Enviroguide CONSULTING

ECOLOGICAL IMPACT ASSESSMENT REPORT

FOR

PROPOSED
RESIDENTIALDEVELOPMENT

AT

STONEY HILL ROAD, RATHCOOLE,
COUNTY DUBLIN

ON BEHALF OF

Romeville Developments Ltd.

Prepared by
Enviroguide Consulting

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1 INTRODUCTION

Enviroguide Consulting was commissioned by Romeville Developments Ltd. to prepare an Ecological Impact Assessment Report for a Proposed Development at Stoney Hill Road, Rathcoole, Co. Dublin.

This Ecological Impact Assessment (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. This report will describe the ecology of the Proposed Development area, with emphasis on habitats, flora and fauna, and will assess the potential effects of the Construction and Operational Phases of the Proposed Development on these ecological receptors. The report follows Guidelines for Ecological Impact Assessment in the UK and Ireland, by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018).

1.1 Quality assurance and competence

Synergy Environmental Ltd., T/A Enviroguide Consulting, is wholly Irish Owned 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. Aisling Walsh, Professional Bat Ecologist with Ash Ecology and Environmental Ltd. undertook the on-site bat surveys. **Shannen O'Brien**, Ecologist with Enviroguide undertook the remaining ecological surveys and desktop research for this report.

Aisling Walsh is a Professional Ecologist and director of Ash Ecology Consulting. Aisling has a wealth of academic qualification having studied a MSc in Biodiversity and Conservation (TCD), A BSc (Hons) Zoology (NUIG), a Diploma in Applied Aquatic Sciences (GMIT), a Post Graduate Diploma in Statistics (TCD), and a Certificate in Environmental Noise (Institute of Acoustics); while also holding a full membership of the Chartered Institute of Ecology and Environmental Management (CIEEM). Aisling has written numerous Ecological Impact Assessments (EcIA), Screening for Appropriate Assessment Stage I and Stage II Natura Impact Statement, Environmental Impact Assessments/Statements, Badger Surveys, Bat Surveys, Habitat Surveys. She has also provided input and reviewed Ecological and Environmental assessments for several EIS and EIA Reports and conducted numerous noise surveys for EPA licensed facilities. AEE is listed as a Registered Practice by the CIEEM.

Shannen O'Brien has a B.A. in Zoology from Trinity College Dublin and a M.Sc. Hons. in Wildlife Conservation and Management from University College Dublin, and has experience in desktop research, report writing, and literature scoping-review, as well as practical field and

laboratory experience (Pollinator surveying, sampling and identification, habitat surveying, invasive species surveying, etc.). Shannen has prepared Stage I and Stage II Appropriate Assessment Reports, Invasive Species Surveys, Ecology Statements, and Ecological Impact Assessments (EcIA).

2 RELEVANT LEGISLATION

An Ecological Impact Assessment (EcIA) is a process of identifying, quantifying, and evaluating potential effects of development-related or other actions on habitats, species and ecosystems (CIEEM, 2016). The Proposed Development is a sub-threshold for an Environmental Impact Assessment (EIA) under the Planning and Development Regulations 2011-2018.

When an EcIA is undertaken as part of an EIA process it is subject to the EIA Regulations (under the EU Planning and Development [Environmental Impact Assessment] Regulations 2001-2018). An EcIA is not a statutory requirement, however it is a best practice evaluation process. 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 EcIA is provided to assist the Planning Authority with its decision making in respect of the Proposed Development.

2.1 National Legislation

2.1.1 Wildlife Act 1976 and amendments

The Wildlife Act 1976 was enacted to provide protection to birds, animals, and plants in Ireland and to control activities which may have an adverse impact on the conservation of wildlife. 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.

2.1.2 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."**

2.1.3 Invasive Species Legislation

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

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

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

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

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

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

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

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

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

2.2 International Legislation

2.2.1. EU Birds Directive

The Birds Directive 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 and a total of 153 Special Protection Areas have been designated.

2.2.2. EU Habitats Directive

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

2.2.3. Water Framework Directive

The EU Water Framework Directive (WFD) 2000/60/EC is an important piece of environmental legislation which aims to protect and improve water quality. It applies to rivers, lakes, groundwater, estuaries, and coastal waters. The Water Framework Directive was agreed by all individual EU member states in 2000, and its first cycle ran from 2009 – 2015. The Directive runs in 6-year cycles, so the second 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.

