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Ecological Impact Assessment Report

PRESENTED TO

Zolbury Ltd.

Large Scale Residential Development (LRD) at lands at Blackglen Road, Sandyford, Dublin 18.

December 2024

Environmental Consultancy Services

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Project Title	Large Scale Residential Development (LRD) at lands at Blackglen Road, Sandyford, Dublin 18.
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TABLE OF CONTENTS

REPORT LIMITATIONS ..... **II**

LIST OF TABLES ..... **V**

LIST OF FIGURES ..... **VI**

1 INTRODUCTION **7**

1.1 Quality Assurance and Competence 7
1.2 Relevant Legislation and Policy Context 8

2 DESCRIPTION OF THE PROPOSED DEVELOPMENT **10**

2.1 Site Location 10
2.2 Proposed Development Description 10
2.2.1 Drainage and Water Supply 14
2.2.2 Landscape Plan 17
2.2.3 Designated Wildlife Refuge 18
2.2.4 Ecological Aspects of the Landscape Plan 20
2.2.5 Lighting Plan 23
2.3 Brief description of the Construction Phase 23
2.4 Description of the Operational Phase 23

3 METHODOLOGY **24**

3.1 Scope of Assessment 24
3.2 Desk Study 24
3.3 Zone of Influence 25
3.4 Identification of Relevant Designated Sites 25
3.5 Field Surveys 26
3.5.1 Habitat Surveys 26
3.5.2 Bat Surveys 26
3.5.3 Bird Surveys 30
3.5.4 Mammal Surveys 31
3.5.5 Herptile Rapid Assessment Survey 31
3.5.6 Other Fauna 31
3.6 Ecological Assessment 31
3.6.1 Evaluation of Ecological Features 32
3.6.2 Impact Assessment 32
3.6.3 Assessment of Cumulative Impacts and Effects 32
3.6.4 Avoidance, Mitigation, Compensation and Enhancement Measures 33
3.7 Limitations 33

4 ECOLOGICAL BASELINE CONDITIONS **35**

4.1 Geology, Hydrogeology and Hydrology 35
4.1.1 Site Drainage 36
4.2 Designated Sites 37
4.2.1 European sites – Appropriate Assessment 37
4.2.2 Other Designated sites 38
4.3 Habitats 43
4.3.1 Scrub (WS1) and Bracken (HD1) 43

4.3.2 Spoil and Bare Ground (ED2), Recolonising Bare Ground (ED3) & Exposed Siliceous Rock (ER1) 44
4.3.3 Acid Grassland (GS3) & Wet Grassland (GS4) 45
4.3.4 Treelines (WL2) & Hedgerows (WL1) 46
4.3.5 Stone walls (BL1) and Drainage Ditches (FW4) 48
4.3.6 Carrickmines Stream (FW1) 49
4.4 Species and Species Groups 53
4.4.1 Flora 53
4.4.2 Invasive Plant Species 53
4.4.3 Bats 55
4.4.4 Birds 59
4.4.5 Mammals (excl. bats) 62
4.4.6 Amphibians 65
4.4.7 Other Fauna 67
4.4.8 Protected and/or Notable Species Unlikely to Occur at the Site 67
4.5 Evaluation of Ecological Features 68
5 ECOLOGICAL IMPACT ASSESSMENT 70
5.1 Avoidance and Mitigation Embedded in Project Design 70
5.2 Construction Phase 71
5.2.1 Impacts on Designated Sites 71
5.2.2 Impacts on Habitats and Flora 74
5.2.3 Impacts on Native Fauna 75
5.3 Operational Phase 77
5.3.1 Impacts on Designated Sites 77
5.3.2 Impacts on Habitats and Flora 78
5.3.3 Impacts on Native Fauna 78
5.4 Do Nothing Impact 79
5.5 Potential for In-Combination Effects 79
5.5.1 Relevant Plans and Policies 79
5.5.2 Existing Planning Permissions 79
6 AVOIDANCE, MITIGATION, COMPENSATION AND ENHANCEMENT MEASURES 81
6.1 Avoidance By Design 81
6.2 Construction Phase 81
6.2.1 Protection of Habitats 83
6.2.2 Protection of Wildlife 88
6.3 Operational Phase 93
6.4 Biodiversity Enhancement Measures 93
6.4.1 Biodiversity Enhancement by Design 93
6.4.2 Enhancement 1: Swift Bricks 93
6.4.3 Enhancement 2: Amphibian and Reptile Hibernacula 94
6.4.4 Enhancement 3: Wildlife Ponds 95
6.4.5 Enhancement 4: Bat Boxes 96
6.4.6 Enhancement 5: Bug Hotels 96
7 MONITORING 96
7.1 Construction Phase Monitoring 96
7.1.1 Ecological Clerk of Works (ECoW) 96

7.2 POST-CONSTRUCTION MONITORING 97
7.2.1 Bat Ecologist *97*
7.2.2 Amphibian Survey *98*
8 RESIDUAL IMPACTS 101
9 CONCLUSION 106
10 REFERENCES 107
APPENDIX I – LEGISLATION AND POLICY 110
APPENDIX II – VALUE OF ECOLOGICAL RESOURCES 116
APPENDIX III – EPA IMPACT ASSESSMENT CRITERIA 118
APPENDIX IV – BAT REPORT 120
APPENDIX V – INVASIVE SPECIES MANAGEMENT PLAN (INVAS BIOSECURITY, 2024) 121
APPENDIX VI – HERPTOFAUNA RAPID ASSESSMENT REPORT (GANDOLA, 2024) 122

LIST OF TABLES

Table 1. EPA monitoring stations and assigned Q values 35
Table 2. WFD Risk and Water Body Status 36
Table 3. Designated sites considered with the Source-Pathway-Receptor (S-P-R) method to establish notable links between the sources of effects arising from the Proposed Development, and any relevant designated sites. those sites with notable S-P-R links that are further assessed in this report are highlighted in green (if any). 39
Table 4. Records of bats for the surrounding 2km grid square associated with the Site from the NBDC. 55
Table 5. Details of amber and red listed bird species within the 2km grid square 59
Table 6. Bird species recorded within the vicinity of the Site during the breeding bird survey July 2021. 60
Table 7. Bird species recorded during walkover survey on the 29th November 2023. 62
Table 8. Records of terrestrial mammals (native and non-native) for the surrounding 2km grid square associated with the Site from the NBDC. 62
Table 9. Evaluation of Designated Sites, Habitats, Flora and Fauna recorded within the Site and the surrounding area. Those identified as Key Ecological Receptors (KERs) are highlighted in green. 68
Table 10. Embedded desing features and their potential to act to avoid or mitigate negative impacts on the local ecology and environment. 70
Table 11. Granted and Pending Development applications within 300 m of the Proposed Development. Location and distance given is relative to the Proposed Development. 79
Table 12. Summary of Best Practice Standards and Mitigation outlined in the Outline Construction and Environmental Management Plan (OCSC, 2024). 82
Table 13. Seasonal Restrictions on Vegetation Removal. Red Boxes Indicate Periods When Clearance / Works are Not Permissible 89
Table 14. Monitoring and pre-works inspections for the identified mitigation measures during Construction Phase of the Proposed Development. 99
Table 15. Summary of potential impacts on KER(s), mitigation proposed and residual impacts. 102

LIST OF FIGURES

Figure 1. Site location. 12
Figure 2. Site Layout (source: Extracted from OMP Drwg: 20006A-OMP-01-00-DR-A-1000)..... 13
Figure 3. Landscape Plan (Extracted from GA Drwg: 23170_Blackglen_PA_J_LM)..... 18
Figure 4. Break in wildlife refuge to support future potential access to the east. 19
Figure 5. Existing habitats within the Proposed Wildlife Refuge Area 21
Figure 6. Enhancement Features proposed within the Wildlife Refuge Area 22
Figure 7. Source-Pathway-Receptor connection between the Proposed Development and nearby/ downstream designated sites..... 42
Figure 8. Image facing west showing Bracken (HD1) and gorse scrub (WS1) habitats. 44
Figure 9.Example of ED3 and ER1 habitats present at the Site. 44
Figure 10. Image showing ED2/ED3 habitat in the north of the Site where adjacent road works have taken place. 45
Figure 11. A patch of wet grassland (GS4) habitat in the south of the Site (Photo taken facing west). 46
Figure 12. Acid Grassland (GS3) habitat along the southern boundary of the Site (Image take facing north). 46
Figure 13. Treeline (WL2) along the Site's southern boundary with private residential lands. 47
Figure 14. Image of the northern Site boundary where roadworks along Blackglen Road have removed the previous broken hedgerow. 48
Figure 15. Example of BL1 stone wall habitat along eastern site boundary. 49
Figure 16. Drainage ditch (FW4) located along boundary with Woodside Road to the south. 49
Figure 17. Images of the Stream (FW1) running along part of the south-eastern boundary of the Site. Image A & C show the overgrown nature of the stream as it passes through the Site (flow direction shown by blue arrow). Image C shows the stream entering the private garden to the east of the Site. 51
Figure 18. Habitat Map of the Site of the Proposed Development (Codes as per Fossitt, 2000). 52
Figure 19. Images of the derelict cottage located along the eastern Site Boundary 57
Figure 20. Sika stags sparring on Site in November 2023. Distinctive sika tail marking visible in right-hand image. 64
Figure 21. Small burrows observed in close proximity along the Site's eastern boundary. 64
Figure 22. Area of pooling along the Site's eastern boundary. The pooling oirginates from a private garden adjacent to the Site. 66
Figure 23. A patch of wet grassland (GS4) habitat in the south-west of the Site (Photo taken facing west). 67
Figure 24. Image showing the location of Fitzsimon's Wood pNHA in relation to the Proposed Development, along with dust impacts buffers as per IAQM (2016). 73
Figure 25. Rhododendron seedling in the south of the Site (Image facing south-east). 85
Figure 26. An example of an Amphibian Safe Zone with one way fencing preventing amphibian access to the construction works area once they enter the safe zone. 92
Figure 27. An example of an one-way Amphibian fencing. the frogs climb in from the works area and fall within the safe zone and are unable to reenter the works area. 92
Figure 28. Example design of a wildlife-friendly log pile. Extracted from Gardening for Biodiversity (Juanita Browne, 2020). 95

1 INTRODUCTION

Enviroguide Consulting was commissioned by Zolbury Ltd., to undertake an Ecological Impact Assessment (EcIA) (the 'Report') in relation to a Proposed Development at lands at Blackglen Road, Sandyford, Dublin 18, hereafter referred to as 'Proposed Development' or 'Site' when referring to the site area of the Proposed Development.

This EcIA 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 on or adjacent to the Site. This Report will describe the ecology of the Site, with emphasis on habitats, flora and fauna, and will assesses the potential effects of the Construction and Operational Phases of the Proposed Development on these ecological receptors. This Report follows Guidelines for Ecological Impact Assessment in the UK and Ireland, by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018) and supplemented by the National Roads Authority (2009) guidelines for Assessment of Ecological Impacts of National Road Schemes. The purpose of this EcIA is to:

- Set out the methodologies used to inform the assessment.
- Identify Key Ecological Receptors (KERs) within the Zone of Influence (ZOI).
- Assess the impacts from the Proposed Development on the KERs and the resulting significant effects.
- Set out measures to avoid or mitigate negative impacts.
- Assess the residual effects after the incorporation of agreed avoidance or mitigation measures to ensure legal compliance.
- Set out agreed measures to offset significant residual effects.
- Set out opportunities for ecological enhancement.

1.1 Quality Assurance and Competence

Enviroguide Consulting is a multi-disciplinary consultancy specialising in the areas of the Environment, Waste Management and Planning. All of our consultants carry scientific or engineering 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 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. Bat Ecologist Dr Tina Aughney of Bat Eco Services undertook the bat surveys that inform this assessment. Subcontracted specialist herpetologist Rob Gandola undertook the amphibian and lizard rapid assessment survey of the Site and provided recommendations for same.

Liam has a B.Sc. in Zoology (Hons) and a M.Sc. (Hons) in Wildlife Conservation and Management from University College Dublin. Liam is a Senior Ecologist with 5 years of experience in Ecological Consultancy and is experienced in desktop research, literature scoping-review, and report writing, as well as practical field experience (e.g., Bat surveys, habitat surveys, invasive species surveys, wintering bird surveys, large mammals, fresh water macro-invertebrates etc.). Liam is experienced in compiling Biodiversity Chapters of EIARs, Ecological Impact Assessments (EcIA), Appropriate Assessment (AA) screening and Natura Impact Statements (NIS) reports, and in the overall assessment of potential impacts to ecological receptors from a range of developments. Liam is also a Qualifying member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

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.

Rob Gandola is a herpetologist expert with a MSc in Ecology from Bangor University, Wales and a BSc (hons) Zoology from UCD. He provides training and professional advice to Local and National Authorities, heritage rangers, eNGOs, and community groups in Ireland and Northern Ireland, and regularly carries out surveys and implements monitoring projects on their behalf.

1.2 Relevant Legislation and Policy Context

An EcIA is a process of identifying, quantifying, and evaluating potential effects of development-related or other actions on habitats, species and ecosystems (CIEEM, 2018). The Proposed Development is sub-threshold for an Environmental Impact Assessment (EIA) under the Planning and Development Regulations 2001-2023, as amended.

When an EcIA is undertaken as part of an EIA process it is subject to the EIA Regulations (under the Planning and Development Regulations 2001-2023, as amended). An EcIA is not a statutory requirement, however it is a best practice evaluation process. This EcIA is provided to assist the Competent Authority with its decision making in respect of the Proposed Development.

There is a number of pieces of legislation, regulations and policies specific to ecology which underpin this assessment. These may be applicable at a European, National or Local level. Legislation at the International level relevant to the Proposed Development are listed below:

- *Council Directive 92/43/EEC* on the Conservation of Natural Habitats and of Wild Fauna and Flora; hereafter the 'Habitats Directive'.
- *Directive 2009/147/EEC*, hereafter the 'Birds Directive'.
- *Directive 2011/92/EU*, hereafter the 'EIA Directive'.
- EU Regulation 1143/2014, on Invasive Alien Species.
- *Convention on the Conservation of European Wildlife and Natural Habitats 1982*, hereafter the 'Bern Convention'

- *The Convention on the Conservation of Migratory Species of Wild Animals 1983*, hereafter the 'Bonn Convention'.
- *Ramsar Convention on Wetlands 1971*, hereafter referred to as 'Ramsar'.
- *Water Framework Directive 2000/60/EC*, hereafter the 'WFD'.

National legislation and policy relevant to the Proposed Development are listed below:

- Wildlife Act 1976, as amended in 2000.
- Flora (Protection) Order 2022.
- The Planning and Development Act 2000 as amended.
- National Biodiversity Plan 2023-2030.

Additionally, Natural Heritage Areas (NHAs) are designations under the Wildlife Acts to protect habitats, species, or geology of national importance. The boundaries of many of the NHAs in Ireland overlap with Special Areas of Conservation (SAC) and/or Special Protection Area (SPA) sites. Although many NHA designations are not yet fully in force under this legislation (referred to as 'proposed NHAs' or pNHAs), they are offered protection in the meantime under planning policy which normally requires that planning authorities give recognition to their ecological value.

Local plans and policies relevant to the Proposed Development are listed below:

- Dún Laoghaire-Rathdown County Development Plan 2022-2028.
- Dún Laoghaire-Rathdown Biodiversity Action Plan 2021-2025.

Further details on legislation and policy relevant to the Proposed Development are detailed in Appendix I.

2 DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 Site Location

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 (See Figure 1). 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.

2.2 Proposed Development Description

Zolbury Ltd., intend to apply to Dun Laoghaire Rathdown County Council for permission for development for a Large Scale Residential Development (LRD) on a site of approx. 3.86ha on lands at Blackglen Road, Sandyford, Dublin 18.

The development will consist of 192 no. residential units ranging from 2-5 storeys in height, associated resident amenity facilities, a childcare facility, all boundary treatment and landscaping works, site services connections and all site development works to include:

a) Construction of 192 no. residential units, in the form of 6 no. new apartment buildings (A1 – B4), 40 duplexes (C1, C2, C2A) and 14 houses (D1 & D2), to include 33 no. 1-beds, 84 no. 2 -beds, 61 no. 3-beds and 14 no. 4-beds as follows:

   - Block A1 (4 storeys) comprising 15 no. apartments (3 no. 1 bed units, 6 no. 2 bed units & 6 no. 3 bed units); a crèche facility of approx. 378.2 sq. m with associated outdoor play space of approx. 170 sq. m; and resident amenity facilities of approx. 31.6 sq. m.
   - Block A2 (3-4 storeys) comprising 26 no. apartments (2 no. 1 bed units, 20 no. 2 bed units and 4 no. no. 3 bed units) and resident amenity facilities of approx. 353.6 sq. m.
   - Blocks B1 and B2 (2-5 storeys) comprising 51 no. apartments (15 no. 1 bed units, 29 no. 2 bed units, 7 no. 3 bed units).
   - Blocks B3 and B4 (2-5 storeys) comprising 46 no. apartments (13 no. 1 bed units, 23 no. 2 bed units and 10 no. 3 bed units).
   - Duplex Units C1 (4 storeys), C2 and C2A (3 storeys) comprising 40 duplexes (6 no. 2 bed units, 20 no. 3 bed units and 14 no. 4 bed units).
   - House Units D1 and D2 (2 storeys) comprising 14 houses (14 no. 3 bed units).

b) Total Open space (approx. 10,854 sq. m) is proposed in the form of public open space (approx. 8, 686 sq. m), and residential communal open space (approx. 2,168 sq. m). Each residential unit is afforded with associated private open space in the form of a garden/terrace/balcony.

c) The development will be served via a new vehicular access via Blackglen Road. This will be designed as a priority junction with pedestrian and cycle crossings where required to tie in with the Blackglen Road Improvement Scheme.

d) A new toucan crossing is proposed across Blackglen Road just to the east of the new vehicular access. This toucan crossing has been designed as per TL607 of the Cycle Design Manual to allow crossing of pedestrians and cyclists to the northern side of Blackglen Road for improved public transport access.

e) Emergency access only is proposed via Woodside Road.

f) A dedicated wildlife corridor is proposed to the east/south-east side of the site and a public open space (approx. 307 m in length) tree trail to the west/north-west side of the site.

g) Basement/Podium car park areas are proposed below Blocks B1, B2, B3 and B4. A total of 226 no. car parking spaces are proposed, which includes 2 no. car club spaces, 12 no. accessible spaces and 47 no. EV charging spaces (198 no. long-stay spaces, 18 no. visitor space & 10 no. car parking spaces for creche use), in addition to 9 no. motorcycle spaces.

h) A total of 484 no. bicycle spaces are proposed in the form of 442 no. long stay bicycle spaces 42 short-term stay visitor parking.

i) 2 no. ESB substations at surface level.

j) Bin Storage areas for the Duplex blocks are proposed at ground level adjacent to the Duplex blocks.

k) All associated site and infrastructural works to include provision for water services; foul and surface water drainage and connections; internal roads, attenuation proposal; permeable paving; all landscaping works including green infrastructure zones; green roofs; and general plant areas; photovoltaic panels; landscaped boundary treatment; footpaths; public lighting; and electrical services.

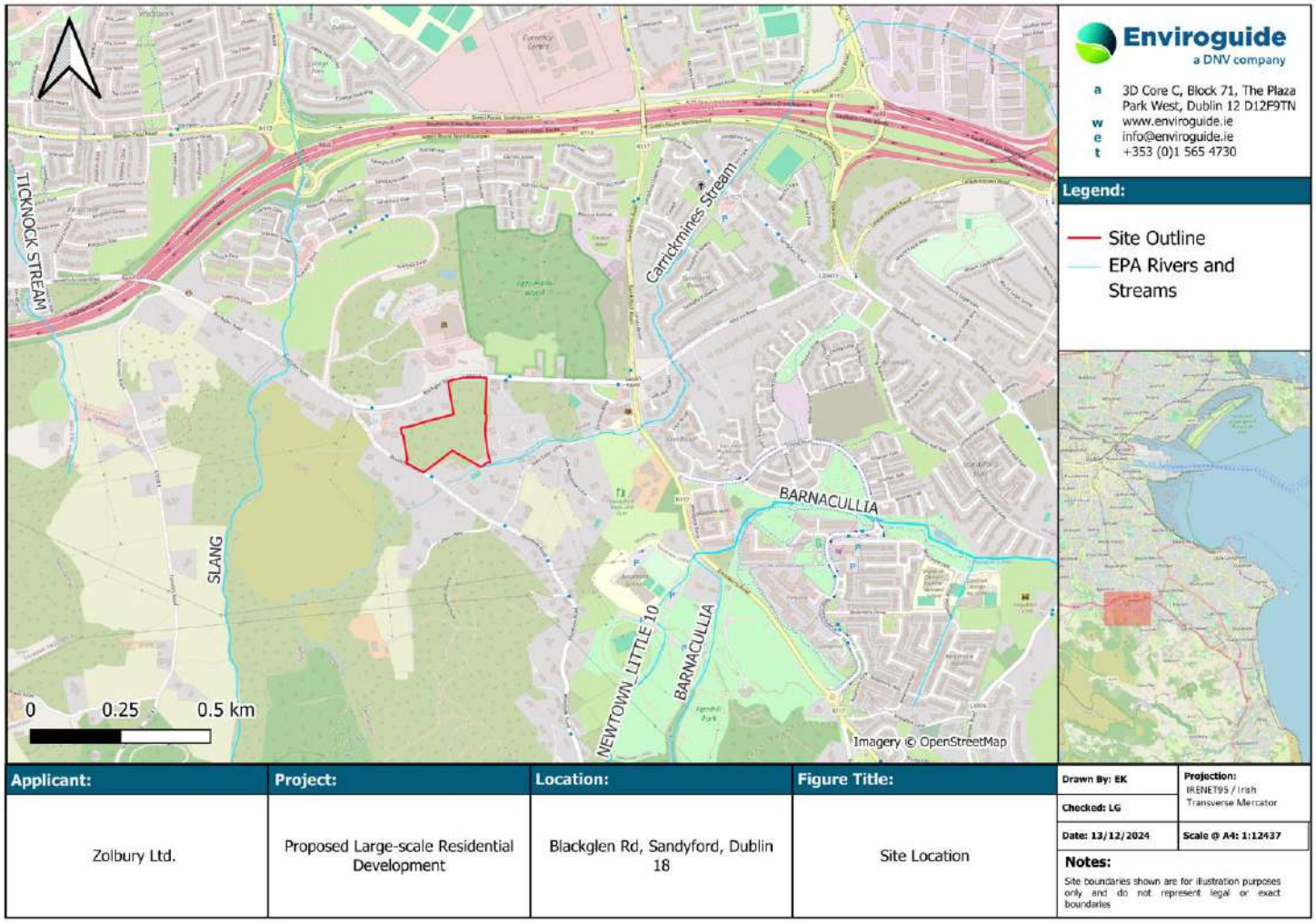


FIGURE 1. SITE LOCATION.



FIGURE 2. SITE LAYOUT (SOURCE: EXTRACTED FROM OMP DRWG: 20006A-OMP-01-00-DR-A-1000)

2.2.1 Drainage and Water Supply

The following details are extracted from the Engineering Services Report submitted prepared by O'Connor Sutton Cronin Consulting Engineers (OCSC) as part of this application (OSCS, 2024a).

2.2.1.1 Existing Drainage

2.2.1.1.1 Surface water

Existing services records indicate that no surface water sewer is present in the vicinity of the Proposed Development and runoff from the Site is allowed to infiltrate naturally.

2.2.1.1.2 Foul water

Existing services records do not indicate the presence of any wastewater infrastructure within the proposed Site. Records indicate that there is an existing 150mm Ø wastewater sewer on Blackglen Rd. This sewer is to be upgraded as part of the upgrade works on Blackglen Rd.

2.2.1.2 Proposed Drainage

It is proposed to separate the surface water and wastewater drainage networks, which will serve the Proposed Development, and provide independent connections to the surface water sewer and local wastewater sewer networks, respectively.

2.2.1.2.1 Surface water

The proposed surface water design splits the Proposed Development into two main catchments to better integrate Sustainable Drainage Systems (SuDS) measures and reduce the rainfall runoff rate:

1. Main Development catchment (**Catchment 1**) discharging controlled and restricted flow rates of the treated rainfall runoff to the existing stormwater network at Blackglen Road. This is split into five sub-catchments (**1A, 1B, 1C, 1D and 1E**)
2. Blocks B3 and B4, including access road (**Catchment 2**), draining to the proposed infiltration soakaway, and then discharging treated rainfall runoff at a restricted rate (Max. of QBAR for the catchment; 1.3 l/s) to the existing stream on the southeast boundary line, matching existing outfall for the catchment.

Each sub-catchment area will look to provide interception and treatment to the rainfall runoff, either at source or through site design. Infiltration systems will be provided in off-podium areas where applicable as the soakaway testing carried out on Site resulted in good infiltration rates across the Site. The proposed surface water networks are to typically comprise a gravity pipe network, with significant SuDS measures e.g., bioretention areas, infiltration trench, green roofs, podium drainage, pervious paving, filter drains, trapped road gullies, flow control devices, attenuation storages implemented and integrated, wherever practicable. Interim attenuation benefits are to be provided at roof level, through the provision of green roofs (>70% total roof area), and throughout the external drainage network: within the landscape features, the podium build-up and pervious paving base course.

2.2.1.2.1.1 SuDS Measures

Permeable 'pervious' paving

A Type B pervious paving, with a 300mm (typical) depth of open graded crushed rock as base course, is to be provided in driveways/ car parking spaces, within the Proposed Development. An overflow pipe, from the basecourse, will be provided to the drainage network, which will allow for interception of initial rainfall, groundwater discharge, with an attenuated outflow to the main network in extreme rainfall events.

Grasscrete

For the remaining car parking spaces, a grasscrete surface is proposed. While providing the general benefits of permeable paving (above), it provides initial abstraction by vegetation and, similar to green roof technology, retains a small amount of runoff allowing for transpiration and evaporation, thus reducing runoff volume.

Bioretention areas

A number of small bioretention areas next to the individual housing units will provide treatment and interception for minor storm events. Runoff will pond temporarily on the surface and then filters through the vegetation and underlying soils. The filtered runoff is then collected using underdrain pipes and partially infiltrated into the surrounding soil.

Green roofs

Green roofs are to be provided across the development with greater than 70% coverage, as required by DLR's planning policy. As this development includes roof areas greater than 300m^2 on apartment buildings, the planning application must include green roof coverage in accordance with Standard GR2 of Appendix 7.2 (DLR County Development Plan). This calls for at least 70% coverage for applicable buildings when using an extensive buildup (min. 80mm substrate), or at least 50% coverage when using an intensive buildup (min 200mm substrate). It is proposed that block B1/B2 and block B3/B4 will each provide a minimum of 50% green roof coverage using an intensive buildup. The green roofs on these blocks will also be blue roofs.

Blocks A1 and A2 both have sloped roofs which are not practical for green roof construction. However, as both buildings exceed the 300m^2 threshold, green roof coverage has been provided as an extensive buildup on 20 of the individual housing units. Even with a 700mm setback on each of these roofs almost 80% coverage for Blocks A1 and A2 is provided, thus exceeding the 70% requirement.

Trapped road gullies

All road gullies serving the Proposed Development are to be trapped, to help prevent sediment and gross pollutants from entering the surface water network, and thus improving the water quality discharging from Site.

Silt traps

A manhole upstream of attenuation system is to contain a 600mm sump, below invert level of outlet pipe, in order to trap sediment and other gross pollutants, and prevent from entering downstream watercourses; thus improving the water quality discharging from Site.

Geocellular storage systems

Unlined proprietary geocellular storage units are to be provided for the attenuation of rainfall runoff for the catchment area. These systems are to provide sufficient temporary storage volume for rainfall events up to, and including, the design 1% AEP rainfall event (including climate change). Typical geocellular storage systems comprise plastic cellular units of high porosity (typically >95%), structurally arranged in rows and layers, with a perforated distribution pipe through the centre.

Interception storage

Interception storage is to 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.

Filter drains

Filter drains (perforated pipe with cl505 surround) to be provided along roads where possible to intercept and treat polluted water.

Flow control device

A flow control device is to be provided immediately downstream of attenuation system, in order to restrict the surface water discharge from Site to a flow rate equivalent, or below, the natural greenfield runoff rate OCSC, 2024a).

Oil separator

A Class 1 bypass fuel separator is to be provided immediately downstream of the last attenuation system, as an additional and final embedded mitigation measure, prior to surface water discharge from each unit sub-catchment to the surface water network.7

For the smaller surface water network which discharges from the area around Block B3/B4 to the existing stream on the south-eastern boundary, a similar separator will be provided immediately upstream of the infiltration soakaway.

2.2.1.2.2 Foul Drainage

It is proposed to separate the wastewater and surface water drainage networks, which will serve the Proposed Development, and provide independent connections to the public wastewater infrastructure. The Proposed Development is to be drained by a gravity wastewater network, based on the natural topography of the development Site. The buildings' wastewater network is to connect to the new development's gravity wastewater network at the ground level which will connect the upgraded foul sewer network on Blackglen Road.

A Pre-Connection Enquiry Form (IW Ref Nr. CDS22002623) was submitted 6th April 2022 to Irish Water for a total of 360nr. residential units. Feedback on this enquiry has been received and states that the development is feasible subject upgrades to the existing network. A new Pre-Connection Enquiry Form (IW Ref Nr. Feedback on this enquiry has been received and states that the development is feasible, subject to upgrades to the existing network. Please see the ESR (OCSC, 2024a) for further details.

2.2.2 Landscape Plan

The proposed landscape design for the Site has been prepared by Gannon and Associates Landscape Architects (GA) and is detailed within the Landscape Design Report (LDR) that accompanies this submission under separate cover (GA, 2024). The landscape plan is shown in Figure 3.

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, northern half, to the higher ground in the south of the Site. As such, tree planting at the Site moves from a largely oak (*Quercus spp*.), holly (*Ilex aquifolium*), birch (*Betula spp.*) woodland in the north, to heathers and Scot's Pine (*Pinus sylvestris*) in the south. The landscape plan also acknowledges the Site's location within the 'Ticknock to River Dodder Wildlife Corridor' as outlined in the Dún Laoghaire-Rathdown Biodiversity Action Plan 2021-2025, and works to support and contribute to the habitat connectivity of this county-wide green infrastructure network, through the choice and design of planting and habitat provision within the Site, and the incorporation of a designated wildlife refuge along its southern and eastern boundaries.

A native woodland trail will run along the wooded western margin of the Site and will contain a variety of native trees and groundcover planting. A wildflower area with tree planting will mirror this western woodland trail, connecting it in with the central sections of the residential development. Existing hedgerows at the Site will be supplemented with native planting and new hedgerows comprising a native mix of hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), holly and dog rose (*Rosa canina*) will run along the majority of the Site's woodland margins. 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.



FIGURE 3. LANDSCAPE PLAN (EXTRACTED FROM GA DRWG: 23170_BLACKGLEN_PA_J_LM)

2.2.3 Designated Wildlife Refuge

Local ecology and wildlife considerations have been integral to the design of the landscape plan for the Site. Following consultation and a meeting with DLR's Biodiversity Officer, a designated wildlife refuge has been incorporated, beginning in the south of the Site at Woodside Road and running northwards along the south-eastern and eastern Site boundaries. This refuge area of ca. 10m in width will be set aside for use by local wildlife e.g., mammals, birds and bats, to exist and commute undisturbed through the Site and access lands to the north of the Site e.g., Fitzsimon's Woods pNHA. This area will be separated from the residential component of the LRD by a dense native hedgerow and sturdy wire fencing, to dissuade residents from accessing the refuge area. Planting within the wildlife corridor will consist of pine and birch trees, along with upland shrub species appropriate for the Site's upland setting e.g., heathers (*Calluna vulgaris & Erica cinerea),* common juniper (*Juniperus communis*), purple moor grass (*Molina caerulea*) and hawthorn shrubs.

It is noted that a break will be present in the wildlife refuge where a potential future access route to adjacent lands to the east has been included at the request of DLR's Transport

Department (Figure 4). It will be possible for wildlife to move from one side of this access road width to the other without impediment. A combination of a small berm and dense hedgerow will be used to delineate the edges of the refuge on either side of this access road.

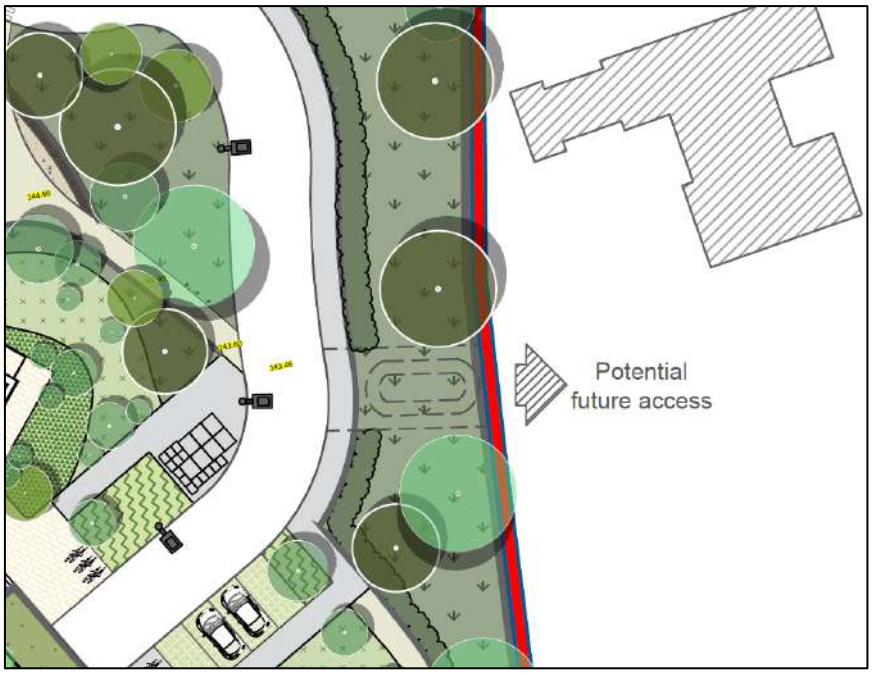


FIGURE 4. BREAK IN WILDLIFE REFUGE TO SUPPORT FUTURE POTENTIAL ACCESS TO THE EAST.

A Wildlife Refuge and Biodiversity Management Plan (WRBMP) has been prepared for the Site (Enviroguide, 2024b) and accompanies this application under separate cover. This management plan outlines the creation and management approach for the wildlife refuge and the various ecological enhancement features it will support. These details are provided below.

2.2.3.1 Creation of Wildlife Refuge

The set aside and protection of the area designated for the wildlife refuge will occur at the beginning of the Construction Phase, with the area defined as per the relevant landscape plans and protected by robust fencing e.g., a combination of heras fencing and wooden posts where ground conditions allow. This fencing will include clear signage noting the area as a wildlife refuge to ensure construction staff are aware of its presence and importance. This fencing will be maintained for the duration of the Construction Phase and checked regularly by the contractor and the Ecological Clerk of Works (ECoW) to ensure it is operational and effective in protecting the wildlife refuge. The Site-side of the wildlife refuge i.e., its internal boundary, will be delineated by a combination of new dense native hedgerow planting, and robust dog-proof wire fencing. A low berm/ditch combination may also be appropriate depending on spatial constraints.

Within the wildlife refuge area itself, minimal work is needed to create or 'set-up' the refuge. In its current condition it already contains a variety of habitats, with areas of deer-grazed grassland, bracken, scrub and exposed ground already present (Figure 5). The creation of the wildlife refuge will largely comprise of the fencing off and protection of its extent, along with some native tree and shrub planting, however it must be ensured that the refuge is not overly planted, and that a patchwork of vegetated and open areas is maintained for a variety of

wildlife to benefit from. The creation of the wildlife ponds and other features within the wildlife refuge are discussed in more detail within the WRBMP (Enviroguide, 2024b) and shown in Figure 6.

2.2.3.2 Management of Wildlife Refuge

As detailed within the WRBMP (Enviroguide, 2024b), the management goal of the wildlife refuge is to provide an area of natural habitat separated from the main residential development proposed, where fauna such as frogs, lizard, mammals, birds and bats can exist relatively undisturbed by their human neighbours. To support these animal groups the habitats within the refuge will need to be 'heterogenous' (variable) and cannot become completely dominated by one plant species e.g., bracken or gorse.

The management team will ensure that a variety of habitats exist within the refuge area. The current habitat mix is already heterogenous, with areas of deer-grazed grassland, bracken, scrub and exposed ground already present. The management regime will seek to maintain this mix through occasional selective cutting of some areas of dense scrub and bracken, and occasional soil scrapes in select areas to ensure patches of the underlying granite geology are exposed to create lizard sunbathing areas.

This selective vegetation cutting will not include the boundary hedgerows and treelines that run along either side of the refuge area, these will be encouraged to grow dense and tall (as per guidance in the WRBMP) to provide shelter, and habitat connectivity to local fauna, as well as protection from the adjacent residential component of the Proposed Development

2.2.4 Ecological Aspects of the Landscape Plan

The needs of local wildlife have also been incorporated into the proposed design, with various areas of different habitat types proposed; including wildlife ponds along the eastern wildlife refuge for local amphibian populations to adopt, wildflower meadow areas throughout for local pollinator species, and potential mammal habitat in the wooded margins of the Site. Bat boxes have also been provided as habitat enhancement measures to provide additional roosting habitat for the local bat population known to use the Site. The proposed landscaping of the Site will continue to support and contribute 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.

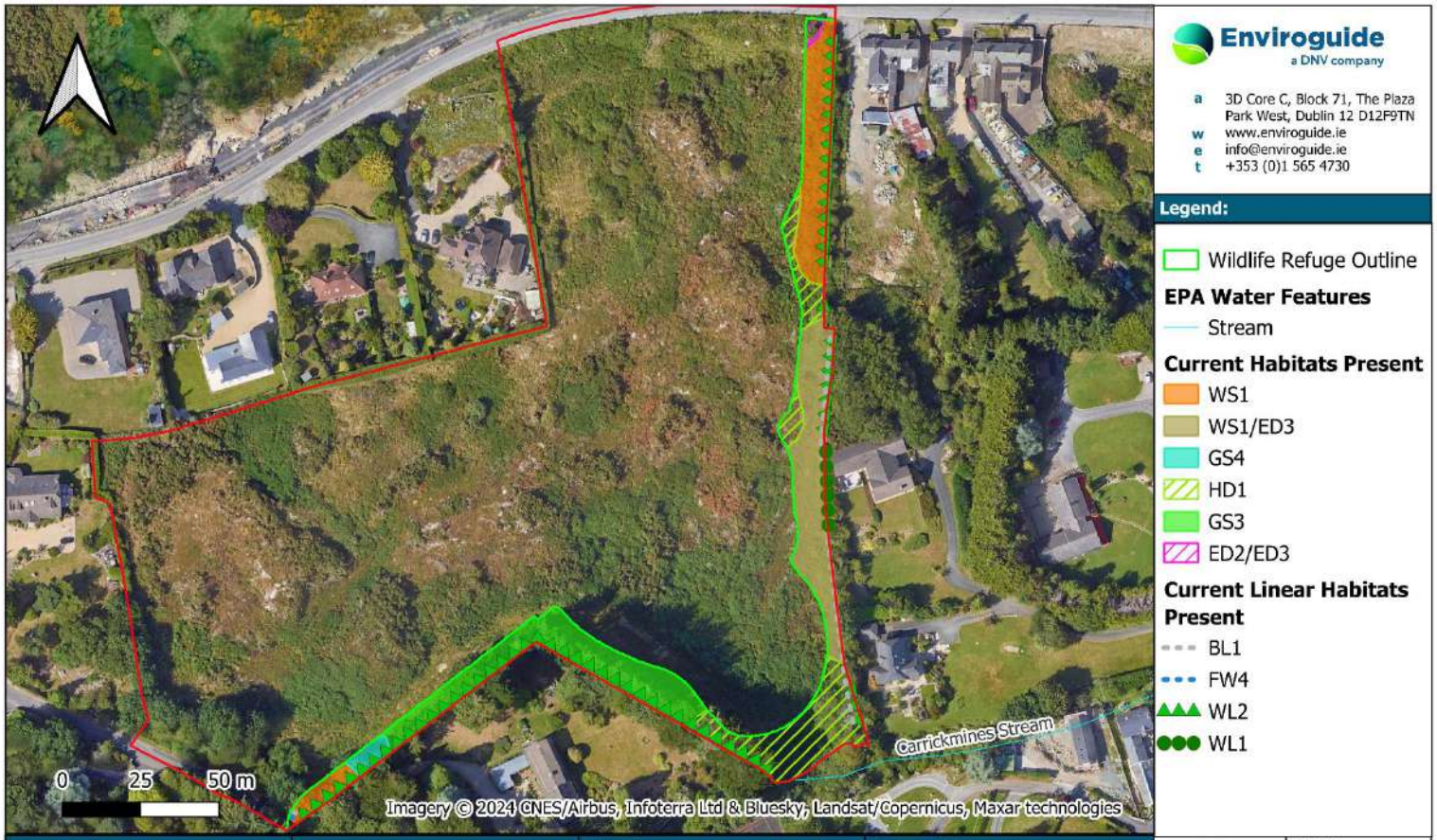


FIGURE 5. EXISTING HABITATS WITHIN THE PROPOSED WILDLIFE REFUGE AREA



FIGURE 6. ENHANCEMENT FEATURES PROPOSED WITHIN THE WILDLIFE REFUGE AREA

2.2.5 Lighting Plan

The proposed lighting plan for the Site has been developed by OCSC in conjunction with Enviroguide to ensure that impacts to wildlife are addressed fully through considerate design.

Light spill from the Proposed Development has been restricted to 0-1 lux along the wooded boundaries of the Site, including the designated wildlife refuge corridor located along the southern and eastern boundaries of the Site. The wildlife corridor area coincides with a known bat commuting/foraging route based on the bat surveys conducted at the Site to date.

2.3 Brief description of the Construction Phase

The Construction Phase will likely entail the erection of hoarding to secure the Site, followed by the erection of tree-protection fencing for retained trees and hedgerows. Soil-strip and excavations/rock breaking as required will then be carried out followed by the construction of road infrastructure and residential units. The landscaping and planting of the Site will then be carried out.

The following details are taken from the Construction Environmental Management Plan (CEMP) prepared by OCSC (2024b).

It is expected that the Construction Phase of the development will have a duration of approximately 18 months.

The Site is currently accessed off an informal access located on Woodside Road (south of Site). It is proposed to provide a new site entrance on Blackglen Road for construction traffic to use during the construction stage as construction will not be able to use the Woodside Road access.

Construction operations will be carried out in accordance with any granted planning conditions. It is expected that normal working hours will be from 07:00 – 19:00 Monday to Friday and from 08:00 – 14:00 on Saturdays.

2.4 Description of the Operational Phase

The operation of the Proposed LRD will entail an increase in human activity at the Site compared to the baseline situation, as would be expected from a residential setting.

