</li> <li>○ pre-1914 buildings with gable ends or slate roofs, regardless of location;</li> <li>○ located within, or immediately adjacent to woodland and/or immediately adjacent to water;</li> <li>○ Dutch barns or livestock buildings with a single skin roof and board-and-gap or Yorkshire boarding if, following a preliminary roost assessment, the site appears to be particularly suited to bats.</li> </ul>
<p><b>(2) Development affecting built structures:</b></p> <ul style="list-style-type: none"> <li>○ tunnels, mines, kilns, ice-houses, adits, military fortifications, air-raid shelters, cellars and similar underground ducts and structures; unused industrial chimneys that are unlined and brick/stone construction;</li> <li>○ bridge structures, aqueducts and viaducts (especially over water and wet ground).</li> </ul>
<p><b>(3) Floodlighting of:</b></p> <ul style="list-style-type: none"> <li>○ churches and listed buildings, green space (e.g. sports pitches) within 50m of woodland, water, field hedgerows or lines of trees with connectivity to woodland or water;</li> <li>○ any building meeting the criteria listed in (1) above.</li> </ul>
<p><b>(4) Felling, removal or lopping of:</b></p> <ul style="list-style-type: none"> <li>○ woodland;</li> <li>○ field hedgerows and/or lines of trees with connectivity to woodland or water bodies;</li> <li>○ old and veteran trees that are more than 100 years old;</li> <li>○ mature trees with obvious holes, cracks or cavities, or that are covered with mature ivy (including large dead trees).</li> </ul>
<p><b>(5) Proposals affecting water bodies:</b></p> <ul style="list-style-type: none"> <li>○ in or within 200m of rivers, streams, canals, lakes, reed beds or other aquatic habitats.</li> </ul>
<p><b>(6) Proposals located in or immediately adjacent to:</b></p> <ul style="list-style-type: none"> <li>○ quarries or gravel pits;</li> <li>○ natural cliff faces and rock outcrops with crevices or caves and swallets.</li> </ul>
<p><b>(7) Proposals for wind farm developments of multiple wind turbines and single wind turbines (depending on the size and location) (NE TIN 051 – undergoing updates at the time of writing).</b></p>
<p><b>(8) All proposals in sites where bats are known to be present<sup>1</sup></b> This may include proposed development affecting any type of buildings, structures, feature or location.</p>
<p><b>Notes:</b></p> <p>1. Where sites are of international importance to bats, they may be designated as SACs. Developers of large sites 5–10km away from such SACs may be required to undertake a HRA.</p>

Figure B: Reproduced from Collins (2016) – page 13.



**Table 2** Factors affecting the probability of bats being present.

<b>Factors affecting the probability of a building being used by bats in summer</b>	
Increased probability	<ul style="list-style-type: none"> <li>Disused or little used; largely undisturbed</li> <li>Large roof void with unobstructed flying spaces</li> <li>Large dimension roof timbers with cracks, joints and holes</li> <li>Uneven roof covering with gaps, though not too draughty</li> <li>Entrances that bats can fly in through</li> <li>Hanging tiles or wood cladding, especially on south-facing walls</li> <li>Rural setting</li> <li>Close to woodland and/or water</li> <li>Pre-20<sup>th</sup> century or early 20<sup>th</sup> century construction</li> <li>Roof warmed by the sun</li> <li>Within the distribution area of horseshoe bats</li> </ul>
Decreased probability	<ul style="list-style-type: none"> <li>Highly urbanised area with few feeding places</li> <li>Small or cluttered roof void (esp. for brown long-eared bat)</li> <li>Heavily disturbed</li> <li>Modern construction with few gaps around soffits or eaves (but be aware these may be used by pipistrelles in particular)</li> <li>Prefabricated with steel and sheet materials</li> <li>Active industrial premises</li> <li>Roof shaded from the sun</li> </ul>
<b>Factors affecting the probability of trees being used by roosting bats</b>	
Increased probability	<ul style="list-style-type: none"> <li>In ancient woodland or parkland</li> <li>Large trees with complex growth form</li> <li>Species that typically form cavities, such as beech, willow, oak or ash</li> <li>Visible damage caused by rot, wind, lightning strike <i>etc.</i></li> <li>Loose bark providing cavities</li> </ul>
Decreased probability	<ul style="list-style-type: none"> <li>Coniferous plantation with no specimen trees</li> <li>Young trees with simple growth form and little damage</li> </ul>
<b>Factors affecting the probability of underground sites being used by roosting bats</b>	
Increased probability	<ul style="list-style-type: none"> <li>Large enough to develop stable temperature in winter</li> <li>High humidity</li> <li>Undisturbed</li> <li>Close to woodland or water (but note that bats will also use upland sites)</li> <li>Many cracks and crevices suitable for bats</li> </ul>
Decreased probability	<ul style="list-style-type: none"> <li>Small and draughty</li> <li>Heavily disturbed</li> <li>In urbanised areas</li> <li>Smooth surfaces with few roosting opportunities</li> </ul>