2.2.4. Bern and Bonn Convention

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

2.2.5. Ramsar Convention

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

3 DESCRIPTION OF THE PROPOSED DEVELOPMENT

3.1 Location

The Site of the Proposed Development is 2.9Ha, located along Stoney Hill Road, approximately 170m west of the Four District Woodlands and 750m south of the N7. The Site is bounded along the west and partially along the north boundary by residential units, with the remaining borders abutted by agricultural land. The landscape to the north and northwest is urban, while the remaining environment is agricultural in nature.

3.2 Description

The Proposed Development comprises of the demolition of 1 no. residential property and 1 no. ancillary outbuilding and will consist of the construction of a residential development of 42 no. 3 bedroom dwellings in a mix of terraced and semi-detached units. The proposed dwellings will comprise of 2 no. typologies (Typology F and Typology L). Typology F will comprise of 21 no. dwellings and Typology L will comprise of 21 no. dwellings. Typology L are two storey and typology F are two storey, plus second floor loft accommodation with front dormer windows. The total proposed residential development gross floorspace is circa: 5,622 sqm.

The Proposed Development also includes 84 no. in curtilage surface car parking spaces, circa 3,281 sq.m public open spaces in an eastern park and a western park, (including proposed play equipment), an additional large parkland to the south of the site of circa 11,797 sq.m comprising the first phase of a linear park, private domestic gardens, a new vehicular, pedestrian and cycle entrance from Stoney Hill Road, an internal road network, including footpaths / cycleways, 3 no. refuse/bin stores, public lighting, landscaping, boundary treatments, drainage and engineering works and all other associated and ancillary development / works.

The incorporation of Sustainable Urban Drainage Systems (SUDS) into the design of the Proposed Development is mandatory for all new developments under the Greater Dublin Regional Code of Practice for Drainage Works. As such, the Proposed Development design entails a suite of SuDS measures. SUDS is a series of management practices and control structures that aim to mimic natural drainage. SUDS reduces flood risk, improves water quality and provides amenity through the use of permeable paving, swales, green roofs, rainwater harvesting, detention basins, ponds and wetlands[1].

[1] https://www.dublincity.ie/dublin-city-development-plan-2016-2022/9-sustainable-environmental-infrastructure/95-policies-and-objectives/954-surface-water-drainage-and