3 METHODOLOGY

This EcIA has been undertaken to support and assess the Proposed Development planning application and assesses the potential impacts that the Proposed Development may have on the ecology of the Site and its environs. Where potential for a risk to the environment is identified, mitigation measures are proposed on the basis that by deploying these mitigation measures the risk is eliminated or reduced to an insignificant level.

This section details the steps and methodology employed to undertake an ecological impact assessment of the Proposed Development.

3.1 Scope of Assessment

The specific objectives of the study were to:

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

3.2 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 in December 2024, relied on the following sources:

- Information on species records [1] and distributions, obtained from the National Biodiversity Data Centre (NBDC) at *maps.biodiversityireland.ie*;
- Information on Floral Protection Order (FPO) Bryophytes database at *dahg.maps.arcgis.com*;
- Information on waterbodies, catchment areas and hydrological connections obtained from the Environmental Protection Agency (EPA) at *gis.epa.ie*;
- Information on bedrock, groundwater, aquifers and their statuses, obtained from Geological Survey Ireland (GSI) at *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*;
- 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 Application Database available at:

[1] The Site of the Proposed Development is located within the Ordnance Survey National 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.

https://housinggovie.maps.arcgis.com/apps/webappviewer/index.html?id=9cf2a09799d74d8e9316a3d3a4d3a8de; and

- Information on the extent, nature and location of the Proposed Development, provided by the applicant and/or their design team.

A comprehensive list of all the specific documents and information sources consulted in the completion of this report is provided in Section 10, References.

3.3 Zone of Influence

The ZOI for a project is the area over which ecological features may be affected by changes as a result of the Proposed Development and associated activities. This is likely to extend beyond the development site, for example where there are ecological or hydrological links beyond the site boundaries (CIEEM, 2018). The ZOI will vary with different ecological features, depending on their sensitivities to an environmental change.

Furthermore, ZOI in relation to European sites is described as follows in the 'OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management' (OPR, 2021):

> "*The zone of influence of a proposed development is the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. This should be established on a case-by-case basis using the Source-Pathway-Receptor framework and not by arbitrary distances (such as 15 km).*"

3.4 Identification of Relevant Designated Sites

To determine the ZOI of the Proposed Development for designated sites, reference was made to the OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management' (OPR, 2021), a practice note produced by the Office of the Planning Regulator, Dublin. This note was published to provide guidance on screening for AA during the planning process, and although it focuses on the approach a planning authority should take in screening for AA, the methodology is also readily applied in the preparation of EcIA reports such as this to identify all relevant designated sites potentially linked to the Proposed Development.

As noted above, the most recent guidance advises against the use of arbitrary distances that serve as precautionary ZOI (e.g., 15km), and instead recommends the application of the Source-Pathway-Receptor (S-P-R) model in the identification of designated sites, stating that "*This should avoid lengthy descriptions of European sites, regardless of whether they are relevant to the proposed development, and a lack of focus on the relevant European sites and issues of importance*". Although this statement refers to European sites, it is also applicable to other designated sites.

Thus, the methodology used to identify relevant designated sites comprised the following:

- Identification of potential sources of effects based on the Proposed Development description and details;
- Identification of potential pathways between the Site of the Proposed Development and any designated sites within the ZOI of any of the identified sources of effects.

- Water catchment data from the EPA (*www.epa.ie*) were used to establish or discount potential hydrological connectivity between the Proposed Development and any designated sites.
- Groundwater and bedrock information used to establish or discount potential hydrogeological connectivity between the Proposed Development and any designated sites.
- Air and land connectivity assessed based on Proposed Development details and proximity to designated sites.
- Consideration of potential indirect pathways, e.g., impacts to flight paths, *ex-situ* habitats, etc.

- Review of Ireland's designated sites to identify those sites which could potentially be affected by the Proposed Development in view of the identified pathways, using the following sources;
  - European sites and nationally designated sites (e.g., NHAs and pNHAs) from the NPWS (*www.npws.ie*);
  - Ramsar sites from the Irish Ramsar Wetland Committee (*https://irishwetlands.ie/irish-sites/);*
  - Other internationally designated sites e.g., UNESCO Biosphere's; and
- Regional development plans to identify any remaining sites or areas designated for nature conservation at a local level.

3.5 Field Surveys

3.5.1 Habitat Surveys

Habitat surveys of the Site were conducted by Enviroguide on the 16th of September 2021 and 29th November 2023. 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. Any incidental observations of evidence for rare and/or protected flora were recorded.

In addition, the Site was searched for invasive flora with a particular focus on those listed on the Third Schedule of SI No. 477/2011, and their location and extent recorded.

3.5.2 Bat Surveys

All bat surveys were conducted within the optimal survey period as per the Bat Conservation Trust Guidelines (Collins, 2023), 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 prepared by Bat Eco Services Ltd., and attached in Appendix IV of this Report. Please note that this Bat Report was included with the previous SHD application submitted for the Site of the Proposed Development in 2022 and is included for reference for the bat survey results detailed in same.

3.5.2.1 Bat Surveys 2021 & 2022

3.5.2.1.1 Preliminary Bat Roost and Habitat Suitability Assessment

Trees along the Site boundaries were assessed for Potential Roost Features (PRFs) and 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 (6th 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.

In 2022 an additional assessment 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 5th of May 2022.

Please see Appended Bat Survey Report for further detail.

3.5.2.1.2 Dusk and Dawn Bat Surveys

Dusk Emergence Surveys were completed by Bat Eco Services on the 6th and 11th 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 walking transect of the local area was completed post dusk survey on the nights of the 6th and 11th August 2021. A dawn survey was completed on the 12th of August 2021, and this was completed 100 minutes before sunrise to 10 minutes after. Surveys completed on 6th August are referred to as Night 1, and surveys completed on 11th and 12th August are referred to a 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.

3.5.2.1.3 Static Bat Detector Surveys

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 6th to 12th 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.

3.5.2.2 Ground Truthing Bat Assessment 2023

A daytime assessment of the Site was undertaken on the 29th November 2023. The aim of this assessment was to ground truth those surveys conducted at the Site in 2021 and 2022 and to confirm whether any significant change had occurred in terms of roost potential and habitat suitability.

It was decided based on the lack of any significant changes in habitats at the Site since 2021 that no further bat surveys were necessary as part of the ecological impact assessment, and that the precautionary approach would be followed in terms of bats in this EcIA. The important habitats at the Site remain the same as they were in 2021, i.e., the treelines that run along the outer margins of the Site; the southern and eastern boundaries in particular. The precautionary principle has been followed in terms of protecting bats at the Site, with a wildlife refuge proposed that aligns with the south-eastern boundary commuting/foraging corridor bats were observed using during surveys at the Site. This corridor will be unlit by public lighting and managed as a wildlife refuge, ensuring bats can continue to move through the Site during its operational lifetime.

3.5.2.2.1 Preliminary Bat Roost Assessment

This assessment included a search for evidence of roosting bats, and to assess the habitat for its ability to support commuting and foraging bats. Buildings and trees on Site were visually assessed from the ground with the aid of a torch and binoculars. The roost inspection comprised a detailed inspection of structures and trees on/adjacent to the Site. These were subject to exterior and interior inspections (where applicable) to search for evidence of bat use. This includes live and dead specimens, droppings, feeding remains, oil staining and noise (Collins, 2023).

The ruined cottage along the Site's eastern boundary was assessed for cracks and crevices that might support roosting bats, while trees at the Site were searched for Potential Roosting

Features (PRFs) such as hollow trunks, knot holes, peeling bark, splits, cracks, and crevices (Collins, 2023; Andrews, 2018). Collins (2023) recommends that structures and trees are assessed for their ability to support roosting bats under separate categorisations using professional judgement and sub-categories as presented in Table 4.1 (Collins, 2023):

- Negligible – No suitable features observed, however, a small element of uncertainty remain;
- Low – A structure with one or more roost features as used by individual bats opportunistically at any time of year;
- Moderate – A structure with one or more roost features that could be used by bats on a regular basis or by a larger number of bats; and
- High – A structure with one or more roost features that are obviously suitable for use by a larger number of bats on a regular basis, and potentially for longer periods of time. These features have the potential to support high conservation status roosts.

Trees are categorized separately accordingly to Table 4.2 of Collins (2023). These classifications are:

- NONE – Either no PRFs in the tree or highly unlikely to be any;
- FAR – Further assessment required to establish if PRFs are present in the tree; and
- PRF – A tree with at least one PRF present.

Where a tree contains at least one PRF, each PRF is further assessed according to Table 6.2 (Collins 2023). PRF's are scored as either:

- PRF-I – PRF is only suitable for individual bats or very small numbers of bats either due to size or lack of suitable surrounding habitats.
- PRF-M – PRF is suitable for multiple bats and may therefore be used by a maternity colony.

For trees with PRF-I's only, no further surveys may be required, but appropriate compensation for all PRF-I's must be designed and incorporated in advance of impacts along with a Precautionary Working Method Statement (PWMS). As the Site increases in suitability for roosting bats e.g., PRF-M's present, the survey effort increases accordingly. A PRF-M will require a detailed inspection, such as aerial inspection, conducted over three survey visits, a minimum of three weeks apart, which should be carried out between May and September with at least two in the period May to August. Where features are inaccessible by ladder, climbing, or MEWP, or too extensive for a PRF inspection, the aerial inspection should be replaced with emergence surveys carried out between May and September with Night Vision Aids (NVA) where possible or otherwise surveyed using Advanced Licence Bat Survey Techniques (ALBST), such as trapping, tagging, and radio-tracking to inform of the importance of a roost.

3.5.2.2.2 Preliminary Bat Habitat Suitability Assessment

A Bat Habitat Suitability Assessment was carried out in conjunction with the roost assessment on the 29th November 2023. This assessment evaluated the habitats present on Site and in the wider area for bat foraging and commuting suitability. Habitat suitability is assessed qualitatively from Negligible to High:

- Negligible – No suitable foraging or commuting habitats on Site.

- Low – Suitable but isolated habitats that could be used by small numbers of commuting and/or foraging bats, such as poorly connected gappy hedgerows, lone trees, unvegetated streams, etc.
- Moderate – Suitable continuous habitat connected to the wider landscape that could be used by commuting and/or foraging bats, such as treelines, scrub, grassland, water, etc.
- High – Continuous high-quality habitat that is well-connected to the wider landscape, and is likely used regularly by commuting and/or foraging bats, such as river valleys, broadleaved woodland, woodland edge, grazed parkland, etc.

3.5.2.3 Bat Landscape Suitability

The Bat Conservation Ireland Landscape Suitability Model (Lundy *et al*., 2011) provides a habitat suitability index for bat species across Ireland. The model divides the country into 1 km grid squares and ranks the habitat within the squares according to its suitability for various bat species. The scores are divided into five qualitative categories of suitability, namely:

- 0.0000000 - 13.000000: Low
- 13.000001 - 21.333300: Low – Medium
- 21.333301 - 28.111099: Medium
- 28.111100 - 36.444401: Medium – High
- 36.444402 - 58.555599: High

3.5.3 Bird Surveys

3.5.3.1 Breeding Bird Surveys

A breeding bird survey was completed at the Site of the Proposed Development on 23rd 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 employed was based on that recommended in standard literature used by for example the British Trust for Ornithology (BTO) (Gillings et al, 2007; Bibby et al, 1992 and Gilbert et al, 1998), which has subsequently been adapted into guidelines for ecological consultants by the Bird Survey & Assessment Steering Group. (2022). During the surveys, the Site was walked slowly, approaching all habitat within and adjacent to the Proposed Development and scanning and listening for birds. The locations of birds seen and heard were mapped using standard BTO codes and activity symbols.

A follow up breeding bird scoping survey was conducted on the 29th November 2023 to confirm whether any significant change in habitat conditions at the Site had occurred since the 2021 survey. The aim of this survey was to confirm whether any further breeding bird surveys would be required. It was decided based on the lack of any significant changes in habitats at the Site since 2021 that no further breeding bird surveys were necessary as part of the ecological impact assessment, and that the precautionary approach would be followed in terms of breeding birds in this EcIA.

3.5.3.2 Wintering Bird Survey

To inform an evaluation of the on-site habitats for wintering bird species, a scoping wintering bird survey was undertaken on the 29th November 2023. The survey was carried out in suitable

weather conditions and within daylight hours. The Site was assessed for its potential to provide *ex-situ* habitat for wintering species of waterbirds associated with the nearest SPAs (those located along the east coast), and raptor species associated with Wicklow Mountains SPA.

Based on the nature of the habitats present (a mosaic of dense gorse scrub, exposed rock, and tall bracken), and their lack of suitability for wintering waterbirds in particular (geese species such as light-bellied brent geese (*Branta bernicla hrota*) and most wader species prefer short-cut grass pitches/golf courses when foraging inland), no further surveys were deemed necessary to rule out potential *ex-situ* habitat usage. SCI raptor species associated with Wicklow Mountains SPA; peregrine (*Falco peregrinus*) and merlin (*Falco columbarius*) may forage in the lands surrounding the Site, but the Site itself provides limited suitable *ex-situ* foraging habitat and no suitable nesting habitat (i.e., cliffs, moorland or plantation forestry) for these species.

3.5.4 Mammal Surveys

Mammal surveys of the Site were carried out in conjunction with the habitat surveys on 16th September 2021 and 29th November 2023. These surveys were conducted during an appropriate period for mammal surveys. 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).

3.5.5 Herptile Rapid Assessment Survey

Following the LRD Stage 2 meeting with DLR CoCo on 25th July 2024, an assessment of the Site for herptiles (amphibians and reptiles) was recommended. As such the Site of the Proposed Development was assessed in July 2024 (Gandola, 2024) for presence of amphibians and common lizard. It is noted that this assessment was undertaken outside of the optimal survey season for amphibians and so the presence of smooth newt (*Lissotriton vulgaris*) on Site could not be determined.

3.5.6 Other Fauna

A general fauna survey of the Site was carried out in conjunction with the other field surveys on the 16th September 2021 and 29th November 2023. The habitat types recorded throughout the survey area were used to assist in identifying the fauna considered likely to utilise the area. Furthermore, the Site was searched for tracks and signs of mammals as per Bang and Dahlstrom (2001) and the National Road Authority (NRA, 2005). These surveys considered protected or notable fauna that may occur within the Site or in the adjacent lands, but for which no historical records from the relevant grid square(s) exist or no targeted surveys were carried out.

3.6 Ecological Assessment

This EcIA has been undertaken following the methodology set out in Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018); and with reference to the National Roads Authority 'Guidelines for Assessment of Ecological Impacts of National Road Schemes' (NRA, 2009) and the Environmental Protection Agency (EPA) 'Guidelines on the information to be contained in

Environmental Impact Assessment Reports' (EPA, 2022) and BS 42020:2013 Biodiversity: Code of practice for planning and development (BSI, 2013).

The evaluation of significant effects should be based on available scientific evidence. Based on the precautionary principle, if the available information is not sufficient, then a significant effect may be assumed likely to occur.

3.6.1 Evaluation of Ecological Features

The value of the ecological features, i.e., the habitats and species present or potentially present, was determined using the ecological evaluation at different geographical scales (NRA, 2009), presented in Appendix II. 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. Based on best practice (CIEEM, 2018), any features considered to be less than of local value are not assessed within this EcIA.

3.6.2 Impact Assessment

As per the NRA guidelines, impact assessment is only undertaken of Key Ecological Receptors (KERs). The assessment of the potential impact of the Proposed Development on the identified KERs was carried out with regard to the criteria outlined in the EPA Guideline (EPA, 2022), presented in Appendix III. These guidelines set out a number of parameters that should be considered when determining which elements of the Proposed Development could constitute impact or sources of impacts. These include;

- Positive, neutral or negative effect;
- Significance;
- Extent;
- Probability;
- Duration;
- Timing;
- Frequency; and
- Reversibility.

The impact assessment process considers both direct and indirect impacts: direct ecological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat. Indirect ecological impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process, or feature, e.g., the creation of roads which cause hydrological changes, which, in the absence of mitigation, could lead to an adverse effect of a sensitive habitat.

3.6.3 Assessment of Cumulative Impacts and Effects

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects can occur where a Proposed Development results in individually insignificant impacts that, when considered in combination with impacts of other proposed or permitted plans and projects, can result in significant effects.

Relevant plans and policies (see Section 1.2) were reviewed to identify any potential for negative cumulative impacts with the Proposed Development. Additionally, existing planning permissions from the past five years (from 2019 onwards) within the ZOI of the Proposed Development were reviewed, with particular focus on potential cumulative impacts on the identified KERs. Long-term developments were also considered where applicable.

3.6.4 Avoidance, Mitigation, Compensation and Enhancement Measures

Where potentially significant effects have been identified, the mitigation hierarchy has been applied, as recommended in the CIEEM Guidelines. The mitigation hierarchy sets out a sequential approach beginning with the avoidance of impacts where possible, the application of mitigation measures to minimise unavoidable impacts and then compensation for any remaining impacts. Once avoidance and mitigation measures have been applied residual effects are then identified along with any necessary compensation measures, and incorporation of opportunities for enhancement. When seeking mitigation or compensation solutions, efforts should be consistent with the geographical scale at which an effect is significant. For example, mitigation and compensation for effects on a species population significant at a county scale should ensure no net loss of the population at a county scale. The relative geographical scale at which the effect is significant will have a bearing on the required outcome which must be achieved.

It is important for the EcIA to clearly differentiate between avoidance, mitigation, compensation and enhancement and these terms are defined here as follows:

- Avoidance is used where an impact has been avoided, e.g., through changes in scheme design. In practice, avoidance measures are typically implemented during the design stage via discussions and re-design (e.g., avoiding a sensitive habitat by relocating a building). Avoidance measures are therefore rarely reported within an EcIA, which focuses on assessing the final design.
- Mitigation is used to refer to measures to reduce or remedy a specific negative impact *in situ*.
- Compensation describes measures taken to offset residual effects, i.e. where mitigation in situ is not possible.
- Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

3.7 Limitations

Every effort has been made to provide a comprehensive description of the Site; however, the following specific limitations apply to this assessment:

- An extensive search of available datasets for records of rare and protected species within proximity 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 November 2023, 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, with Sika deer (*Cervus nippon*) (peak count of 5no deer) recorded on Site on 29th November 2023. Therefore, the presence of rare flora at the Site is considered unlikely based on its current condition and recent disturbance.

- Updated surveys for bats and breeding birds have not been carried out for this application. A suite of surveys were conducted in 2021, with no significant breeding bird activity of note recorded at the time, and no potential bat roosts noted at the Site, with some boundary treelines and hedgerows showing moderate levels of commuting and foraging activity. The Site has been assessed for any significant changes in habitats or conditions that may have occurred since the previous surveys. It was confirmed in November 2023 that no such changes had occurred, with Site remaining as it was at the time of the bat surveys and breeding bird survey conducted in 2021.
- The lack of updated surveys for bats and breeding birds is therefore not considered a significant limitation, when considered in combination with the level of mitigation and habitat enhancement being proposed in adherence to the pre-cautionary principle, and the retention of the identified important habitat on Site e.g., a designated wildlife corridor along the Site's south-eastern boundaries and extensive tree and shrub planting throughout the Site.
- The amphibian and reptile survey conducted in July 2024 was conducted outside of the optimal survey period for amphibians. As such this assessment only provides an indication of presence, where sightings occurred, or indeed absence, for any species not detected.

4 ECOLOGICAL BASELINE CONDITIONS

This section sets out the baseline conditions for the ecological features within the Site using the findings of the desk study and field surveys.

4.1 Geology, Hydrogeology and Hydrology

The Site is located in the Avoca-Vartry Catchment (Catchment I.D. 10) and in the Dargle_SC_010 Sub-catchment (Sub-catchment I.D.10_5) (EPA, 2024).

The Carrickmines (1st order) stream passes along part of the south-eastern Site boundary and flows in a southeasterly direction for 8.9km before joining the Shanganagh River (3rd order). The Shanganagh River flows a further 1.7km southeast before discharging into the Southwestern Irish Sea at Killiney Bay.

The EPA water quality monitoring data for the stations on the Carrickmines Stream and Shanganagh River located closest to the Site is summarised in Table 1. The reported Q-value results indicate that water quality in the Carrickmines Stream was 'poor' in 2003 but 'good' in the Shanganagh River downstream of the Site as of 2020 (EPA, 2024).

TABLE 1. EPA MONITORING STATIONS AND ASSIGNED Q VALUES

EPA Monitoring Station name	Station Code	Location from Site	Distance from Site	Assigned Q value
Carrickmines Stream – Glenamuck rd Br (Friarsland/Priorsland)	RS10C040200	Southeast downstream	4.3km	3 "Poor" (2003)
At Commons Road	RS10S010600	Southeast downstream	7.9km	4 "Good" (2020)

The Site of the Proposed Development is situated on the Wicklow (IE_EA_G_076) groundwater body. The bedrock aquifer identified beneath the Site is mapped as "Poor Aquifer – Bedrock which is Generally Unproductive except for Local Zones" (Pl) (GSI, 2024).

The Groundwater Vulnerability Rating assigned to groundwater beneath Site is "*Extreme" (E)* (GSI, 2024).

The soil beneath the Site is not mapped. Subsoils beneath the Site are classified as "*Bedrock at or close to surface – Rck*" (EPA, 2024).

The groundwater rock units underlying the aquifer are classified as *Granites and other Igneous Intrusive Rocks* (GSI, 2024).

The Waterbody Status for river, groundwater, transitional and coastal water bodies relevant to the Site as recorded for the most recent reporting period—2016-2021—by the EPA (2024) in accordance with European Communities (Water Policy) Regulations 2003 (SI no. 722/2003), Part IV of the European Communities Environmental Objectives (Surface Waters) Regulations 2009 and Part IV of the European Communities Environmental Objectives (Groundwater) Regulations 2010, are provided in Table 2.

TABLE 2. WFD RISK AND WATER BODY STATUS

Waterbody Name	Water body; EU code	Location from Site	Distance from Site	WFD water body status (2016-2021)	WFD 3rd cycle Risk Status	Hydraulic Connection to the Site
Surface Water Bodies						
Carrickmines Stream	IE_EA_10C040350	South	8m	Good	Not at risk	Downstream of the Site
Shanganagh River	IE_EA_10S010600	Southeast	8.9km	Good	Not at risk	Downstream of the Site
Coastal Water Bodies						
Southwestern Irish Sea – Killiney Bay	IE_EA_100_0000	East	8.4km	High	Not at Risk	Downstream of the Shanganagh River
Groundwater Bodies						
Wicklow Groundwater Body	IE_EA_G_076	N/A	N/A	Good	At risk	Underlying groundwater-body

4.1.1 Site Drainage

There is an existing ditch along Woodside Road on the southwestern corner of the Site with flow due east into a neighbouring private garden observed during the Site walkover on the 29th of November, 2023. Overall, the Site slopes south to north towards Blackglen Road. The Carrickmines Stream (1st order) runs along part of the Site's south-eastern boundary.

4.2 Designated Sites

All European sites potentially linked to the Proposed Development have been identified and fully assessed in the AA Screening Report (Stage 1 AA) accompanying this submission under separate cover (Enviroguide, 2024a). A summary of the AA conclusions is given below.

Other nationally or internationally designated sites potentially linked to the Proposed Development are identified in Section 4.2.2.

4.2.1 European sites – Appropriate Assessment

The AA Screening identified no European sites at risk of potential significant impacts as a result of the Proposed Development. The following conclusion is extracted from the AA Screening accompanying this application under separate cover:

> *"In conclusion, upon the examination, analysis and evaluation of the relevant information and applying the precautionary principle, it is concluded by the authors of this report that the possibility **may be excluded** that the Proposed Development will have a likely significant effect on any of the European sites listed below:*
>
> - *North Dublin Bay SAC (000206)*
> - *South Dublin Bay SAC (000210)*
> - *The Murrough Wetlands SAC (002249)*
> - *Rockabill to Dalkey Island SAC (003000)*
> - *Wicklow Mountains SAC (002122)*
> - *North Bull Island SPA (004006)*
> - *South Dublin Bay and River Tolka Estuary SPA (004024)*
> - *North-west Irish Sea SPA (004236)*
> - *Dalkey Islands SPA (004172)*
> - *Wicklow Mountains SPA (004040)*
>
> *In carrying out this AA screening, specific targeted mitigation measures included for the primary reason of protecting a European site have not been taken into account.*
>
> *On the basis of the screening exercise carried out above, it can be concluded, on the basis of the best scientific knowledge available and objective information, that the possibility of any likely significant effects on the above listed European sites, whether arising from the project itself or in combination with other plans and projects, can be excluded in light of the above listed European sites' conservation objectives. Thus, there is no requirement to proceed to Stage 2 of the Appropriate Assessment process; and a NIS is not required."*

As such, European sites are not considered further in this Report.

4.2.2 Other Designated sites

A designated site will only be at risk from likely significant effects where a S-P-R link of note exists between the Proposed Development and the designated site. All designated sites considered using the S-P-R method (excl. European sites) are listed in Table 3 and shown in Figure 7. Those sites with notable S-P-R links to the Proposed Development are assessed further in this report as KERs of 'National Importance' (pNHAs and NHAs) or 'International Importance' (UNESCO sites, Ramsar sites, etc.) where applicable.

The AA Screening ruled out all impact pathways connecting the Proposed Development to European sites. With regards to any other designated sites considered as part of this assessment, and listed in Table 3, that overlap with those SACs and SPAs assessed in the AA Screening prepared for this application, and that are designated for analogous reasons e.g., the same waterbird species, habitats etc., it is deemed that the AA Screening has assessed the potential impact of the Proposed Development on these other designated sites by proxy. As such, the potential for likely significant effects to occur to these designated sites has been assessed in the AA Screening and they will not be assessed further as part of this EcIA. This applies to the following designated sites: North Dublin Bay pNHA (000206) and South Dublin Bay pNHA (000210).

4.2.2.1 S-P-R links to Designated Sites

Potential impact pathways are discussed in the following sections in the context of the Proposed Development as described in Section 2.

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 (001753) located ca.110m to the north. There is an air impact pathway connecting the pNHA to the Proposed Development due to proximity. Construction Phase dust and noise will therefore be considered further, along with the increased recreational use of Fitzsimon's Woods pNHA that is likely to occur as a result of the increase in population in the area due to the Proposed Development. As such, Fitzsimon's Woods pNHA is included in the precautionary ZOI of the Proposed Development **and assessed further in this EcIA**.

There is a tenuous hydrological link connecting the Proposed Development and the Loughlinstown Woods pNHA (001211) and Dalkey Coastal Zone and Killiney Hill pNHA (001206), via the Carrickmines Stream, which runs along the Site's south-eastern boundary and eventually outflows into Killiney Bay as the Shanganagh River ca. 10.6km downstream of the Site. As a result, these pNHAs are included in the precautionary ZOI of the Proposed Development **and are assessed further in this EcIA**

No other pNHAs are deemed to maintain potential impact pathways linking them to the Proposed Development. Table 3 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 3. DESIGNATED SITES CONSIDERED WITH THE SOURCE-PATHWAY-RECEPTOR (S-P-R) METHOD TO ESTABLISH NOTABLE LINKS BETWEEN THE SOURCES OF EFFECTS ARISING FROM THE PROPOSED DEVELOPMENT, AND ANY RELEVANT DESIGNATED SITES. THOSE SITES WITH NOTABLE S-P-R LINKS THAT ARE FURTHER ASSESSED IN THIS REPORT ARE HIGHLIGHTED IN GREEN (IF ANY).

Site Name & Code (Receptor)	Distance to Proposed Development	Potential Pathway to receptors
Proposed Natural Heritage Area		
Fitzsimon's Wood (001753)	110m north	Direct impact pathway via Construction Phase dust and noise. Indirect impact pathway via 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	
Dolphins, Dublin Docks (000201)	8.9 km north-east	These pNHAs overlap with North Bull Island SPA, North Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA, and South Dublin Bay SAC, and are designated for analogous reasons. These sites have therefore been assessed and screened out in the AA Screening (Enviroguide, 2024) which accompanies this application under separate cover.
North Dublin Bay (000206)	9.9 km north-east	
South Dublin Bay (000210)	5.6 km north-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 (sic) *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, andelusite 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 hipposcastanum), 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 mountonnes 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."

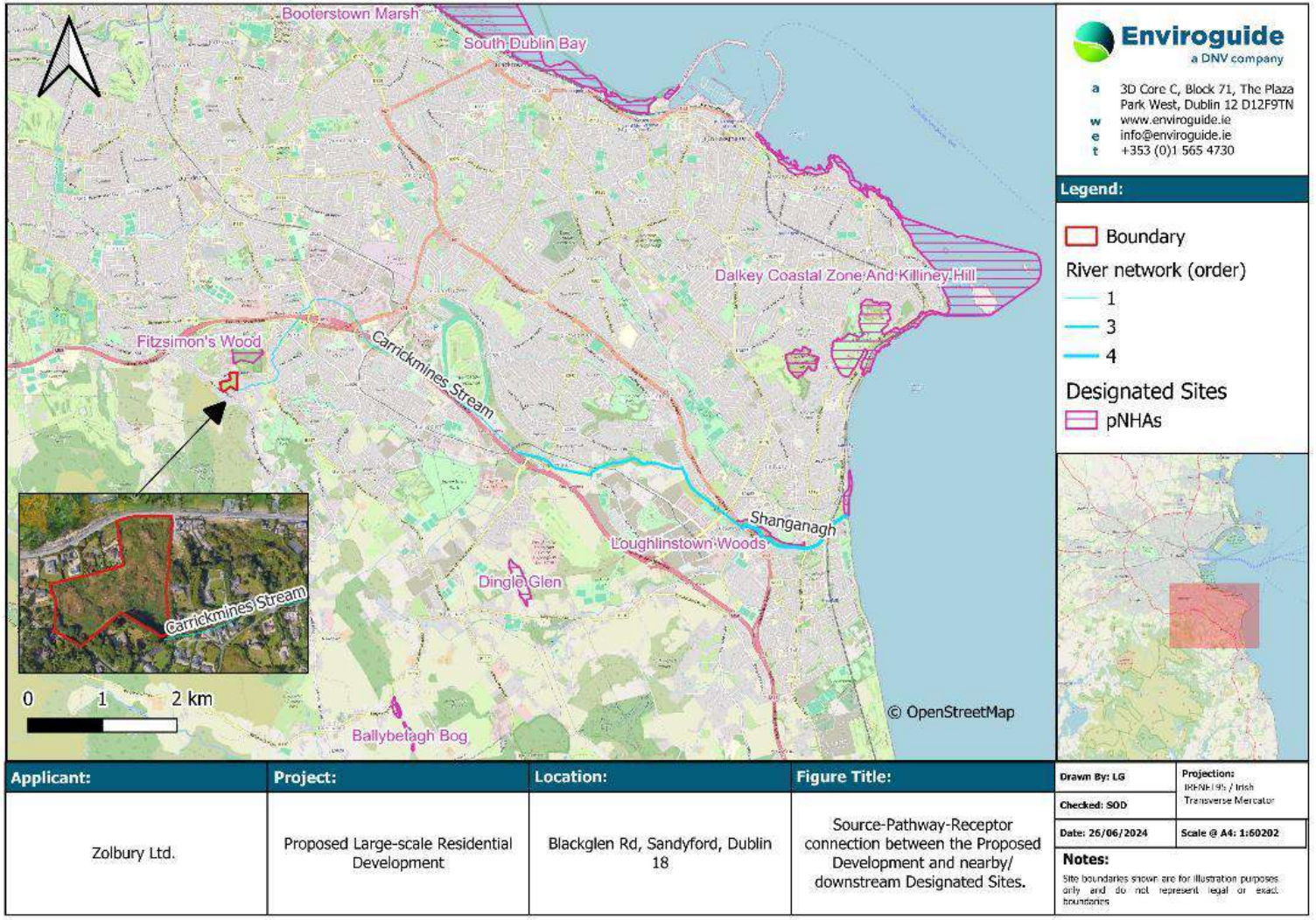


FIGURE 7. SOURCE-PATHWAY-RECEPTOR CONNECTION BETWEEN THE PROPOSED DEVELOPMENT AND NEARBY/ DOWNSTREAM DESIGNATED SITES.

4.3 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 16th September 2021 and 29th November 2023, 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 or adjacent to the redline boundary of the Site:

- Scrub (WS1)
- Spoil and Bare Ground (ED2)
- 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)
- Eroding/upland rivers (FW1)

4.3.1 Scrub (WS1) and Bracken (HD1)

Islands of scrub habitat of varying sizes are present across the Site, largely comprised of gorse, 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 (*Urtica dioica*) and creeping thistle (*Cirsium arvense*) are also present in patches.



FIGURE 8. IMAGE FACING WEST SHOWING BRACKEN (HD1) AND GORSE SCRUB (WS1) HABITATS.

4.3.2 Spoil and Bare Ground (ED2), 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 (ED3) 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, Common nettle, sheep's sorrel (*Rumex acetosella*), pineapple weed (*Matricaria discoidea*), and common Ragwort (*Senecio jacobaea*). Sheep's bit scabious (*Jasione montana*) was also recorded in one location.



FIGURE 9.EXAMPLE OF ED3 AND ER1 HABITATS PRESENT AT THE SITE.

An area of Spoil and Bare Ground (ED2)/ Recolonising Bare Ground (ED3) exists in the north of the Site, running along the area of Blackglen Road roadworks that overlapped with the Site. The works were recent at the time of survey and so this habitat mosaic was highly disturbed and contained no vegetation of note (Figure 10).



FIGURE 10. IMAGE SHOWING ED2/ED3 HABITAT IN THE NORTH OF THE SITE WHERE ADJACENT ROAD WORKS HAVE TAKEN PLACE.

4.3.3 Acid Grassland (GS3) & Wet Grassland (GS4)

Present in one location in the south of the Site, Wet Grassland (GS4) 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 (*Junchus effusus*), hard rush (*Junchus inflexus*) and hairy bittercress (*Cardamime 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 11. A PATCH OF WET GRASSLAND (GS4) HABITAT IN THE SOUTH OF THE SITE (PHOTO TAKEN FACING WEST).



FIGURE 12. ACID GRASSLAND (GS3) HABITAT ALONG THE SOUTHERN BOUNDARY OF THE SITE (IMAGE TAKE FACING NORTH).

4.3.4 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 is present

along the south-eastern boundary; 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. Non-native invasive cherry laurel (*Prunus laurocerasus*) was also present emerging from the understory of this treeline.



FIGURE 13. TREELINE (WL2) ALONG THE SITE'S SOUTHERN BOUNDARY WITH PRIVATE RESIDENTIAL LANDS.

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 Blackglen Road a broken hedgerow comprised of hawthorn, gorse, willow (*Salix sp.)* and bramble was present during the 2021 visit. This hedgerow has since been removed as part of the road works along Blackglen Road. Non-native species Himalayan Honeysuckle (*Leycesteria formosa*) was recorded along this hedgerow, particularly in the north-easternmost corner of the Site.



FIGURE 14. IMAGE OF THE NORTHERN SITE BOUNDARY WHERE ROADWORKS ALONG BLACKGLEN ROAD HAVE REMOVED THE PREVIOUS BROKEN HEDGEROW.

4.3.5 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 sp.*), holly saplings and occasional hard fern (*Blechnum spicant*) and hart's tongue (*Asplenium scolopendrum*) located along the wetter southern example.



FIGURE 15. EXAMPLE OF BL1 STONE WALL HABITAT ALONG EASTERN SITE BOUNDARY.



FIGURE 16. DRAINAGE DITCH (FW4) LOCATED ALONG BOUNDARY WITH WOODSIDE ROAD TO THE SOUTH.

4.3.6 Carrickmines Stream (FW1)

A section of an upland eroding stream – the Carrickmines Stream (1st order) runs along the south-eastern corner of the Site. The stream channel is narrow (<50cm) and overgrown as it passes the Site (Figure 17A & C), with a steeply sloping overgrown bank to the south, and a less steep slope rising from the stream on its Site-side bank. Tall, dense vegetation overshadows the stream with bracken and nettles dominating.

The flora species present along the riparian edges of this narrow stream are terrestrial in nature with no aquatic species recorded. Species included nettle, bracken, creeping buttercup,

herb-Robert, spear thistle, ragwort, dock (*Rumex sp.*), lesser knotweed (*Persicaria campanulata*) and hedge bindweed (*Calystegia sepium*).

The stream channel opens up (ca.1m) as it leaves the Site and enters a private garden to the east. The stream bed substrata here is largely comprised of stones, gravels and woody debris, with occasional small boulders (See Figure 17B).

Following the LRD Stage 2 meeting with DLR CoCo, the Biodiversity department requested an ecological evaluation of the Carrickmines Stream and its riparian edge. The section of the stream that passes the Site is defined by a narrow, overgrown channel. This stream appears to originate from road drains and drainage ditches south of the Site and south of Woodside Road. The stream passes through a private garden to the south of the Site, before running along an overgrown ravine of sorts as it passes the Site. Due to the narrow channel and overgrown nature of this section of the stream, it is not likely to support a biodiverse assemblage of aquatic flora and fauna, with no such species recorded during the survey of the stream. The stream is somewhat buffered from the main Site area by the existing dense riparian vegetation, however, this vegetation is bracken dominant and overshadows the stream channel. No bird species were recorded nesting within the vegetation along the stream however it likely supports common passerines that use these kinds of scrub habitats.

The Hydrological and Hydrogeological Risk Assessment (HHRA) prepared for the Proposed Development (Enviroguide, 2024c) notes that the Carrickmines Stream maintains a potential shallow groundwater connection to the Site due to the nature of the underlying geology (short groundwater flow paths to nearest surface waterbody). There is also a connection through surface water run-off during rainfall events.



FIGURE 17. IMAGES OF THE STREAM (FW1) RUNNING ALONG PART OF THE SOUTH-EASTERN BOUNDARY OF THE SITE. IMAGE A & C SHOW THE OVERGROWN NATURE OF THE STREAM AS IT PASSES THROUGH THE SITE (FLOW DIRECTION SHOWN BY BLUE ARROW). IMAGE C SHOWS THE STREAM ENTERING THE PRIVATE GARDEN TO THE EAST OF THE SITE.



FIGURE 18. HABITAT MAP OF THE SITE OF THE PROPOSED DEVELOPMENT (CODES AS PER FOSSITT, 2000).

4.4 Species and Species Groups

4.4.1 Flora

4.4.1.1 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.

The Site does not contain any species listed on the Flora (Protection) Order 2022 (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.

4.4.2 Invasive Plant Species

4.4.2.1 Desk Study Results

There are records for 4 species of flora considered to be invasive within the 2km (O12S) grid square within which the Site of the Proposed Development is located:

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

4.4.2.2 Field Study Results

As detailed within the Invasive Alien Species Management Plan (IASMP) prepared for the Site (INVAS Biosecurity, 2024), nine invasive alien plant species (IAPS), one that is listed in the First Schedule (Part 1) of SI 374/2024 (highlighted in bold) and eight that are known to be invasive in Irish riparian and terrestrial habitats, were recorded throughout the survey area. These included rhododendron (*Rhododendron ponticum*), butterfly-bush, cherry laurel, cotoneaster (*Cotoneaster horizontalis*), himalayan honeysuckle, lesser knotweed, old man's beard (*Clematis vitalba*), sycamore and winter heliotrope (*Petasites pyrenaicus*).

Of this list, rhododendron is contained in Irish Legislation (S.I 374/2024), with no species from the EU Regulation (EU 1143/2014) detected at this site. Rhododendron seedlings were recorded in the south of the Site, possibly having spread from a private residence to the south.

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 and in the north of the Site. Cotoneaster was noted in the southern scrub section of the Site and in its north-western part. Himalayan honeysuckle was present in the

[2] 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

north-eastern corner of the Site. Lesser knotweed was present in one location to the south-east of the Site, across the far side of the stream. Sycamore was present along the various treelines along the Site's margins. One large infestation of old man's beard was present in the north of the site, primarily growing on top of butterfly bush scrub. See the IASMP in Appendix V of this Report for invasive flora locations at the Site of the Proposed Development.

4.4.2.3 Species Information

According to Maguire et al. (2008), cherry laurel is a dense thicket forming invasive ever-green shrub of gardens, parks and woodlands from south-west Asia. The leaves are thick and laurel-like, poisonous with cyanide, the white flowers are produced on upright spikes and are succeeded in autumn by blackish cherry-like fruits which should not be eaten. Widely used for hedge planting due to its vigorous growth and dense canopy, this species has become a high impact invasive species in Ireland, outcompeting native understory flora through overshadowing and producing impenetrable thickets. This species regenerates from cuttings, root suckers, and its seeds can also be dispersed by birds via their droppings.

Rhododendron is a perennial evergreen, acid-loving shrub that was introduced to Ireland in the 18th Century. It is native to south-west Europe and south-west Asia. There are more than 900 species of Rhododendron, but only one, *Rhododendron ponticum,* is invasive in Ireland. Since then, it has established itself as a major weed of acid woodlands, most notably in Kerry and Donegal where concerted efforts to control it have been ongoing for many decades. The TII (2020) note that it is only likely to be a problematic species on road schemes in areas of acid or peaty soils. Each flower head can produce between 3,000 and 7,000 tiny seeds. The small, light seeds are produced in capsules and have a high germination rate. They are primarily dispersed by wind and can persist in soils for up to three years. The plant can also spread by vegetative means where plants sucker or throw up new sprouts from roots as well as from branches (layering). It forms dense thickets that can exclude all light from the understorey thereby eliminating herbaceous plants and preventing the natural regeneration of trees and shrubs. It can withstand considerable shade and thrives as an understorey species in woodland, although it also tolerates open conditions in suitable acid soils.

A per the description given in TII (2020), Winter heliotrope, is a low-growing herbaceous plant native to the Mediterranean region. It is established widely in Ireland, particularly in the south of the country. A shade-tolerant species, it is frequently found along roadsides, railway banks, riverbanks, hedgerows, woodland edges and waste ground. As only the male plant has been recorded in Ireland, its spread is confined to vegetative means. Winter heliotrope forms large dense monocultures, which exclude native vegetation by shading out light.

Cotoneasters represent a large species group of small trees that are evergreen or deciduous, and which produce bright red berries. The majority originate in eastern Asia and have become invasive in Ireland and elsewhere. Seeds are spread over great distances by birds who feed on the berries produced by cotoneasters, while dumping of garden waste can also lead to infestations (Boer, 2014).

Sycamore is considered to be an invasive species due to its ability to outcompete native tree species, and its supposedly low contribution to local biodiversity by supporting fewer insect species than native tree species. However sycamore's invasiveness is considered to be more of an issue in some sensitive native woodland settings, and this species has been found to support relatively high numbers of lichen species, including rarer species, when compared to

native tree species (Leslie, 2005). Sycamore is not considered to pose any risk of impacts at the Site of the Proposed Development and will be removed where required as per the Arborist's Tree Impact Plan.

As per the description given in TII (2020), butterfly-bush has established itself as a problem plant in many countries where along watercourses, due to its shallow root system, it is frequently washed away, resulting in erosion of the riverbanks and downstream blockages. In Ireland, butterfly-bush must be considered an invasive species because of the damage it can cause to hard standing and structures, and to native biodiversity. Butterfly-bush produces very large numbers of viable seeds, which are dispersed via wind and water. The seeds are relatively short-lived in the soil, rarely lasting longer than four years. The plant can also readily spread by producing roots, and ultimately new plants, where stem nodes come into contact with the ground. It can also spread by fragmentation of stems or roots.