Figure C: Table 2 Reproduced from Marnell *et al.* (2022).

## 8.4 Appendix 4 – Static Surveillance 2021

### Mini 5

	Leisler's bat	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Brown long- eared bat	Daubenton's bat	Myotis spp	Total
06/08/2021	25	369	24	1	5	6	14	418
07/08/2021	7	184	6	0	1	5	0	197
08/08/2021	24	227	32	0	5	0	3	283
09/08/2021	50	137	21	0	10	0	2	208
10/08/2021	71	286	19	1	2	1	3	376
11/08/2021	83	356	39	0	2	0	5	0
<b>TOTAL</b>	<b>177</b>	<b>1203</b>	<b>102</b>	<b>2</b>	<b>23</b>	<b>12</b>	<b>22</b>	<b>1482</b>

### Mini 6

	Leisler's bat	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Brown long- eared bat	Total
06/08/2021	11	3	1	0	0	15
07/08/2021	56	0	0	0	0	56
08/08/2021	15	9	1	0	0	25
09/08/2021	38	14	4	0	0	56
10/08/2021	107	102	10	1	0	219
11/08/2021	15	29	6	0	1	0
<b>TOTAL</b>	<b>227</b>	<b>128</b>	<b>16</b>	<b>1</b>	<b>0</b>	<b>371</b>

### Mini 10

	Leisler's bat	Common pipistrelle	Soprano pipistrelle	Brown long- eared bat	Daubenton's bat	Myotis spp	Total
06/08/2021	9	913	49	0	1	2	971
07/08/2021	2	1185	175	0	3	17	1362
08/08/2021	6	379	67	0	1	4	452
09/08/2021	20	314	17	0	0	2	351
10/08/2021	45	192	11	0	0	1	248
11/08/2021	8	125	9	1	0	0	0
<b>TOTAL</b>	<b>90</b>	<b>3108</b>	<b>328</b>	<b>1</b>	<b>5</b>	<b>26</b>	<b>3384</b>

## 9. Bat Species Profile

### 9.1 Leisler's bat

Ireland's population is deemed of international importance and the paucity of knowledge of roosting sites, makes this species vulnerable. However, it is considered to be widespread across the island. The modelled Core Area for Leisler's bats is a relatively large area that covers much of the island of Ireland (52,820km<sup>2</sup>). The Bat Conservation Ireland Irish Landscape Model indicated that the Leisler's bat habitat preference has been difficult to define in Ireland. Habitat modelling for Ireland shows an association with riparian habitats and woodlands (Roche *et al.*, 2014). The landscape model emphasised that this is a species that cannot be defined by habitats preference at a local scale compared to other Irish bat species but that it is a landscape species and has a habitat preference at a scale of 20.5km. In addition, of all Irish bat species, Leisler's bats have the most specific roosting requirements. It tends to select roosting habitat with areas of woodland and freshwater.