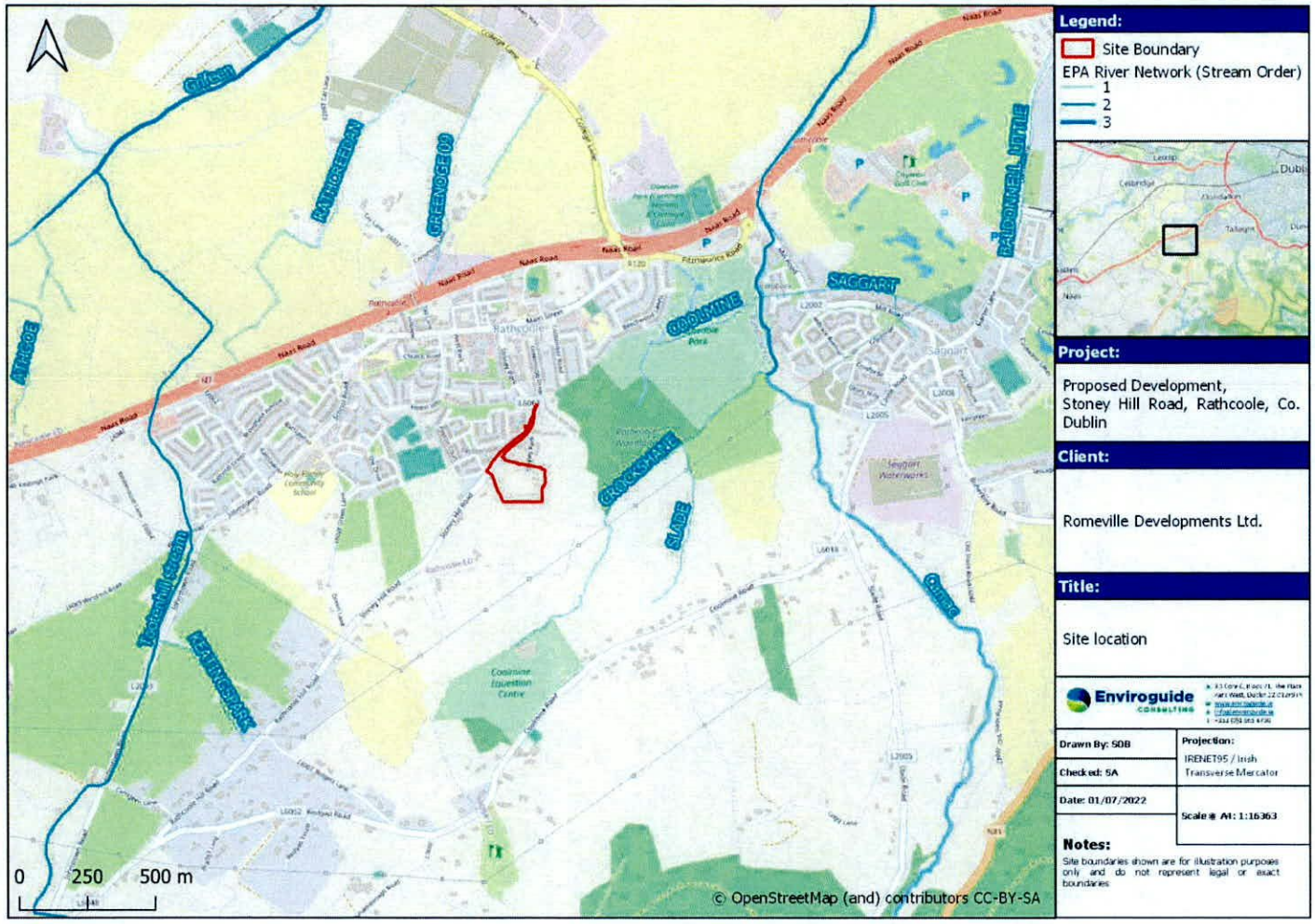

FIGURE 1. SITE LOCATION.

4 METHODOLOGY

This section details the steps and methodology employed to undertake an Ecological Impact Assessment of the Proposed Development.

4.1 Scope of Assessment

The specific objectives of the study were to:

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

4.2 Desk Study

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

- Information on species records and distributions, obtained from the National Biodiversity Data Centre (NBDC) at *www.maps.biodiversityireland.ie*.
- Information on waterbodies, catchment areas and hydrological connections obtained from the Environmental Protection Agency (EPA) at *www.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 of designated conservation sites, 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 and Ordnance Survey Ireland.
- Information on the existence of permitted developments, or developments awaiting decision, in the vicinity of the Proposed Development from South Dublin County Council available at: https://sdublincoco.maps.arcgis.com/apps/webappviewer/index.html?id=004b5a1a557a4c1a91b4629923f9d4b7
- Information on the extent, nature and location of the Proposed Development, provided by the applicant and/or their design team.
- The current conservation status of birds in Ireland taken from Gilbert et al. (2021).
- The pollinator friendly planting code provided by The All-Ireland Pollinator Plan (2015-2020 and 2021-2025) available at www.pollinators.ie
- Connecting with Nature – Draft Biodiversity Action Plan for South Dublin County 2020-2026
- South Dublin County Development Plan 2022-2028

A comprehensive list of all the specific documents and information sources consulted in the completion of this document is provided in Section 11, References.

4.3 Field surveys

4.3.1 Habitat Surveys

Habitat surveys were carried out at the Site on the 23rd of July 2021 and the 15th of June 2022. 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. Satellite imagery was used together with GPS to accurately enable field navigation. Habitat categories, characteristic plant species, invasive species and other ecological features were recorded.

4.3.2 Bat Surveys

A bat survey was carried out on Site of the Proposed Development on the 24th of August 2021. A Seek Thermal Reveal Pro High-Resolution Thermal Imaging Camera, along with a RIDGID 36848 Micro CA-150 Hand-Held Borescope was available for inspection of any crevices/roof spaces on the building (where accessible). The borescope is fitted with a camera and allows visibility of confined spaces and narrow passages potentially used by hibernating/roosting bats. It allows spaces up to 3m from ground level to be inspected. Further details of the Bat Report can be found in Appendix III.