The TII (2020) note that Himalayan honeysuckle's red-purple berry-like fruits are widely dispersed by birds. Its bamboo-like stems can grow up to 2m tall and commonly form dense thickets, which can dominate hedgerows and displace native species.

4.4.3 Bats

4.4.3.1 Desk Study Results

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

TABLE 4. RECORDS OF BATS FOR THE SURROUNDING 2KM GRID SQUARE ASSOCIATED WITH THE SITE FROM THE NBDC.

Species	Date of last record	Database	Designation
Brown Long-eared Bat (*Plecotus auritus*)	06/08/2021	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Common Pipistrelle (*Pipistrellus pipistrellus*)	11/05/2022	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Daubenton's Bat (*Myotis daubentonii*)	06/08/2021	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Lesser Noctule (Leisler's) Bat (*Nyctalus leisleri*)	11/05/2022	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Nathusius's Pipistrelle (*Pipistrellus nathusii*)	06/08/2021	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Natterer's Bat (*Myotis nattereri*)	04/08/2011	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	11/05/2022	National Bat Database of Ireland	• EU Habitats Directive - Annex IV • Wildlife Act 1976 (as amended)

4.4.3.2 Field Survey Results

4.4.3.2.1 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 within the Site, with some boundary treelines and hedgerows showing moderate levels of commuting and foraging activity by potentially six bat species.

4.4.3.2.2 Potential Bat Roost Survey - Ruined Cottage

A bat survey of the ruined cottage present along the Site's eastern boundary was carried out in 2022 by Bat Eco Services. This structure was inspected for roosting bats and roost potential on the 5th 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."

The survey carried out on the 29th November 2023 confirmed the results of Bat Eco Services' assessment. The structure is missing its roof and eastern side walls and is therefore open to the elements (Figure 19). The walls of the cottage were observed to be largely rendered although some cracks and crevices were noted.



FIGURE 19. IMAGES OF THE DERELICT COTTAGE LOCATED ALONG THE EASTERN SITE BOUNDARY

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 (5th May-11th May) and five bat species were recorded; common pipistrelle, soprano pipistrelle, Leisler's bat, brown long-eared bat and a *Myotis sp*.

Bat Eco Services concluded that, due to the open structure of the building, the bat species recorded were not indicative of roosting bats (echolocation call structure was 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 numbers.

4.4.3.2.3 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 Site's 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 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.

4.4.3.3 Evaluation

No bat roosts were recorded at the Site and limited tree cover exists. There was overall moderate bat usage of the Site of the Proposed Development observed during the on-site activity surveys, with most bat activity focused along the vegetative boundaries in the south of the Site. As such it is considered that the Site and the habitats along its southern and eastern boundaries in particular support regularly occurring populations of Irish bat species, commuting and foraging through the Site.

The derelict cottage provides low roost potential and is located outside of the Site itself, although adjacent to the eastern Site boundary. Due to its location, this structure will be buffered from the Site to the west by the designated wildlife corridor/refuge area proposed along the Site's southern and eastern boundaries. This corridor will also follow the commuting and foraging route noted to be important to bats during the bat surveys of the Site. For more detail, please see the Bat Report (Bat Eco Services, 2022) in Appendix IV.

4.4.4 Birds

4.4.4.1 Desk study Results

A total of 20 bird species have been recorded within the 2km grid square O12S in the last 30 years (Table 5). Of these, two are amber listed birds and one is red listed as identified on the Birds of Conservational Concern in Ireland (BoCCI) (Gilbert et al. 2021).

TABLE 5. DETAILS OF AMBER AND RED LISTED BIRD SPECIES WITHIN THE 2KM GRID SQUARE

Species	Date of record	BoCCI Status
Black-billed Magpie (*Pica pica*)	31/12/2011	Green
Common Bullfinch (*Pyrrhula pyrrhula*)	31/12/2011	Green
Common Buzzard (*Buteo buteo*)	11/04/2021	Green
Common Chiffchaff (*Phylloscopus collybita*)	31/12/2011	Green
Common Linnet (*Carduelis cannabina*)	28/04/2020	Amber
Common Pheasant (*Phasianus colchicus*)	10/03/2016	Green
Common Raven (*Corvus corax*)	28/04/2020	Green
Common Whitethroat (*Sylvia communis*)	28/04/2020	Green
Eurasian Jay (*Garrulus glandarius*)	18/10/2018	Green
Eurasian Siskin (*Carduelis spinus*)	31/12/2011	Green
Eurasian Sparrowhawk (*Accipiter nisus*)	28/04/2020	Green
Eurasian Treecreeper (*Certhia familiaris*)	22/05/2019	Green
European Robin (*Erithacus rubecula*)	31/12/2011	Green
Lesser Redpoll (*Carduelis cabaret*)	31/12/2011	Green
Meadow Pipit (*Anthus pratensis*)	28/04/2020	Red
Mistle Thrush (*Turdus viscivorus*)	31/12/2011	Green
Reed Bunting (*Emberiza schoeniclus*)	31/12/2011	Green
Stonechat (*Saxicola torquata*)	28/04/2020	Green
White Wagtail (*Motacilla alba*)	31/12/2011	Green
Willow Warbler (*Phylloscopus trochilus*)	28/04/2020	Amber

4.4.4.2 Field Survey Results

4.4.4.2.1 Breeding Bird Survey

Results from the bird survey carried out at the Site of the Proposed Development on the 23rd of July 2021 are shown in Table 6 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.

No bird species were recorded nesting within the bracken/scrub habitat along the banks of the Carrickmines Stream as it runs along the Site's south-western boundary. Regardless, this riparian corridor lies within the proposed wildlife refuge and will be retained as is. As detailed within Section 4.3.6, the section of the Carrickmines Stream in question is narrow and densely overgrown, providing little in terms of aquatic flora and fauna. It is unlikely to support any bird species of note beyond the expected assemblage of passerine species that nest in scrub habitats such as those present.

Red-listed Bird Species

No species listed on the BoCCI[3] 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.

- Swallow (*Hirundo rustica*) – up to 10 birds were feeding over area.
- Willow warbler (*Phylloscopus trochilus*) – one heard in song.
- Starling (*Sturnus vulgaris*) – feeding in the area.
- Goldcrest (*Regulus regulus*) – present along hedgerows and mature deciduous woodlands.
- Linnet (*Linaria Cannabina*) – small party feeding in the scrubland area.

TABLE 6. BIRD SPECIES RECORDED WITHIN THE VICINITY OF THE SITE DURING THE BREEDING BIRD SURVEY JULY 2021.

Species	BoCCI Status	EU Designation	Notes
Goldcrest (*Regulus regulus*)	Amber	N/A	Several recorded throughout the site
Coal Tit (*Periparus ater*)	Green	N/A	Two in the conifer trees on south side
Wren (*Troglodytes troglodytes*)	Green	N/A	Several recorded throughout the site
Robin *(Erithacus rubecula)*	Green	N/A	Several recorded throughout the site

[3] Birds of Conservation Concern in Ireland 2020-2026 (Gilbert, Stanbury and Lewis, 2021).

Species	BoCCI Status	EU Designation	Notes
Dunnock (*Prunella modularis*)	Green	N/A	Several recorded throughout the site
Blue Tit (*Cyanistes caeruleus*)	Green	N/A	Several recorded throughout the site
Great Tit (*Parus major*)	Green	N/A	Several recorded throughout the site
Chaffinch *(Fringilla coelebs)*	Green	N/A	Several recorded throughout the site
Goldfinch *(Carduelis carduelis)*	Green	N/A	Up to six feeding on scrubland
Blackbird (*Turdus merula*)	Green	N/A	Common
Linnet (*Linaria canabina*)	Amber	N/A	Small party of birds feeding on scrubland
Siskin (*Carduelis spinus*)	Green	N/A	Two in mature trees along the western section
Jackdaw (*Corvus monedula*)	Green	N/A	Common
Rook (*Corvus frugilegus*)	Green	N/A	Common
Magpie *(Pica pica)*	Green	N/A	Common
Hooded Crow (*Corvus cornix*)	Green	N/A	Common
Song Thrush (*Turdus philomelos*)	Green	N/A	Several recorded throughout the site
Wood pigeon *(Columba palumbus)*	Green	N/A	Common
Willow Warbler (*Phylloscopus trochilus*)	Amber	N/A	One in song on northern section
Blackcap (*Sylvia atricapilla*)	Green	N/A	One heard along Woodside Road boundary
Chiffchaff (*Phylloscopus collybita*)	Green	N/A	One calling along Woodside Road section
Starling (*Sturnus vulgaris*)	Amber	N/A	Common

Species	BoCCI Status	EU Designation	Notes
Swallow (*Hirundo rustica*)	Amber	N/A	Feeding over the area

4.4.4.2.2 Bird Scoping Survey

During the Site walkover on the 29th November 2023, eleven species of birds were recorded (Table 7). Of these, only goldcrest (*Regulus regulus*) is amber listed, with the remaining ten species green listed (Gilbert et al. 2021).

TABLE 7. BIRD SPECIES RECORDED DURING WALKOVER SURVEY ON THE 29TH NOVEMBER 2023.

Species	BoCCI Status
Blackbird (*Turdus merula*)	Green
Magpie (*Pica pica*)	Green
Blue Tit (*Cyanistes caeruleus*)	Green
Wren (*Troglodytes troglodytes*)	Green
Great tit (*Parus major*)	Green
Coal tit (*Periparus ater)*	Green
Long-tailed tit (*Aegithalus caudatus*)	Green
Goldcrest (*Regulus regulus*)	Amber
Robin (*Erithacus rubecula*)	Green
Mistle Thrush (*Turdus viscivorus*)	Green
Woodpigeon (*Columba palumbus*)	Green

4.4.4.3 Evaluation

Considering the variety of bird species recorded both in the historical records and during the various field surveys, it is considered that the Site contains resident and regularly occurring, locally important populations of bird species protected under the Wildlife Act 1976 (as amended).

4.4.5 Mammals (excl. bats)

4.4.5.1 Desk Study Results

Records for terrestrial mammals recorded in the surrounding 2km grid square were retrieved from the NBDC online database (Table 8).

TABLE 8. RECORDS OF TERRESTRIAL MAMMALS (NATIVE AND NON-NATIVE) FOR THE SURROUNDING 2KM GRID SQUARE ASSOCIATED WITH THE SITE FROM THE NBDC.

Species	Date of last record	Source	Designation
NATIVE SPECIES			

Eurasian Badger (*Meles meles*)	09/10/2018	Mammals of Ireland 2016-2025	• Wildlife Act 1976 (as amended)
Eurasian Pygmy Shrew (*Sorex minutus*)	07/08/2014	Atlas of Mammals in Ireland 2010-2015	• Wildlife Act 1976 (as amended)
Eurasian Red Squirrel (*Sciurus vulgaris*)	04/12/2022	Mammals of Ireland 2016-2025	• Wildlife Act 1976 (as amended)
West European Hedgehog (*Erinaceus europaeus*)	23/05/2021	Hedgehogs of Ireland	• Wildlife Act 1976 (as amended)
Irish Stoat (*Mustela erminea subsp. hibernica*)	19/06/2012	Atlas of Mammals in Ireland 2010-2015	• Wildlife Act 1976 (as amended)
Red Fox (*Vulpes vulpes*)	13/01/2018	Mammals of Ireland 2016-2025	• Not legally protected
NON-NATIVE AND INVASIVE SPECIES			
Eastern Grey Squirrel (*Sciurus carolinensis*)	04/12/2022	Mammals of Ireland 2016-2025	• High Impact Invasive Species • Regulation S.I. 477/2011 (Ireland)
House Mouse (*Mus musculus*)	01/12/2014	Atlas of Mammals in Ireland 2010-2015	• High Impact Invasive Species
Fallow Deer (*Dama dama*)	30/03/2016	Mammals of Ireland 2016-2025	• High Impact Invasive Species • Regulation S.I. 477/2011 (Ireland) - Specified provisions of Regulations 49 and 50
Sika Deer (*Cervus nippon*)	25/03/2013	Atlas of Mammals in Ireland 2010-2015	• High Impact Invasive Species • Regulation S.I. 477/2011 (Ireland) - Specified provisions of Regulations 49 and 50
European Rabbit (*Oryctolagus cuniculus*)	25/06/2013	Atlas of Mammals in Ireland 2010-2015	• Medium Impact Invasive Species

Two 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.

4.4.5.2 Field Survey Results

Several mammal trails were observed entering the Site from the Woodside Road (southern end of the Site) likely deer related. An abundance of deer prints and droppings were recorded throughout the Site, with sika deer observed on Site during site visits; a doe and young male recorded separately grazing in the north of the Site on 16th September 2021, and a peak count of five deer recorded in 2023, including both stags and does. A pair of stags were observed sparring in the centre of the Site in 2023 (Figure 20).



FIGURE 20. SIKA STAGS SPARRING ON SITE IN NOVEMBER 2023. DISTINCTIVE SIKA TAIL MARKING VISIBLE IN RIGHT-HAND IMAGE.

Two small mammal burrows were observed in the east of the Site at the base of a tree by the derelict cottage in November 2023. These burrow entrances were small ca.15cm width, with one part blocked by a buried rock, narrowing the entrance, meaning they were likely dug by a smaller mammal e.g., rabbit. The burrow entrances contained debris and looks to have been in disuse for some time (Figure 21). A fox scat was recorded along the southern boundary, and scuffle marks indicative of mammal foraging were recorded along the western boundary. No signs of other mammals were observed during the survey.



FIGURE 21. SMALL BURROWS OBSERVED IN CLOSE PROXIMITY ALONG THE SITE'S EASTERN BOUNDARY.

4.4.5.3 Evaluation

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 signs of badger (*Meles meles*) were observed during the survey in November 2023, despite a thorough survey being conducted for setts, latrines, mammal trails and prints. It is therefore unlikely that badger regularly use the Site and the thin soils and exposed bedrock present at the Site would 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).

Western European hedgehog (*Erinaceus europaeus*) and pygmy shrew (*Sorex minutus*) 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 (*Sciurus vulgaris*) 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 (*Mustela erminea subsp. hibernica*) have the potential to utilise wooded habitat in the lands surrounding the Site.

The habitats available at the Site are not optimal for the majority of the native mammals recorded within the relevant grid square. However, they may support pygmy shrew, hedgehog, and Irish stoat. Badger could potentially forage at the Site if in the locality. These species are less likely to be recorded during walkover surveys due to their timid behaviours and/or nocturnal habits.

4.4.6 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 2022 (NBDC: *Amphibians and reptiles of Ireland*). Smooth newt (*Lissotriton vulgaris*), also a protected species under the Wildlife Acts, was recorded in 2010 (NBDC: *Newt Survey 2010-2014*). Smoot newt are also known to be present in newt ponds within the 'Gorse Hill' area adjacent to Fitzsimon's Woods (D'Arcy, 2021).

The Site of the Proposed Development likely supports a breeding population of common frog (*Rana temporaria*) with juveniles recorded at the Site during an assessment by a herptile expert in July 2024 (Gandola, 2024. See Appendix VI for Rapid Assessment Report). The Site contained two areas of transient pooling during the previous surveys; one in the south-west of the Site (Figure 23) within some wet grassland and one along the Site's eastern boundary (Figure 22) that is associated with an adjoining private garden pond. Both had dried up by the time of the July walk-over carried out by Mr Gandola. The July assessment was undertaken outside of the optimal survey season for amphibians and so the presence of smooth newt (*Lissotriton vulgaris*) on Site could not be determined. Smoot newts are known to inhabit ponds in Fitzsimon's Woods across the road to the north-east of the Site and so may be present on Site.

As no targeted surveys for amphibians were carried out during the optimal survey period, it is assumed that a locally important population of frog and smooth newt may be present in the areas of transient pooling that occur at the Site. The area of pooling along the eastern boundary of the Site, is located within the proposed wildlife corridor/refuge, and so will be retained. The south-western wet grassland area that supported pooling will be lost to facilitate the access road and development footprint.



FIGURE 22. AREA OF POOLING ALONG THE SITE'S EASTERN BOUNDARY. THE POOLING OIRGINATES FROM A PRIVATE GARDEN ADJACENT TO THE SITE.



FIGURE 23. A PATCH OF WET GRASSLAND (GS4) HABITAT IN THE SOUTH-WEST OF THE SITE (PHOTO TAKEN FACING WEST).

4.4.7 Other Fauna

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. No common lizard were recorded during an assessment conducted by a herptile expert in July 2024 (Gandola, 2024. See Appendix VI for Rapid Assessment Report). However, it is assumed under the precautionary principle that a locally important population of this species may be present at the Site based on the presence of suitable habitat and of lizard populations in the locality.

4.4.8 Protected and/or Notable Species Unlikely to Occur at the Site

Other notable and/or rare species and species listed on Annex IV of the Habitats Directive that were considered but that are unlikely to occur at the Site include:

- **Flora**
  - Marsh Saxifrage (*Saxifraga hirculus*) – Known populations only in Co. Mayo.
  - Killarney Fern (*Vandenboschia speciosa*) – Nearest known populations in Co. Wicklow, not recorded at the Site, no suitably sheltered and moist habitats available.
  - Slender Naiad (*Najas flexilis*) – A clear water, lowland lake species. No suitable habitat available at the Site.
- **Fauna**
  - White-clawed Crayfish (*Austropotamobius pallipes*) – No suitable habitat.
  - Freshwater Pearl Mussel (*Margaritifera margaritifera*) – No suitable habitat.
  - Natterjack Toad (*Epidalea calamita*) – Distribution restricted to few coastal sites.

- Kerry Slug (*Geomalacus maculosus*) – Distribution restricted to south and west of Ireland.

4.5 Evaluation of Ecological Features

Habitats have been evaluated for their conservation importance, based on the NRA evaluation scheme (NRA, 2009b). Those selected as KERs are those which are evaluated to be of at least local importance (higher value).

Fauna that has the potential to utilise the Site and immediate area of the Proposed Development, or for which records exist in the wider area, have been evaluated for their conservation importance. This evaluation follows the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009b).

The impacts of the Proposed Development on the identified KERs are assessed in Section 0. Table 9 below summarises the evaluation rating assigned to each ecological feature and the rationale behind these evaluations is also provided.

TABLE 9. EVALUATION OF DESIGNATED SITES, HABITATS, FLORA AND FAUNA RECORDED WITHIN THE SITE AND THE SURROUNDING AREA. THOSE IDENTIFIED AS KEY ECOLOGICAL RECEPTORS (KERS) ARE HIGHLIGHTED IN GREEN.

Ecological Receptor	Evaluation	Rationale	Key Ecological Receptor (KER)?
Designated Sites			
Fitzsimon's Woods pNHA	National Importance	Direct impact pathway via Construction Phase dust and noise. Indirect impact pathway via increased recreational usage by new residents of the Proposed Residential Development.	**Yes**
Loughlinstown Woods pNHA **Dalkey Coastal Zone and Killiney Hill pNHA**		Tenuous hydrological connection via Carrickmines stream in the southeast of the Site.	
Habitats			
Scrub (WS1) **Recolonising bare Ground (ED3)** **Exposed Siliceous Rock (ER1)** **Wet Grassland (GS4)** **Bracken (HD1)** **Acid Grassland (GS3)**	Local Importance (Lower Value)	Vegetated habitats provide some cover and foraging habitat for common frog, small mammal and nesting birds. Non-native sika deer also observed foraging on-Site. Stone wall and scrub habitat may provide habitat for common lizard. These habitats themselves are not of higher than local importance (lower level) as they are common and widespread. Stone walls along eastern boundary will be retained as part of the proposed wildlife corridor/refuge.	No

Ecological Receptor	Evaluation	Rationale	Key Ecological Receptor (KER)?
Stone Walls and other stonework (BL1)			
Hedgerows (WL1) **Treelines (WL2)**	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. These habitats are largely being retained and bolstered as part of the proposed landscape plan.	**Yes**
Eroding/upland rivers (FW1) (Carrickmines Stream)	Local Importance (Higher Value)	The Carrickmines Stream runs along a part of the Site's south-eastern boundary. This waterbody provides a connection with downstream rivers and streams.	**Yes**
Invasive Plant Species on Site	Local Importance (Lower Value)	Provide some pollinator habitat, however included as a KER as low, medium and high impact invasive species require removal from Site as er best practice due to risk of establishment/ dispersal off Site.	**Yes**
Fauna			
Badger	Local Importance (Lower Value)	No evidence of badger on Site despite a thorough survey conducted for setts, latrine, mammal trails and prints. Site largely unsuitable for sett creation.	No
Hedgehog, Pygmy Shrew, Irish stoat.	Local Importance (Higher Value)	No evidence of these species recorded on Site, however, they are elusive and discrete species not often easy to record in passing. There are NBDC records present from the surrounding area and suitable habitat to support this species is present on Site.	**Yes**
Red Squirrel	Local Importance (Lower Value)	Limited tree cover on Site provides no significant habitat for red squirrel.	No
Bat assemblage	Local Importance (Higher Value)	Six species of bat recorded within the vicinity of the Site of the Proposed Development. Important for commuting/ foraging.	**Yes**
Breeding Bird assemblage (Amber listed)	Local Importance (Higher Value)	Five amber listed species noted on site. Site provides nesting/foraging habitat in scrub and boundary vegetation.	**Yes**

Ecological Receptor	Evaluation	Rationale	Key Ecological Receptor (KER)?
Common Frog	Local Importance (Higher Value)	Some potential spawning habitat within areas of transient pooling in the south and east of the Site. Young frogs recorded at the Site in July 2024. Smooth newt known to be present in Fitzsimon's Wood nearby.	**Yes**
Smooth Newt			
Common Lizard	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).	**Yes**

5 Ecological Impact Assessment

5.1 Avoidance and Mitigation Embedded in Project Design

The Proposed Development includes several embedded design features that may act to avoid or mitigate negative impacts that would likely occur in the absence of these features. However, as opposed to typical mitigation measures, the implementation of these features is integral to the design and completion of the Proposed Development, and as such the impact assessments are performed with consideration of these features as integrated parts of the Proposed Development. All considered embedded design features that may act to mitigate negative impacts on local ecology and environment are listed in Table 10.

Table 10. Embedded desing features and their potential to act to avoid or mitigate negative impacts on the local ecology and environment.

Embedded Design Feature	Avoidance / Mitigation Potential
SUDS: • Permeable paving. • Bioretention areas. • Green roofs. • Trapped road gullies. • Underground pipe network. • Silt traps. • Geocellular storage systems. • Interception storage. • Filter drains. • Flow control device. • Oil separator.	The SUDS features included in the Project Design will ensure the surface water discharge from the Proposed Development has been managed and treated prior to discharge at the greenfield runoff rate. These features will be implemented as part of the surface water drainage design.
Landscape Design: • Extensive native tree, shrub and hedgerow planting. • Proposed wildlife refuge along southern and eastern boundaries. • Provision of wildlife ponds within wildlife corridor in south of Site.	The proposed planting and habitat features offset the loss of habitats at the Site. There will be an increase in native tree cover across the Site and a wildlife refuge retained along the Site's southern and eastern boundaries.

• Bioretention areas along eastern boundary within wildlife refuge.	
Lighting Design • Maintenance of a dark corridor for bats and wildlife along the southern and eastern boundaries of the Site. • Light-spill from the public lighting onto boundary vegetation reduced to 0-1 lux through placement and design of fixtures.	Lighting designed with ecologist input and will entail no significant light spill on to natural habitats along the Site's boundaries.

5.2 Construction Phase

5.2.1 Impacts on Designated Sites

As detailed in the preceding sections, potential impacts to designated sites have been addressed in the AA Screening that accompanies this application under separate cover (Enviroguide, 2024a). No likely significant effects are expected on any designated site. Please refer to the AA screening for further details.

5.2.1.1 Fitzsimon's Wood pNHA

The Proposed Development maintains a Construction Phase dust and noise impact pathway with this pNHA due to its proximity to the Site (ca.110m to the north).

5.2.1.1.1 Dust Impacts

Dust from construction sites deposited on vegetation can cause ecological stress to plants, adversely affecting photosynthesis and other biological functions. Rainfall, although removing the deposited dust from foliage, can also rapidly leach chemicals in the dust into the soil. Plant communities near short-term works are likely to recover within a year of the dust soiling stress ceasing (Holman et al., 2014). However, large scale construction sites may give rise to dust deposition over an extended period of time and have more significant effects on vascular plant communities.

According to Institute of Air Quality Management (IAQM) *Guidance on the Assessment of Mineral Dust Impacts for Planning.* (IAQM, 2016), experience of the Working Group together with published studies and anecdotal evidence on the change in both airborne concentrations and the rate of deposition with distance, suggests that dust impacts will occur mainly within 400m of the operation, even at the dustiest of mineral sites. Adverse dust impacts from sand and gravel sites are uncommon beyond 250m and beyond 400m from hard rock quarries measured from the nearest dust generating activities. IAQM (2016) note that is commonly accepted that the greatest impacts will be within 100m of a source, and this can include both large (>30 µm) and small dust particles. The greatest potential for high rates of dust deposition and elevated particulate matter (PM10) concentrations occurs within this 100m distance.

IAQM note that their 2016 guidance applies to the operational phases of minerals developments e.g., quarries. Whilst these share some common features with construction

activities, minerals sites can be on a significantly larger scale. The IAQM's 2014 *Guidance on the assessment of dust from Demolition and Construction* (Holman et al. 2014) deals with construction dust assessment specifically and does not provide specific dust impact distances as such but assesses sensitivity to dust impacts at <20m and <50m for ecological features; impact zones far smaller than that of mineral sites detailed in IAQM (2016).

In taking a precautionary approach, and in anticipation that the Proposed Development will entail some hard rock breaking on Site, the 400m, 250m and 100m impact zones are used in this EcIA to assess the potential for construction dust related impacts on Fitzsimon's Wood pNHA. However, it should be noted that the Proposed Development is a construction project and not a long-term mineral extraction facility, and so its capacity for dust related impacts will be much lower.

As can be seen in Figure 24, the Site of the Proposed Development is located ca.110m south of Fitzsimon's Wood pNHA, meaning that effectively the southern half of the pNHA is within the 400m and 250m buffers where dust related impacts can occur, as described in IAQM (2016) above. What is important to note it that the pNHA is entirely outside of the 100m buffer where the IAQM note the greatest impacts are most likely to occur.

As noted by Holman et al. (2014), vegetation located near short-term construction works are likely to recover within a year of the stress caused by dust deposition having ceased. The Construction Phase for the Proposed Development is estimated to be 18 months which would be considered short-term in nature when compared with a quarry or infrastructure project. In addition, the surrounding topographical context of the Site and the receptor (in this case the pNHA) need to be considered. Holman et al. (2014) note that topography and natural barriers (e.g. woodland) will reduce airborne concentrations due to impaction. Neither the Site nor the pNHA are directly adjacent to each other, with trees, buildings and indeed the southern woodland section of the pNHA lying between the Site and the majority of the Fitzsimon's Woods.

Based on the above factors i.e., the relatively low impact nature of the Proposed Development, the short-term nature of its Construction Phase (18 months), the distance between Site and the pNHA, and the intervening topography involved, it can be concluded that Construction Phase dust deposition will not lead to any likely significant effects on Fitzsimon's Wood pNHA. Any potential dust related effects at the pNHA are therefore assessed in the worst-case scenario as being **adverse, short-term, slight** at the **local scale**, in the absence of mitigation.

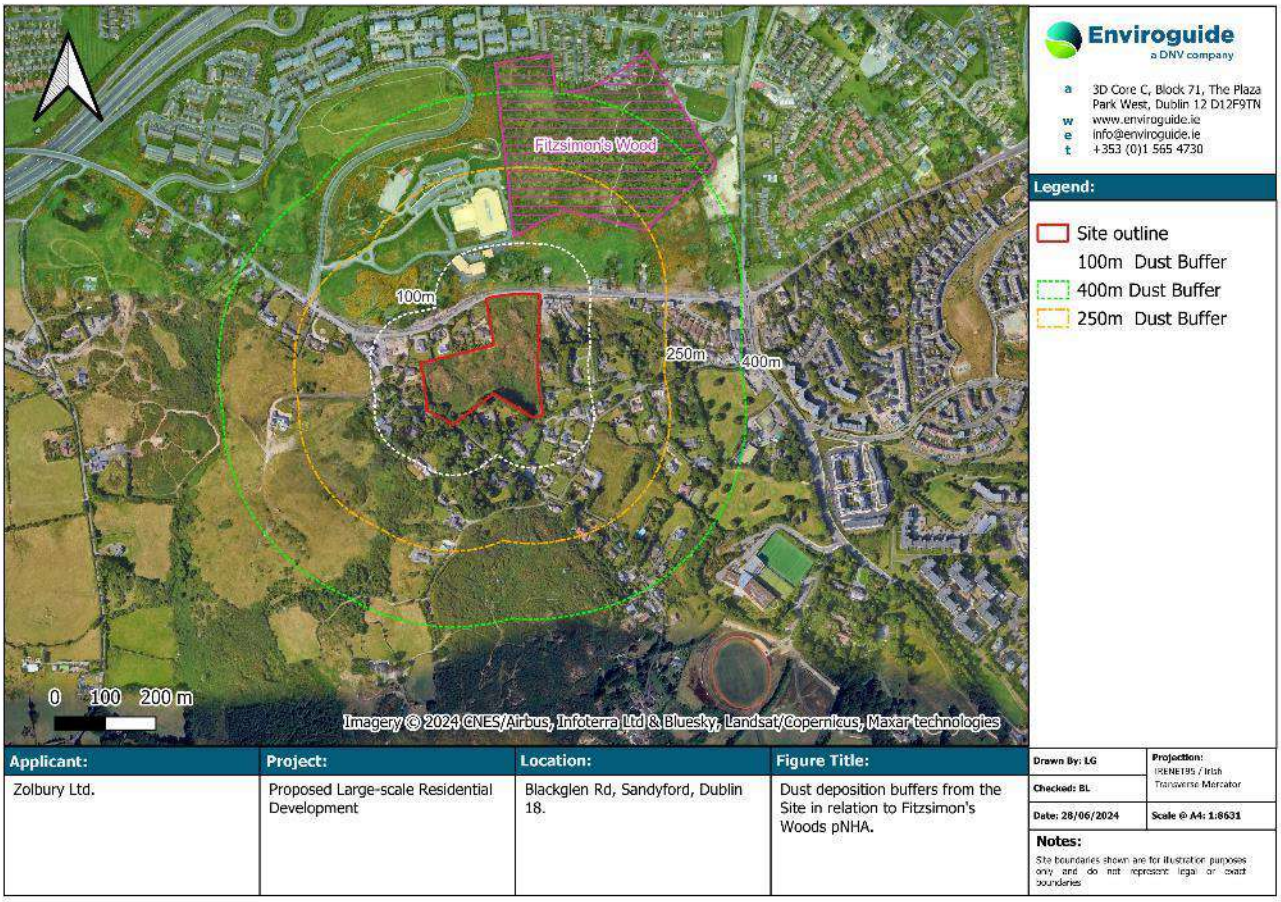


FIGURE 24. IMAGE SHOWING THE LOCATION OF FITZSIMON'S WOOD PNHA IN RELATION TO THE PROPOSED DEVELOPMENT, ALONG WITH DUST IMPACTS BUFFERS AS PER IAQM (2016).

5.2.1.1.2 Noise Impacts

Fitzsimon's pNHA is designated for its woodland habitats and flora and fauna species. It is not considered to be designated for overly noise sensitive ecological features e.g., coastal waterbirds which can be easily spooked by construction related noise sources (Cutts et al., 2009). The pNHA is located ca.110m from the Site at its closest point, with intervening buildings trees and a topographical rise present between the two. The above features along with the pNHA's woodland component would attenuate any noise levels generated by the Construction Phase of the Proposed Development, should they reach the Site, rendering any residual noise levels as negligible. Furthermore, the Construction Phase is expected to last 18 months, with the period of the highest noise generation likely to be the initial rock-breaking and/or piling activities should they be required. Any overall increase in baseline noise levels in the vicinity of the Site will therefore be short-term in nature, regardless of level of impact. As such, there is no capacity for the Proposed Development to lead to likely significant effects relating to noise disturbance at Fitzsimon's Woods pNHA. Any potential noise related effects at the pNHA are therefore assessed in the worst-case scenario as being **adverse, short-term, imperceptible** at the **local scale**, in the absence of mitigation

5.2.1.2 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. 10.6km downstream of the Site. As a result, these pNHAs are included in the precautionary 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 ca.14m natural buffer from the stream has been included within the proposed project design as part of the proposed wildlife refuge along the Site's southern and eastern boundaries. This buffer will lie between the nearest construction activities at the Site and the Carrickmines Stream itself to the south-east, 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 effects** on water quality at any pNHA sites, or any other adverse impact, as a result of the Proposed Development.

5.2.2 Impacts on Habitats and Flora

5.2.2.1 Damage to Retained Trees and Hedgerows

In the absence of mitigation measures, there is potential for damage to occur to treelines and hedgerow habitats being retained along the margins of the Site during the Construction Phase of the Proposed Development e.g., through plant machinery movements, inappropriate location of earth stockpiles and materials and general site-creep. This is considered to represent a potential **adverse, short-term, slight** to **significant** impact **at the Local scale**, with the level of significance depending on the level of damage that occurs/extent of habitat effected.

5.2.2.2 Spread of Invasive Species

Nine non-native plant species were recorded at the Site. One of these species is listed on the Third Schedule of S.I. 477/2011 (as amended): rhododendron, and one other is listed as a High Impact invasive species: cherry laurel.

The spread of these high impact invasive species off-site could result in **adverse, long-term, significant** effects, with the scale depending on the level of transmission and establishment off-site.

The remainder of the invasive species recorded on Site are Low- Medium Impact species. And are generally unlikely to result in significant adverse effects if transmitted off-site. However, as best practice these species will be removed and disposed of appropriately. In the absence of appropriate removal, there is the potential for **adverse, short-term, slight** impacts **at the Local scale** should these plants be spread off Site. The significance level is deemed to be short-term and slight for these species on the basis that they are widespread in the urban environment, are not considered to cause significant issues where present, and are easily removed where required.

5.2.2.3 Pollution of Carrickmines Stream

The Hydrological and Hydrogeological Risk Assessment (HHRA) prepared for the Proposed Development (Enviroguide, 2024c) notes that the Carrickmines Stream maintains a potential shallow groundwater connection to the Site due to the nature of the underlying geology (short groundwater flow paths to nearest surface waterbody). There is also a connection through surface water run-off during rainfall events. The HHRA evaluates the risk of these pathways to receptors including the Carrickmines Stream in the worst-case unmitigated scenario as *Low to Moderate Risk* in terms of groundwater contamination, and *Low Risk* in terms of contaminated surface water run-off. The HHRA goes on to note that once standard construction measures within the CEMP are implemented the overall impacts to surface/groundwater quality and flow will be negligible.

It is noted that no construction works are proposed in proximity to the Carrickmines Stream as it passes the south-eastern section of the Site. As detailed in the preceding sections of this Report, the Proposed Development includes a wildlife refuge along its southern and eastern boundaries, which will entail a set-back of ca. 14m from the closest area of construction works to the stream in question. This set-back will, by virtue of its presence within the wildlife refuge, be maintained as it currently is i.e., dense vegetation. The presence of this natural buffer will minimise the likelihood of any pollutants/ construction surface water run-off entering the stream during the Construction Phase.

In the worst-case scenario, the construction contamination risks to the Carrickmines Stream are therefore deemed to represent **adverse, short-term, moderate** effects at the **Local scale** in the absence of standard mitigation.

5.2.3 Impacts on Native Fauna

5.2.3.1 Small Mammals

Construction Waste

Construction sites can pose a source of harm for mammals should they find themselves trapped in an excavation or uncapped pipe, or within construction materials e.g., plastic sheeting or netting. There is therefore a potential for **adverse, short-term, significant** impacts at the **Local scale**, via harm/entrapment, in the absence of construction mitigation.

Noise Disturbance

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

5.2.3.2 Bats

If lighting is required at the Site during the Construction Phase e.g., in the case of security lighting, improper placement or direction of luminaires could cause light spill onto the hedgerows and treelines that run along the Site's boundaries. These vegetated edge habitats are used by bats for commuting and foraging and therefore Construction Phase lighting could impact bats through a loss of suitable foraging/commuting habitat. This is considered to represent a potential **adverse, short-term, significant** impact **at the Local scale**, in the absence of mitigation.

The trees marked for removal have all been assessed and confirmed to be of low-negligible bat roost potential and do not have the capacity to support roosts of multiple bats (e.g. maternity, hibernation roosts). Nevertheless, should individual bats be present during felling, there is the potential for **adverse, short-term, slight** impacts on the local bat population **at the Local scale**, in the absence of mitigation.

5.2.3.3 Breeding Birds

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

Should any vegetation clearance take place within the breeding bird season (within period March 1st to August 31st, inclusive), there is the potential for harm/mortality to nesting birds and their eggs/young. This would represent an **adverse, short-term, significant** effect to breeding birds at the **Local scale** in the absence of mitigation.

There will be likely some noise disturbance to local birds at the Site during the construction works, and some loss of habitat in the trees and scrub to be removed at the Site. The latter will be offset by the tree and shrub planting proposed as part of the landscape plan for the Site. As such both of the above will represent **adverse, short-term, moderate** effects to breeding birds at the **Local scale.**

5.2.3.4 Amphibians and Common Lizard

Common frog, smooth newt and common lizard are all listed as *Least Concern* on the relevant Red List (King et al., 2011) and being an Annex V species under the EU Habitats Directive, common frog are noted as having *Favourable* status in NPWS (2019); due to their adaptability to land use changes and their widespread abundance. King et al. (2011) note that smooth newt are widespread in Ireland, locally distributed and under-recorded, and that no population estimate is available but that the Irish population is thought to be stable. Common lizards are highly mobile, and mortality arising as a result of the Construction Phase is not likely to result in any level of injury or mortality that would affect the species' conservation status. The Proposed Development may result in the injury/mortality of frog, newt and lizards during the vegetation clearance works should these species be present. This could result in **adverse, short-term, significant** impacts to these species at the **Local scale**, in the absence of mitigation.

Due to the limited size of the Proposed Development Site, the population of herptiles that use the Site is anticipated to be small, and the loss of habitat is not anticipated to have a significant impact on the conservation status of the local populations of common frog, smooth newt or lizard, especially in the case of amphibians considering the retention of the area of pooling

within the proposed wildlife corridor along the southern and eastern boundary, and the proposed wildlife ponds and bioretention areas proposed with same.

5.3 Operational Phase

5.3.1 Impacts on Designated Sites

5.3.1.1 Fitzsimon's Wood pNHA

The Proposed Development will increase the local residential population in the area, and this can reasonably be expected to result in an increase in the number of people visiting Fitzsimon's Wood pNHA.

In terms of wildlife disturbance caused by recreation, a study by Souldard (2017) on the impacts of recreational trails on wildlife states that it is common for birds to habituate to routine sounds (e.g., traffic on roads, walkers on designated trails etc.), while unexpected sounds (e.g., gun shots) result in a flight response. Consequently, walkers who leave official roads and trails are perceived by the birds as spatially unpredictable and more high risk than those walkers who tend to make more predictable movements following official trail networks.

It is noted that there are existing established walking trails throughout Fitzsimon's Wood pNHA woodland and as such, no significant increased disturbance to flora and fauna including birds is anticipated from any increased footfall at the pNHA. Badgers are also 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 terms of the current management of the pNHA, a Biodiversity Education Programme for primary schools and community/youth groups was developed for Fitzsimons' Wood as an action under the Dun Laoghaire-Rathdown Biodiversity Plan 2009-2013 (DLRCC, 2009). It is also noted that a Biodiversity Audit of Fitzsimons Wood was completed in 2006 (Tubridy, 2006) and included a number of Management Recommendations for the pNHA. The 2021-2025 DLRCC Biodiversity Plan (DLRCC, 2021) contains Action 5.14 to "work with NPWS and community groups to develop woodland management plans for the protection of Loughinstown Woods pNHA and Fitzsimons Woods pNHA". As such, it is clear that there is a certain level of community and local authority engagement and monitoring associated with Fitzsimons Wood which would serve to detect and/ or monitor any increased littering or increased recreational impact associated with increased visitor numbers to the woodland in the future.

In addition, the Proposed Development entails the creation and provision of an extensive internal woodland walk and associated natural amenities for future residents, which will provide an alternative natural environment on-Site for local residents and serve to lessen the extent of their usage of Fitzsimon's Woods pNHA.

It is therefore deemed that there will be no significant adverse effects on Fitzsimon's Woods pNHA as a result of recreational pressures associated with the Operational Phase of the Proposed Development. In the worst case potential effects are deemed to represent **adverse, permanent, slight** effects on the pNHA at the **Local scale**.

5.3.2 Impacts on Habitats and Flora

No Operational Phase impacts to habitats and flora have been identified. The landscape proposals for the Site will ensure that no significant impacts in terms of habitats and flora will occur as a result of the Operation Phase of the Proposed Development.

5.3.3 Impacts on Native Fauna

5.3.3.1 Small Mammals

There is the potential for an overall increase in levels of ambient disturbance at the Site in the long-term, due to presence of humans in what was once a semi-natural area of scrubland in the foothills of the Dublin mountains. However, it is noted that the Site itself has been subjected to disturbance in the recent past, with some mechanical clearance having occurred in recent years. In addition, an existing level of human activity does surround the Site in the form of neighbouring private residences and the Blackglen and Woodside Roads.

Nevertheless, an increase in the baseline levels of human activity will occur at the Site once the Proposed Development is operational. Considering that a wildlife refuge is included within the proposal that will allow wildlife respite and the ability to move through the Site south-north, separate from the rest of the development, Operational Phase disturbance levels are not expected to be significant. As such, considering the embedded mitigation proposed in the landscape approach, Operational Phase disturbance will likely result in **adverse, permanent, slight** impact at the **local scale** for the lifetime of the Proposed Development.

5.3.3.2 Bats

No Operational Phase impacts to bats have been identified. The bat-friendly lighting included within the lighting design as embedded mitigation will ensure that no impacts to bats as a result of the proposed public lighting at the Site will occur. The retention of the existing dark commuting foraging corridor along the southern and eastern boundaries of the Site within the proposed wildlife refuge will ensure bats can continue to use the Site for the development's operational lifetime.

5.3.3.3 Breeding Birds

No Operational Phase impacts to breeding birds are likely to occur.

5.3.3.4 Amphibians and Common Lizard.

Some Operational Phase disturbance effects would be expected to these species groups if present within the Site; as a result of the Proposed Development in terms of an increase in disturbance by human activity and the presence of dogs etc. Given that important herptile habitats (old stone walls, existing area of pooling, proposed wildlife ponds and eastern bioretention areas) are all located within the proposed wildlife refuge area, disturbance to these groups is expected to be limited to an **adverse, permanent, slight** impact at the **local scale** for the lifetime of the Proposed Development.

5.4 Do Nothing Impact

If the Proposed Development were not to go ahead, the Site would likely continue to develop ecologically, with gorse 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.