Irish Status	Near Threatened
European Status	Least Concern
Global Status	Least Concern
Irish Population Trend	2003-2013 ↑
Estimated Irish Population Size	73,000 to 130,000 (2007-2013) Ireland is considered the world stronghold for this species
Estimate Core Area (Lundy <i>et al.</i> 2011)	52,820 km <sup>2</sup>

Taken from Roche *et al.*, 2014, Lysaght & Marnell, 2016 & Marnell *et al.*, 2019

The principal concerns for Leisler's bats are poorly known in Ireland but those that are relevant for this survey area are as follows:

- Selection of maternity sites is limited to specific habitats;
- Relative to the population estimates, the number of roost sites is poorly recorded;
- Tree felling, especially during autumn and winter months; and
- Increasing urbanisation.

### 9.2 Common pipistrelle

This species is generally considered to be the most common bat species in Ireland. The species is widespread and is found in all provinces. The modelled Core Area for common pipistrelles is a large area that covers much of the island of Ireland (56,485km<sup>2</sup>) which covers primarily the east and south east of the area (Roche *et al.*, 2014). The Bat Conservation Ireland Irish Landscape Model indicated that the Common pipistrelle selects areas with broadleaf woodland, riparian habitats and low density urbanization (<30%) (Roche *et al.*, 2014).

Irish Status	Least Concern
European Status	Least Concern
Global Status	Least Concern
Irish Population Trend	2003-2013 ↑
Estimated Irish Population Size	1.2 to 2.8 million (2007-2012)
Estimate Core Area (km <sup>2</sup> ) (Lundy <i>et al.</i> 2011)	56,485

Taken from Roche *et al.*, 2014, Lysaght & Marnell, 2016 & Marnell *et al.*, 2019

Principal concerns for Common pipistrelles in Ireland that are relevant for this survey area are as follows:

- Lack of knowledge of roosting requirements



- This species has complex habitat requirements in the immediate vicinity of roosts. Therefore, careful site specific planning for this species is required in order to ensure all elements are maintained.
- Renovation or demolition of derelict buildings.
- Tree felling
- Increasing urbanisation (e.g. increase in lighting)

### 9.3 Soprano pipistrelle

This species was the second most recorded species along the proposed development site and it generally considered to be the second most common bat species in Ireland. The species is widespread and is found in all provinces, with particular concentration along the western seaboard. The modelled Core Area for soprano pipistrelle is a large area that covers much of the island of Ireland (62,020km<sup>2</sup>). The Bat Conservation Ireland Irish Landscape Model indicated that the soprano pipistrelle selects areas with broadleaf woodland, riparian habitats and low density urbanisation (Roche *et al.*, 2014).

Irish Status	Least Concern
European Status	Least Concern
Global Status	Least Concern
Irish Population Trend	2003-2013 ↑
Estimated Irish Population Size	0.54 to 1.2 million (2007-2012)
Estimate Core Area (km <sup>2</sup> ) (Lundy <i>et al.</i> 2011)	62,020

Taken from Roche *et al.*, 2014, Lysaght & Marnell, 2016 & Marnell *et al.*, 2019

Principal concerns for Soprano pipistrelles in Ireland that are relevant for this survey area are as follows:

- Lack of knowledge of roosts;
- Renovation or demolition of structures;
- Tree felling; and
- Increasing urbanisation (e.g. increase in lighting).

### 9.4 Brown long-eared Bat

This species is generally considered to be widespread across the island. The modelled Core Area for Brown long-eared bats is a relatively large area that covers much of the island of Ireland (52,820km<sup>2</sup>) with preference suitable areas in the southern half of the island. The Bat Conservation Ireland Irish Landscape Model indicated that the Brown long-eared bat habitat preference is for areas with broadleaf woodland and riparian habitats on a small scale of 0.5km emphasising the importance of local landscape features for this species (Roche *et al.*, 2014).