4.3.3 Bird Surveys

Bird surveys were completed on the 23rd of July 2021 and the 15th of June 2022. All birds encountered on Site, through visual and/or audio means, were recorded during this survey.

4.3.4 Mammal Surveys

Mammal surveys of the Site were carried out in conjunction with the habitat surveys. The Site was examined for tracks and 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.

4.3.5 Invasive Species Surveys

The Site was assessed for the presence of invasive plant species during the habitat surveys undertaken.

4.4 Consultation

No consultation was undertaken as part of this Ecological Impact Assessment.

4.5 Assessment

The value of the ecological resources, i.e., the habitats and species present or potentially present, was determined using the ecological evaluation guidance given in the National Roads Authority's Ecological Assessment Guidelines (NRA, 2009a), presented in Appendix I. This evaluation scheme, with values ranging from locally important to internationally important, seeks to provide value ratings for habitats and species present that are considered ecological

receptors of impacts that may ensue from a proposal. As per the NRA guidelines, impact assessment is only undertaken of key ecological receptors (KERs).

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

4.6 Limitations

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.

5 BASELINE ECOLOGICAL CONDITIONS

5.1 Site Overview

5.1.1 Geology, Hydrology and Hydrogeology

The Site of the Proposed Development is within the *Liffey and Dublin Bay* catchment and *Liffey_SC_090* sub catchment. The closest watercourse to the Site is the Crockshane Stream approximately 240m to the southeast, which flows into the River Camac almost 900m northeast of the Site of the Proposed Development. The EPA station located approximately 650m upstream of where these watercourses intersect designated the River Camac as *Poor* (Q-Value 3) by the EPA in 2019 (station code: RS09C020100). This watercourse is currently *At Risk* of not meeting its WFD objectives and was assigned a *Moderate* ecological status during the most recent 2013-2018 survey period. The River Camac flows into the River Liffey, and ultimately into Dublin Bay.

The surface water drainage network surrounding the Site drains to the River Griffeen, 1.7km northwest of the Site. The River Griffeen is *At Risk* of not meeting its WFD objectives and was designated a *Moderate* ecological status during the most recent 2013-2018 survey period and a *Good* chemical surface water status. The most current EPA station assigned this watercourse a *Poor* (Q-Value 3) status in 2019 (station code: RS09G010600). The River Griffeen also enters the River Liffey and flows into Dublin Bay.

The Site is situated on the *Kilcullen* groundwater body, which is *At Risk* of not meeting its WFD objectives. The predominant aquifer type within the Site boundary is *Poor Aquifer* (Pl) on bedrock which is *Generally Unproductive except for Local Zones*, with small areas of the northwest and southeast of the Site on *Poor Aquifer* (Pu) on bedrock which is *Generally Unproductive*. The groundwater rock units underlying the aquifer are classified as *Silurian Metasediments and Volcanics* (GSI, 2022).

The level of vulnerability of the Site to groundwater contamination via human activities is predominantly *High*, with an area of *Extreme* within the east of the Site. The main soil is classified as *Drumkeeran*, with an area of *Urban* in the northwest and the predominant subsoil is Sandstone and shale till (Lower Paleozoic) (*TLPSsS*), with a small area of made ground (*Made*) within the northwest of the Site (EPA, 2022).

5.2 Designated Sites

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and wild fauna and flora by the designation of Special Areas of Conservation (SACs) and the Birds Directive (2009/147/EC) seeks to protect birds of special importance by the designation of Special Protection Areas (SPAs). It is the responsibility of each member state to designate SPAs and SACs, both of which will form part of Natura 2000, a network of protected sites throughout the European Community. SACs are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPAs are selected for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats. The annexed habitats and species for which each site is selected

correspond to the qualifying interests of the sites; from these the conservation objectives of the site are derived.

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 SAC and/or 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.

Table 1 below presents details of the designated sites within a 15km radius of the Proposed Development. In addition, the potential for connectivity with designated sites at distances of greater than 15km from the Development was also considered in this initial assessment. In this case, there is no potential connectivity between the Development site and designated sites located at a distance greater than 15km from the Proposed Development.