5.5 Potential for In-Combination Effects

5.5.1 Relevant Plans and Policies

The following plans and policies were reviewed and considered for possible in-combination effects with the Proposed Development:

- Dún Laoghaire-Rathdown County Development Plan 2022-2028.
- Dún Laoghaire-Rathdown Biodiversity Action Plan 2021-2025.

No specific projects or plans within the Dún Laoghaire-Rathdown County Development Plan (CDP) 2022-2028 were identified that could act in-combination with the Proposed Development and cause adverse effects on the KERs identified in this Report. Additionally, the CDP has directly addressed the protection, enhancement and incorporation of biodiversity through specific Policies and Objectives, as well as through its Development Management Standards (see Appendix I for details). The Dún Laoghaire-Rathdown Biodiversity Action Plan 2021-2025 is set out to protect and improve biodiversity in the county, and as such will not result in negative in-combination effects with the Proposed Development.

Therefore, on examination of the above it is considered that there are no means for the Proposed Development to act in-combination with any plans that would cause any likely significant effects to nearby ecological sensitivities.

5.5.2 Existing Planning Permissions

A search of planning applications located within a 300m of the Site of the Proposed Development was conducted using online planning resources such as the National Planning Application Database (NPAD) (MyPlan.ie) and Dún Laoghaire-Rathdown County Council Planning Applications online 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 the relevant European sites. Long-term developments granted outside of this time period were also considered where applicable.

A search radius of 300m was deemed appropriate given the rural/sub-urban nature of the surrounding environs and the considerable distance between the Site and any designated sites within the ZOI. 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. Larger developments considered are provided in Table 11 below.

TABLE 11. GRANTED AND PENDING DEVELOPMENT APPLICATIONS WITHIN 300 M OF THE PROPOSED DEVELOPMENT. LOCATION AND DISTANCE GIVEN IS RELATIVE TO THE PROPOSED DEVELOPMENT.

Planning Reference	Planning Authority	Status	Location

D19A/0769	**Dun Laoghaire Rathdown County Council**	**Granted**	**Woodside Road, Sandford, Dublin 18 (50m west of Proposed Development)**
Development Description 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. **Potential for In-combination effects** Due to the small-scale nature of this development, it is not considered that it is capable of acting in combination with the Proposed Development to cause significant impacts on local ecology in the area.			
ABP31332122	**Dun Laoghaire Rathdown County Council**	**Granted**	**Balally and Woodside at Blackglen Road and Slate Cabin Lane, Dublin 18 (50m east of Proposed Development)**
Development Description Demolition of the existing structures on site, construction of 101 no. residential units (32 no. houses, 69 no. apartments), creche and associated site works. **Potential for In-combination effects** Both this development and the Proposed Development will result in a reduction of commonly occurring vegetated habitats in the locality. However, the Proposed Development retains its boundary treelines and hedgerows and will result in a net increase in tree cover. This along with the provision of a wildlife refuge minimizes the impact of the Proposed Development on habitat connectivity in the area and ensures no significant cumulative effects will occur with this development.			
D23A/0456 (ABP319621)	**Dun Laoghaire Rathdown County Council**	**Granted**	**Crohamhurst, Sandyford Road, Dublin 18, D18W9Y5 (300m east of Proposed Development)**
Development Description The demolition of the existing single storey dwelling and the construction of a new neighbourhood centre and residential development. The development consists of 80 no. residential apartment units and associated residential amenity space, a supermarket and associated off licence, a restaurant / bar and associated winter garden, 2 no. retail units, an ATM area, a health centre and a café. **Potential for In-combination effects** Both this development and the Proposed Development will result in a reduction of some commonly occurring vegetated habitats in the locality. However, the Proposed Development retains its boundary treelines and hedgerows and will result in a net increase in tree cover. This along with the provision of a wildlife refuge minimizes the impact of the Proposed Development on habitat connectivity in the area and ensures no significant cumulative effects will occur with this development. The Crohamhurst development site is not large and any combined impacts relating to habitat loss would be minor and localized.			

The Dún 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. The scheme is proposed to be completed on a phased basis and was expected to be completed in 2023. The Site visit in November 2023 confirmed that the works have progressed and that a section of broken hedgerow along the Site's northern boundary has been removed to facilitate the area of works. No significant cumulative effects would be expected involving the road improvement works and the Proposed Development, beyond a loss of some marginal scrub hedgerow habitats in the area.

Further afield, there are a number of thinning and clear-felling licences within the mountains to the south-west of the Proposed Development Site as indicated in the DAFM Forestry Licence Viewer[4]. A small number of these are located within the Shanganagh River's catchment.

A flood relief scheme is also currently being progressed for Loughlinstown. The Loughlinstown Flood Relief Scheme comprises works in two river catchments; Deansgrange and Carrickmines/Shanganagh. The Proposed Development is hydrologically linked to the Carrickmines/Shanganagh catchment via those waterbodies. The Carrickmines/Shanganagh flood relief scheme is at design stage with a Preferred Option Public Consultation Event held in December 2023 according to the scheme's website (*https://www.csfrs.ie/*). The website notes that Stage 2: *Planning Process* is expected to be completed in 2024, with the construction works (Stage 4) expected to start sometime in 2025 and be completed in 2026. As such, there is the possibility of some overlap between these works and the construction of the Proposed Development.

The Proposed Development is, however, unlikely to contribute in any significant manner to adverse cumulative effects to downstream waterbodies such as the Carrickmines stream or Shangannagh River involving the flood relief works, let alone contribute to significant in-combination effects to downstream designated sites e.g., Loughlinstown Wood pNHA and Dalkey Coastal Zone and Killiney Hill pNHA. As described in this Report, the Site maintains a tenuous hydrological link to these sites rendering the potential for likely significant effects negligible.

In conclusion, given the distance and rural buffer between the Proposed Development and the above-mentioned permitted developments/forestry Operations, the nature of the Site's hydrological connection to downstream designated sites within the ZOI, and the lack of any other notable impact pathways linking the Site to any designated sites, it is considered that there is no potential for the Proposed Development to act cumulatively with other permitted developments in the vicinity that could cause likely significant effects on any designated sites or KERs.

6 AVOIDANCE, MITIGATION, COMPENSATION AND ENHANCEMENT MEASURES

6.1 Avoidance By Design

The Proposed Development design does not implement any specific avoidance measures.

6.2 Construction Phase

Table 12 gives a summary of the best practice development standards and mitigation measures to be implemented during the Construction Phase of the Proposed Development. The measures listed are outlined in more detail in the CEMP (OCSC, 2024) accompanying this application under separate cover. Where specific details relating to protection of KERs is required under these measures, reference is made in the table to the appropriate section in this Report.

[4] https://forestry-maps.apps.rhos.agriculture.gov.ie/

TABLE 12. SUMMARY OF BEST PRACTICE STANDARDS AND MITIGATION OUTLINED IN THE OUTLINE CONSTRUCTION AND ENVIRONMENTAL MANAGEMENT PLAN (OCSC, 2024).

Theme	Best Practice Standards and Mitigation	Ecology Specific Mitigation
Pollution Prevention	Only sediment-free run-off is to leave the site. A suitably sized detention basin or settlement area will be installed at the lowest point before discharge where excess run-off must leave the Site. Silt curtains or earth berms will be used to channel run-off to locations where it can be controlled. These may take the form of an open retention area or, where the need arises, a portable skip/s, or similar, where inflow passes through straw bales, gravel etc. The Site Manager will be responsible for the pollution prevention programme and will ensure that at least daily checks are carried out to ensure compliance. A record of these checks will be maintained	No
Training	All site personnel will be trained in the importance of good environmental practices including reporting to the site manager when pollution, or the potential for pollution, is suspected.	No
Protection of Trees	Appropriate measures will be put in place to protect any trees on the site which are designated for protection or retention under any granted planning permission for the development. The appointed contractor shall have regard to the Tree Survey Report prepared by the Site Arborist for the project	Yes, see Section 6.2.1.3.
Rhododendron Control and Removal	Pre-commencement survey of Site and physical/chemical treatment and removal of Site as per best practice guidelines (TII, 2020).	Yes, see Section 6.2.1.1.
Construction Waste Management	Waste from the Construction Phase to be segregated and stored securely.	Yes, see Section 6.2.2.1.

Noise Control	To comply with the requirements of BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014 (Code of Practice for Noise and Vibration Control on Construction and Open Sites) as well as Safety, Health and Welfare at Work (General Application) Regulations 2007, Part 5 Noise and Vibration. Noise and Vibration Management Plan (NVMP) to be in place.	No
Vibration Control	The Noise Impact Assessment states that without a detailed construction plan, it is prudent to assess the likely vibration levels at the nearby dwellings from this most severe test as all other sources of vibration will be below this level. The report sets out vibration limits for Disturbance and Cosmetic Damage respectively. Noise and Vibration Management Plan (NVMP) to be in place.	No
Dust Control	Measures to include suppression via watering of areas identified as potential dust source; road sweeping to remove aggregate materials; appropriate cover of transported materials; maintenance of public roads in relation to dust; and appropriate monitoring.	No

In addition, to ensure the CEMP remains 'fit for purpose' for the duration of the project it should be reviewed and updated by the Project Manager in consultation with the Contractor's Ecologist during the life of the project to ensure that it remains suitable to facilitate efficient and effective delivery of the project's environmental commitments. The Contractor shall also designate a Site Engineer/Manager/Assistant Manager as the Construction Waste Manager and who will have overall responsibility for the implementation of the Project Waste Management Plan (WMP). This Plan will be prepared upon appointment of the Main Contractor.

Additional mitigation measures required for sufficient protection of the KERs identified in this Report, and/or details for the specific implementation of the mitigation measures as per the above table are given in the below sections.

6.2.1 Protection of Habitats

6.2.1.1 Mitigation 1: Pre-clearance Invasive Species Survey

A pre-clearance survey of the Site will be conducted by a suitable qualified Ecologist before any clearance of vegetation or soil strip takes place. This survey will identify any locations of invasive plant species, in particular the rhododendron and cherry laurel plants recorded along the southern Site boundary. The Ecologist and Site manager will consult the IASMP prepared by INVAS Biosecurity (2024) attached in Appendix V of this Report for recorded locations of invasive species on Site.

6.2.1.2 Mitigation 2: Invasive Species Management

6.2.1.2.1 Low-Medium Impact Invasive Species

The Ecologist and Site manager will consult the IASMP prepared by INVAS Biosecurity (2024) attached in Appendix V of this Report for the recommended management/control measures for each of the invasive plant species on Site.

With regard to the below listed low-medium impact species recorded on Site:

- Butterfly-bush.
- Himalayan Honeysuckle.
- Cotoneaster sp.
- Winter Heliotrope.

These plants will be removed as per the species-specific guidance for each species included in the IASMP and the Traffic Infrastructure Ireland (TII) guidance document titled "The Management of Invasive Alien Plant Species on National Roads – Technical Guidance - GE-ENV-01105" (TII, 2020).

It is noted that sycamore is not considered to pose a risk of spread or impacts at the Site or off Site due to the nature of its invasiveness (See Section 4.4.2.3 for details). This species is not included in the TII guidance and does not require a specific removal approach; it can be removed as per normal tree removal protocol if required.

Although traditionally considered to be a 'low impact' invasive species, winter heliotrope has been recognised as a vigorous invasive that outcompetes native plant species and significantly alters natural habitats. Furthermore, it is extremely difficult to eradicate and so its removal and treatment on Site will be a priority.

Francis *et al.* (2021) prepared a research report for the EPA which includes chapters on winter heliotrope and the most effective treatment measures for same. Experiments were conducted involving Synero (a selective herbicide containing aminopyralid and fluroxypyr) and Roundup Biactive (a systemic, broad-spectrum herbicide containing glyphosate that is cleared for use near aquatic situations), and these two herbicides each combined with Topfilm (an adjuvant designed to improve the performance of herbicides, particularly in water). The authors concluded that Synero gave the most consistently successful results in these experiments. In locations where the use of Synero is not permitted, such as under the dripline of trees, repeated applications of Roundup Biactive may be used to suppress growth.

6.2.1.2.2 High Impact Invasive Species Management

Rhododendron seedlings were recorded in the south of the Site in November 2023 by the Enviroguide Ecologist. Rhododendron is listed in the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended), **making it an offence under Regulation 49 of that instrument to plant, disperse, allow or cause to grow this plant.**



FIGURE 25. RHODODENDRON SEEDLING IN THE SOUTH OF THE SITE (IMAGE FACING SOUTH-EAST).

The following is extracted from Traffic Infrastructure Ireland (TII) guidance document titled *"The Management of Invasive Alien Plant Species on National Roads – Technical Guidance - GE-ENV-01105*" (TII, 2020):

Control Information

It is recommended that a suitably qualified ecologist or horticulturalist with sufficient training, experience and knowledge in the control of Invasive Alien Plant Species (IAPS) should be employed to assist in the planning and execution of control measures in relation to rhododendron. In addition, those involved in the control of rhododendron may be advised to have access to the advice of a Registered Pesticide Advisor on the register established by the Minister for Agriculture, Food and the Marine pursuant to Regulation 4 of the Sustainable Use of Pesticides Regulations. All pesticide users must be registered and have the appropriate training necessary to carry out the proposed method of control.

Rhododendron grows vigorously when cut and the tiny seeds may be unintentionally spread by machinery, on clothes, boots, or other PPE. Hence, **biosecurity measures must be put in place to prevent further spread** of the plant when undertaking any control works. Regular follow-up is required to deal with re-growth and seedling germination, irrespective of the control method employed.

Combined chemical and physical control

With isolated plants (> 1m tall) or small infestations, effective control can be achieved by cutting the plant to the stump and immediately treating the latter with herbicide. Any cut material will need to be removed from the site to avoid resprouting or suckering, which will produce new plants and potential infestations. Mulching is a good option for disposal and the mulch may be left on site, if no seeds are present.

Recommended Management Approach for the Site

Considering the nature of rhododendron on Site, and the fact that the species is only present in small seedling plants, effective control may be achieved by:

1. Manual pulling of plants that are less than 20cm high ensuring all of the roots are removed.
2. For plants too big to manually pull, with a stem diameter less than 2cm, the stem can be broken at the base ensuring that it is not fully severed, and a concentrated solution of herbicide immediately applied. For plants greater than 2cm in diameter, notches can be cut in the stem using a hatched or saw (referred to as feathering) and a concentrated solution of herbicide immediately applied.
3. Any herbicide application should be carried out by a suitably qualified and registered professional. Professional users of pesticides must be registered pursuant to Regulation 4 of the Sustainable Use of Pesticides Regulations and must have the appropriate training (with associated certificates) required to perform the necessary treatment to suitably manage the targeted IAPS. Chemical treatments must always be used in compliance with the product label (TII, 2020).
4. Herbicide can be applied by spraying, weed-wiping, injection or painted directly onto stumps. The appropriate measure shall be chosen by a suitably qualified professional.
5. An inert dye should be mixed with the herbicide to ensure that no stumps are missed.
6. Herbicide application should be carried out in dry weather, with a 6 to 24 hour rain free period following the treatment.
7. It is important that the herbicide has access to the plant's transport system, which is just inside the bark. This type of treatment is effective all year-round, although it is deemed to be most effective when conducted during the plant's active growth period while transpiration is readily occurring. This will help the herbicide spread through the plants transport system. This treatment should be carried out in late Spring or Summer.
8. Any cut material will be bagged and removed from the Site to avoid resprouting or suckering which will produce new plants and potential infestations.
9. The movement of plant material of any plants listed on the Third Schedule requires a licence from the NPWS under Section 49 of the European Communities (Birds and Natural Habitats) Regulations, 2011 (as amended).
10. Mulching is a possible option for the disposal of small stands provided they have not produced seed. Considering rhododendron, these are plants of less than 10 years old. The mulch may be left on Site, provided no seeds are present.
11. Should any seed producing plants be evident on Site and where bare soil remains, soil should be mulched (covered with a natural or synthetic barrier, such as wood chip, straw, geo-textile, or other appropriate material) and planted at the earliest opportunity

with appropriate native replacement vegetation to stabilize the soil and deter subsequent re-invasion by this species (TII, 2020).

12. As part of the clearance programme, follow up surveys will be required to ensure that the above control measures are effective. Rhododendron seed remain viable in soil for up to three years (TII, 2020) and as such these surveys may be required to be undertaken at the end of the growing season following herbicide treatment (i.e., September – October) for a period of three years or until the Site is clear of rhododendron and no longer under threat of reinvasion.
13. Any soil removal scheduled to occur involving mature seed producing rhododendron must be done so under approval from the NPWS and disposed of at a registered and approved waste treatment facility. Soils that contain seed of Third Schedule plants are considered vector materials for the spread of invasive species and may only be transported under licence from the NPWS. The IAS specialist will advise on whether any mature plants exist on Site based on their pre-commencement survey.
14. Machinery operating within an area of IAS should be treated according to TII (2020) guidelines before entering and exiting the Site. This should involve designated power washing areas to prevent the spread of seed on machinery. Similarly, PPE and clothing should be removed and changed when exiting the Site.
15. The treatment programme will be carried out by a suitably qualified person who has experience of treating invasive species and will be carried out in line with the herbicide manufacturer's instructions.
16. If found to be present during the pre-commencement survey, any larger stands of Rhododendron should be inspected for breeding birds during the bird nesting season (1*st* March to 31*st* August) before any removal takes place.

Please refer to the IASMP prepared by INVAS Biosecurity (2024) attached in Appendix V of this Report for further details.

6.2.1.3 Mitigation 3: Tree Protection Measures & Wildlife Refuge Protection

Robust tree protection fencing will be put in place along the southern and eastern boundaries and **will be set back an additional amount to account for the wildlife refuge to be maintained there**. The location of the fencing will be agreed with the Site Manager, Ecologist and Arborist to ensure it accurately protects the wildlife refuge. This will ensure that no construction activity, vehicle movement or stockpiling of materials occur within this sensitive area.

Protective tree fencing in compliance with BS 5837:2012 'Trees in relation to design, demolition and construction – Recommendations' will be erected prior to any Construction works being undertaken to prevent damage to the canopy and root protection areas of existing trees to be retained at the Site.

The project Arborist will be instructed **prior to commencement on Site**; to ensure that appropriate tree protection measures are in place. These measures will entail robust fencing around the root protection zones of all trees and hedgerows being retained on Site. An adequate level of signage will also be provided to highlight 'no work zones' and ensure that Site creep and damage to retained habitats does not occur. The wildlife refuge in particular must be sufficiently protected for the duration of the Construction Phase to maximise its ecological value in the final landscape plan.

The set aside and protection of the area designated for the wildlife refuge will occur **at the beginning of the Construction Phase,** with the area defined as per the relevant landscape plans and protected by robust fencing e.g., a combination of heras fencing and wooden posts where ground conditions allow.

This fencing will include clear signage noting the area as a wildlife refuge to ensure construction staff are aware of its presence and importance. Clear signage will be placed at regular intervals along this wildlife refuge fencing e.g., '*Protected Wildlife Corridor'* or similar, to alert Site operatives that the fences are not to be moved.

The fencing will be signed off by a qualified arborist prior to Construction to ensure it has been properly erected. No ground clearance, earthworks, stockpiling or machinery movement will be undertaken within these areas.

This fencing will be maintained for the duration of the Construction Phase and checked regularly by the contractor and the Ecological Clerk of Works (ECoW) to ensure it is operational and effective in protecting the wildlife refuge. The Site-side of the wildlife refuge i.e., its internal boundary, will be delineated by a combination of new dense native hedgerow planting, and robust dog-proof wire fencing. A low berm/ditch combination may also be appropriate depending on spatial constraints.

Machinery movement and activity within the wildlife refuge area will be avoided and any works required will be carried out from the adjacent main Site area.

Within the wildlife refuge area itself, minimal work is needed to create or 'set-up' the refuge. In its current condition it already contains a variety of habitats, with areas of deer-grazed grassland, bracken, scrub and exposed ground already present. The creation of the wildlife refuge will largely comprise of the fencing off and protection of its extent, along with some native tree and shrub planting, however it must be ensured that the refuge is not overly planted, and that a patchwork of vegetated and open areas is maintained for a variety of wildlife to benefit from. Please refer to the Wildlife Refuge and Biodiversity Management Plan (Enviroguide, 2024b) for details on the creation and management of the wildlife refuge.

The project Arborist, the project Ecologist and the Site Manager will work together to ensure these sections of habitat are protected for the duration of the works.

6.2.2 Protection of Wildlife

6.2.2.1 Mitigation 4: Construction Phase Lighting

Any night-time lighting required during the Construction Phase for security etc., will be directed away from the boundary vegetation at the Site (i.e., away from hedgerows and treelines), and will not be directed skyward. Lighting will be focused into the centre of the Site and only on equipment and machinery that needs to be illuminated.

The Project Ecologist acting as ECoW for the project will review the Construction Phase lighting with the Contractor regularly during their site visits and make recommendations as required to ensure the lighting is maintained as bat friendly for the duration of the works.

6.2.2.2 Mitigation 5: Timing of Vegetation Clearance

To ensure compliance with the Wildlife Act 1976 as amended, the removal of areas of vegetation will not take place within the nesting bird season (March 1st to August 31st inclusive)

to ensure that no significant impacts (i.e., nest/egg destruction, harm to juvenile birds) occur as a result of the Proposed Development. 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.

Table 13 provides guidance for when vegetation clearance is permissible. Information sources include British Hedgehog Preservation Society's *Hedgehogs and Development* and *The Wildlife (Amendment) Act, 2000* (as amended).

The preferred period for vegetation clearance is **within the months of September and October**. Vegetation will be removed in sections working in a consistent direction to prevent entrapment of protected fauna potentially present (e.g., hedgehog). Where this seasonal restriction cannot be observed, a check will be carried out immediately prior to any Site clearance by an appropriately qualified ecologist and repeated as required to ensure compliance with legislative requirements.

TABLE 13. SEASONAL RESTRICTIONS ON VEGETATION REMOVAL. RED BOXES INDICATE PERIODS WHEN CLEARANCE / WORKS ARE NOT PERMISSIBLE

Ecological Feature	January	February	March	April	May	June	July	August	September	October	November	December
Breeding Birds	Vegetation clearance permissible **(Sept - Feb)**		Nesting bird season. No clearance of vegetation unless confirmed to be devoid of nesting birds by an ecologist. **(Mar - Aug)**						Vegetation clearance permissible **(Sept - Feb)**			
Bats	Tree felling to be avoided unless confirmed to be devoid of bats by an ecologist. **(Jan - Aug)**								Preferred period for tree-felling **(Sep - Oct)**		Tree felling to be avoided unless confirmed to be devoid of bats by an ecologist **(Nov - Dec)**	
Hibernating mammals (e.g., Hedgehog, Pygmy Shrew)	Mammal hibernation season. No clearance of vegetation unless confirmed to be devoid of hibernating mammals by an ecologist. **(Jan - Mar)**			Vegetation clearance permissible **(Apr - Oct)**							Mammal hibernation season. No clearance of vegetation unless confirmed to be devoid of hibernating mammals by an ecologist. **(Nov - Dec)**	

<table>
<tr><th>Ecological Feature</th><th>January</th><th>February</th><th>March</th><th>April</th><th>May</th><th>June</th><th>July</th><th>August</th><th>September</th><th>October</th><th>November</th><th>December</th></tr>
<tr><td>Amphibians</td><td colspan="2">Habitat clearance permissible (Jan - Feb)</td><td colspan="3"><u>Amphibian breeding season</u> (estimated). No habitat destruction (Ponds, drainage ditches) unless confirmed to be devoid of tadpoles and other signs of amphibians. (Mar - June)</td><td colspan="6">Habitat clearance permissible if devoid of tadpoles and signs of amphibians (July - Dec)</td></tr>
<tr><td>Common Lizard</td><td colspan="2"><u>Lizard Hibernation Season</u> No habitat clearance permissible (November – March)</td><td colspan="8"><u>Active period</u> Habitat (Scrub, old stone walls) clearance permissible (Early March - October)</td><td><u>Lizard Hibernation Season</u> No habitat clearance permissible (November – March)</td></tr>
</table>

6.2.2.3 Mitigation 6: Bat Precautions When Felling Trees

Although all trees on Site set for felling have been assessed and confirmed to be of low-negligible bat roost suitability, harm to individual bats is possible should they be present during the felling process. It is also possible that trees can become damaged in the time between the original PBRA survey and the tree felling taking place, and this can sometimes increase the bat roost suitability of a tree, providing new roost features e.g., cracks, holes etc.

As such, a pre-felling check will be conducted by a suitably qualified Ecologist of all trees to be felled at the Site prior to felling taking place; to ensure that no changes have occurred and that no individual bats will be harmed. Any PRF-I trees identified by the Ecologist will be soft felled as per their guidance.

In the unlikely event that a roosting bat is found, no felling of the tree in question will take place and a derogation licence will be obtained from the NPWS to proceed. The Area around the tree will be protected with an appropriate buffer to prevent disturbance of the bat(s).

It is important to note that permission for the Proposed Development can be granted without any reliance on the potential grant of a derogation licence, and that any references to the potential need to obtain a licence are purely precautionary, as detailed above, and therefore not integral to the decision on whether to grant permission.

6.2.2.4 Mitigation 7: Construction Site Management for Wildlife

As a precaution, a **pre-construction mammal survey of the Site** will be conducted by a suitably qualified Ecologist <u>prior to any clearance of scrub, cutting back of hedgerows/woodland taking place</u>; to confirm whether mammals e.g., badger have occupied the Site between the time of the mammal survey that informed this EcIA and the commencement of works on Site.

As best-practice 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.

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 (Species such as badgers will continue to use established paths across a site even when construction work has started).

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

6.2.2.5 Mitigation 8: Pre-construction Amphibian Survey & Mitigation

Amphibian surveys will be carried out by a suitably qualified Ecologist during the appropriate season (Spring) and prior to any works taking place on Site. These surveys will update the results of the rapid amphibian assessment carried out outside of the recommended survey period in July 2024 and will inform the mitigation approach for the Site clearance works.

Clearance works will occur between September and February with an amphibian 'safe zone' agreed with between the ECoW and the Site Manager and located within the wildlife refuge along the Site's eastern and southern boundaries. This area will be protected with one way amphibian fencing required around the safe zone.

Any amphibians encountered during the construction works will be carefully collected and moved to within the safe zone. Amphibians here will have access to the existing transient pool and the new wildlife ponds as they become available.

A **one-way appropriate exclusion barrier** will be installed as the main feature of the safe zone (See Figure 26 and Figure 27). This fencing would permit frogs to access the safe zone themselves while prevent entry into the construction works zone.

General amphibian protection measures are as follows:

- Institute and adhere to a code of best practice when operating in the areas identified as common frog breeding habitat.
- Retain a suitably qualified and licenced ECoW during the Construction Phase.
- Create and maintain a safe zone with associated pond feature for the resident frog population for the duration of the works.
- Install one-way fencing and exclusion barriers and/or temporary landscaping to divert the frogs away from the works and into the safe zone.
- Work from the middle of the site outwards with controlled removal of the scrub areas and hedgerows i.e., sequentially rather than all at once.
- A monitoring programme for a minimum of two breeding seasons post construction works should be established to ensure net benefits occur for amphibians.
- Installation of "amphibian ladders" in any gully pot or lined surface water drains that are connected to the surface water sewers.



FIGURE 26. AN EXAMPLE OF AN AMPHIBIAN SAFE ZONE WITH ONE WAY FENCING PREVENTING AMPHIBIAN ACCESS TO THE CONSTRUCTION WORKS AREA ONCE THEY ENTER THE SAFE ZONE.

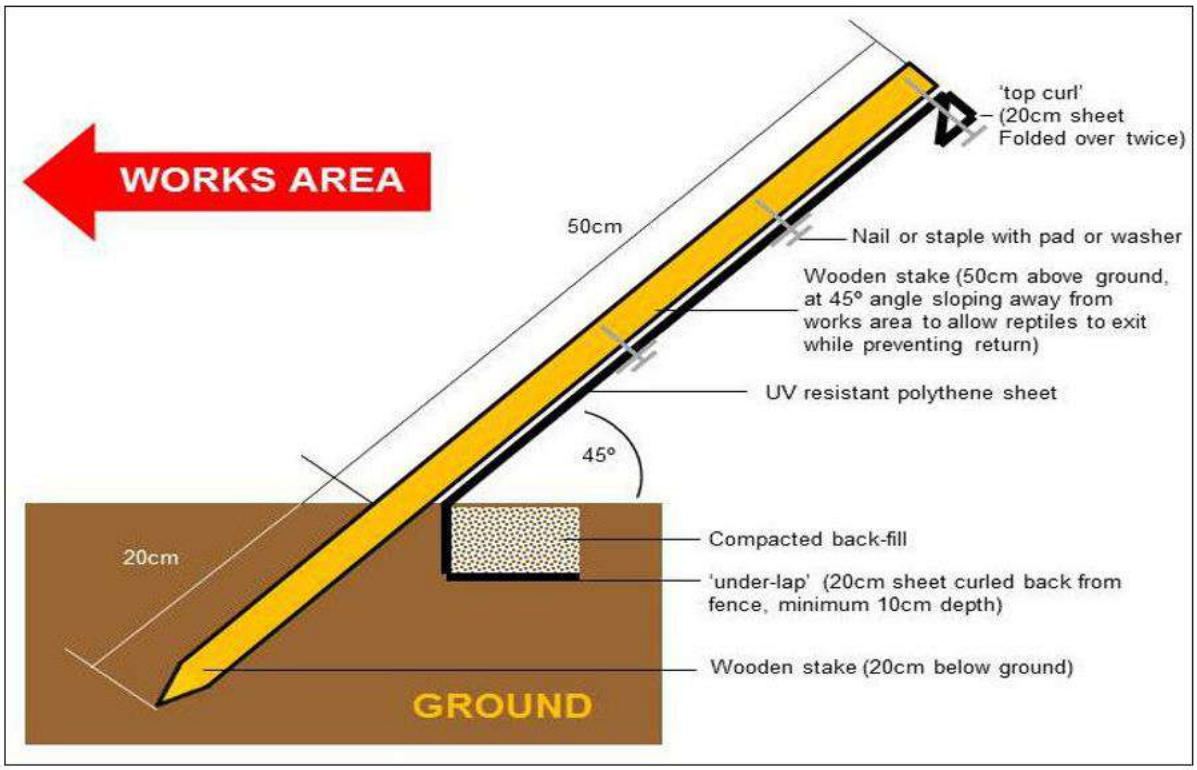


FIGURE 27. AN EXAMPLE OF AN ONE-WAY AMPHIBIAN FENCING. THE FROGS CLIMB IN FROM THE WORKS AREA AND FALL WITHIN THE SAFE ZONE AND ARE UNABLE TO REENTER THE WORKS AREA.

6.3 Operational Phase

No Operational Phase mitigation is required for the Proposed Development. Embedded design mitigation e.g., the 'bat-friendly' public lighting plan, will ensure that no Operational Phase impacts are likely to occur at the Site to any KERs.

6.4 Biodiversity Enhancement Measures

Please see the Wildlife Refuge and Biodiversity Management Plan (Enviroguide, 2024b) that accompanies this application for details on the creation and management of the biodiversity enhancement features described below.

6.4.1 Biodiversity Enhancement by Design

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. These habitat types are common and widespread in the surrounding upland area, and as such, are considered to be of low value at a local scale. The loss will not constitute a significant negative impact as a result of the Proposed Development.

As previously described in Section 2.2.2 of this Report, the landscape plan entails the retention of the majority of treelines and boundary habitats at the Site, a significant degree of native tree planting across what is currently a scrub dominated Site, and areas of native woodland, hedgerow, wildflower meadow, parkland/street tree planting, and ornamental planting. A native woodland margin is proposed for the outer boundaries of the Site, including a designated wildlife refuge along the Sites southern and eastern boundaries (as detailed in Section 2.2.3). There will also be extensive planting of pollinator friendly flower and shrub species that will benefit bees and suburban pollinator species, along with birds and local bats through an increased availability of prey.

Although the Proposed Development will entail the introduction of hardstanding areas to the Site, it will lead to a net increase in native tree cover, and the provision of a more diverse mix of habitats compared to the bracken and scrub mosaic that currently exists. It is therefore concluded that the Proposed Development will result in an overall positive effect through the proposed landscaping at the Site as described above. This general increase in the quality and provision of habitats at the Site of the Proposed Development represents a ***positive, permanent, significant*** effect **at the local scale**.

6.4.2 Enhancement 1: Swift Bricks

It is proposed to include swift bricks (number and location yet to be confirmed) as part of the Proposed Development. The swift bricks will be installed side by side in groups as swifts are a social nesting species. As per best practice, swift bricks will be installed at least 5 metres above the ground, in safe areas where they will not be disturbed. As the bricks tend not to overheat, they can be placed facing in any direction. Care will be taken to ensure no obstacles or plate glass windows are located below the bricks.

Guidelines for the bird box scheme follow the guidelines published by Swift Conservation Ireland, and those published by Birdwatch Ireland entitle "Saving Swifts" (2009/2010). The incorporation of Swift Bricks will help recover the declining swift population, which are now Red Listed in Ireland (Gilbert et al., 2021).

Swifts are a “clean” bird species which remove their own wastes from their nests periodically. As such, Swift bricks do not require any cleaning by the management company.

A **Swift calling system** will be installed to attract Swifts and encourage them to take up residence at a new site. A Swift calling system is a small speaker set-up that plays Swift calls during the summer. It will be located close to the brick entrances and has been seen to greatly increase the chances of Swifts using the Swift boxes/bricks. Solar powered options are available.

An Ecologist will be instructed to set up the Swift calling system once the construction of the Proposed Development is complete. This can be with the help of active local Swift groups as required (e.g., Dublin Swift Conservation Group), who can help and advise as to the best set-up etc. If any advice is needed regarding a swift calling system, Swift Conservation Ireland can be contacted at: swiftconservationireland@gmail.com. Further information can be found at the following url prepared by Swift Conservation Ireland: https://www.swiftconservation.ie/wp-content/uploads/2024/09/Which-box-September-2024-compressed.pdf.

6.4.3 Enhancement 2: Amphibian and Reptile Hibernacula

Hibernacula or ‘refugia’ for amphibians and reptiles will be constructed at the Site as part of the biodiversity enhancement approach. These features are relatively easy to create from rubble, logs and soil, all of which can likely be sourced from the Site during works.

Hibernacula will be created at the beginning of the Construction Phase to provide alternative habitat for wildlife during the Construction Phase and mitigate the loss of existing habitats.

The numbers and location of the hibernacula at the Site will be guided by the ECoW / Project Ecologist. Figure 28 below shows how these features can be constructed to maximise their biodiversity value. Small/medium piles of logs and other woody vegetation will be placed in discrete, out-of-the-way parts of the Site; such as along the wooded margins of the Site, particularly within the wildlife corridor proposed along southern and eastern boundaries, where wildlife ponds and a bioretention area are proposed. According to Baker *et al.* (2011), Hibernacula should be located:

- Close to a breeding site i.e., pond (within 250m maximum).
- In an area unlikely to flood.
- Within habitat likely to be used by amphibians.
- In an area with minimal disturbance.

To create hibernacula rubble and wood in various sizes can be piled either in a shallow depression in a disorganised way to create nooks and crevices. Larger logs or rocks can be placed so that they will protrude through the final mound to provide open entrance points for small wildlife. The pile should then be covered in soil to allow the inner crevices to maintain a stable temperature through the winter and allow for hibernation. The top can be planted with for example grass and native wildflowers. These will provide potential habitat for common frog, lizard and small mammals such as hedgehog and pygmy shrew. These piles will also benefit local invertebrate species through the provision of shelter and food sources.

The location, construction and type of refugia (e.g., log pile, rubble pile etc.) will be informed by consultation with an Ecologist. At the very least, small-medium piles of logs and leaf litter; associated with the vegetation clearance and operational maintenance of the woodland areas, should be distributed throughout the wooded margins of the Site to provide habitat for amphibians, insects and small mammals. These habitats will be particularly important for amphibians given they likely breed at the Site. These areas of woody debris will also benefit local invertebrate species through the provision of shelter and food sources.

Hibernacula will be left by management and remain undisturbed in discrete locations to allow colonisation by invertebrates and fungi as part of the biodiversity provision at the Site. These features will require minimal maintenance, with new logs and vegetation added as the older logs break down. Decaying wood can support a range of fungi and microhabitats and will be maintained as part of the log-pile habitat.

No herbicides, fertilisers or pesticides will be used near to hibernacula to protect the wildlife they provide habitat for.

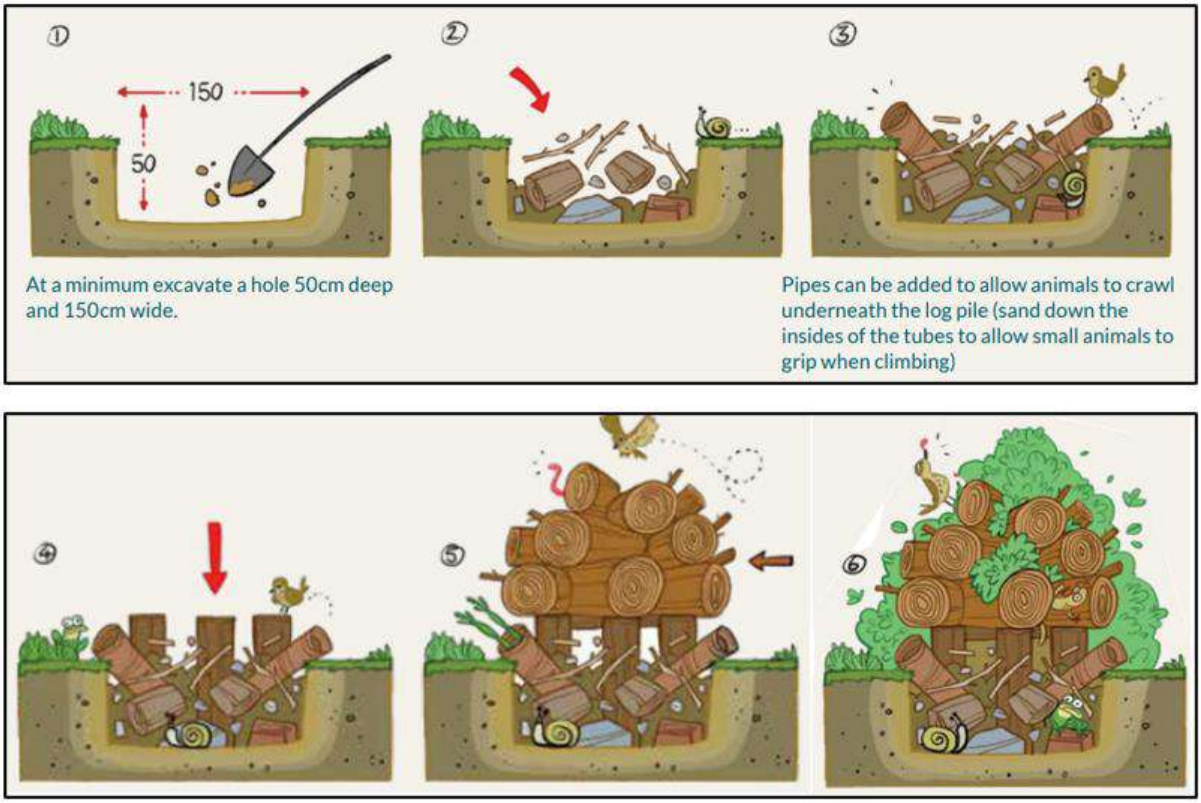


FIGURE 28. EXAMPLE DESIGN OF A WILDLIFE-FRIENDLY LOG PILE. EXTRACTED FROM GARDENING FOR BIODIVERSITY (JUANITA BROWNE, 2020).

6.4.4 Enhancement 3: Wildlife Ponds

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 wildlife corridor/refuge. 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. Please see the Wildlife Refuge and Biodiversity Management Plan (Enviroguide, 2024b) that accompanies this application for details on the creation and management of these features.

6.4.5 Enhancement 4: Bat Boxes

As recommended in the Bat Survey Report appended to this document, 4no. 'Rocket Box' Bat boxes will be erected around the Site 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 $1m^3$ of 40 newton strength concrete (Please see appendices of Bat Report for details).

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.

6.4.6 Enhancement 5: Bug Hotels

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.

7 MONITORING

Table 14 below provides a summary of the required monitoring and pre-works inspections during the Construction Phase, as well as any surveys that should be completed during the Operational Phase. The monitoring, inspections and surveys will ensure that the identified mitigation measures are implemented and maintained efficiently and have the desired effect of protecting the local ecology from adverse impacts.

The Construction Phase mitigation measures in this EcIA (Section 6.2) are included in the CEMP that accompanies this application under separate cover.

The creation and management/ monitoring of the biodiversity enhancement measures (Section 6.4) are described within the Wildlife Refuge and Biodiversity Management Plan (Enviroguide, 2024b) that accompanies this application. In addition to the items listed below, this document will detail the landscape management operations for the Proposed Development, including cutting/trimming regimes and maintenance of bird and bat boxes (if applicable). This document will also be updated to reflect any follow-up survey results as they are carried out and will be agreed with DLR Biodiversity Department prior to commencement of works.

7.1 Construction Phase Monitoring

7.1.1 Ecological Clerk of Works (ECoW)

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

ECoW will be responsible for guiding the Site Manager in the implementation of the Wildlife Refuge and Biodiversity Management Plan (Enviroguide, 2024b) at the Site.

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 1st – August 1st (i.e., the breeding bird nesting season) is required. It is noted that clearance will be avoided during this period 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 EcIA.
- The ECoW will be required to carry out **amphibian surveys** of the Site prior to and maintain a watching brief 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 EcIA. If amphibians are found, the NPWS will be consulted by the ECoW as to the most appropriate protection/relocation approach.
- 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 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.
- A suitable qualified 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 nighttime. 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 ecologist will **supervise the installation of the Bat Box Scheme** at the Site, advising on the location and orientation of the 4no. rocket boxes to be installed on Site.

7.2 Post-construction Monitoring

7.2.1 Bat Ecologist

- Once the Construction Phase 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 and eastern boundary treelines are of particular importance to local bats and lighting of these will be avoided. As agreed with the lighting consultant and applicant, light levels of <1 Lux will be achieved along the boundary vegetation 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 will be undertaken for a minimum of 2 years.

7.2.2 Amphibian Survey

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

TABLE 14. MONITORING AND PRE-WORKS INSPECTIONS FOR THE IDENTIFIED MITIGATION MEASURES DURING CONSTRUCTION PHASE OF THE PROPOSED DEVELOPMENT.