Irish Status	Least Concern
European Status	Least Concern
Global Status	Least Concern
Irish Population Trend	2008-2013 Stable
Estimated Irish Population Size	64,000 -115,000 (2007-2012)
Estimate Core Area (Lundy <i>et al.</i> 2011)	49,929 km <sup>2</sup>

Taken from Roche *et al.*, 2014, Lysaght & Marnell, 2016 & Marnell *et al.*, 2019

Principal concerns for brown long-eared bats are poorly known in Ireland, but those that are relevant for this survey area are as follows:

- Selection of maternity sites is limited to specific habitats;
- Lack of knowledge of winter roosts;
- Loss of woodland, scrub and hedgerows;
- Tree surgery and felling;
- Increasing urbanisation; and
- Light pollution.

## 9.5 Daubenton's bat

The modelled Core Area for Daubenton's bats is a relatively large area that covers much of the island of Ireland (41,285km<sup>2</sup>) reflecting the distribution of sizeable river catchments. The Irish Landscape Model indicated that the Daubenton's bat habitat preference is for areas with broadleaf woodland, riparian habitats and low density urbanisation (Roche *et al.*, 2014).

Irish Status	Least Concern
European Status	Least Concern
Global Status	Least Concern
Irish Population Trend	2008-2013 Stable
Estimated Irish Population Size	81,000 to 103,000 (2007-2012)
Estimate Core Area (km <sup>2</sup> ) (Lundy <i>et al.</i> 2011)	41,285

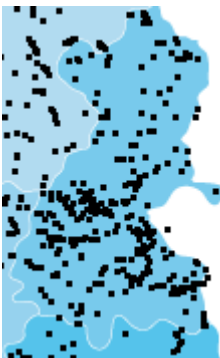
Taken from Roche *et al.*, 2014, Lysaght & Marnell, 2016 & Marnell *et al.*, 2019

Principal concerns for Daubenton's bats are poorly known in Ireland but those that are relevant for this survey area are as follows:

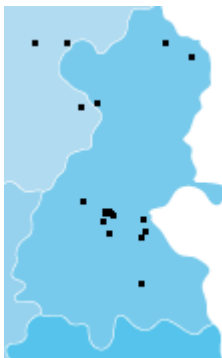
- Potential roost loss due to bridge maintenance;
- Loss of woodland and forest clearance;
- Loss of woodland, scrub and hedgerows;
- Tree surgery and felling;
- Increasing urbanisation; and
- Light pollution.

9.6 Bat Conservation Ireland Bat Species Maps

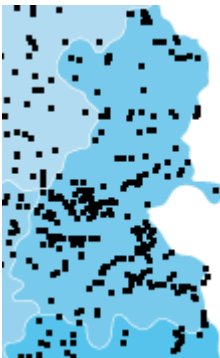
Bat records for County Dublin (Source: [www.batconservationireland.org](http://www.batconservationireland.org))



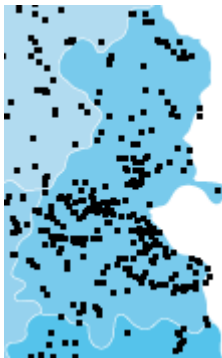
Common pipistrelle



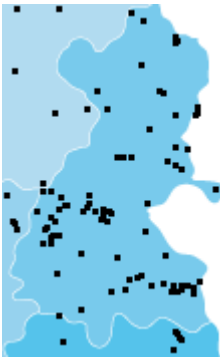
Nathusius' pipistrelle



Soprano pipistrelle



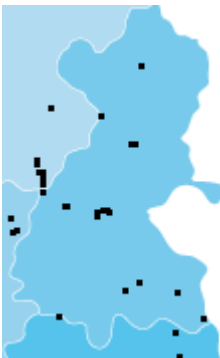
Leisler's bat



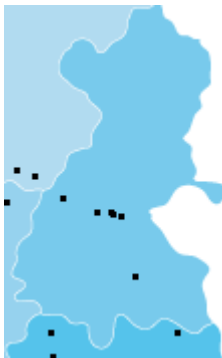
Brown long-eared bat



Daubenton's bat



Natterer's bat



Whiskered bat



Lesser horseshoe bat