The result of this preliminary screening concluded that there is a total of 6 SACs, 4 SPAs and 16 pNHAs located within the Zone of Influence of the Proposed Development Site. The distances to each site listed are taken from the nearest possible point of the Proposed Development Site boundary to nearest possible point of each European Site or pNHA. In addition, Dublin Bay is designated as a UNESCO Biosphere[2]. Dublin Bay Biosphere contains three different zones, which are managed in different ways:

- The core zone of Dublin Bay Biosphere comprises 50km² of areas of high natural value. Key areas include the Tolka and Baldoyle Estuaries, Booterstown Marsh, Howth Head, North Bull Island, Dalkey Island and Ireland's Eye.
- The buffer zone comprises 82km² of public and private green spaces such as parks, greenbelts and golf courses, which surround and adjoin the core zones.
- The transition zone comprises 173km² and forms the outer part of the Biosphere. It includes residential areas, harbours, ports and industrial and commercial areas.

TABLE 1. DESIGNATED SITES WITHIN THE ZONE OF INFLUENCE (15KM) OF THE PROPOSED DEVELOPMENT, POTENTIAL PATHWAYS BETWEEN THE PROPOSED DEVELOPMENT SITE AND THE DESIGNATED SITES. SITES THAT HAVE BEEN SCREENED INTO THIS ECIA FOR FURTHER ASSESSMENT ARE SHADED IN GREEN.

Site Name & Code (Receptor)	Distance to Proposed Development	Potential Pathway to receptor
Special Area of Conservation		
Glenasmole Valley SAC (001209)	6.4km SE	No – Refer to AA Screening Report accompanying this application.
Wicklow Mountains SAC (002122)	7.3km SE	
Rye Water Valley/Carton SAC (001398)	9.5km NW	
Red Bog, Kildare SAC (000397)	9.6km SW	
South Dublin Bay SAC (000210)	*>15km NE*	

[2] A biosphere is a special designation awarded by the United Nations Educational, Scientific and Cultural Organisation (UNESCO) but managed in partnership by communities, NGOs and local and national governments (https://www.dublinbaybiosphere.ie/).

Site Name & Code (Receptor)	Distance to Proposed Development	Potential Pathway to receptor
North Dublin Bay SAC (000206)	*>15km NE*	
Special Protection Area		
Wicklow Mountains SPA (004040)	10.5km SE	No – Refer to AA Screening Report accompanying this application.
Poulaphouca Reservoir SPA (004063)	10.7km S	
South Dublin Bay and River Tolka Estuary SPA (004024)	*>15km NE*	
North Bull Island SPA (004006)	*>15km NE*	
Proposed Natural Heritage Area		
Slade Of Saggart And Crooksling Glen (000211)	1.8km SW	No – there is no hydrological connection with these pNHAs and the intervening distances between the Site and the pNHAs are sufficient to exclude the possibility of significant effects on the pNHA arising from: emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.
Lugmore Glen (001212)	4.0km SE	
Grand Canal (002104)	5.5km N	
Kilteel Wood (001394)	5.8km SW	
Glenasmole Valley (001209)	6.4km SE	
Dodder Valley (000991)	7.4km E	
Liffey Valley (000128)	8.6km N	
Red Bog, Kildare (000397)	9.5km SW	
Rye Water Valley/Carton (001398)	9.5km NW	
Royal Canal (002103)	10.2km N	
Poulaphouca Reservoir (000731)	10.3km S	
South Dublin Bay (000210)	*>15km NE*	Yes - Weak hydrological pathway via surface water discharges to the River Camac both the Construction and Operational Phases and discharges from Ringsend WwTP into Dublin Bay during the Operational Phase. There is also a potential hydrogeological pathway to the River Camac via groundwater flow. The potential for pollutants to enter the River Griffeen via surface water and River Camac via groundwater from the Site of the Proposed Development to reach European Sites within Dublin Bay and cause significant effects, during both the Construction and Operational Phase, is negligible due to: • The distance and consequent potential for dilution in the River Griffeen, River Liffey and Dublin Bay. Surface water discharges would have to travel over 32km along the River Griffeen and River Liffey before discharging into Dublin Bay. • The distance and consequent potential for dilution in the River Camac, River Liffey and Dublin Bay. Surface water discharges would have to travel approximately 23km along the River Camac and River Liffey before discharging into Dublin Bay.
North Dublin Bay (000206)	*>15km NE*	