Ecological Receptor	Relevant stage of the Proposed Development	Monitoring Type	Details
Mammals	**Pre-Construction Phase**	**Ecological Clerk of Works (ECoW)**	The ECoW will 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.
Birds	**Construction Phase**	**ECoW**	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 1st – August 1st (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.
Amphibians	**Pre and during Construction Phase**	**ECoW**	The ECoW will be required to carry out **a pre-commencement survey and watching brief for amphibians** 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 EcIA. If amphibians are found, the NPWS will be consulted by the ECoW as to the most appropriate protection/relocation approach if required.
	Construction Phase	**ECoW**	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.
Mammals	**Construction Phase**	**ECoW**	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.
Bats	**Construction Phase**	**ECoW**	A suitable qualified 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 nighttime. 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	**ECoW**	The ecologist will **supervise the installation of the Bat Box Scheme** at the Site, advising on the location and orientation of the 4no. 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 **to assess the nigh-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 and eastern boundary treelines are of particular importance to local bats and lighting of these will be avoided. As agreed with the lighting consultant and applicant, light levels of <1 Lux will be achieved along the boundary vegetation of the Site of the Proposed Development.
	Operational Phase	**Bat Ecologist**	**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 will be undertaken for a minimum of 2 years.
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 and for two seasons after; to ensure that the ponds are in suitable condition and to check for common frog and smooth newt usage.

8 RESIDUAL IMPACTS

Residual impacts are impacts that remain once mitigation has been implemented or impacts that cannot be mitigated. Table 15 below provides a summary of the impact assessment for the identified KERs and details the nature of the impacts identified, the mitigation measures proposed, and the classification of any residual impacts.

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

Provided all recommended 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, will occur as a result of the Proposed Development.

TABLE 15. SUMMARY OF POTENTIAL IMPACTS ON KER(S), MITIGATION PROPOSED AND RESIDUAL IMPACTS.

Key Ecological Resource	Evaluation	Potential Effect	Effect Without Mitigation				Proposed Mitigation/ Mitigating Factors	Proposed Enhancements	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance			
Designated Sites									
Loughlinstown Woods pNHA **Dalkey Coastal Zone and Killiney Hill pNHA**	National Importance	No notable impact pathway or likely significant effects envisaged and therefore no mitigation required.							
Fitzsimon's Woods pNHA	National Importance	**Construction Phase:** Construction Phase dust. Construction Phase noise. **Operation Phase:** Increased recreational usage by new residents of the Proposed Residential Development.	Adverse Adverse Adverse	Local Local Local	Short-term Short-term Permanent	Slight Imperceptible Slight	- Standard noise and dust mitigation included within the CEMP (OCSC, 2024b). - Woodland walks and amenities provided within the Proposed Development itself.	N/A	**Adverse, short-term, imperceptible at the local scale** (Noise and Dust) **Adverse, permanent, slight at the local scale** (recreational usage)
Habitats and Flora									

Treelines and hedgerows	Local Importance (Higher Level)	**Construction Phase:** Inadvertent damage to retained vegetation along boundaries during construction. **Operation Phase:** No impacts.	Adverse	Local	Short-term	Slight - Significant	- **Mitigation 3**: Tree protection measures as per Tree Report (Enviroguide, 2024d) and CEMP (OCSC, 2024b).	N/A	**Positive, Permanent, Significant at the local scale**
Carrickmines Stream	Local Importance (Higher Level)	**Construction Phase:** Contamination during construction works. **Operation Phase:** No impacts.	Adverse	Local	Short-term	Moderate	- Standard surface and ground water mitigation included within the CEMP (OCSC, 2024b).	N/A	**Short-term, Imperceptible**
Invasive Plant species	Local Importance (Lower Value)	**Construction Phase:** Spread of low, medium and high impact Invasive species off Site during Site clearance.	Adverse	Local	Short - Long term (depending on the species)	Slight - Significant (depending on the species)	- **Mitigation 1**: Pre-commencement Invasive Species Survey. - **Mitigation 2**: Invasive Species Management.	N/A	**Short-term, Imperceptible**
Fauna									
Small mammals	Local Importance (Higher Level)	**Construction Phase:** Possible harm/entrapment due to construction waste and excavations. Noise disturbance during the Construction Phase.	Adverse Adverse Adverse	Local Local Local	Short-term Short-term Permanent	Significant Moderate Slight	- **Mitigation 7:** Construction Site Management for Wildlife - Standard noise mitigation included within the CEMP (OCSC, 2024b).	N/A	**Imperceptible** (Entrapment) **Adverse, short-term, slight** (Noise) **Adverse, permanent,**

		Operation Phase: Increase in human activity at the Site (with wildlife corridor taken into account).							**Slight at the local scale** (Human activity disturbance)
Bat Assemblage	Local Importance (Higher Level)	**Construction Phase:** Loss of foraging/ commuting habitat due to construction light-spill. Harm to individual bats if present during tree felling. **Operation Phase:** No impacts due to embedded mitigation in lighting plan.	Adverse Adverse	Local Local	Short-term Short-term	Significant Slight	- **Mitigation 4:** Construction Phase Lighting. - **Mitigation 6:** Bat Pre-cautions when Felling Trees.	**Enhancement 4:** Provision of new roosting habitat in the form of 4no. Rocket bat boxes.	**Imperceptible** (Lighting & Tree felling) **Positive, Permanent, Significant** (New roosting opportunities)
Birds									

Breeding Bird Assemblage	Local Importance (Higher Level)	**Construction Phase:** Mortality during vegetation clearance. Disturbance due to noise during Construction Phase. Initial loss of scrub habitat (offset in the long-term by the landscape plan). **Operation Phase:** No impacts.	Adverse Adverse Adverse	Local Local Local	Short-term Short-term Short-term	Significant Moderate Moderate	- **Mitigation 5:** Timing of Vegetation Clearance. - Standard noise mitigation included within the CEMP (OCSC, 2024b).	**Enhancement 1:** Provision of Swift bricks in the project design.	**Imperceptible** (Vegetation Clearance) **Adverse, short-term, slight** (Noise) **Positive, Permanent, Significant** (New nesting opportunities for Swifts (**red**-listed))
Herptiles									
Common Frog, Smooth Newt & Common Lizard	Local Importance (Higher Level)	**Construction Phase:** Mortality during vegetation clearance. **Operation Phase:** Increase in human activity at the Site (with wildlife corridor taken into account).	Adverse Adverse	Local Local	Short-term Permanent	Significant Slight	- **Mitigation 5:** Timing of Vegetation Clearance. - **Mitigation 8:** Pre-construction Amphibian Survey & Mitigatoion	**Enhancement 2:** Amphibian and Reptile Hibernacula. **Enhancement 3:** Wildlife Ponds	**Adverse, Short-term, slight** (Vegetation Clearance) **Positive, Permanent, Significant** (New amphibian spawning opportunities & reptile hiberncula)

9 CONCLUSION

It is considered that, provided the mitigation measures proposed are carried out in full, there will be no likely significant adverse effects on any valued habitats, designated sites or individual or group of species as a result of the Proposed Development. The inclusion of 'rocket' bat boxes and swift bricks in the design of the Proposed Development will also provide novel nesting habitat for bats and swifts at the Site.

The Proposed Development is considered to result in an overall slight net gain in biodiversity at the Site via the landscaping plan, which proposes the retention of the majority of existing boundary treelines and hedgerows at the Site, a net increase in total native and non-native trees at the Site through a considerable amount of tree planting, and the provision of a designated wildlife refuge along the Site's southern and eastern boundaries.

A Wildlife Refuge and Biodiversity Management Plan has been prepared for the Site (Enviroguide, 2024b) which details the creation and management of the habitats and biodiversity enhancement features proposed within the wildlife refuge and the wider Site.

The above approaches to landscaping and biodiversity enhancement at the Site will provide additional suitable foraging, commuting and nesting habitat for local wildlife populations including birds, bats, amphibians, reptiles and small mammals, providing connectivity between the Site and the wider area and thus contributing to the county-wide green infrastructure network as part of the 'Ticknock to River Dodder Wildlife Corridor', as outlined in the Dún Laoghaire-Rathdown Biodiversity Action Plan 2021-2025, and in line with policy objective GIB23 of the Dún Laoghaire-Rathdown County Development Plan 2022-2028.

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APPENDIX I – LEGISLATION AND POLICY

International Legislation

EU Birds Directive

The Birds Directive constitutes 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.

EU Habitats Directive

The Habitats Directive aims to protect some 220 habitats and approx. 1000 species throughout 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 (SACs) for areas of habitat deemed to be of European interest. The SACs together with the SPAs from the Birds Directive from a network of protected sites called Natura 2000.

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.

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.

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; the second cycle ran from 2016 – 2021, and the current (third) cycle runs from 2022-2027. 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.

National Legislation

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. With 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 the National Parks and Wildlife Service (NPWS). This list includes all wild 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 1st of March to the 31st of August. The act also provides a mechanism to give statutory protection to Natural Heritage Areas (NHAs). 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.

The current list of plant species protected by Section 21 of the Wildlife Act, 1976 (and amendments) is set out in the Flora (Protection) Order, 2015 (S.I. No. 356/2015). The Flora (Protection) Order 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.

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.

Annex IV of the EU Habitats Directive provides protection to a number of listed species, wherever they occur. Under Regulation 23 of the Habitats 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 eggs from the wild or damages or destroys a breeding site or resting place of such an animal shall be guilty of an offence.”

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."

National Biodiversity Action Plan 2023-2030

The National Biodiversity Plan (NBAP) 2023-2030, the fourth such plan for Ireland, captures the objectives, targets and actions for biodiversity that will be undertaken by a wide range of government, civil society and private sectors. Actions required to achieve the strategic objectives as well as the lead and key partners responsible for their implementation are set out for each of the objectives and their outcomes (Table A1).

TABLE A1.1: OBJECTIVES AND TARGETS OF THE NATIONAL BIODIVERSITY ACTION PLAN 2023-2030.

Objective	Outcome
1: Adopt a Whole-of-Government, Whole-of-Society Approach to Biodiversity	1A. Governance structures and reporting outputs have improved.
	1B. Organisational capacity and resources for biodiversity have increased at all levels of Government.
	1C: Responsibility for biodiversity is shared across the whole of government.
	1D: Biodiversity initiatives are supported across the whole of society.
	1E. The legislative framework for biodiversity conservation is robust, clear and enforceable.
2: Meet Urgent Conservation and Restoration Needs	2A: The protection of existing designated areas and protected species is strengthened and conservation and restoration within the existing protected area network are enhanced.
	2B: Biodiversity and ecosystem services in the wider countryside are conserved and restored – agriculture & forestry.
	2C: Biodiversity and ecosystem services in the wider countryside are conserved and restored – peatlands & climate action.

	2D: Biodiversity and ecosystem services in the marine and freshwater environment are conserved and restored.
	2E: Genetic diversity of wild and domesticated species is safeguarded.
	2F: A National Restoration Plan is in place to contribute to the ambition of the EU Biodiversity Strategy 2030 and global restoration targets.
	2H: Invasive alien species (IAS) are controlled and managed on an all-island basis to reduce the harmful impact they have on biodiversity and measures are undertaken to tackle the introduction and spread of new IAS to the environment.
3. Secure Nature's Contribution to People	3A: Ireland's natural heritage and biocultural diversity is recognised, valued, enhanced and promoted in policy and practice.
	3B: The role of biodiversity in supporting wellbeing, livelihoods, enterprise and employment is recognised and enhanced.
	3C: Planning and development will facilitate and secure biodiversity's contributions to people.
4. Enhance the Evidence Base for Action on Biodiversity	4A: Research funding bodies will have an improved understanding of the research and skills required to address biodiversity research gaps.
	4B: Data relevant to biodiversity and ecosystems, including conservation needs, is widely accessible and standardised.
	4C: Long-term monitoring programmes are in place to guide conservation and restoration goals.
	4D: Ireland has prepared national assessments of ecosystem services.
5. Strengthen Ireland's Contribution to International Biodiversity Initiatives	5A: Science, policy and action on biodiversity conservation and restoration is effectively coordinated in an all-island approach.
	5B: Ireland takes action internationally to cooperate with other countries, sectors, disciplines and communities to address the biodiversity crisis.
	5C: Ireland enhances its contributions to the international biodiversity data drive.

Dún Laoghaire-Rathdown County Development Plan 2022-2028

Policies and objectives of the Dún Laoghaire-Rathdown County Development Plan 2022 – 2028 that are of relevance to this Report are outlined below:

- **GIB11:** Coastal Area Feasibility Study. It is a Policy Objective to explore undertaking a comprehensive feasibility study on the recreational potential along the coastal area

of the County, which comprehensively addresses recreational impact - including visitor numbers, mapping and surveying of sensitive habitats and species and identification of significant threats on European sites - and which would allow an assessment of any future proposals, alone or in combination, to assess impact on the coastal and marine zone within and adjacent to the County boundary. The Council will explore the possibility of carrying out this study with adjoining and/or coastal Local Authorities and/or other agencies.

- **GIB18:** Protection of Natural Heritage and the Environment. It is a Policy Objective to protect and conserve the environment including, in particular, the natural heritage of the County and to conserve and manage Nationally and Internationally important and EU designated sites - such as Special Protection Areas (SPAs), Special Areas of Conservations (SACs), proposed Natural Heritage Areas (pNHAs) and Ramsar sites (wetlands) - as well as non-designated areas of high nature conservation value known as locally important areas which also serve as 'Stepping Stones' for the purposes of Article 10 of the Habitats Directive.

- **GIB19:** It is a Policy Objective to ensure the protection of natural heritage and biodiversity, including European Sites that form part of the Natura 2000 network, in accordance with relevant EU Environmental Directives and applicable National Legislation, Policies, Plans and Guidelines.

- **GIB21:** It is a Policy Objective to protect and preserve areas designated as proposed Natural Heritage Areas, Special Areas of Conservation, and Special Protection Areas. It is Council policy to promote the maintenance and as appropriate, delivery of 'favourable' conservation status of habitats and species within these areas.

- **GIB22:** It is a Policy Objective to protect and promote the conservation of biodiversity in areas of natural heritage importance outside Designated Areas and to ensure that notable sites, habitats and features of biodiversity importance - including species protected under the Wildlife Acts 1976 and 2000, the Birds Directive 1979, the Habitats Directive 1992, Birds and Habitats Regulations 2011, Flora (Protection) Order, 2015, Annex I habitats, local important areas, wildlife corridors and rare species - are adequately protected. Ecological assessments will be carried out for all developments in areas that support, or have potential to support, features of biodiversity importance or rare and protected species and appropriate mitigation/ avoidance measures will be implemented. In implementing this policy, regard shall be had to the Ecological Network, including the forthcoming DLR Wildlife Corridor Plan, and the recommendations and objectives of the Green City Guidelines (2008) and 'Ecological Guidance Notes for Local Authorities and Developers' (Dún Laoghaire-Rathdown Version 2014).

- **GIB23:** It is a Policy Objective to protect the Ecological Network which will be integrated into the updated Green Infrastructure Strategy and will align with the DLR County Biodiversity Action Plan. Creating this network throughout the County will also improve the ecological coherence of the Natura 2000 network in accordance with Article 10 of the Habitats Directive. The network will also include non designated sites.

- **GIB25:** It is a Policy Objective to retain and protect hedgerows in the County from development, which would impact adversely upon them. In addition, the Council will promote the protection of existing site boundary hedgerows and where feasible require

the retention of these when considering a grant of planning permission for all developments. The Council will promote the County's hedgerows by increasing coverage, where possible, using locally native species and to develop an appropriate code of practice for road hedgerow maintenance. The Council will promote the protection of existing hedgerows when considering a grant of planning permission for all developments.

- **GIB28:** It is a Policy Objective to prepare an 'Invasive Alien Species Action Plan' for the County which will include actions in relation to Invasive Alien Species (IAS) surveys, management and treatment and to also ensure that proposals for development do not lead to the spread or introduction of invasive species. If developments are proposed on sites where invasive species are or were previously present, the applicants will be required to submit a control and management program for the particular invasive species as part of the planning process and to comply with the provisions of the European Communities Birds and Habitats Regulations 2011 (S.I. 477/2011).

Dún Laoghaire-Rathdown Biodiversity Action Plan

The Dún Laoghaire-Rathdown Biodiversity Action Plan (BAP) is set out to protect and improve biodiversity, following five main themes:

1. Reaching a deeper understanding of our county's biodiversity.
   "***Objective 1*** *Strengthen the knowledge base for conservation, management, and sustainable use of biodiversity."*
2. Making good decisions for biodiversity.
   "Objective 2 *Mainstream biodiversity into decision making and improve the management of this valuable resource"*
3. Powerful actions to protect biodiversity and us.
   *"**Objective 3** Conserve and restore biodiversity and ecosystems and support ecosystem services in DLR, including coastal and marine"*
4. Connecting people and nature and inspire a positive future.
   *"**Objective 4** Increase awareness, training and appreciation of biodiversity, ecosystems and ecosystem services*."
5. Strength in working together.
   "***Objective 5*** *Strengthen the effectiveness of collaboration between all stakeholders for the conservation of biodiversity, including with Local Authority Biodiversity Officers, Local Authority Waters Programme (LAWPRO), the National Biodiversity Data Centre, BirdWatch Ireland, NPWS and other State Bodies"*.

APPENDIX II – VALUE OF 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 (NRA, 2009a), were used for assigning value to designated sites, habitats and species within the Site of the Proposed Development and surrounding area.

TABLE A2.1. DESCRIPTION OF VALUES FOR ECOLOGICAL RESOURCES BASED ON GEOGRAPHIC HIERARCHY OF IMPORTANCE (NRA, 2009A).

Importance	Criteria
International Importance	- 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. - 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). - Features essential to maintaining the coherence of the Natura 2000 Network - Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. - Resident or regularly occurring populations (assessed to be important at the national level) of the following: o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive - Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). - World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). - Biosphere Reserve (UNESCO Man & The Biosphere Programme) - Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). - Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). - Biogenetic Reserve under the Council of Europe. - European Diploma Site under the Council of Europe. - Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National Importance	- Site designated or proposed as a Natural Heritage Area (NHA). - Statutory Nature Reserve. - Refuge for Fauna and Flora protected under the Wildlife Acts. - National Park. - 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. - Resident or regularly occurring populations (assessed to be important at the national level) of the following: o Species protected under the Wildlife Acts; and/or o Species listed on the relevant Red Data list. o Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive
County Importance	- Area of Special Amenity. - Area subject to a Tree Preservation Order. - Area of High Amenity, or equivalent, designated under the County Development Plan. - Resident or regularly occurring populations (assessed to be important at the County level) of the following:

	○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; ○ Species protected under the Wildlife Acts; and/or ○ Species listed on the relevant Red Data list. ○ 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. - 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. - 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. - Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (higher value)	- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; - Resident or regularly occurring populations (assessed to be important at the Local level) of the following: ○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; ○ Species protected under the Wildlife Acts; and/or o ○ Species listed on the relevant Red Data list. ○ 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; - 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.
Local Importance (lower value)	- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; - Sites or features containing non-native species that is of some importance in maintaining habitat links.

APPENDIX III – EPA IMPACT ASSESSMENT CRITERIA

In line with the draft EPA Guidelines (EPA, 2022), the following terms are defined when evaluating and quantifying the quality, significance, extent/context, probability and duration/frequency of effects.

TABLE A3.1. DEFINITION OF QUALITY, SIGNIFICANCE, EXTENT/CONTEXT, PROBABILITY AND DURATION/FREQUENCY OF EFFECTS.

Term	Definition
Quality of Effects	
Positive	A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative/Adverse	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).
Significance of Effects	
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	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	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	An effect which obliterates sensitive characteristics. No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
Extent and Context of Effects	
Extent	Describe the size of the area, the number of sites and the proportion of a population affected by an effect.
Context	Describe whether the extent, duration or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)
Probability of Effects	
Likely	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.

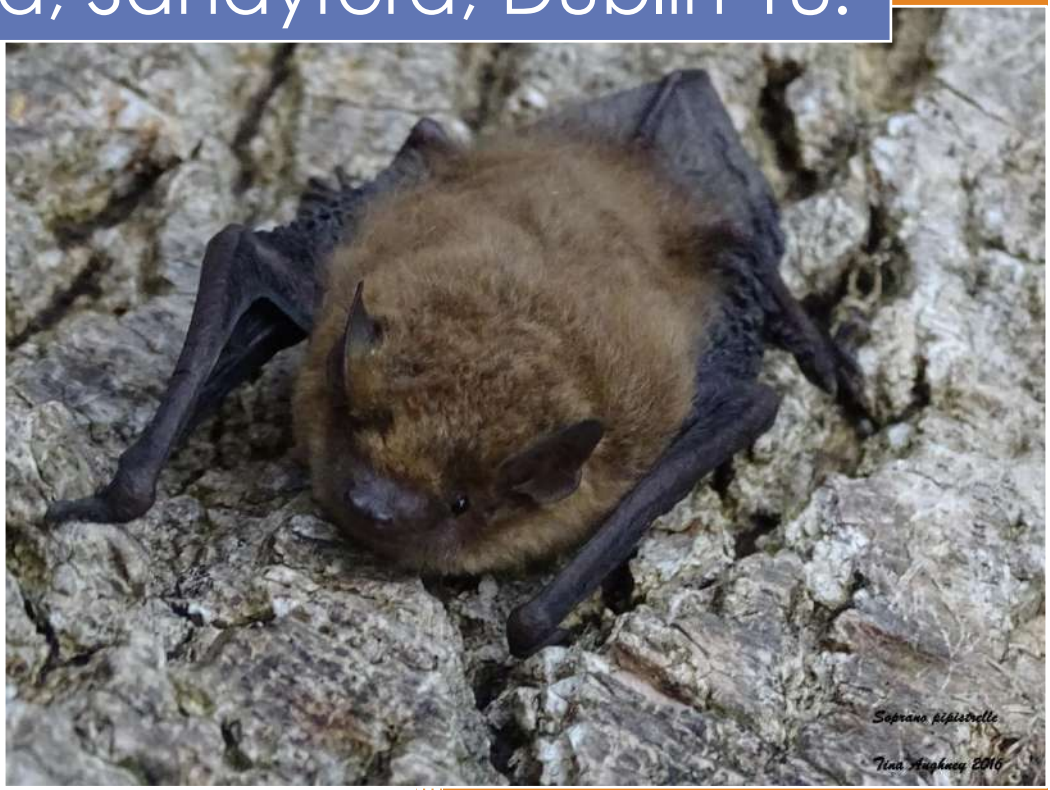
Unlikely	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Duration and Frequency of Effects	
Momentary	Effects lasting from seconds to minutes.
Brief	Effects lasting less than a day
Temporary	Effects lasting less than a year.
Short-term	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term	Effects lasting fifteen to sixty years.
Permanent	Effects lasting over sixty years.
Reversible	Effects that can be undone, for example through remediation or restoration.
Frequency	Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).

APPENDIX IV – BAT REPORT

Please note that this Bat Report was included with the previous SHD application submitted for the Site of the Proposed Development in 2022 and is included for reference for the bat survey results detailed in same.

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, 086 4049468)
NPWS licence C13/2020 (Licence to handle bats, expires 31st December 2022);
NPWS licence 08/2020 (Licence to photograph/film bats, expires 31st December 2022) ;
NPWS licence DER/BAT 2022-36 (Survey licence, expires 24th 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 21st 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 24th 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)
5th October 2021	Draft 1	By email to Enviroguide Consulting
13th October 2021	Draft 2	By email to Enviroguide Consulting
8th June 2022	Draft 1 & Draft 2	By email to Enviroguide Consulting
11th June 2022	Draft 3	By email to Enviroguide Consulting
26th 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: Blackglen Road and Woodside Road, Sandyford, Dublin 18.

Proposed work: Residential Development.

Bat Survey Results - Summary

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

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: Blackglen Road & Woodside Road, Sandyford, Dublin 18. Unpublished report prepared for Enviroguide Consulting.

Contents

1. Introduction 5

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

2. Bat Survey Methodology 29

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

3. Bat Survey Results 34

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

4. Bat Ecological Evaluation 48

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

5. Impact Assessment & Mitigation 53

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
6. Survey Conclusions 58
7. Bibliography 59
8. Appendices 63
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
9. Bat Species Profile 68
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: www.batconservationireland.org) 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 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 un 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 Rhinolophidea 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
Resident Bat Species ^			
Daubenton's bat *Myotis daubentonii*	Least Concern	Least Concern	Least Concern
Whiskered bat *Myotis mystacinus*	Least Concern	Least Concern	Least Concern
Natterer's bat *Myotis nattereri*	Least Concern	Least Concern	Least Concern
Leisler's bat *Nyctalus leisleri*	Least Concern	Least Concern	Least Concern
Nathusius' pipistrelle *Pipistrellus nathusii*	Least Concern	Least Concern	Least Concern
Common pipistrelle *Pipistrellus pipistrellus*	Least Concern	Least Concern	Least Concern
Soprano pipistrelle *Pipistrellus pygmaeus*	Least Concern	Least Concern	Least Concern
Brown long-eared bat *Plecotus auritus*	Least Concern	Least Concern	Least Concern
Lesser horseshoe bat *Rhinolophus hipposideros*	Least Concern	Least Concern	Least Concern
Possible Vagrants ^			
Brandt's bat Myotis brandtii	Data deficient	Least Concern	Least Concern
Greater horseshoe bat *Rhinolophus ferrumequinum*	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 (3rd 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.

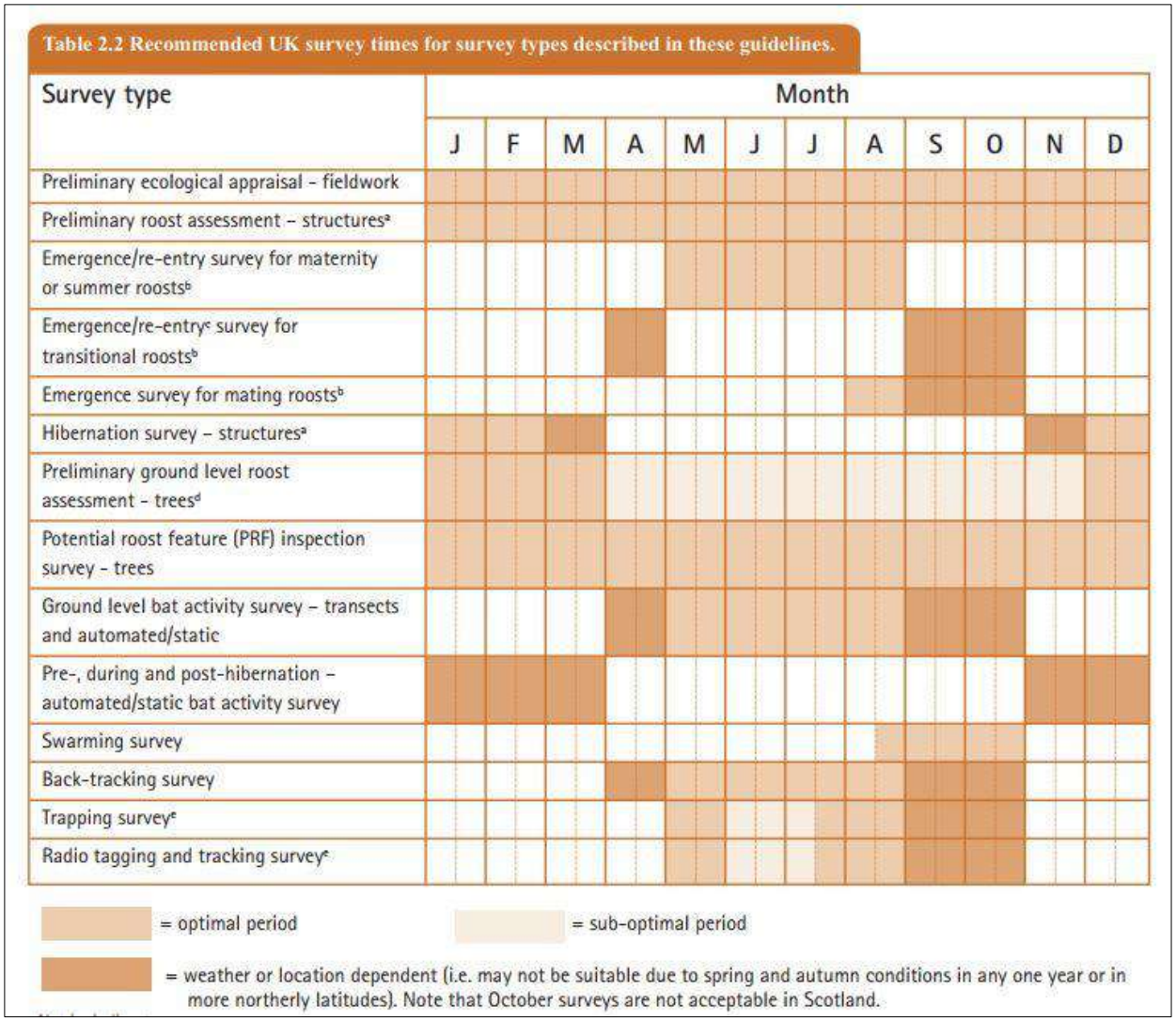


Table 2.2 Recommended UK survey times for survey types described in these guidelines.

Survey type	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Preliminary ecological appraisal – fieldwork												
Preliminary roost assessment – structures[a]												
Emergence/re-entry survey for maternity or summer roosts[b]												
Emergence/re-entry[c] survey for transitional roosts[b]												
Emergence survey for mating roosts[b]												
Hibernation survey – structures[a]												
Preliminary ground level roost assessment – trees[d]												
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[e]												
Radio tagging and tracking survey[e]												

= 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)
Negligible	Building have no potential as a roost site Urban setting, heavily disturbed, building material unsuitable, building in poor condition etc.	No surveys required.
Low	Building has a low potential as a roost site. No evidence of bat usage (e.g. droppings)	One dusk or dawn survey.
Medium	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).
High	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.

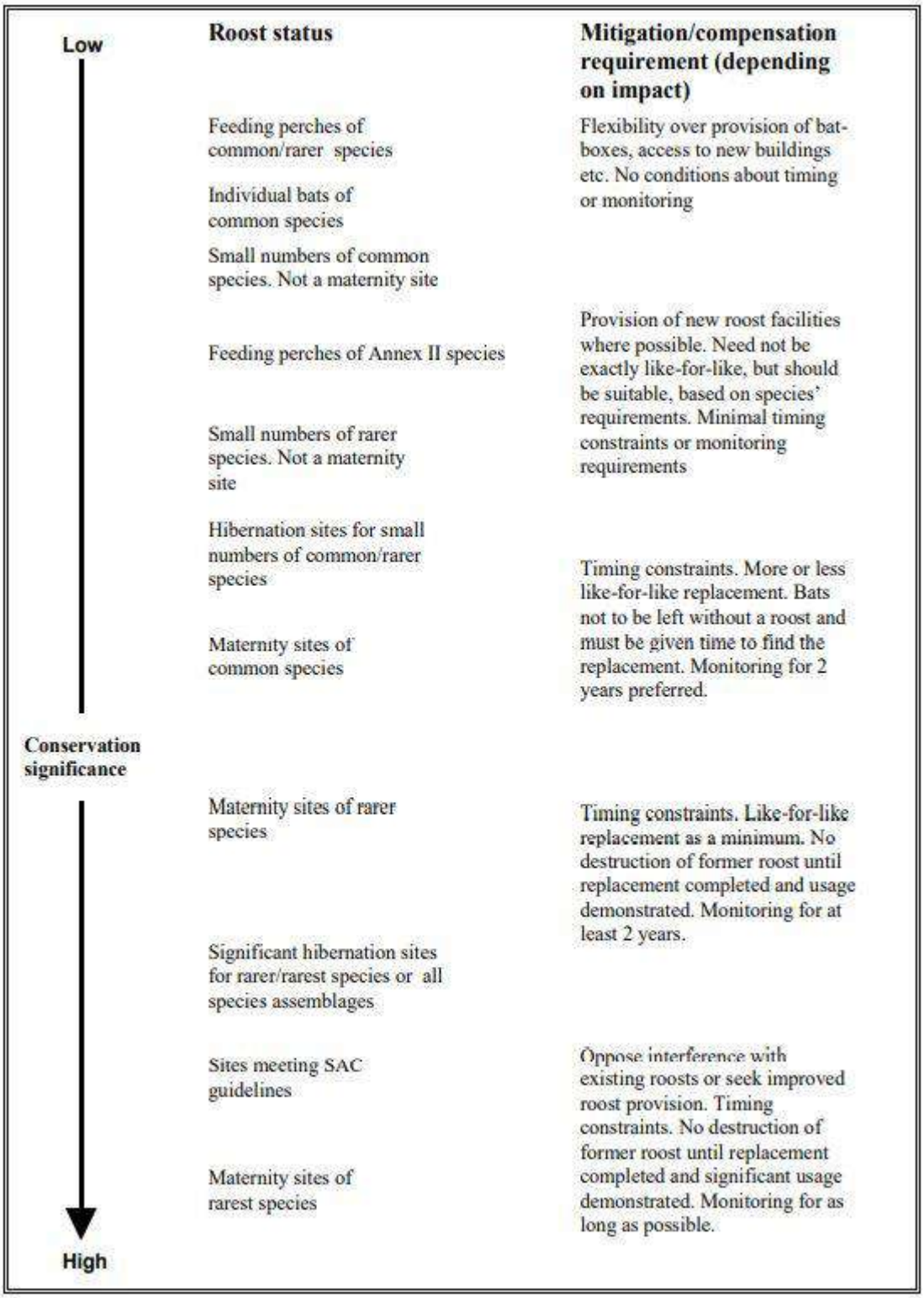


Figure 20 Guidelines for proportionate mitigation. The definition of common, rare and rarest species requires regional interpretation.

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
Positive	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	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative	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:
    - Table 4 of Marnell *et al.* (2022) (Figure 1a);
    - the known ecology and distribution of the bat species in Ireland;
    - bat survey results including type of roosts (if any recorded), pattern of bat usage of the survey area, level of bat activity recorded etc.
    - 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
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	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	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	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):

Describing the Probability of Effects 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.	**Likely Effects** The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing the Duration and Frequency of Effects '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.	**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.
	Frequency of Effects 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.

Describing the Types of Effects	**Indirect Effects (a.k.a. Secondary or Off-site Effects)** 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.
	Cumulative Effects The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
	'Do-nothing Effects' The environment as it would be in the future should the subject project not be carried out.
	'Worst-case' Effects The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable Effects When the full consequences of a change in the environment cannot be described.
	Irreversible Effects When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SOx and NOx 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.

Species: Common Name	Rydell Category	Sensitivity
Daubenton's bat *Myotis daubentonii*	Category 4	Light sensitive
Whiskered bat *Myotis mystacinus*	Category 4	Light sensitive
Natterer's bat *Myotis nattereri*	Category 4	Light sensitive
Leisler's bat *Nyctalus leisleri*	Category 2	Light tolerant
Nathusius' pipistrelle *Pipistrellus nathusii*	Category 3	Semi-tolerant
Common pipistrelle *Pipistrellus pipistrellus*	Category 3	Semi-tolerant
Soprano pipistrelle *Pipistrellus pygmaeus*	Category 3	Semi-tolerant
Brown long-eared bat *Plecotus auritus*	Category 4	Light sensitive
Lesser horseshoe bat *Rhinolophus hipposideros*	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:
    - Dynamic lighting schemes, where possible.
    - 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.
    - 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.
    - 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.
    - 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
Rhinolophus hipposideros	N/A	N/A	N/A	Horseshoe bats cannot use bat boxes
Myotis daubentonii	H	H		
Myotis mystacinus	H	H		
Myotis nattereri	H	?		
Pipistrellus nathusii	H	H		
Pipistrellus pipistrellus	C	C/H	C	H are rarely used as maternity roosts.
Pipistrellus pygmaeus	C	C/H	C	
Nyctalus leisleri	H	H	H?	
Plecotus auritus	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 advise 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 demolishment 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 doxes 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	1st October – 1st May
Summer (not a proven maternity site)	1st September – 1st May
Hibernation	1st May – 1st October
Mating/swarming	1st November – 1st 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. The 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 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. 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 n0. 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 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
Day Roost	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
Night Roost	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
Feeding Roost	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
Transitional Roost	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.
Swarming Site	Where large numbers of males and females gather. Appear to be important mating sites.	Late summer and autumn
Mating Site	Where mating takes place.	Late summer and autumn
Maternity Site	Where female bats give birth and raise their young to independence.	Summer months
Hibernation Site	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
Satellite Roost	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: 5th & 11th 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 (6th 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).

Tree Category	Description
1 High	Trees with multiple, highly suitable features (Potential Roosting Features = PRFs) capable of supporting larger roosts
2 Moderate	Trees with definite bat potential but supporting features (PRFs) suitable for use by individual bats;
3 Low	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;
4 Negligible	Trees have no potential.

2.1.3 Bat Habitat & Commuting Routes Mapping

The survey site was assessed during daytime walkabout surveys (6th 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 6th and 11th 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 12th August 2021 and this was completed 100 minutes before sunrise to 10 minutes thereafter. A walking transect was complete post dusk survey on the 6th and 11th August 2021 of the local area. Surveys completed on 6th August is referred to as Night 1 and surveys completed on 11th and 12th August are referred to a Night 2. In 2022, a dusk survey was completed on 11th 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 (6th to 12th August 2021) and repeated in 2022 (5th to 11th May 2022):

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

Static Unit Code	Bat Detector Type	Recording Function	Microphone
Mini Bat 2, 5, 6, 9 and 10	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 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.

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 11th 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.

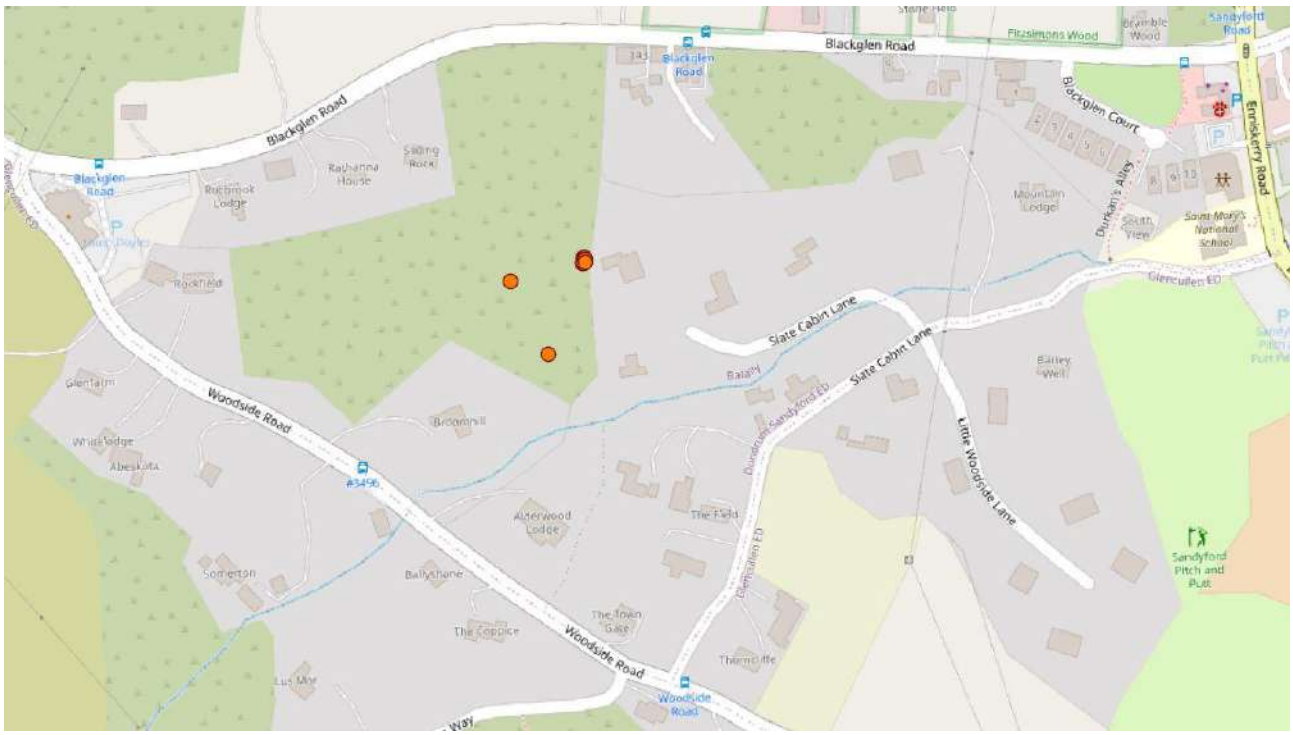


Figure 3a: Leisler's bat encounters during dusk survey and walking transect (OpenSource Maps).

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.

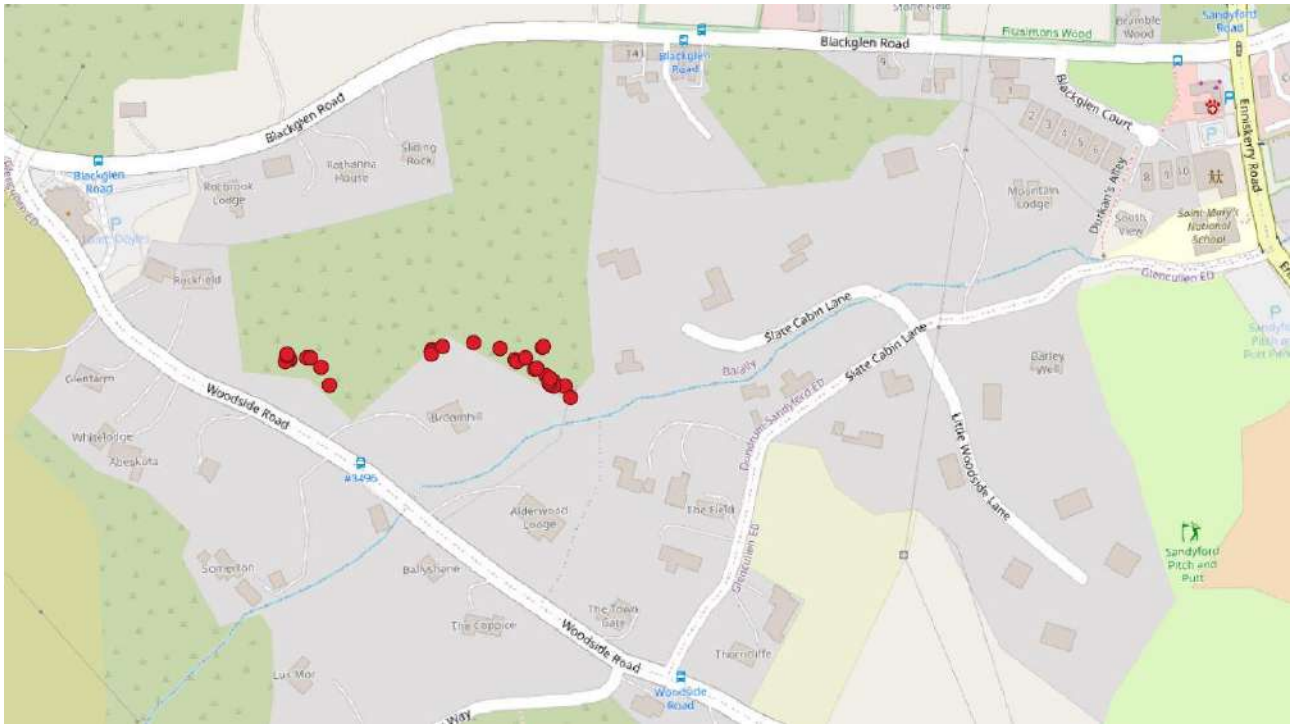


Figure 3b: Common pipistrelle bat encounters during dusk survey and walking transect (OpenSource Maps).

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).

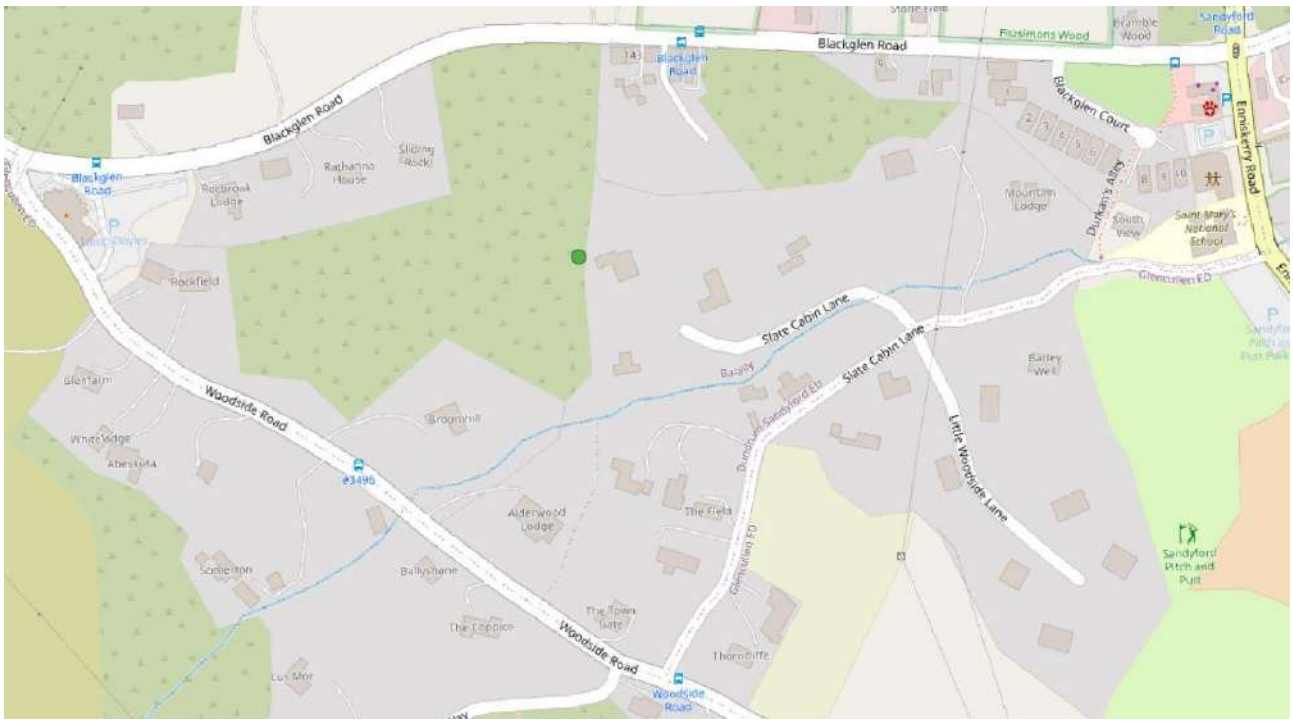


Figure 3c: Soprano pipistrelle bat encounters during dusk survey and walking transect (OpenSource Maps).

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.

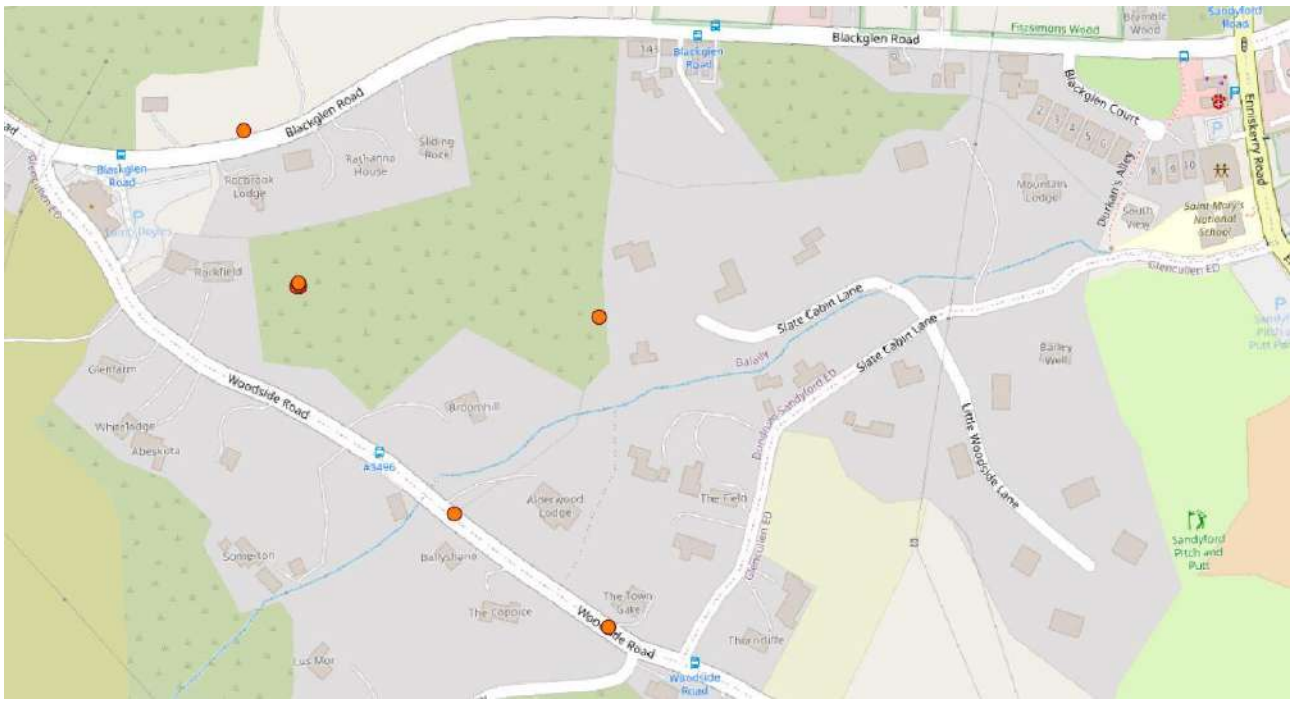


Figure 4a: Leisler's bat encounters during dusk survey and walking transect (OpenSource Maps).

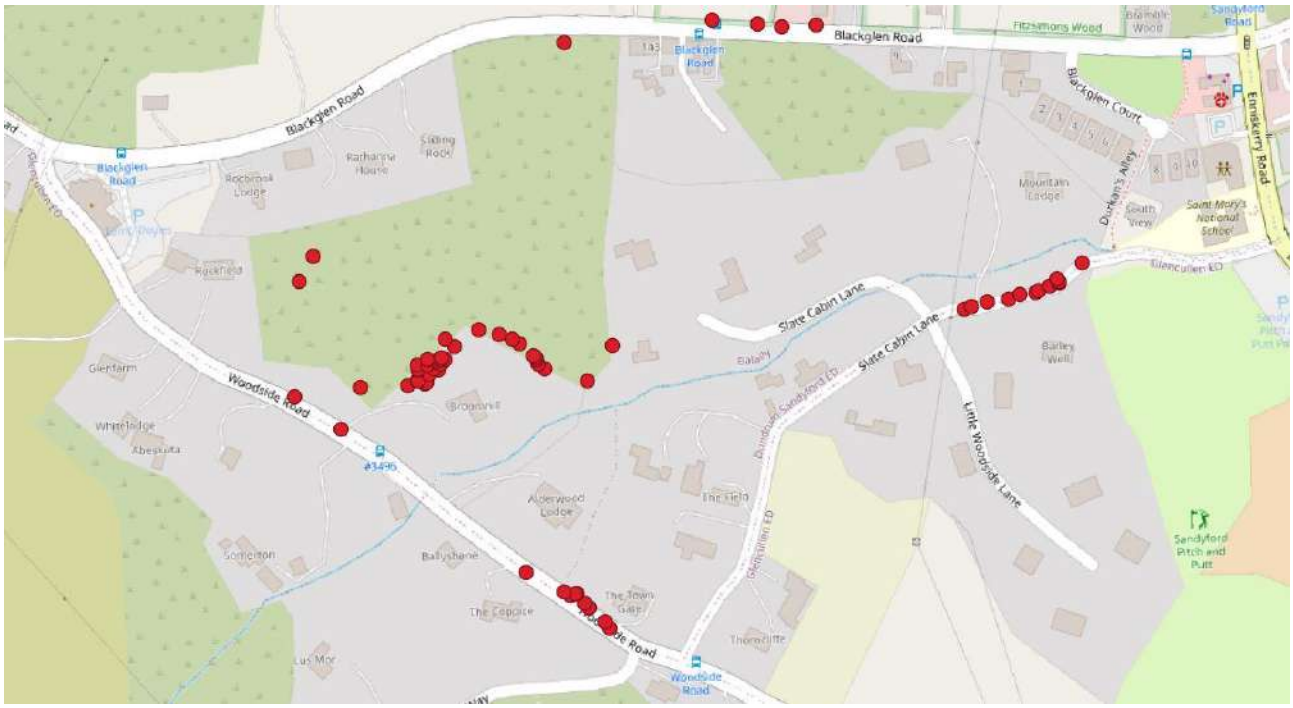


Figure 4b: Common pipistrelle bat encounters during dusk survey and walking transect (OpenSource Maps).

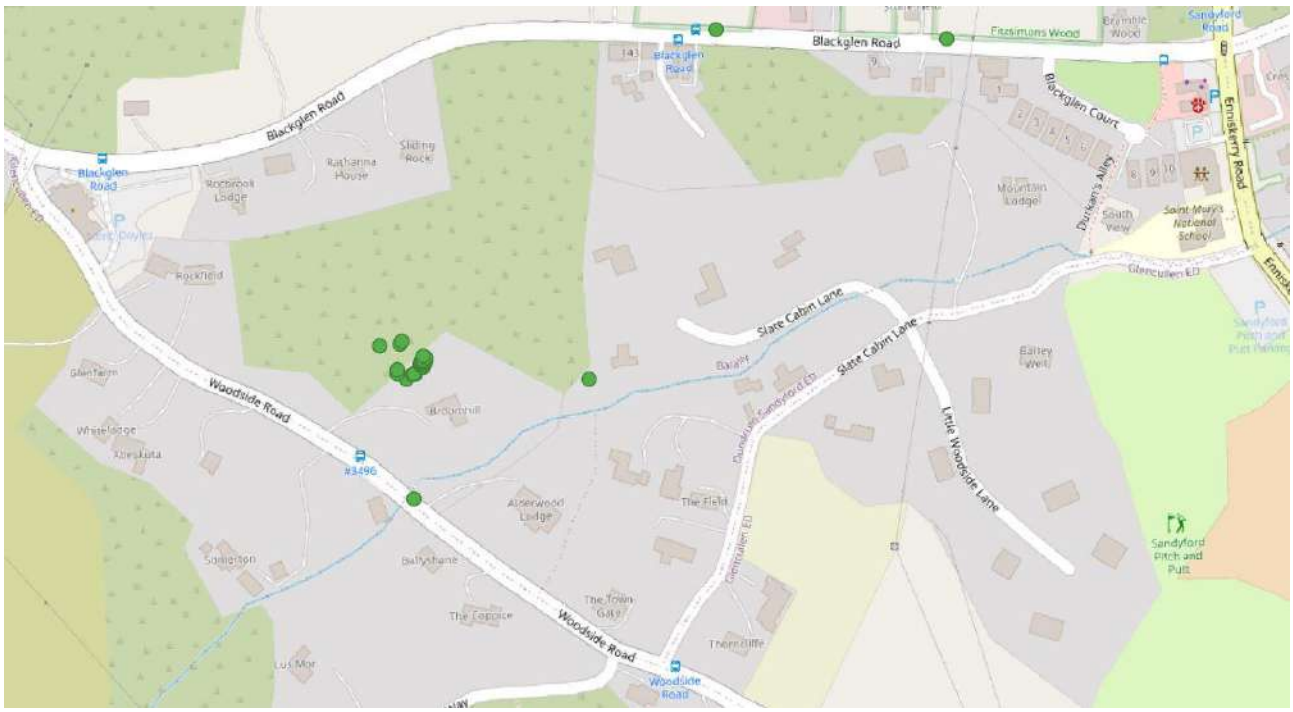


Figure 4c: Soprano pipistrelle bat encounters during dusk survey and walking transect (OpenSource Maps).

3.2.1.3 Night 3 – Dusk Survey & Walking Transect

Surveying started at 21:00 hrs in vicinity of the derelict building (11th 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.

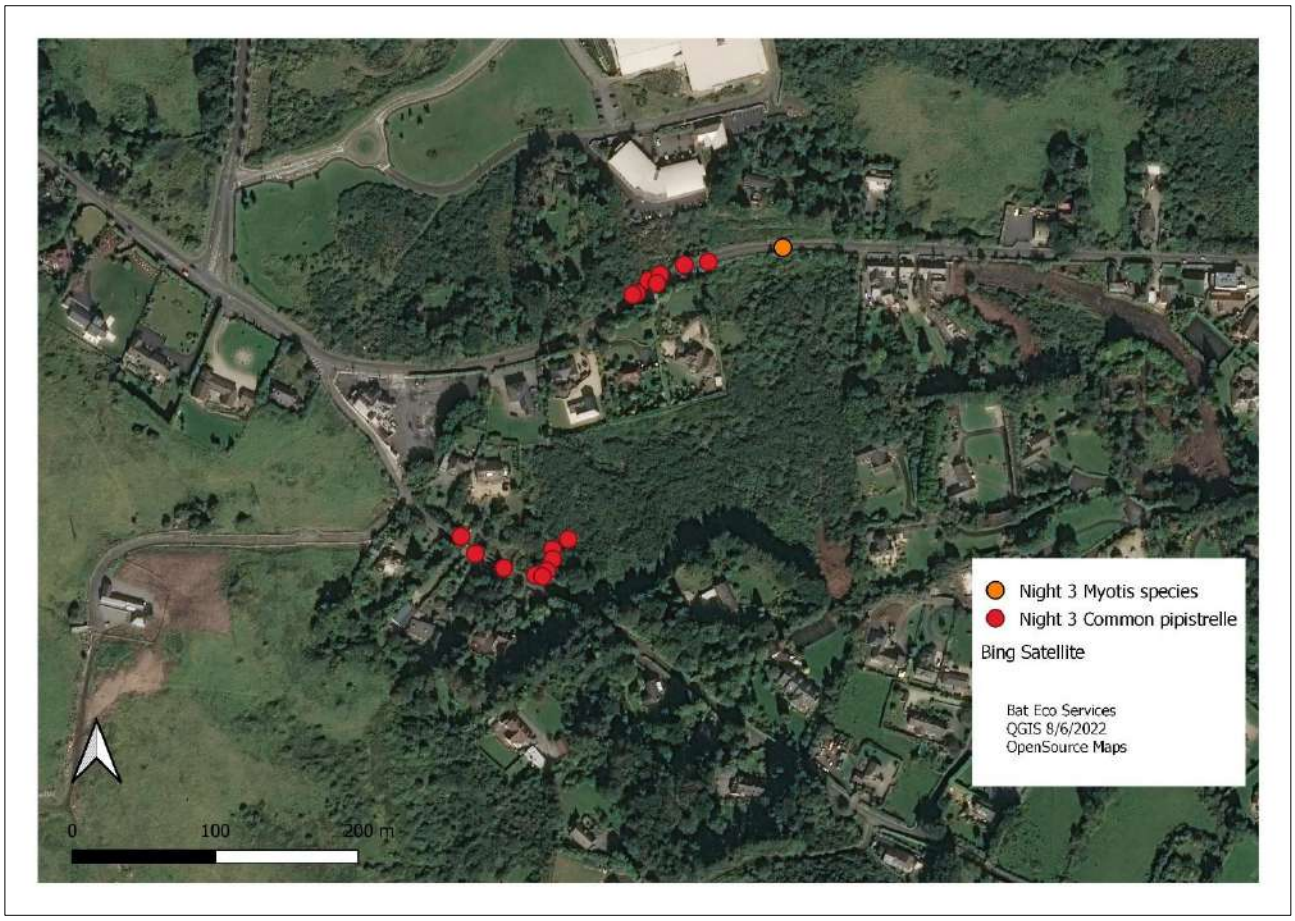


Figure 4d: Common pipistrelle and *Myotis* species bat encounters during walking transect completed on 11th May 2022 (OpenSource Maps).

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 *Myotis* 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 *Myotis* 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.

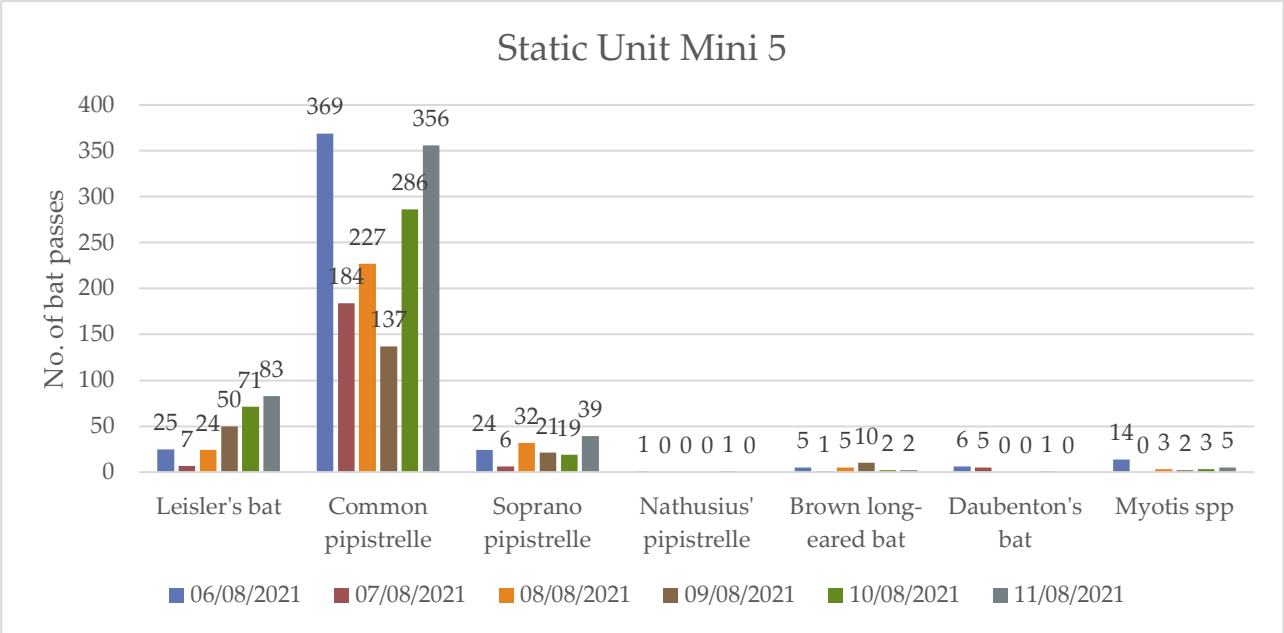


Figure 6a: Static surveillance results for each bat species recorded on Static Unit Mini 5.

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.

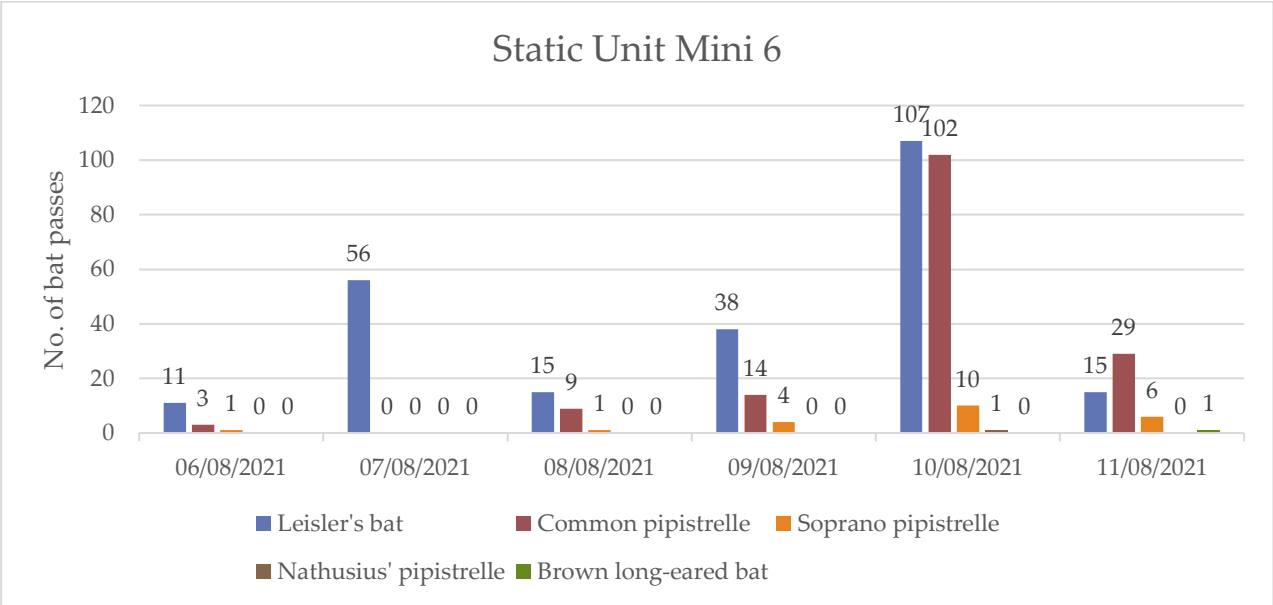


Figure 6b: Static surveillance results for each bat species recorded on Static Unit Mini 6.

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.

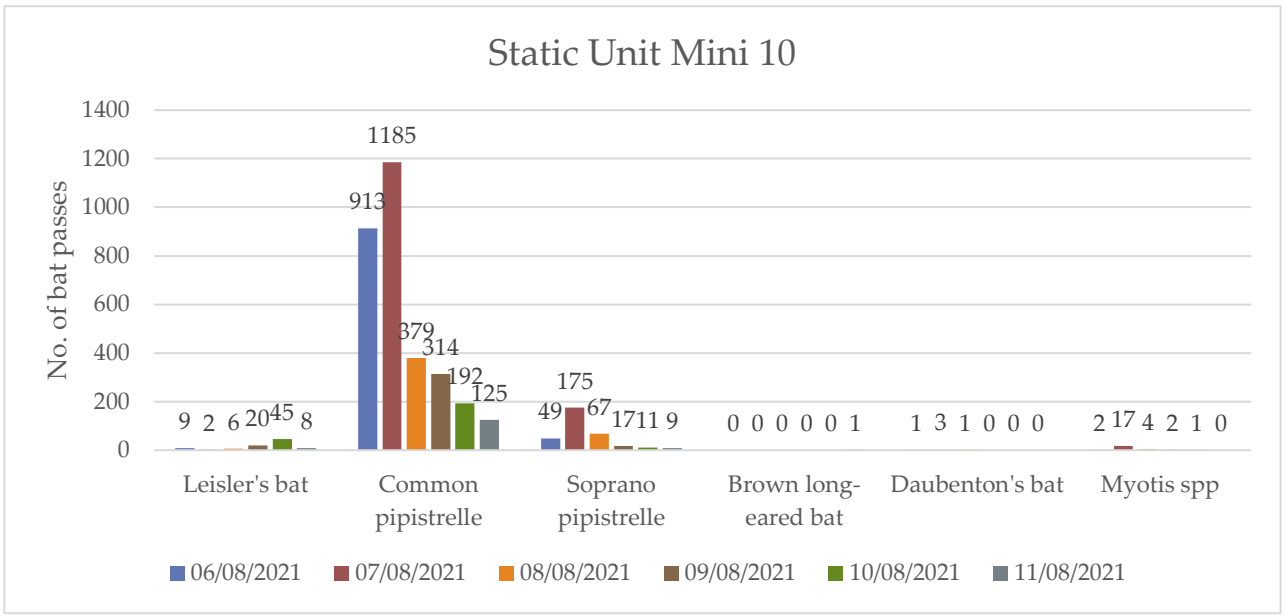


Figure 6c: Static surveillance results for each bat species recorded on Static Unit Mini 10.

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	*Daubenton's bat & Myotis* spp.
Mini 5	Low	Medium	Low	Low	Low	Low
Mini 6	Low	Low	Low	Low	Low	None
Mini 10	Low	High	Low	None	Low	Low

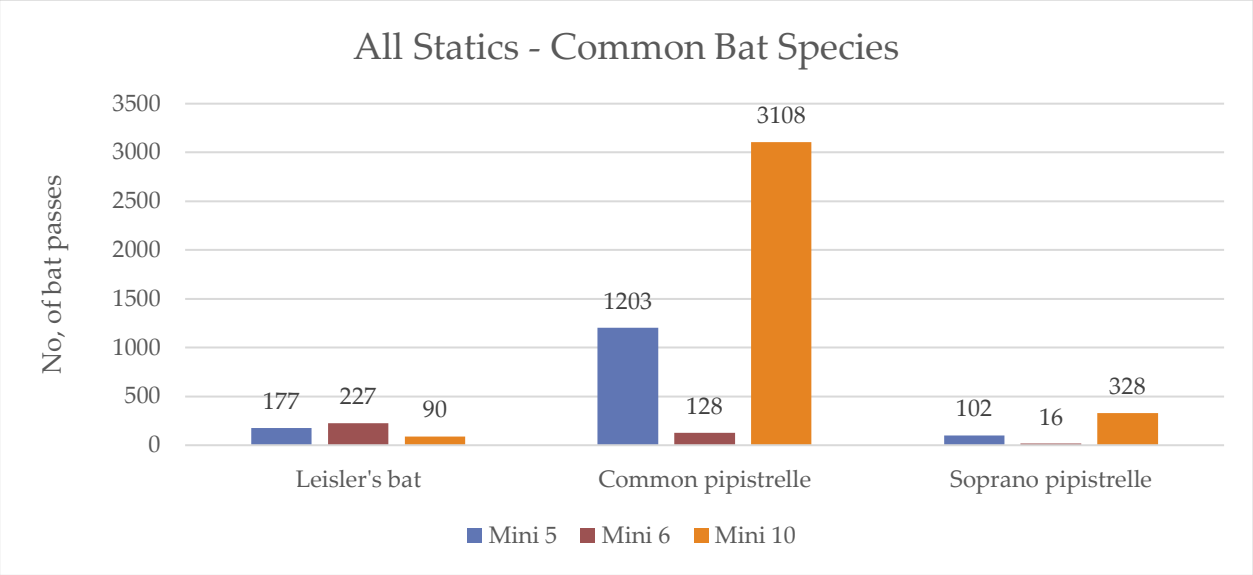


Figure 6d: Static surveillance results for common bat species.

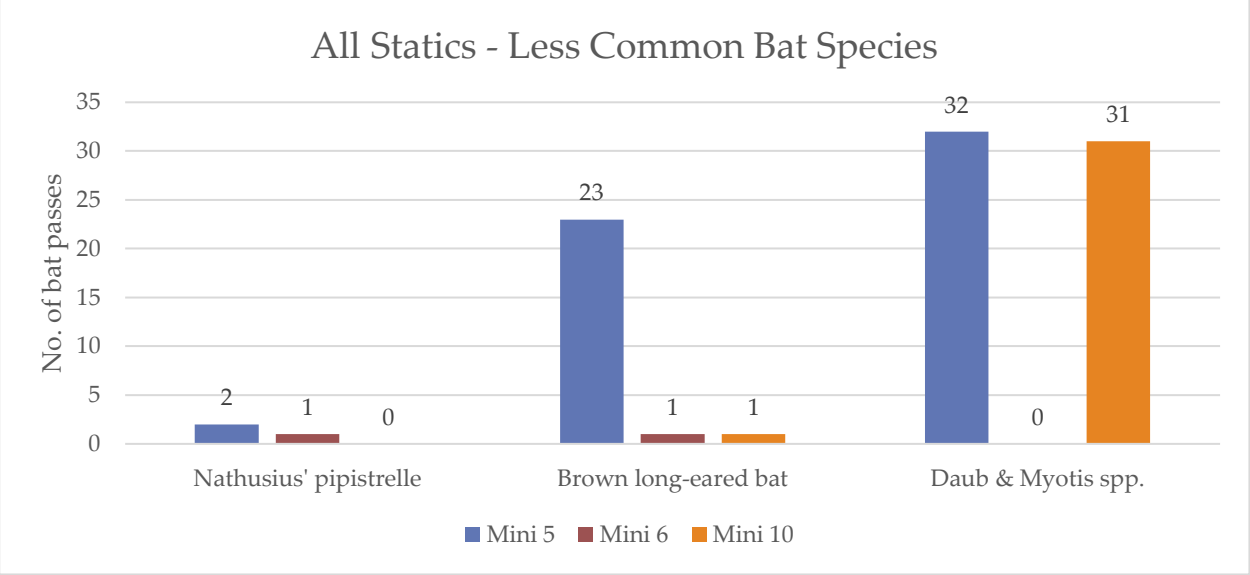


Figure 6e: Static surveillance results for less common bat species.

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.

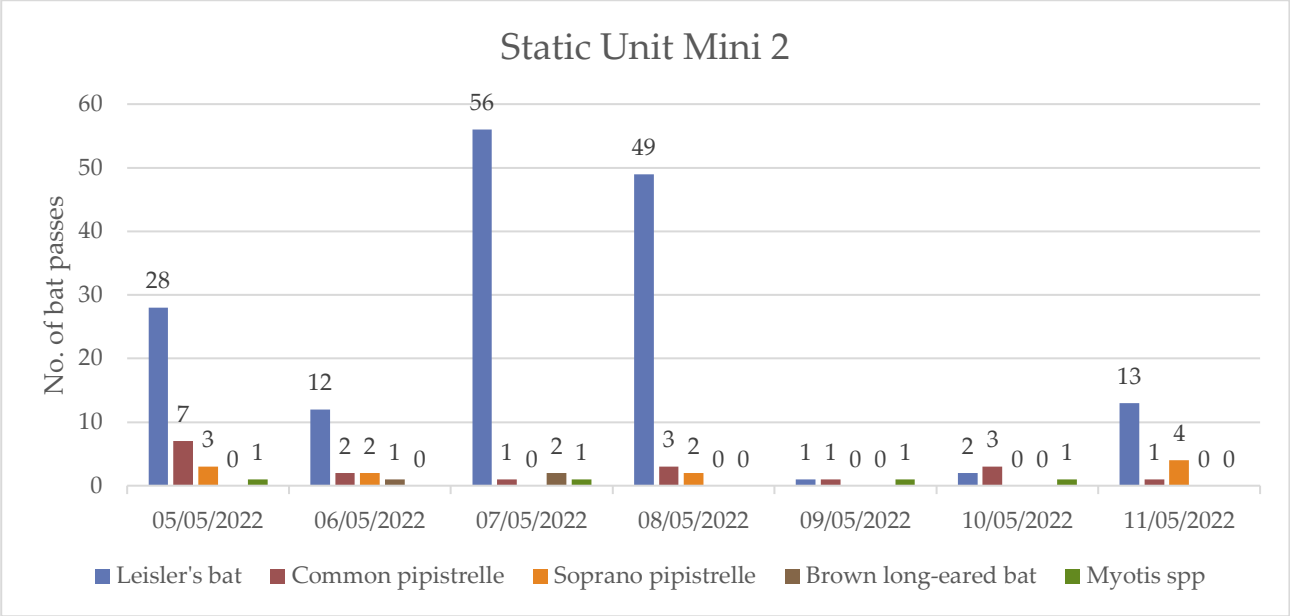


Figure 6f: Static surveillance results for less common bat species.

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;
Pipistrellus species	0 records;
Leisler's bat	2 records;
Myotis 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. 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
Timing of surveys **Surveying meets Collins, 2016 guidelines.**	2021 Summer bat survey: 6th to 12th August 2021 (appropriate survey period for summer bat surveys). 2022 Summer bat survey: 5th to 11th May 2022 appropriate survey period for summer bat surveys).
Survey Type 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) 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) ○
Weather conditions	Suitable weather conditions for bat surveys.
Survey Constraints	Limited access through the proposed development site during the hours of darkness due to dense scrub.
Survey effort Daytime – 3 hrs Bat surveys – 13 hrs Static surveillance – 193 hrs **TOTAL = 209 hrs**	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
Extent of survey area	Summer bat survey: proposed development area
Equipment	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^2). 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^2). 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^2). 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^2). 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^2) 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 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 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 bats 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.

BCT, 2018 Guidelines	Included in Lighting Plan	Action
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.

Additional features 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. – This is subject to approval by local authority.

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 in 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 $1m^3$ 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
Small Hedgerow	**SH**	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. 
Medium Hedgerow	**MH**	Hedgerow is approximately 1.5 to 3 m high. This type of hedgerow will provide foraging and commuting potential for bats. 
Sparse Treeline Hedgerow	**ST**	Hedgerow, low or medium in height, with individuals trees (where tree canopies, for the most part, do not touch).

		
Dense Treeline Hedgerow	**DT**	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. 

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	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[a] 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[b]). 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.[c]	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. 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.
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[a] 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).	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. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
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[a] and surrounding habitat.	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. 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. Site is close to and connected to known roosts.

[a] For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.
[b] 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.
[c] 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).

(1) Conversion, modification, demolition or removal of buildings (including hotels, schools, hospitals, churches, commercial premises and derelict buildings) which are:

- agricultural buildings (e.g. farmhouses, barns and outbuildings) of traditional brick or stone construction and/or with exposed wooden beams;
- buildings with weather boarding and/or hanging tiles that are within 200m of woodland and/or water;
- pre-1960 detached buildings and structures within 200m of woodland and/or water;
- pre-1914 buildings within 400m of woodland and/or water;
- pre-1914 buildings with gable ends or slate roofs, regardless of location;
- located within, or immediately adjacent to woodland and/or immediately adjacent to water;
- 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.

(2) Development affecting built structures:

- 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;
- bridge structures, aqueducts and viaducts (especially over water and wet ground).

(3) Floodlighting of:

- 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;
- any building meeting the criteria listed in (1) above.

(4) Felling, removal or lopping of:

- woodland;
- field hedgerows and/or lines of trees with connectivity to woodland or water bodies;
- old and veteran trees that are more than 100 years old;
- mature trees with obvious holes, cracks or cavities, or that are covered with mature ivy (including large dead trees).

(5) Proposals affecting water bodies:

- in or within 200m of rivers, streams, canals, lakes, reed beds or other aquatic habitats.

(6) Proposals located in or immediately adjacent to:

- quarries or gravel pits;
- natural cliff faces and rock outcrops with crevices or caves and swallets.

(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).

(8) All proposals in sites where bats are known to be present[1]

This may include proposed development affecting any type of buildings, structures, feature or location.

Notes:

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.

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

Table 2 Factors affecting the probability of bats being present.

Factors affecting the probability of a building being used by bats in summer	
Increased probability	Disused or little used; largely undisturbed
	Large roof void with unobstructed flying spaces
	Large dimension roof timbers with cracks, joints and holes
	Uneven roof covering with gaps, though not too draughty
	Entrances that bats can fly in through
	Hanging tiles or wood cladding, especially on south-facing walls
	Rural setting
	Close to woodland and/or water
	Pre-20th century or early 20th century construction
	Roof warmed by the sun
	Within the distribution area of horseshoe bats
Decreased probability	Highly urbanised area with few feeding places
	Small or cluttered roof void (esp. for brown long-eared bat)
	Heavily disturbed
	Modern construction with few gaps around soffits or eaves (but be aware these may be used by pipistrelles in particular)
	Prefabricated with steel and sheet materials
	Active industrial premises
	Roof shaded from the sun
Factors affecting the probability of trees being used by roosting bats	
Increased probability	In ancient woodland or parkland
	Large trees with complex growth form
	Species that typically form cavities, such as beech, willow, oak or ash
	Visible damage caused by rot, wind, lightning strike *etc.*
	Loose bark providing cavities
Decreased probability	Coniferous plantation with no specimen trees
	Young trees with simple growth form and little damage
Factors affecting the probability of underground sites being used by roosting bats	
Increased probability	Large enough to develop stable temperature in winter
	High humidity
	Undisturbed
	Close to woodland or water (but note that bats will also use upland sites)
	Many cracks and crevices suitable for bats
Decreased probability	Small and draughty
	Heavily disturbed
	In urbanised areas
	Smooth surfaces with few roosting opportunities

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
TOTAL	**177**	**1203**	**102**	**2**	**23**	**12**	**22**	**1482**

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
TOTAL	**227**	**128**	**16**	**1**	**0**	**371**

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
TOTAL	**90**	**3108**	**328**	**1**	**5**	**26**	**3384**

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^2). 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 *et al. 2011)*	52,820 km^2

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^2) 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^2) (Lundy *et al. 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^2). 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^2) (Lundy *et al. 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^2) 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 *et al. 2011)*	49,929 km^2

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^2) 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^2) (Lundy *et al. 2011)*	41,285

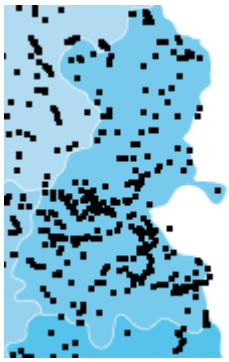
Taken from Roche *et al.,* 2014, Lysaght & Marnell, 2016 & Marnell *et al.*, 2019

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

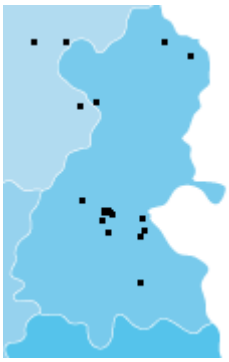
- Potential roost loss due to bridge maintenance;
- Loss of woodland and forest clearance;
- Loss of woodland, scrub and hedgerows;
- Tree surgery and felling;
- Increasing urbanisation; and
- Light pollution.

9.6 Bat Conservation Ireland Bat Species Maps

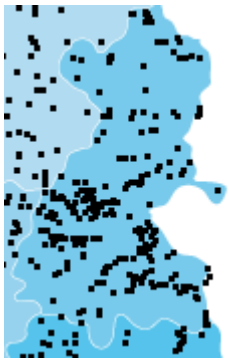
Bat records for County Dublin (Source: www.batconservationireland.org)



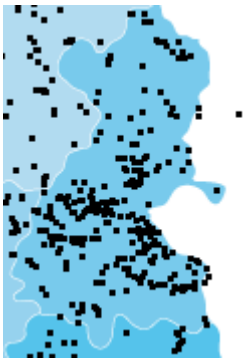
Common pipistrelle



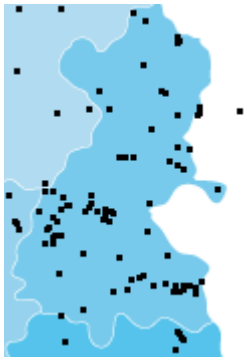
Nathusius' pipistrelle



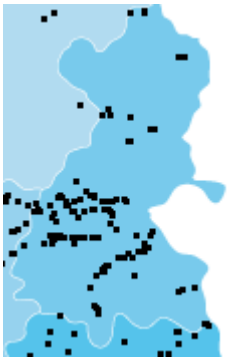
Soprano pipistrelle



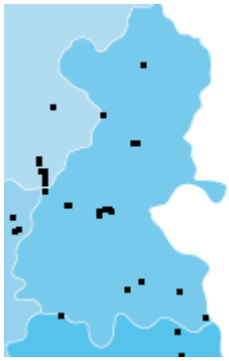
Leisler's bat



Brown long-eared bat



Daubenton's bat



Natterer's bat



Whiskered bat



Lesser horseshoe bat

APPENDIX V – INVASIVE SPECIES MANAGEMENT PLAN (INVAS BIOSECURITY, 2024)

Invasive Alien Species Survey at Blackglen



October 2024

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Rev	Date	Details	Prepared by	Checked by	Approved by
0	October 2024	IAS Survey	Dr. William Earle (Invasive species specialist)	Mr Tom Donovan (Director)	Dr. William Earle (Invasive species specialist)

Cover photo: A Sika stag beside Buddleja on the Blackglen site in September 2024.

Rear photo: Buddleja and Old man's beard on the Blackglen site in September 2024.

Table of Contents

1. INTRODUCTION 1

1.1. Project Background 1

1.2. Objectives 2

2. SURVEY 3

2.1. Survey Details 3

2.2. Survey limitations 3

2.3. General IAPS distribution 3

3. GENERAL LOCATIONS, DESCRIPTIONS AND LEGISLATION FOR IAPS RECORDED ON THE BLACKGLEN ROAD SITE 23

3.1. Rhododendron 23

3.1.1. Management of Rhododendron 24

3.2. Buddleja 25

3.2.1. Management of Buddleja 26

3.3. Cherry laurel 28

3.3.1. Management of Cherry laurel 28

3.4. Old man's beard 30

3.4.1. Management of Old man's beard 31

3.5. Winter Heliotrope 32

3.5.1. Management of Winter heliotrope 33

3.6. Other species 34

4. BIOSECURITY 35

4.1. Biosecurity Standard Operating Procedure for Personnel and Equipment 35

Appendices **38**

1. INTRODUCTION

At the request of Enviroguide Consulting (Enviroguide), INVAS Biosecurity Ltd. (INVAS) was commissioned to carry out a survey for Invasive Alien Plant Species (IAPS) and preparation of associated reports and a Management Plan For the site at Blackglen, Dublin (Figure 1.1).



Plate 1.1: *A Sika stag at the northern site boundary in October 2024.*

1.1. Project Background

The information provided by this survey will aid in the development of a Management Plan for the IAPS detected. The site will be used for residential development and to date, localised general maintenance around the boundaries and some construction works along the Blackglen Road have taken place in the area. Otherwise, the site is heavily overgrown throughout with dense Bracken and Gorse dominating the site. The survey area is located *circa*. 5km from the Wicklow Mountains SAC (IE002122) and SPA (IE004040) and *circa*. 100m from Fitzsimons Wood pNHA (001753).

1.2. Objectives

The aim of the survey was to identify all IAPS within the footprint of the proposed development site (Figure 1.1), in particular invasive species that are restricted under Irish legislation (S.I. 347/2024) and those listed as being of Union concern in the EU invasive alien species (IAS) Regulations (1143/2014). The survey will generate distribution maps for each IAPS identified within the survey area.



Figure 1.1: *The map provided to INVAS Biosecurity by Enviroguide outlining the survey area for the IAPS survey in September 2024.*

2. SURVEY

2.1. Survey Details

The field survey was conducted on the 27th of September 2024 by Dr William Earle (INVAS). Survey points for all listed species were recorded using a Garmin® GPSmap78 at a height of one metre. Points were recorded at 0.5-metre intervals around the perimeter of IAPS infestations. In some cases, survey points were taken along the extremities of certain infestations due to dangerous terrain, inaccessibility of sites or overgrowth with vegetation. In the case of some difficult sites, Google Maps was used in the field to record additional information regarding the extent of an infestation, using local landmarks as reference points. Records were maintained on printed satellite imagery maps. No Small Unmanned Aerial Vehicle (SUAV) survey was carried out. Microsoft® Bing™ Maps were used to provide an overview of the distribution for each species within the survey area and for the development of visual aids to assist with future works. Digital photographs were taken of each species to show the full extent of IAPS infestations.