Site Name & Code (Receptor)	Distance to Proposed Development	Potential Pathway to receptor
		• The potential for dilution in the surface water network during heavy rainfall events. Also, the potential for foul water generated at the Site of the Proposed Development to reach Dublin Bay and cause significant effects, during Operational Phase, is excluded due to: • The fact that the surface water hydrological link will only exist during rainfall events. • The upgrade works to Ringsend WWTP which will increase the capacity of the facility from 1.6 million PE to 2.4 million PE. • Effects on marine biodiversity and protected sites within Dublin Bay from the current operation of Ringsend WwTP are unlikely (see section 8.1.3 for more details).

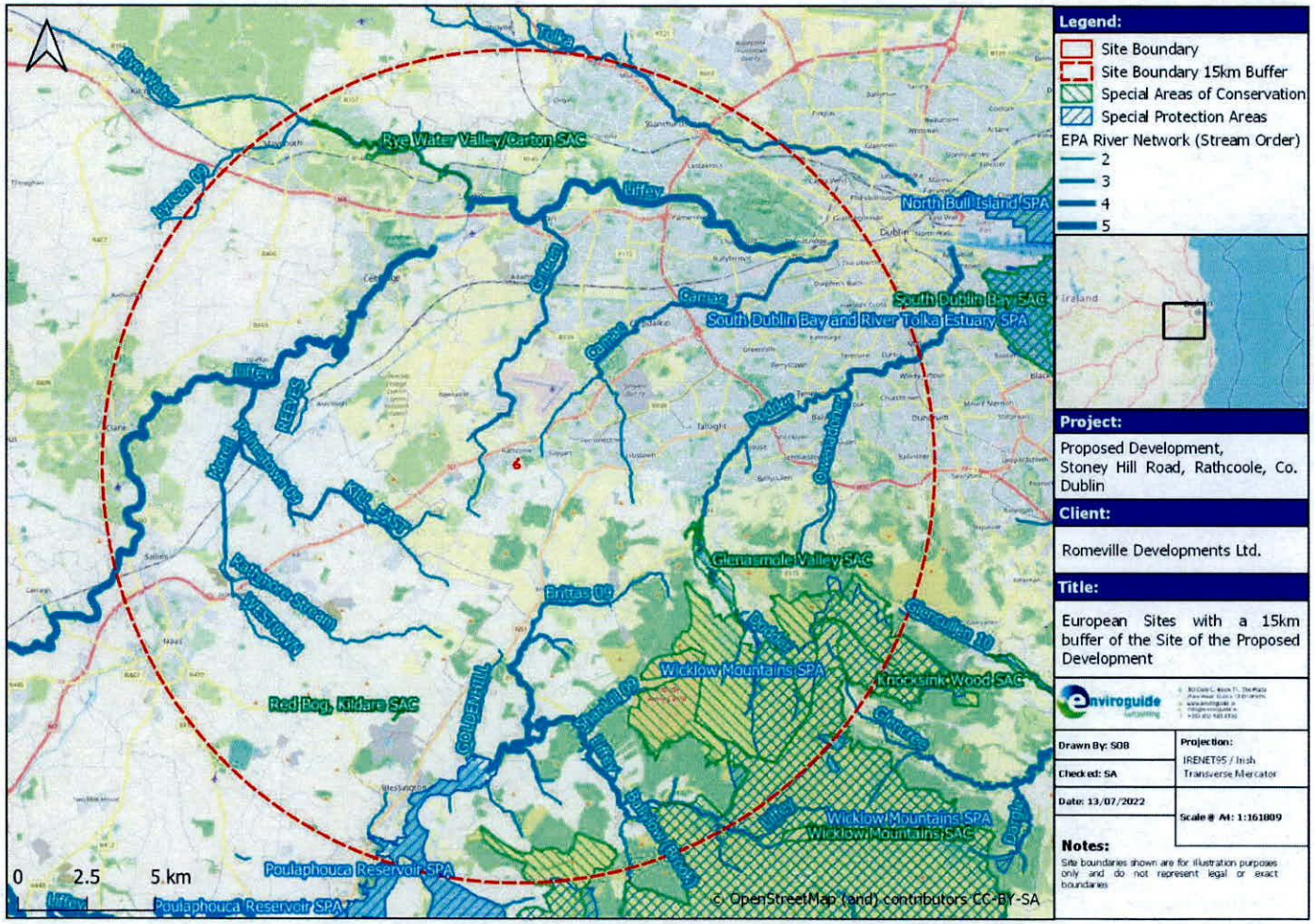

FIGURE 2. EUROPEAN SITES WITHIN 15KM OF THE PROPOSED DEVELOPMENT SITE.