2.2. Survey limitations

The above ground vegetation of Three-cornered leek and Spanish bluebell (both regulated under S.I. 374/2024) is most regularly encountered between December and late April depending on weather conditions each year. As the survey took place in September it is possible that infestations of both of these species may be present in the survey area but were not recorded due to the absence of above ground vegetation.

2.3. General IAPS distribution

Nine IAPS, one that is listed in the First Schedule (Part 1) of SI 374/2024 (highlighted in bold) and eight that are known to be invasive in Irish riparian and terrestrial habitats, were recorded throughout the survey area (Figure 2.2, Table 2.1). These included **Rhododendron (*Rhododendron ponticum*)**, Buddleja (*Buddleja davidii*), Cherry laurel (*Prunus laurocerasus*), Cotoneaster (*Cotoneaster horizontalis*), Himalayan honeysuckle (*Lycesteria formosa*), Lesser knotweed (*Persicaria campanulata*), Old man's beard (*Clematis vitalba*), Sycamore (*Acer pseudoplantanus*) and Winter heliotrope (*Petasites pyrenaicus*). Of this list, Rhododendron is contained in Irish Legislation (S.I 374/2024), with no species from the EU Regulation (EU 1143/2014) detected at this site. Detailed distribution maps for all species are provided for the survey area (Figure 2.1 – 2.9). Plates 2.1 to 2.9 provides images relating to the general

distribution of the IAPS on the ground. **Sika deer (*Cervus nippon*)** were also recorded throughout the site and are listed in the First Schedule (Part 2) of SI 374/2024.

Table 2.1: The IAPS recorded and a description of their general location on the Blackglen Road site in September 2024. The colours refer to the polygons represented by each species on the following maps: Figure 2.1-2.9.

Common name	**Scientific name**	**Location**	**Map Colour**
Species included in S.I. 274/2024 or EU 1143/2014			
Rhododendron	*Rhododendron ponticum*	Two small infestations in close proximity to the south site boundary	Pink
Species not yet included in any regulations or legislation			
Buddleja	*Buddleja davidii*	Widespread throughout the survey area with dense infestations primarily in the north of the site	Purple
Cherry laurel	*Prunus laurocerasus*	Two infestations in the south of the site along the site boundary	Green
Cotoneaster	*Cotoneaster horizontalis*	Two infestations in the south of the site along the site boundary and one in the northwest of the site	Light green
Himalayan honeysuckle	*Lycesteria formosa*	One infestation in the northeast of the site near the site boundary	Yellow
Lesser knotweed	*Persicaria campanulata*	One infestation off site across the stream on the southeastern site boundary	Red
Old man's beard	*Clematis vitalba*	One large infestation in the north of the site, primarily growing on top of Buddleja	Orange
Sycamore	*Acer pseudoplantanus*	Primarily mature trees along the site boundaries in the south and east of the site	Light blue
Winter heliotrope	*Petasites pyrenaicus*	One infestation in the north of the site and one adjacent to the road on the south site boundary	Blue

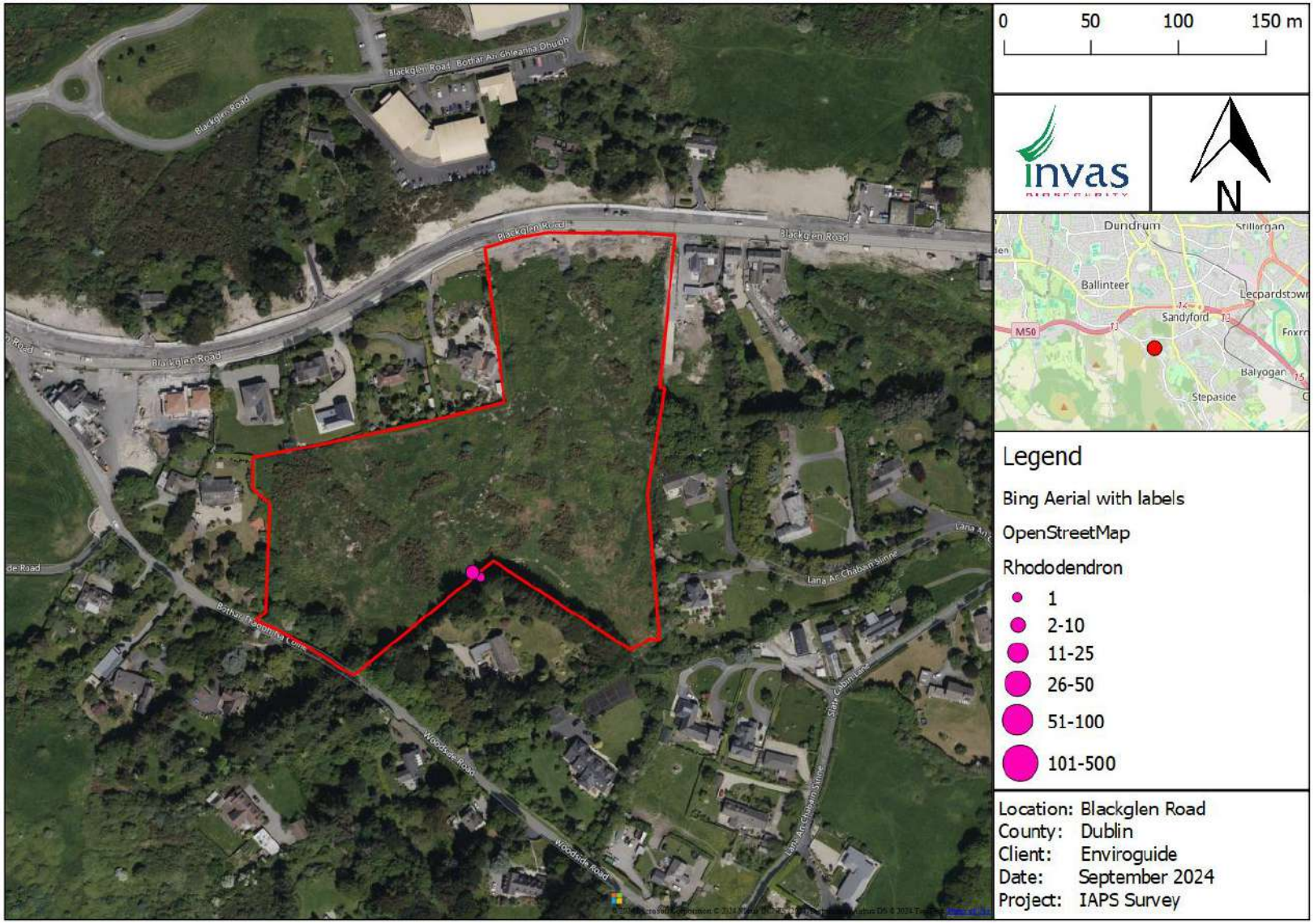


Figure 2.1: The Blackglen Road site with Rhododendron (m²) recorded in September 2024.



Plate 2.1: *Photographs showing Rhododendron growing on the Blackglen Road site (a & b).*

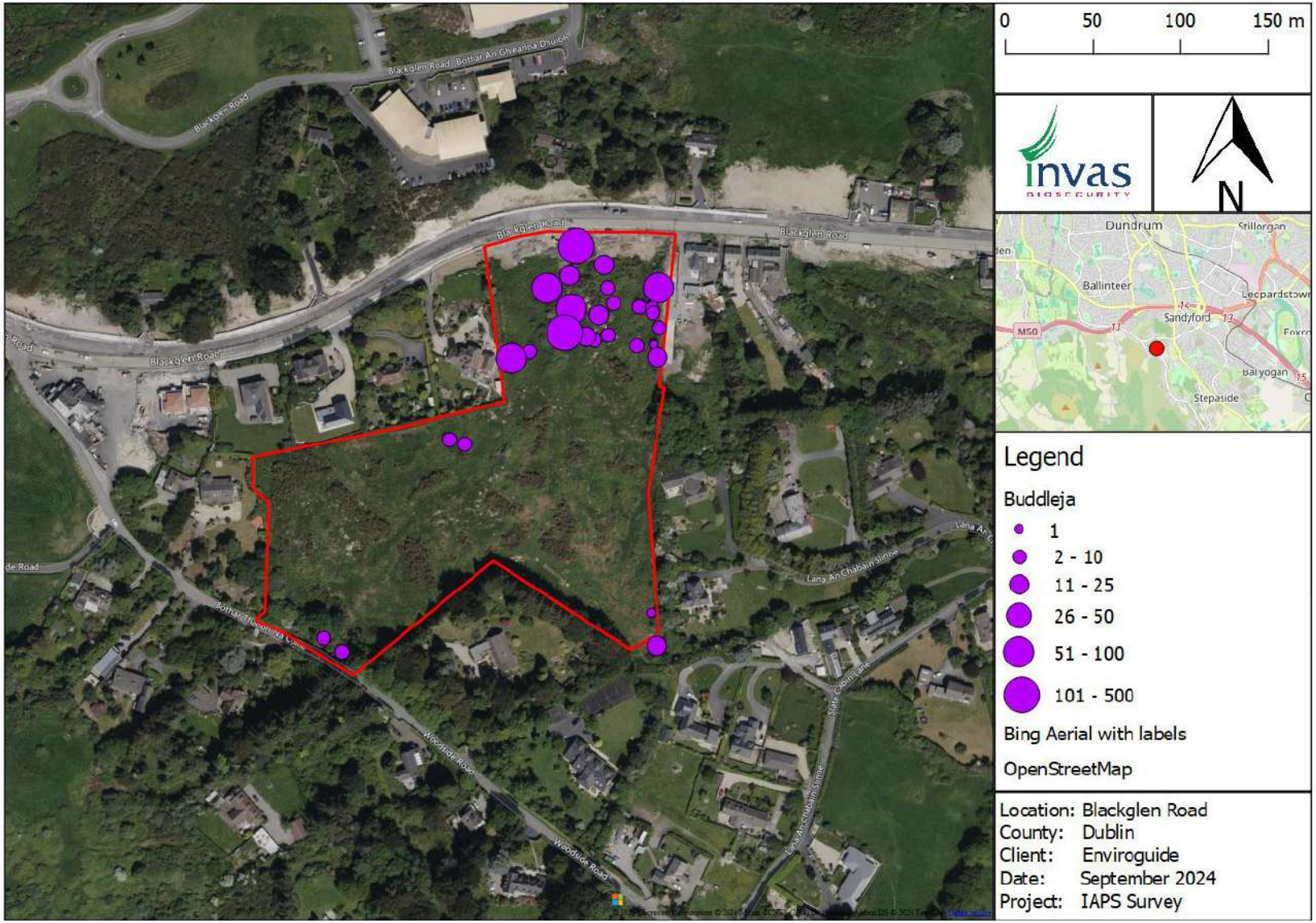


Figure 2.2: The Blackglen Road site with Buddleja (m²) recorded in September 2024.

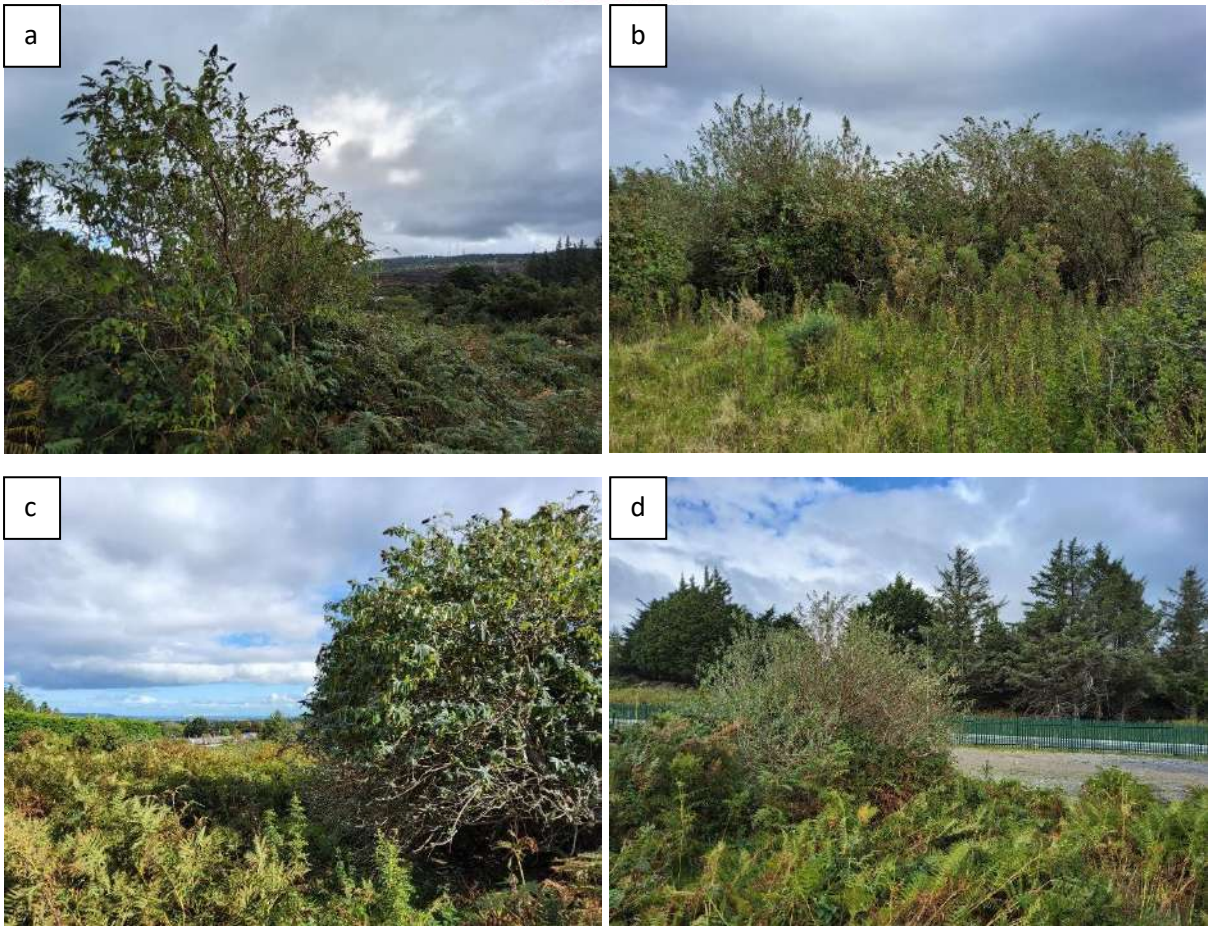


Plate 2.2: *Photographs showing Buddleja growing on the Blackglen Road site (a, b, c & d).*



Figure 2.3: The Blackglen Road site with Cherry laurel (m²) recorded in September 2024.



Plate 2.3: *Photographs showing Cherry laurel growing on the Blackglen Road site (a & b).*

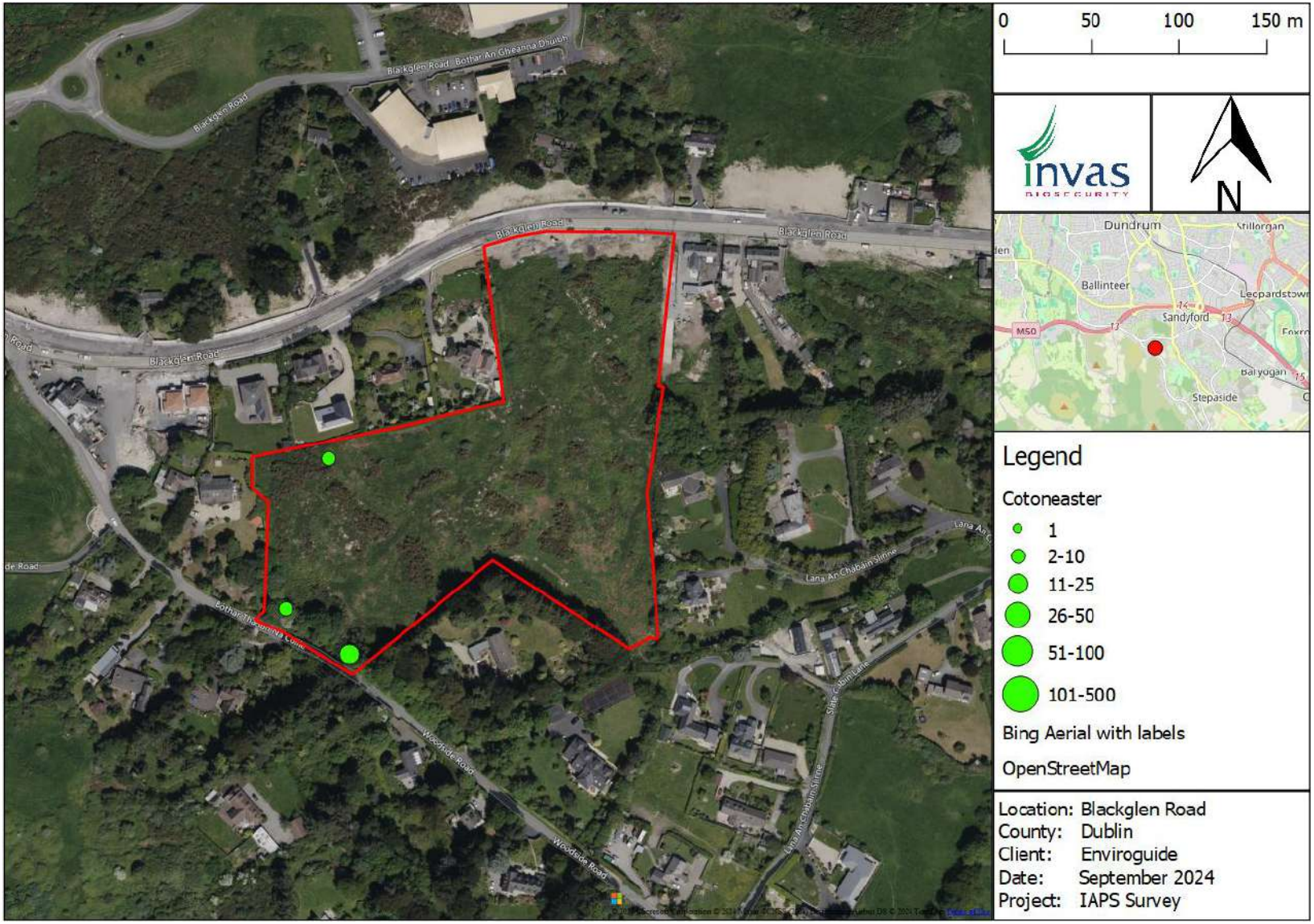


Figure 2.4: The Blackglen Road site with Cotoneaster (m²) recorded in September 2024.



Plate 2.4: *Photographs showing Cotoneaster growing on the Blackglen Road site (a & b).*

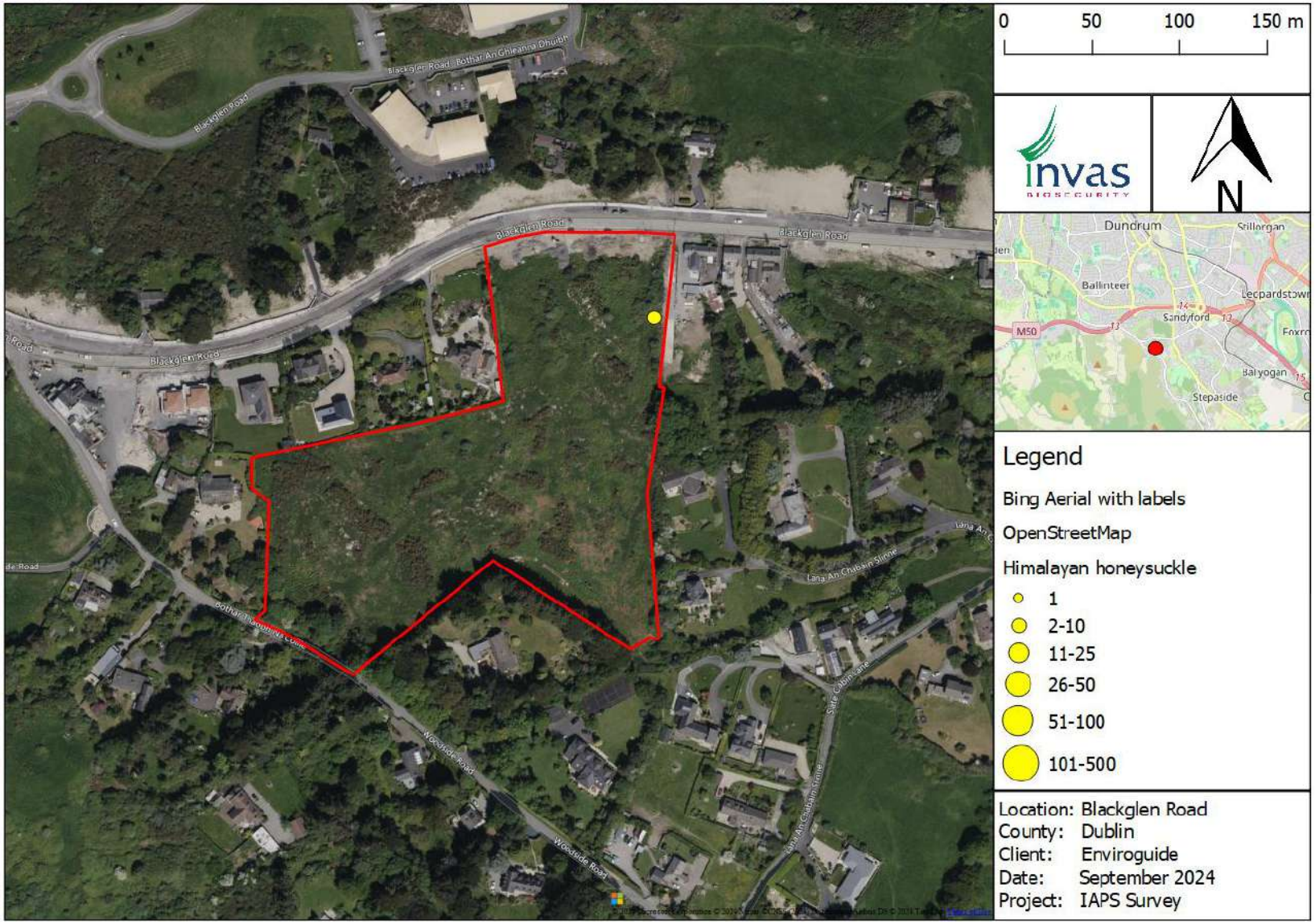


Figure 2.5: The Blackglen Road site with Himalayan honeysuckle (m²) recorded in September 2024.



Plate 2.5: *A photograph showing Himalayan honeysuckle growing among dense Buddleja on the Blackglen Road site (a).*

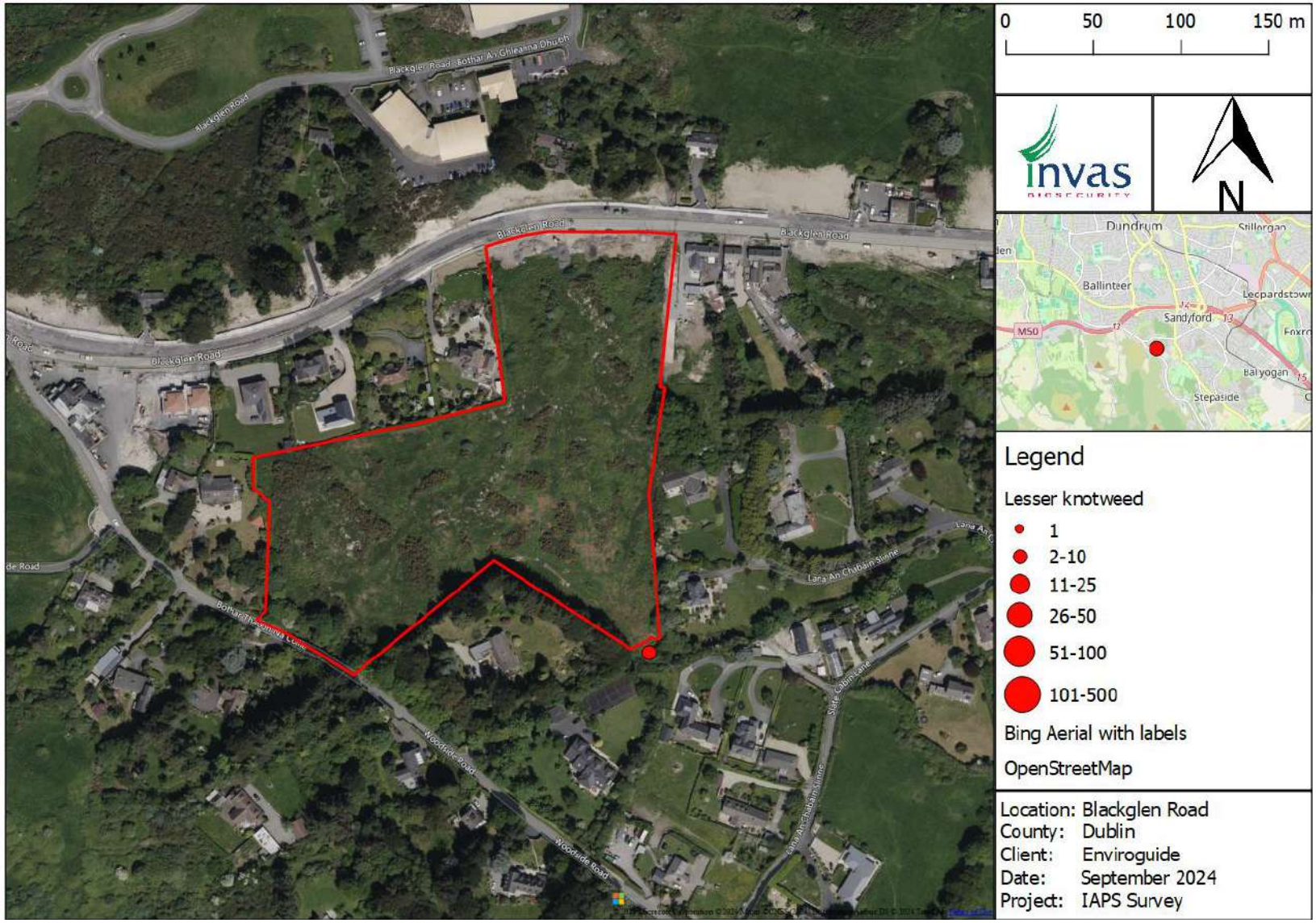


Figure 2.6: The Blackglen Road site with Lesser knotweed (m²) recorded off site in September 2024.

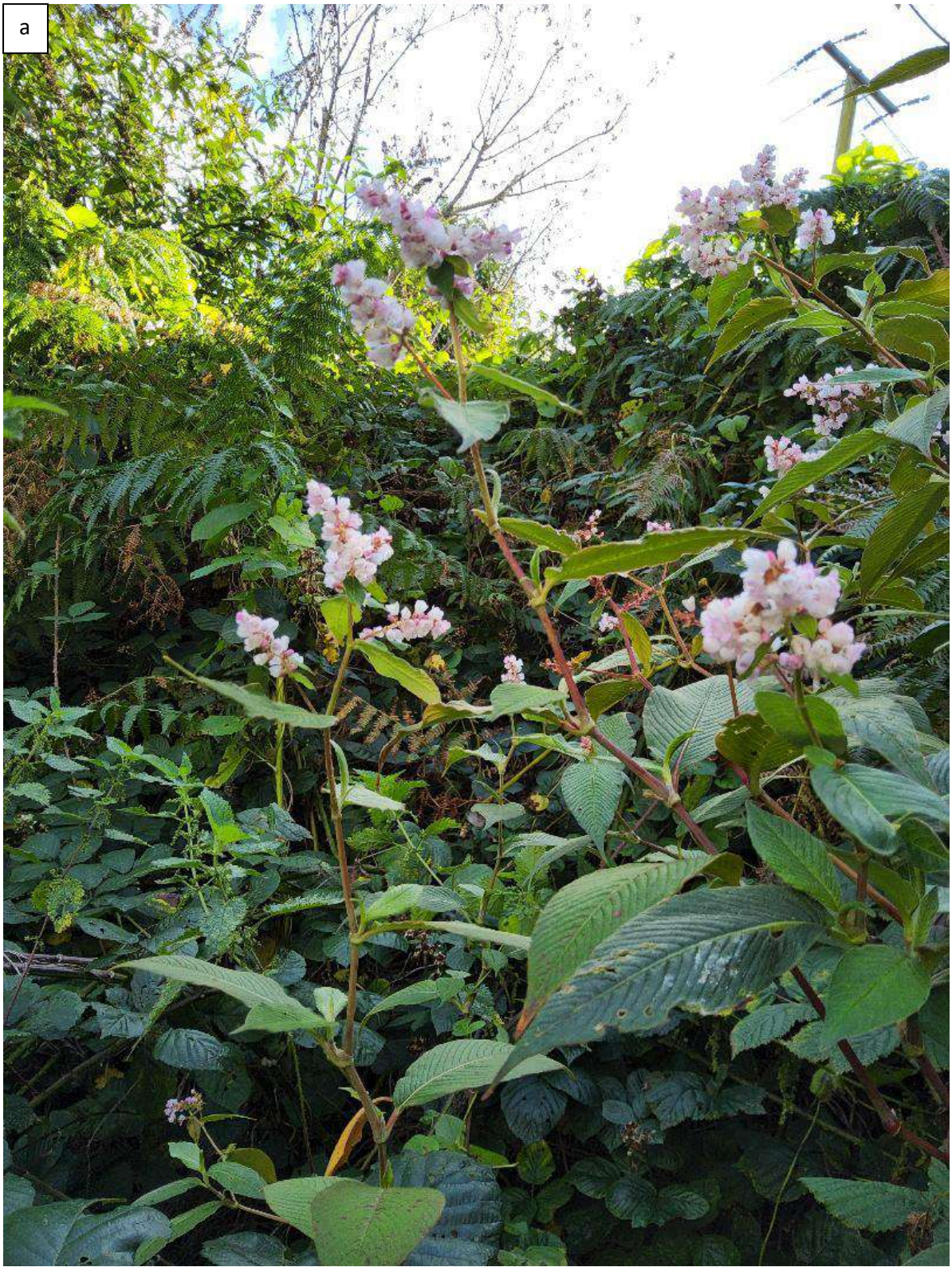


Plate 2.6: *A photograph showing Lesser knotweed growing off site near the stream at the southeast boundary of the Blackglen Road site (a).*

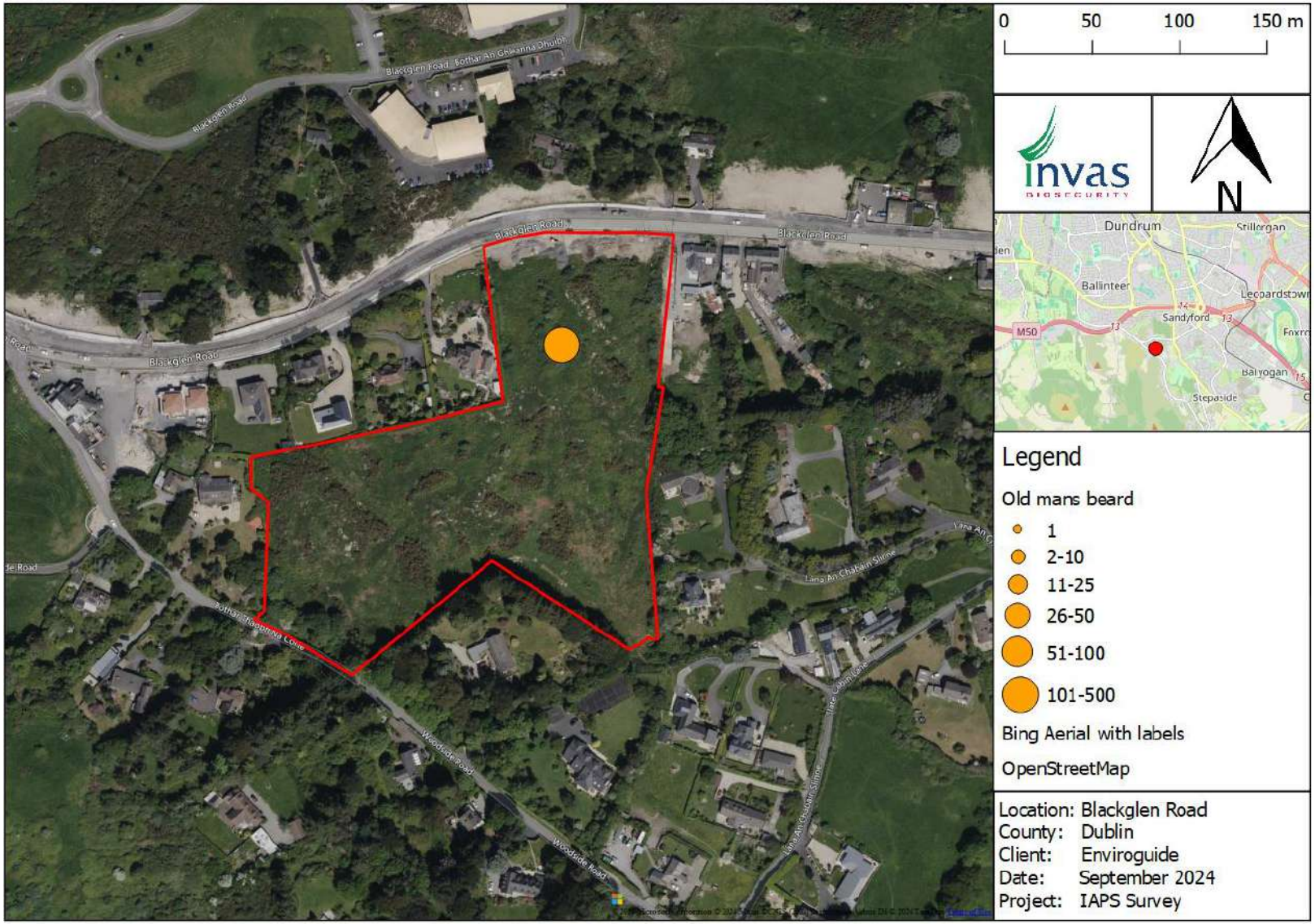


Figure 2.7: The Blackglen Road site with Old man's beard (m²) recorded in September 2024.



Plate 2.7: *Photographs showing Old man's beard growing on the Blackglen Road site (a & b).*

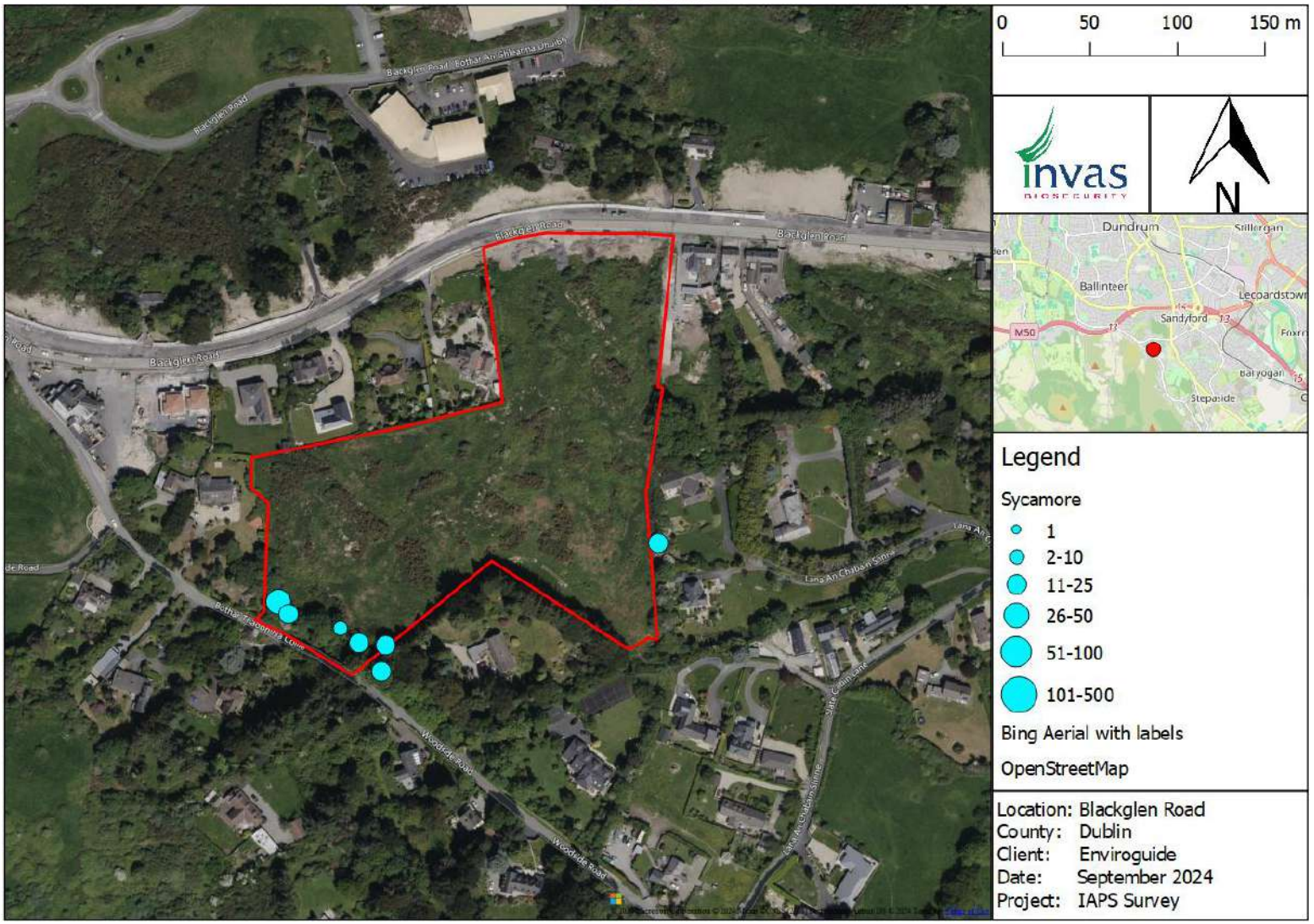


Figure 2.8: The Blackglen Road site with Sycamore (m²) recorded in September 2024.



Plate 2.8: *A photograph showing Sycamore growing on the Blackglen Road site (a).*

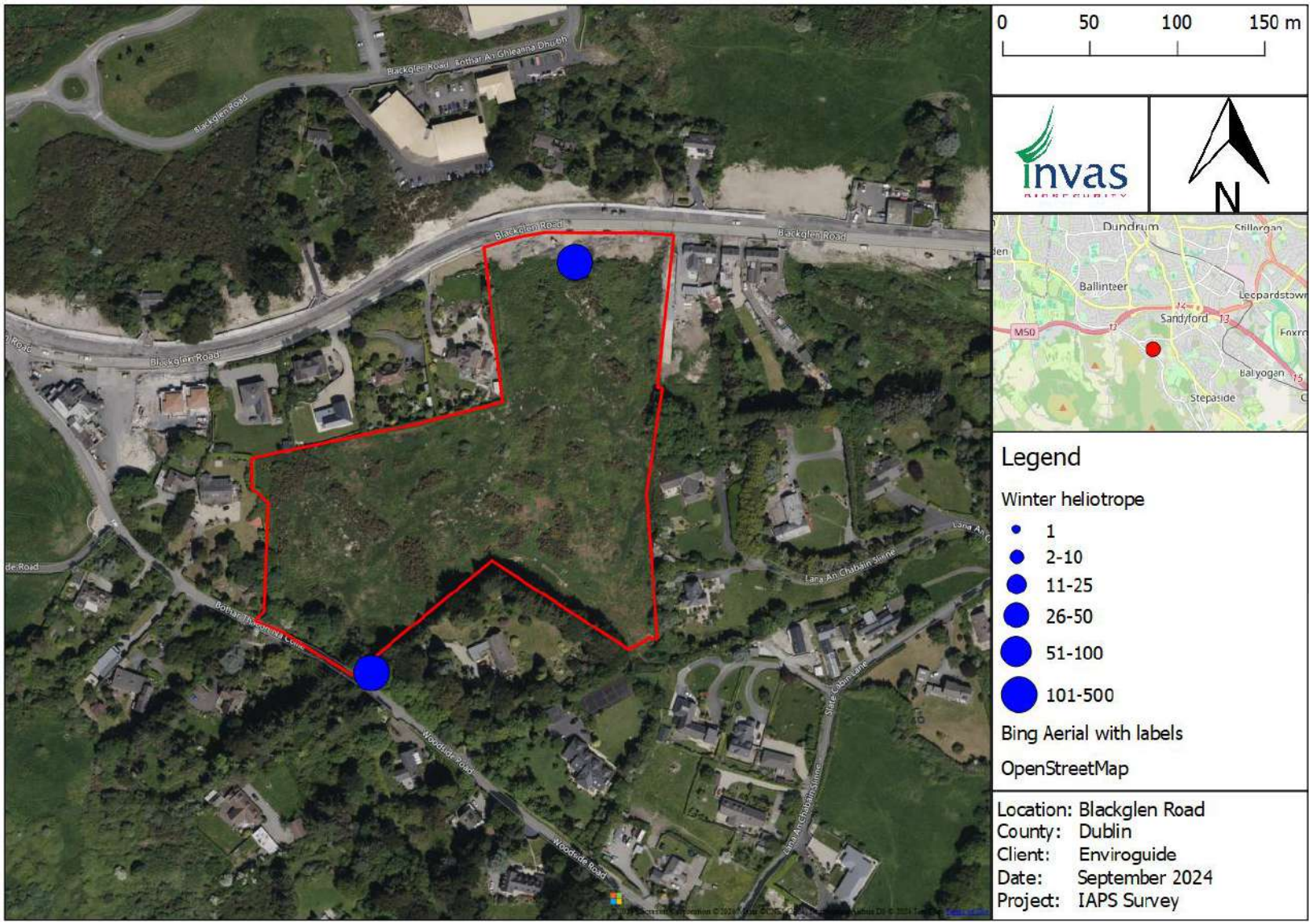


Figure 2.9: The Blackglen Road site with Winter heliotrope (m²) recorded in September 2024.



Plate 2.9: *Photographs showing Winter heliotrope growing on the Blackglen Road site (a & b).*

3. GENERAL LOCATIONS, DESCRIPTIONS, LEGISLATION AND MANAGEMENT OPTIONS FOR IAPS RECORDED ON THE BLACKGLEN ROAD SITE

The following sections contain information relating to each of the IAPS recorded on the Blackglen Road Site in June 2024. For each species maps are provided that detail the specific distribution of that species within the survey area (see Section 2). These maps are supported by photographic images of the infestations. There follows a Table that provides a description of the individual invasive species, to include their general ecology, impacts and dispersal mechanisms. This Table also identifies any national or European legislation relating to the keeping, propagation and dispersal of each species.

3.1. Rhododendron

Rhododendron was recorded as two small infestations in close proximity to the south site boundary (Figure 2.1, Plate 2.1).

Table 3.1: Species description and legislation relating to Rhododendron.