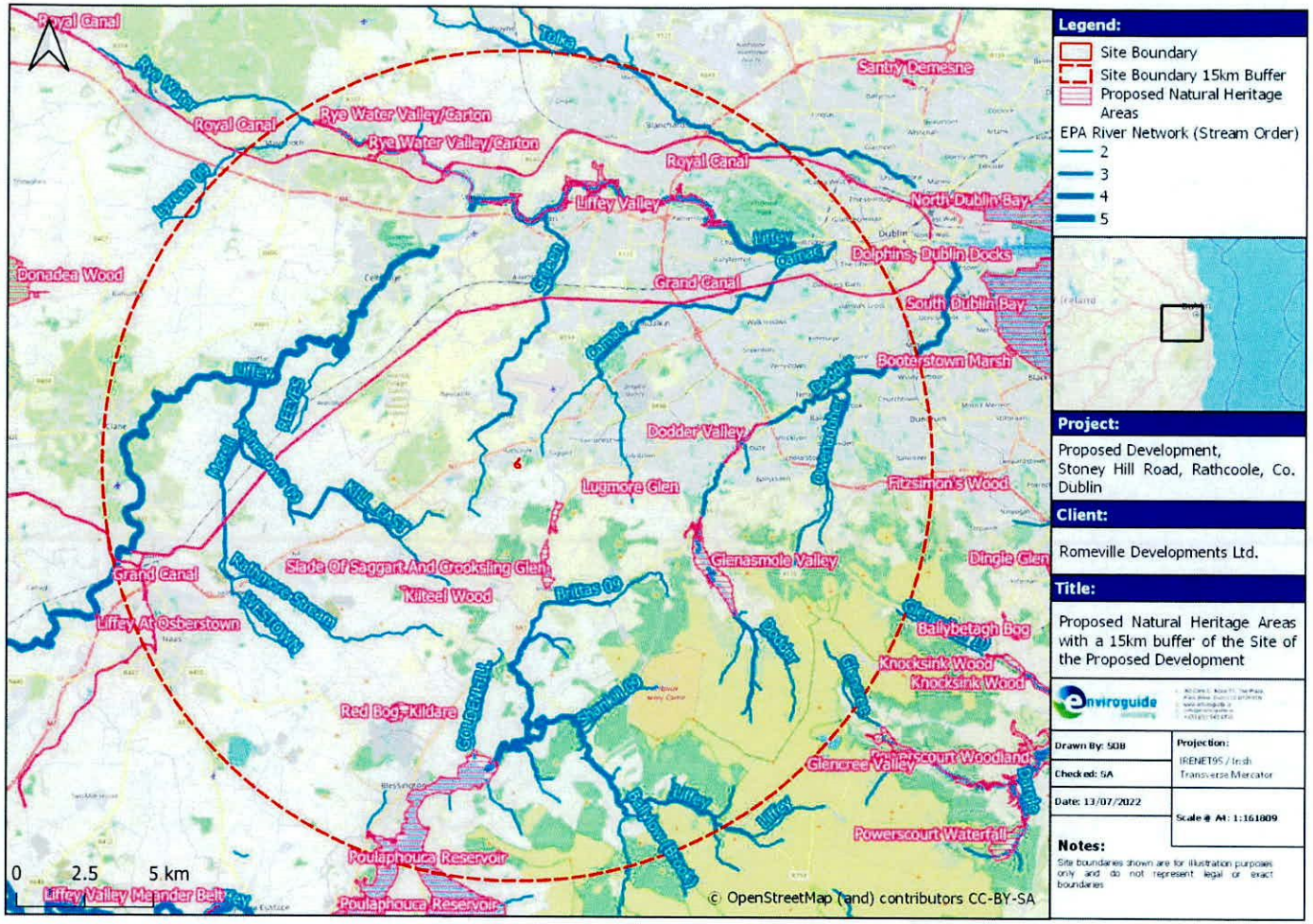

FIGURE 3. PROPOSED NATURAL HERITAGE AREAS WITHIN 15KM OF THE PROPOSED DEVELOPMENT SITE

5.3 Desk Study

5.3.1 Species and Species Groups

The Site of the Proposed Development is located within the Ordnance Survey Ireland National Grid 2km square O02I. Species records from the National Biodiversity Data Centre (NBDC) online database for this grid square was studied for the presence of rare or protected flora and fauna. The following records were excluded:

- Records greater than 20 years old.
- Species records with no designation or conservation status (excluding mammals and birds).

In addition, data from various sources (e.g., Inland Fisheries Ireland) were used to determine the presence of species in the vicinity of the Proposed Development. The following sections outline the results of this assessment.

5.3.1.1 Flora

Rare and Protected Flora

Species records from the NBDC online database were studied for the presence of rare of protected flora and no records were found. There are no records for protected bryophytes within the area[3].

Invasive Plant Species

The NBDC have records (dated within the last 20 years) of 1 *Medium Impact* invasive plant species within the 2km (O02I) grid square (Table 2).

TABLE 2. INVASIVE PLANT SPECIES WITHIN THE 2KM (O02I) GRID SQUARE. THE RECORDS ARE DATED WITHIN THE LAST 20 YEARS AND ARE PROVIDED BY THE NBDC.

Name	Date of last record	Database	Legal status / Designation
Sycamore *Acer pseudoplatanus*	05/06/2016	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	- Medium Impact Invasive

5.3.1.2 Mammals (excl. bats)

Records for terrestrial mammals were retrieved from the NBDC online database. Table 3 lists these species, their last record date and summarises their legal status/designation. Two terrestrial mammals were recorded within the 2km grid square (O02I), one of which is protected, namely Hedgehog, with records of both live animals and roadkill throughout the landscape surrounding the Site.