Distinguishing features	Rhododendron (*Rhododendron ponticum*) is a fast-growing evergreen shrub that can grow to 8m tall and is tolerant of a wide range of conditions and soil types. It is capable of producing dense thickets. Its leaves are hairless, dark green and glossy above, with a paler underside. Leaves are borne in a spiral at the end of each stem. Flowering normally occurs from late April to June, with plants capable of producing large quantities of seed. Each flower is violet to purple and borne in groups of 10 to 15.
Habitat	Rhododendron favours acid soils, in areas of wetland, rocky banks and hillsides, gardens and riparian zones. It is also well adapted to the understory of forestry and woodlands.
Ecology	It is a non-native species (originally from the Iberian Peninsula and wider Mediterranean) that has become widespread in mountainous areas of Ireland, especially in the west. It was introduced into Great Britain in 1763 for ornamental purposes. Rhododendron thrives on peaty, sandy and acidic soils and is extremely hardy. This invasive plant is highly prolific in terms of seed production. These are normally spread up to 100m from the parent plant by wind action or along watercourses. It has become highly invasive in Ireland with a wide distribution along the west coast due to its prolific seeding, rapid growth rate and its toxicity, which gives it a competitive advantage over native species. This aids in the creation of dense impenetrable thickets that can cover large areas, such as the infestations in Killarney National Park. These mature thickets reduce access and make it difficult to implement control measures.

Impact	Because of the dense vegetation that the species produces, it can easily outcompete native species and become dominant. Rhododendron has a significant adverse impact on native floral (and associated faunal) biodiversity. Leaves contain toxins (free phenols) that result in herbivore avoidance and suppresses regeneration of native understorey species. It is host to *Phytophthora ramorum*, which causes Sudden oak death.
Dispersal	*Via* rhizome fragments, suckers and seeds. Each flower produces between 3,000 to 7,000 fine powder-like seeds that can persist for up to three years.
Legislation	Subject to restrictions under EU (Birds and Natural Habitats) Regulations, 2011(SI 374/2024).

3.1.1. Management of Rhododendron

The preferred management option for mature Rhododendron at the Blackglen site is a combination of targeted mechanical cutting and chemical treatment with an approved herbicide. This follows the methodology screened for the Department of Housing, Local Government and Heritage for the 'Adoption of Rhododendron clearance within Connemara National Park in accordance with Regulation 42A EC (Birds and Natural) Habitats Regulations 2011-2021'. In summary, the base of each Rhododendron tree will be cut as close to the ground as possible using a chainsaw. The chainsaw will be used to create notches and wells in the trunk of the tree) and a concentrated 5:1 solution of a glyphosate-based herbicide is immediately applied. The use of an inert dye mixed with the herbicide will ensure that no stumps are missed during treatment programmes. This type of treatment is effective all year-round but may be best carried out outside of the bird nesting season which runs from the 1st of March to the 31st of August.

Manual pulling of plants that are less than 20cm high is successful, once all of the roots are removed. It is important to knock the soil from the roots to minimise the possibility of re-rooting. Exposure of the root system to air and sunlight will result in dehydration and death of the plant.

Following the treatment of Rhododendron large plants can be cut or pulled down, if access to machinery is available. It is possible to mechanically uproot mature Rhododendron plants due to the relatively shallow nature of the root system. However, this is generally only appropriate for sites where access to machinery is possible and at sites of low ecological interest, where damage to existing native vegetation is not a concern. Where chemical control of cut stumps and rootstocks is not an option, stump extraction will be necessary. This will normally involve using machinery, where access is possible. Any cut material that has not been treated should

be removed from the site and disposed of in a licenced landfill to avoid resprouting or suckering, which will produce new plants and potential infestations. Mulching is a good option for disposal and the mulch may be left on site, if no seeds are present.

Table 3.2: Proposed management schedule for Rhododendron recorded on the Blackglen site in September 2024.

Year	Timing	Description of works	Treatment
Year 1	October/November	Mechanical and herbicide management	Cut-stump treatment and seedling removal
Year 2	February	Assessment of regrowth and retreatment as required	Cut-stump treatment and seedling removal
Year 2	October/November	Assessment of regrowth and retreatment as required	Cut-stump treatment and seedling removal
Year 3	February	Assessment of regrowth and retreatment as required	Cut-stump treatment and seedling removal
Year 3	TBC	Removal of Rhododendron trees	Mechanical removal of vegetation prior to construction works
Year 4	January/March	Survey and retreatment as necessary	Seedling removal Cut-stump treatment

3.2. Buddleja

Buddleja was widespread throughout the survey area with dense infestations primarily in the north of the site (Figures 2.2, Plate 2.2). Dense seedling growth was recorded along the north boundary in the open gravel area of the site (Plate 3.1).



Plate 3.1: *A photograph showing Buddleja seedlings growing adjacent to Blackglen Road.*

Table 3.3: Species description and legislation for Buddleja.

Distinguishing features	Buddleia (*Buddleja davidii*) is a perennial shrub that can grow to up 4 metres tall. Leaves are grey-green, lanceolate and oppositely arranged. Stems are light brown, with a cracked appearance. This species has an extensive network of large and fine roots. Scented lilac flowers are borne on a long conical spike. Each plant produces large numbers of small seeds that can persist for up to four years in the soil.
Habitat	In waste ground, roadsides, rail corridors and along lakes, rivers, canals, ponds and ditches in rich to poor soil types.
Ecology	Introduced from China as an ornamental and butterfly attractant, Buddleja has now become widespread in urban environments throughout Ireland. This species is highly adaptable and tolerant of disturbed conditions.
Impact	The penetrating roots can cause damage to buildings and hard structures, while the profusion of above-ground growth produced each growing season can have a very adverse impact on native biodiversity.
Dispersal	Buddleja reproduces by seeds that are spread primarily by wind. It can also reproduce asexually *via* stem and root cuttings.
Legislation	Not yet contained in any legislative lists.

3.2.1. Management of Buddleja

The preferred management option for mature Buddleja at the Blackglen site is a combination of targeted mechanical cutting and chemical treatment with an approved herbicide. This follows the methodology screened for the Department of Housing, Local Government and Heritage for the 'Adoption of Rhododendron clearance within Connemara National Park in accordance with Regulation 42A EC (Birds and Natural) Habitats Regulations 2011-2021'. The treatment has proven to be highly effective against Buddleja following management by INVAS on experimental sites. In summary, the base of each Buddleja tree will be cut as close to the ground as possible using a chainsaw. The chainsaw will be used to create notches and wells in the trunk of the tree) and a concentrated 5:1 solution of a glyphosate-based herbicide is immediately applied. The use of an inert dye mixed with the herbicide will ensure that no stumps are missed during treatment programmes. This type of treatment is effective all year-round but may be best carried out outside of the bird nesting season which runs from the 1st of March to the 31st of August.

Manual pulling of plants that are less than 20cm high is successful, once all of the roots are removed. It is important to knock the soil from the roots to minimise the possibility of re-rooting. Exposure of the root system to air and sunlight will result in dehydration and death of the plant.

Following the treatment of Buddleja large plants can be cut or pulled down, if access to machinery is available. It is possible to mechanically uproot mature Buddleja plants due to the relatively shallow nature of the root system. However, this is generally only appropriate for sites where access to machinery is possible and at sites of low ecological interest, where damage to existing native vegetation is not a concern. Where chemical control of cut stumps and rootstocks is not an option, stump extraction will be necessary. This will normally involve using machinery, where access is possible. Any cut material that has not been treated should be removed from the site and disposed of in a licenced landfill to avoid resprouting or suckering, which will produce new plants and potential infestations. Mulching is a good option for disposal and the mulch may be left on site, if no seeds are present.

Table 3.4: Proposed management schedule for Buddleja recorded on the Blackglen site in September 2024.

Year	Timing	Description of works	Treatment
Year 1	October/November	Mechanical and herbicide management	Cut-stump treatment and seedling removal
Year 2	February	Assessment of regrowth and retreatment as required	Cut-stump treatment and seedling removal
Year 2	October/November	Assessment of regrowth and retreatment as required	Cut-stump treatment and seedling removal
Year 3	February	Assessment of regrowth and retreatment as required	Cut-stump treatment and seedling removal
Year 3	TBC	Removal of Rhododendron trees	Mechanical removal of vegetation prior to construction works
Year 4	January/March	Survey and retreatment as necessary	Seedling removal Cut-stump treatment

3.3. Cherry laurel

Two infestations of Cherry laurel were recorded in the south of the site along the site boundary (Figures 2.3, Plate 2.3).

Table 3.5: Species description and legislation for Cherry laurel.

Distinguishing features	Cherry laurel (*Prunus laurocerasus*) is a fast-growing evergreen shrub that can grow to 15m tall and is tolerant of a wide range of habitat conditions and soil types. Its leaves are hairless, dark green and glossy above, with a paler underside. Leaves are arranged alternately on stems, ending with a single leaf. Flowering occurs in spring/summer with white flowers being produced on racemes (upright spikes). Seeds are produced in black berries.
Habitat	Cherry laurel is well adapted to the understory of forestry and woodlands. It thrives in areas of rocky banks and hillsides, gardens and riparian zones.
Ecology	It is a non-native species (originally South-West Asia) that has become widespread in forestry and estates throughout Ireland. Cherry laurel is hardy and is tolerant of drought and shade. It has become highly invasive in Ireland. It's rapid growth rate and the toxicity of its leaves give it a competitive advantage over native species. This aids in the creation of dense thickets that can cover large areas. These thickets can reduce access and make it difficult to implement control measures.
Impact	Because of the dense vegetation that the weed produces it can easily outcompete native species and becomes abundant. Cherry laurel has a significant adverse impact on native floral (and associated faunal) biodiversity. The leaves contain toxins (cyanide) that result in herbivore avoidance and suppresses regeneration of native understorey species
Dispersal	Spreads by suckers and seeds.
Legislation	Not yet contained in any legislative lists.

3.3.1. Management of Cherry laurel

The preferred management option for mature Cherry laurel at the Blackglen site is a combination of targeted mechanical cutting and chemical treatment with an approved herbicide. This follows the methodology screened for the Department of Housing, Local Government and Heritage for the 'Adoption of Rhododendron clearance within Connemara National Park in accordance with Regulation 42A EC (Birds and Natural) Habitats Regulations 2011-2021'. The treatment has proven to be highly effective against Cherry laurel following management by INVAS on experimental sites and a large scale project conducted by Coillte in the Devils Glen, Co. Wicklow. In summary, the base of each Cherry laurel tree will be cut as close to the ground as possible using a chainsaw. The chainsaw will be used to create notches and wells in the trunk of the tree) and a concentrated 5:1 solution of a glyphosate-based herbicide is immediately applied. The use of an inert dye mixed with the herbicide will ensure

that no stumps are missed during treatment programmes. This type of treatment is effective all year-round but may be best carried out outside of the bird nesting season which runs from the 1st of March to the 31st of August.

Manual pulling of plants that are less than 20cm high is successful, once all of the roots are removed. It is important to knock the soil from the roots to minimise the possibility of re-rooting. Exposure of the root system to air and sunlight will result in dehydration and death of the plant.

Following the treatment of Cherry laurel large plants can be cut or pulled down, if access to machinery is available. It is possible to mechanically uproot mature Cherry laurel plants due to the relatively shallow nature of the root system. However, this is generally only appropriate for sites where access to machinery is possible and at sites of low ecological interest, where damage to existing native vegetation is not a concern. Where chemical control of cut stumps and rootstocks is not an option, stump extraction will be necessary. This will normally involve using machinery, where access is possible. Any cut material that has not been treated should be removed from the site and disposed of in a licenced landfill to avoid resprouting or suckering, which will produce new plants and potential infestations. Mulching is a good option for disposal and the mulch may be left on site, if no seeds are present.

Table 3.6: Proposed management schedule for Cherry laurel recorded on the Blackglen site in September 2024.

Year	Timing	Description of works	Treatment
Year 1	October/November	Mechanical and herbicide management	Cut-stump treatment and seedling removal
Year 2	February	Assessment of regrowth and retreatment as required	Cut-stump treatment and seedling removal
Year 2	October/November	Assessment of regrowth and retreatment as required	Cut-stump treatment and seedling removal
Year 3	February	Assessment of regrowth and retreatment as required	Cut-stump treatment and seedling removal
Year 3	TBC	Removal of Rhododendron trees	Mechanical removal of vegetation prior to construction works
Year 4	January/March	Survey and retreatment as necessary	Seedling removal Cut-stump treatment

3.4. Old man's beard

Old man's beard was recorded as one large infestation in the north of the site, primarily growing on top of Buddleja (Figure 2.7, Plate 2.7).

Table 3.7: Species description and legislation for Old man's beard.

Distinguishing features	Old man's beard/Traveller's joy (*Clematis vitalba*) is a fast-growing vine with climbing woody stems that can extend its vertical or horizontal range by up to 10m in one season. The plant can live for up to 40 years and has woody stems that can grow to 20m long. This species is a deciduous, perennial plant and the leaves are pinnately compound (leaflets in opposite pairs with one terminal leaflet), consisting of usually 5 leaflets. Flowers are white and about 2cm in diameter. Seeds are produced in autumn and often remain on the vines late into winter. Individual plants can produce up to 100,000 seeds per season. Where the plant produces dense canopy vegetation, it can produce up to 17,000 viable seeds per $0.5m^2$. It rapidly forms dense vegetative canopies over host plants or structures, often totally obscuring them from view.
Habitat	Grows in hedgerows, roadsides, rail corridors, riverbanks and forest edges. Seedling growth is restricted in closed canopy woodlands.
Ecology	The growth form of the species is such that it uses its vines to climb over trees, shrubs, along fence lines and any other support structure that it can avail of. Old man's beard can self-pollinate or be pollinated by wind or insects. Plants in their third year of growth can produce viable seeds. Seeds can remain viable in the soil for up to 5 years and soil disturbance creates opportunities for germination from the soil seed reserve.
Impact	The blanketing growth of this species can smother and even collapse large trees, while the dense canopy it produces restricts light to plants beneath, thus effectively suppressing them. Old man's beard can impede wind passage through this dense blanketing vegetation and cause the collapse of manmade structures or already weakened trees. Old man's beard has a significant adverse impact on native floral (and associated faunal) biodiversity. Because of the large biomass of vegetation that the weed produces, it can readily impede access in infested locations to humans and animals. This reduced access can also make it difficult to implement control measures. Reputedly, sap from Old man's beard plants can cause blistering to human skin.
Dispersal	This species is primarily dispersed by seed through the action of wind (roads/rail corridors), water (rivers), human and animal interaction. Hanging vines will set root at any node that touches the ground and produce new plants. Old man's beard can spread by fragmentation, where cut or detached stems (with nodes) come into contact with the ground.
Legislation	Not yet contained in any legislative lists.

3.4.1. Management of Old man's beard

A combination of chemical and manual control methods can be highly successful in the management of Old man's beard. Seedlings should be manually removed once visible in May/June and disposed of by composting in a managed bunded area. Old man's beard that has been identified should be treated by the foliar application of a glyphosate-based herbicide. Spraying will be carried out at a rate of 5L/Ha using knapsacks fitted with low pressure drift beta nozzles. An inert dye (super signal blue) should be mixed with the spray solution to ensure all plants at the site are treated. Herbicide treatment should be carried out in June when foliage is present during the growth season and before flowering has begun, thus avoiding risk to local pollinators. Chemical application will be focused on the upper and lower foliage of Old man's beard to minimise the risk of drift to neighbouring plants. Extra care should be taken where infestations are located among or in close proximity to nontarget plant species. For mature plants that have engulfed native or sensitive vegetation, the vines should be cut back to ground level or waist height in winter or spring and the subsequent re-growth can be treated with foliar herbicide application as outlined above. This method will avoid impacting on the host plant the vine may be covering.

Following herbicide treatment, plant material should be manually removed in late July or when systemic herbicide application has effectively killed all foliage and stems have dried out. Plant material should be removed along with any further seedlings that have emerged and disposed of as outlined above. All Old man's beard stumps should be drilled and treated with a 5:1 dilution of a glyphosate-based herbicide. Stump treatment should only be required in year one but should be considered as a precautionary measure in year two.

Herbicide application should always follow the manufacturers guidelines and only be carried out by staff wearing suitable PPE and in possession of the relevant qualifications. Records of herbicide use must be kept in accordance with all relevant legislation and must be retained after each treatment. Suitable PPE including boots, durable gloves and full-length overalls should be worn by all staff involved in manual control works due to the potential toxicity of Old man's beard.

Table 3.8: Proposed management schedule for Old man's beard at the Blackglen site.

Year	Timing	Description of works	Treatment
Year 1	May/June	Seedling removal and foliar herbicide application	Manual removal and foliar herbicide application
Year 1	July	Manual removal of foliage and seedlings with stump treatment	Manual removal and cut-stump treatment
Year 2	May/June	Assessment of regrowth, seedling removal and foliar herbicide application	Manual removal and foliar herbicide application
Year 2	July	Manual removal of foliage and seedlings with stump treatment	Manual removal and cut-stump treatment
Year 3	May/June	Assessment of regrowth, seedling removal and foliar herbicide application	Manual removal and foliar herbicide application
Year 3	July	Manual removal of foliage and seedlings with stump treatment	Manual removal and cut-stump treatment
Year 4	January/March	Assessment of regrowth and retreatment as necessary	Seedling removal, foliar herbicide application and cut-stump treatment

3.5. Winter Heliotrope

Two infestations of Winter heliotrope were recorded on the Blackglen Road site. One infestation in the north of the site adjacent to the cleared site near Blackglen Road and one adjacent to the road on the south site boundary (Figure 2.9, Plate 2.9).

Table 3.9: Species description and legislation for Winter heliotrope.

Distinguishing features	Winter heliotrope (*Petasites pyrenaicus*) is a perennial, rhizomatous species that can form very dense and continuous stands. The rounded-kidney shaped leaves of this species can be present throughout the year and grow to 25cm in diameter, with large lobes where the leaf stalks attach. They have a conspicuous, regular toothed margin with dull downy hair beneath that rubs off easily. The rhizome network is extensive, but it is usually quite shallow (to 30cm deep). Winter heliotrope flowers produce an inflorescence up to 15mm across in short, loose, cone-like racemes. Individual florets are pink/lilac and tubular with sweet vanilla-scented flowers. Flowering stems are erect, D-shaped (don't roll freely between fingers), pinkish and covered with scale-like bracts.
Habitat	Riparian species on fertile soil adjacent to rivers and canals, but also in disturbed terrestrial habitats such as ditches, roadsides, railway embankments and waste places.
Ecology	Non-native species (native to Mediterranean region) and widespread in Ireland. It is one of few plants that actively grow throughout winter,

	flowering from November to February. This species readily forms monocultures in suitable habitats. Winter heliotrope may be confused with native Butterbur (*Petasites hybridus*) and Coltsfoot (*Tussilago farfara*). To date, only male plants have been recorded in Ireland. This plant is favoured by beekeepers as it provides a rare source of nectar during the winter months. Is becoming particularly prevalent along river and canal banks in Ireland.
Impact	Because of the dense vegetation that the species produces it can easily outcompete native species and become locally dominant.
Dispersal	It is dispersed by rhizome expansion and fragments. Rhizomes are often transported accidentally during ground works *via* machinery, equipment and soil movement.
Legislation	Not yet contained in any legislative lists.

3.5.1. Management of Winter heliotrope

A combination of chemical and manual control methods can be highly successful in the management of Winter heliotrope. The foliar application of a Glyphosate based herbicide is most effective in spring, however, this species is very difficult to control using herbicides because of the extensive and perennating rhizome network (Lucey et. al. 2021). If it is possible to excavate all plant material to a depth > 30cm, it may be possible to locally eradicate the plant. Excavated Winter heliotrope material (rhizomes or stems) must be carefully disposed of off-site or retained on-site on top of root barrier membrane or for local deep buried. Rhizomes that remain in the soil will re-sprout rapidly. If excavation is to be conducted, it is recommended to treat the vegetation with herbicide approximately three weeks before the works are conducted. It is important to monitor the treated areas annually and to schedule further treatment, as necessary.

Herbicide application should always follow the manufacturers guidelines and only be carried out by staff/volunteers wearing suitable PPE and in possession of the relevant qualifications. Records of herbicide use must be kept in accordance with all relevant legislation and must be retained after each treatment.

Table 3.10: Proposed management schedule for Winter heliotrope at the Blackglen site.

Year	Timing	Description of works	Treatment
Year 1	February/March	Foliar herbicide application	Foliar herbicide application
Year 1	Three weeks post herbicide application	Excavation of infested soils for disposal	Excavation and disposal
Year 2	February/March	Assessment of regrowth and foliar herbicide application, if required	Foliar herbicide application
Year 2	Three weeks post herbicide application	Excavation of infested soils for disposal, if required	Excavation and disposal
Year 3	February/March	Assessment of regrowth and foliar herbicide application, if required	Foliar herbicide application
Year 3	Three weeks post herbicide application	Excavation of infested soils for disposal, if required	Excavation and disposal
Year 4	February/March	Assessment of regrowth	N/A

3.6. Other species

Cotoneaster was recorded at three locations on the Blackglen Road site. Two infestations were recorded in the south of the site along the site boundary and one in the northwest of the site (Figure 2.4, Plate 2.4). Himalayan honeysuckle was recorded as one infestation in the northeast of the site near the site boundary (Figure 2.5, Plate 2.5). These species are not contained on any legislative lists but can crowd out native plants through rapid and dense growth and can be difficult to control once established. Both species may be managed as part of general site clearance works through flailing or extraction of vegetative material for disposal.

An infestation of Lesser knotweed was recorded off site, across the stream on the southeastern site boundary (Figure 2.6, Plate 2.6). This species may be managed through the excavation of infested soil. This species was not recorded on the Blackglen Road site. This species can become locally dominant and outcompete native plant species but is not yet contained on any legislative lists.

Sycamore was primarily recorded as mature trees along the site boundaries in the south and east of the site (Figure 2.8, Plate 2.8). This species is not contained on any legislative lists yet but can become locally dominant and outcompete native plant species. This species can reproduce vigorously by seed and is also capable of causing structural damage *via*. root extension. This species may be managed as part of general site clearance works through flailing or extraction of vegetative material for disposal.

4. BIOSECURITY

For the purposes of this document, biosecurity refers to all practical measures used to manage and prevent the introduction and spread of IAS.

A number of high impact aquatic and riparian invasive alien plant species (IAPS) are currently present in Ireland, and most are continuing to spread aggressively. Prominent among the terrestrial IAPS are: Japanese knotweed (*Reynoutria japonica*), Giant knotweed (*Reynoutria sachalinensis*), Bohemian knotweed (*Reynoutria x bohemica*), Giant hogweed (*Heracleum mantegazzianum*) and Himalayan balsam (*Impatiens glandulifera*). The above species are listed in the Third Schedule (Part 1) of the Habitats Directive (S.I. 477/2011) and some are included among the list of 88 EU IAS of Union Concern (http://ec.europa.eu/environment/nature/pdf/IAS_brochure_species.pd) in the EU Invasive Alien Species Regulations (1143/2014).

The ecological effects of IAPS are often irreversible and, once established, they are extremely difficult and costly to control and eradicate. Hence, the urgent need to prevent their introduction and spread. Prevention is clearly more cost-effective and less environmentally damaging than long-term containment, control or eradication. The most effective measure to reduce introductions and halt spread of IAS in aquatic situations is to promote and implement good biosecurity practice.

4.1. Biosecurity Standard Operating Procedure for Personnel and Equipment

This Biosecurity SOP applies to all equipment (hand tools and PPE) that are used during operations to control IAPS. The purpose of this SOP is to provide standardised practical methods for cleaning and disinfecting all equipment that comes into contact with IAPS while carrying out control works. This Biosecurity SOP will enhance existing biosecurity activity employed by the Council and will deliver an improved biosecurity system that will help limit the introduction and spread of IAPS during ongoing control operations.

All staff, be they Council or contract, that are involved in the control of IAPS should have access to cleaning and disinfection facilities that include, but is not limited to:

- detailed guide to proper cleaning and disinfection procedure, and instructions for making the correct disinfection concentration;
- clean water and Virkon Aquatic tablets or powder for the disinfection of equipment and PPE;

- hard-bristle brush;
- disposable non-latex gloves for equipment and PPE; and
- plastic bags and cable ties (for disposing of IAPS material removed from equipment).

[* Disinfectants must be used with care and in strict accordance with the manufacturer's instructions. Disposable gloves should be worn when using the disinfectant solution.]

Before commencing operations, a 1% Virkon Aquatic disinfection solution (10g Virkon Aquatic powder or 1 tablet in 1 litre of clean water) should be prepared for personnel working in infested areas. The disinfectant solution will remain pink in colour while it is still active. Additional clean water should be readily available for washing and for making up further disinfection solutions.

Best biosecurity practice will be achieved by ensuring that the following guidelines are adhered to when planning IAPS operations:

- Where possible, schedule operations so that uncontaminated sites can be accessed before sites that are known or suspected to support IAPS.
- Clean and disinfect all equipment prior to the commencement of operations.
- Clean and disinfect all equipment when moving between sites.
- Report suspected IAPS to personnel responsible for the control operations, accompanied by the location (GPS coordinates) and good quality photographs.

It is important that all PPE and equipment used are cleaned and disinfected according to the procedures below. These biosecurity measures should be conducted before leaving each site.

- Put on disposable gloves before cleaning and disinfecting the equipment.
- Visually inspect all equipment that has come into contact with water for evidence of attached IAPS material, or adherent mud or debris. Remove any such material before cleaning and disinfecting the equipment and leaving the site.
- Dispose of any IAPS material taken from the equipment using the plastic bags provided.
- Spray equipment with the disinfection solution to the point of run-off. Do not rinse in clean water for at least 15 minutes.

- Use the hard-bristle brush to remove all mud and debris from boots and equipment. Then spray with the prepared disinfectant solution onto the cleaned surfaces to the point of run-off. During inspection and cleaning, pay particular attention to places where IAPS could be accidentally trapped, such as the treads of boots and attachment points on equipment.
- Visually inspect all PPE that has been in contact with vector material and remove any attached IAPS material, or adherent mud or debris. Wipe down this PPE with an absorbent cloth soaked in the prepared disinfectant solution.
- Where time permits and it is practical, it is good biosecurity practice to air dry equipment following cleaning and disinfection.
- Remove disposable gloves and dispose of safely.

Appendices

Appendix 1: Survey details for the Blackglen Road site in September 2024.

Contactor name	INVAS Biosecurity Ltd.
Surveyor name	William Earle
Survey date/time	September 2024
County	Dublin
Area	Blackglen Road
Site ID	SUR_BlackglenRoad_Enviroguide
Risk assessment (Potential hazards)	Slips/trips/falls particularly in dense undergrowth, working in isolation, river, wildlife, public
Health and safety (PPE required)	Hi viz, Safety boots
Regulated species recorded	RHO, SIK
GPS details	Throughout survey area
Area located	Throughout survey area
Site details	Overgrown site adjacent to Blackglen Road
Pervious treatment/Interference	General maintenance of roadside boundaries and adjacent private property. Temporary use of north for road construction project
Infestation beyond fence line	Yes, several species crossing boundaries to private property.
Notes	No
Photos	Throughout survey area
Is the site within or proximate to an ecologically sensitive area (SAC/SPA)	The Wicklow Mountains SAC (IE0002122) and Wicklow Mountains SPA (IE0004040) 5km. Fitzsimons Wood pNHA (001753) 100m.
Other invasive species observed	BUD, CLE, PHE, WHO, CHL, COT, SYC, LKO

Appendix 2: Schedule of activities for the Blackglen Road site.

Schedule of Activities			
Site ID	SUR_BlackglenRoad_Enviroguide		
Project details	IAPS Management		
Biosecurity supervisor			
Date	September 2024		
	Phase	Date	Additional comments
Site survey and development of Management Plan	1	September 2024	Site survey complete September 2024
Establish and implement biosecurity protocol	2		
Toolbox talks to appropriate staff	3		
Implementation of Management Plan	4		
Decontamination of vehicles and equipment	5		
Sign off	6		



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APPENDIX VI – HERPTOFAUNA RAPID ASSESSMENT REPORT (GANDOLA, 2024)

A Rapid Survey & Assessment for Herpetofauna at Blackglen Road LRD

Dublin 18



A REPORT TO ENVIROGUIDE

29TH JULY 2024

ROB GANDOLA **robgandola@gmail.com**

WILDLIFE CONSULTANT **0868629113**

KEY POINTS:

- Common frogs were found occupying a large percentage of the total site, with this year's metamorphs encountered in the wet grassland and near to the ephemeral ponding areas.

- Smooth newts were not detected however the timing of the assessment, lack of standing water, and overgrown vegetation made species specific surveying conditions difficult

- Ample suitable habitat and favourable landscape features are present within the site boundaries for the common lizard, *Zootoca vivipara*, although no individuals were seen during the survey.

- The potential for all three native amphibian and reptile species to occur on-site is high, given known populations live in close proximity

- Opportunities exist for habitat creation and enhancement works within the site that could ensure the continued persistence of these species within a rapidly urbanising environment.

- It is recommended that, should planning be granted, by way of condition a suite of surveys for all three species be conducted during the most appropriate time for these species i.e from February to June. This timing corresponds with when they will be more easily encountered and a better assessment of their population status can be determined.

EXECUTIVE SUMMARY:

A rapid survey was conducted to assess the occupancy of the proposed development site at Blackglen by two native amphibians, the common frog and smooth newt- *Rana temporaria* and *Lissotriton vulgaris*, and the common lizard, *Zootoca vivipara*. These species constitute the native herpetofauna that are known to inhabit the local landscape in south county Dublin.

Of the two amphibians, only common frogs were detected. The ephemeral nature of the ponds would also lend themselves to earlier metamorphosis and dispersal for any smooth newts that may also be resident. Common lizard were not detected either. However, ample suitable habitat is present on site. A single survey effort outside of the optimal survey period can only provide a limited assessment on the presence or any apparent absence(s) of the focal species.

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THINGS TO CONSIDER WHEN READING THIS REPORT

1. Unless explicitly stated, the data in this report should only be used to infer the presence of a given species where sightings occurred. The data in report should not be used to definitively indicate the absence of any species not detected over the course of the rapid survey. The sub-optimal timing of this rapid survey does not provide sufficient opportunity for an accurate estimate of population size(s) to be made nor a detailed assessment on the extent of species occupancy of available habitats at Blackglen road.

2. Best practice dictates that where a known occupied habitat is to be disturbed for a protected amphibian or reptile species (as in the case in Ireland for *Rana temporaria*, *Lissotriton vulgaris*, and *Zootoca vivipara*), even if the aim is to ultimately restore, enhance or otherwise provide a "net gain" for these species, then measures must be put in place to ensure, and mitigate, any risk to these species while the works are on-going. The "precautionary principle" should always be adhered to when dealing with widespread species and also in cases where the initial surveys were conducted outside of the recognised "peak season"

TABLE OF CONTENTS

1. **Scope and Aims** 1

2. **Introduction** 1

3. **Methodology** 2

3.1 Desktop study……2

3.2 Rapid Survey Zone……3

3.3 Survey methodology …… 3

3.4 Data collection, visualisation and analysis……3

3.5 Appropriate licensing by National Parks and Wildlife Service…… 3

4. **Results** 4

4.1 Desktop study 4

4.2 General results of rapid survey……. ……...…… 4

5. **Discussion & Conclusion** 5

6. **Recommendations** 5

References 6

Appendix A 7

Appendix B 8

1. SCOPE AND AIMS*:*

The scope of this study is to determine the status and distribution of the native amphibians and reptile within the proposed Black glen LRD. The primary aim of this rapid survey was to assess the occupancy status, distribution and habitat use of the local herpetofauna population(s) via a single rapid survey and make assessments on the habitat availability and quality for said populations with an overarching aim to identify ecologically important areas for each species and make recommendations for their protection while mitigating against the negative impacts of future development of the site for residential use.

1.2 STATEMENT OF AUTHORITY

All surveying and report writing was conducted by R Gandola, Wildlife Consultant. He has an MSc in Ecology from Bangor University, Wales and a BSc (hons) Zoology from UCD. He provides training and professional advice to Local and National Authorities, heritage rangers, eNGOs, and community groups in Ireland and Northern Ireland. He provides advice and regularly carries out surveys and implements monitoring and habitat management projects on the behalf of local authorities, government agencies and large corporates and other organisations. He is also holds the position of Senior Scientific Officer for the Herpetological Society of Ireland.

2. INTRODUCTION:

The common frog (*Rana temporaria*) and the smooth newt (*Lissotriton vulgaris*) comprise the native amphibian species of County Dublin. The common frog has a widespread distribution across the county and inhabits a wide array of habitats, both terrestrial and aquatic, including urban gardens, amenity greenspaces and wetlands (Reid et al. 2013). The smooth newt, while also widely distributed, tends to prefer habitats in proximity to more permanent vegetated pools and ponds, where they must return to breed. Their distribution and site occupancy within Dublin is not well known and it is likely that garden and urban ponds contribute a large proportion of the habitat available to both species.

The common lizard, *Zootoca vivipara*, is Ireland's only native terrestrial reptile. It has a broad global distributional, spanning from Ireland in the west to Hokkaido, Japan in the east (Inns, 2009). In Ireland, *Z. vivipara*, has a broad distribution and occupies a variety of habitats from

the limestone karst habitats, to bog-land and rural gardens, with coastal and heathland ecosystems deemed to be strongholds for the species (Marnell, 2002). In open scrubby systems, common lizards tend to occupy a mosaic of east to southwest facing subtle micro-habitats of high structural complexity (Edgar et. al, 2010).

The ephemeral ponds created from pluvial flooding of clay rich hollows at the east and south of the site could provide breeding habitat for both amphibian species as both species are known to breed in similar habitats in Fitzsimon's Wood north of the Blackglen road. Common lizards are also known to occur in the grass- and heathlands to the south of the site and up into the foothills of the Dublin Mountains at TickKnock.

2.1 CONSERVATION AND LEGAL STATUS OF AMPHIBIANS AND REPTILES (HERPETOFAUNA) IN IRELAND

All three amphibian and reptile species included in this assessment are protected under the Wildlife Act and amendments (1976, 2000) whereby it is an offence to kill, to deliberately disturb during breeding, rearing, hibernation or migration, or to damage a breeding site or resting place. In Northern Ireland, native herpetofauna are also protected under the Wildlife Order (1985). The common frog, *Rana temporaria*, is also protected under international legislation (EU Habitats Directive 92/43/EEC [Article 17 / Annex V]). All species are listed as being of "Least Concern" on the Irish Red List however there is no official national monitoring scheme in place for any of these species.

3. METHODOLOGY:

3.1 DESKTOP STUDY

A thorough search of all relevant databases (e.g NBDC) was conducted for relevant spatial data pertaining to local amphibian and common lizard presence within 2km of the proposed development site. The independent Herpetological Society of Ireland (HSI) database of native reptiles and amphibian sightings was also searched for records of herpetofauna from within the proposed survey areas.

3.2 RAPID SURVEY ZONE

All accessible areas within the boundaries of the site were surveyed. Existing animal tracks and trails and easy to navigate open spaces were walked and surveyed (Figure 1). Only the more overgrown and dense gorse and bracken areas to the very norther east of the site were not explored as access beyond the periphery was impossible at the time of survey.

3.3 SURVEY METHODOLOGY

A Visual encounter survey (VES) is the only appropriate methodology that can be used during a rapid survey unless there are opportunities for dip netting or funnel trapping (requires the presence of ponds or other waterbodies). The starting point for the survey was immediately upon access to the site from the Woodside Road.



Figure 1. A map of the Blackglen LRD site with herpetofauna sightings (yellow circles).Pink hatching = indicates suitable areas for common lizard; Blue = wet grassland and ephemeral pond-ing that likely has year round importance for resident frogs and any smooth newts and lizards IF they are present; Yellow = core area for Common frogs & yellow circles = common frog sightings respectively.

3.4 DATA COLLECTION, VISUALISATION AND ANALYSIS

Spatial data was collected using a Garmin 60csx unit coupled with a smartphone with geolocation turn-on, whichever had the highest accuracy at the time of encounter.

Data collected during the study was visualised with QGIS 3.32 Lima software. The same software was used to generate the Figures in this document.

3.5 Appropriate licensing by National Parks and Wildlife Service

A Valid licences for 2024 "To capture protected wild animals for educational, and scientific or other purposes" for Common frog, *Rana temporaria*; Smooth newt, *Lissotriton vulgaris*; and Common lizard, *Zootoca vivipara*, is held by R. Gandola (Licence no: C40/2024).

4. RESULTS:

4.1 DESKTOP STUDY

In total, 12 historical records were obtained for the survey area: *Rana temporaria* (n =8), *Lissotriton vulgaris* (n =3), and *Zootoca vivipara* (n=1) were retrieved from the National Biodiversity Data Centre (NBDC) archives for the area within 1km of the proposed LRD. The closest of these records is from Fitzsimons Wood pNHA(approx. 50m) across the Blackglen Road where two known smooth newt breeding ponds were known to have recently been accidentally lost during upgrade works to the road network (Appendix A).

4.2 GENERAL RESULTS OF THE RAPID SURVEY

A total of 6 encounters with the Common frog were made over the course of the rapid survey. Neither the smooth newt nor the common lizard were detected. However both ephemeral pond areas were completely dry. The Balally stream runs along the south and east of the site yet is very over shaded by dense hedging along the majority of its visible course. Ample habitat and potential refugia exists on site for both all three species (Appendix B)

5. DISCUSSION & CONCLUSION:

Only common frogs were found occupying a large percentage of the total site, with this year's metamorphs encountered in the wet grassland and near to the ephemeral ponding areas. Smooth newts were not detected however the timing of the assessment, lack of standing water, and overgrown vegetation made species specific surveying conditions difficult. Ample suitable habitat and favourable landscape features are present within the site boundaries for the common lizard, *Zootoca vivipara*, although no individuals were seen during the rapid survey. The potential for all three native amphibian and reptile species to occur on-site is high, given known populations live in close proximity. Opportunities exist for habitat creation and enhancement works within the site that could ensure the continued persistence of these species within a rapidly urbanising environment.

6. RECOMMENDATIONS:

Should the Planning Authority be mindful of granting permission for the proposed development,, it is recommended that a suite of focussed surveys for all three species be conducted during the most appropriate time for these species i.e from February to June 2025. This timing corresponds with when they will be more easily encountered and a better assessment of their population status can be determined. Standing water would also likely be available as the ephemeral ponds have shown themselves to hold water until mid-late Summer. Applying the "precautionary principle" in this case would not be advisable or feasible given the high percentage of site occupancy for the one species known to inhabit the site for certain. Upwards of 70% of the site would need to be "fenced out" to permit clearance works to be initiated. While these surveys would need to be carried out prior to the commencement of development, the results would more accurately guide the best approach to construction works while also directly informing the appropriate level(s) of mitigation required for the Blackglen Road site.

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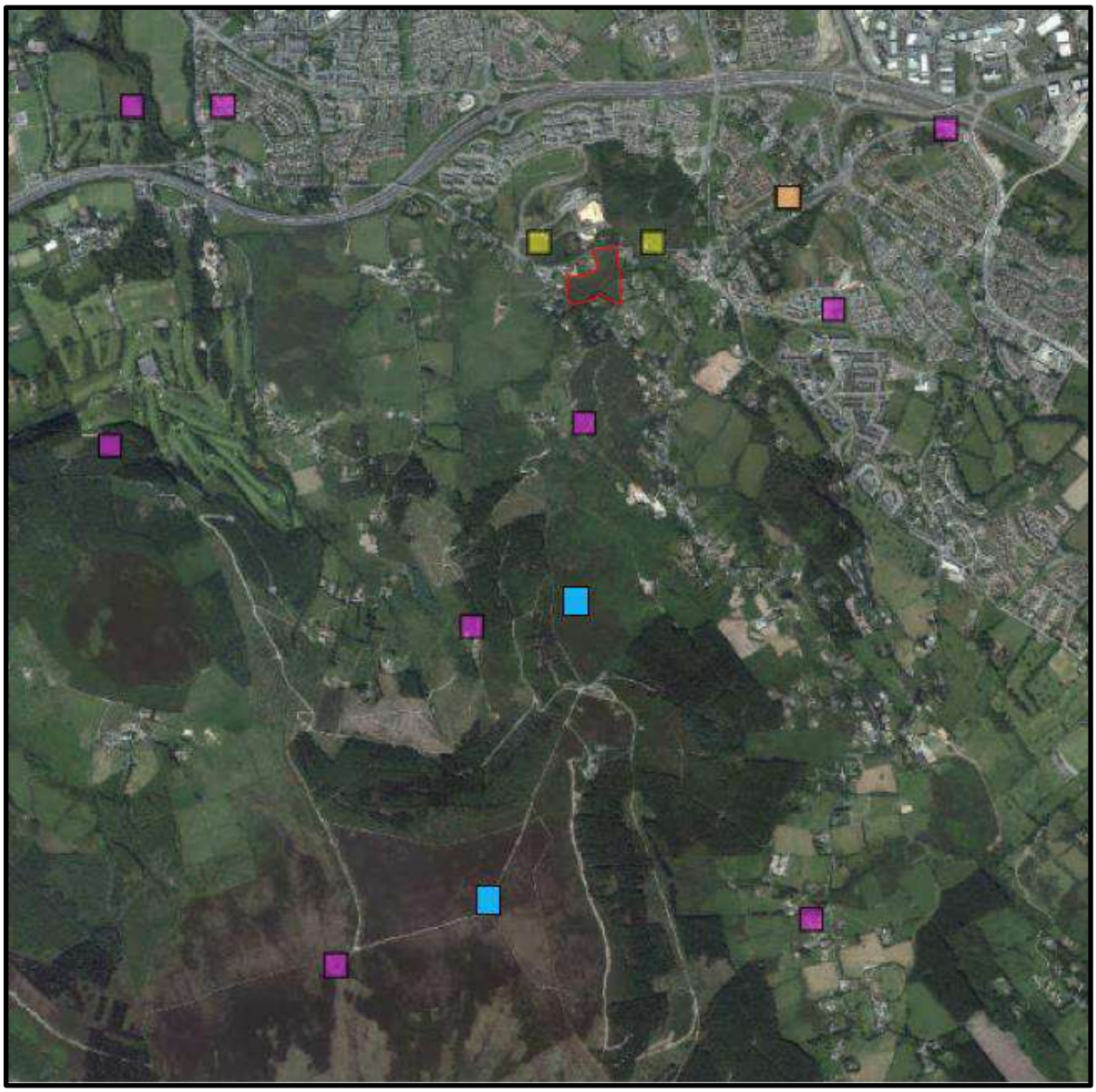
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Appendix A



A map highlighting the results of the desktop search for all native herpetofauna species with potential connectivity to the proposed development site at Blackglen road. **Pink box** = Common frog; **Yellow box** = Smooth newt; **Blue box** = Common lizard. **Red line** indicates the boundary of the proposed development site.

Appendix B



Habitat features available to native herpetofauna at Blackglen Road. Clockwise from top left: south facing open scrub edges; brash piles (refugia); open, south facing rocky scrub edge; common frog in gorse dominated scrub; 2024 metamorph froglet in-situ; recently dry ephemeral wetland habitat

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