[3] https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=71f8df33693f48edbb70369d7fb26b7e

TABLE 3. TERRESTRIAL MAMMAL SPECIES WITHIN THE 2KM (O02I) GRID SQUARE. THE RECORDS ARE DATED WITHIN THE LAST 20 YEARS AND ARE PROVIDED BY THE NBDC.

Name	Date of last record	Database	Legal Status / Designation
Red Fox *Vulpes vulpes*	20/09/2015	Atlas of Mammals in Ireland 2010-2015	- n/a
West European Hedgehog *Erinaceus europaeus*	11/10/2020	Hedgehogs of Ireland	- Wildlife (Amendment) Act, 2000

5.3.1.3 Bats

There are 3 bat species recorded within the 2km grid square associated with the Site (O02I), namely Brown Long-eared Bat (*Plecotus auritus*), Pipistrelle (*Pipistrellus pipistrellus sensu lato*), and Soprano Pipistrelle (*Pipistrellus pygmaeus*). The NBDC maps landscape suitability for bats based on Lundy et al. (2011). The index ranges from 0 to 100 with 0 being least favourable and 100 most favourable for bats. The overall habitat suitability index for bats in the area is 39.67. The species with the highest individual suitability scores for the area encompassing the Site are Lesser Noctule (*Nyctalus leisleri*) and Brown Long-eared Bat (*Plecotus auritus*), both with 59.

5.3.1.4 Birds

A total of 3 bird species have been recorded within the 2km grid square by the NBDC within the last 20 years. Of these, 2 are listed as *Green* in *Birds of Conservation Concern in Ireland 2020-2026* (Gilbert et al., 2021), namely Buzzard (*Buteo buteo*) and Wood Pigeon (*Columba palumbus*), and also Pheasant (*Phasianus colchicus*), a green-listed game bird.

5.3.1.5 Fish

There were no fish species recorded within the 2km grid square by the NBDC.

Atlantic salmon (*Salmo salar*) & Brown trout (*Salmo trutta*)

There are three species of salmonid associated with freshwater habitats in Ireland, namely Atlantic Salmon (*Salmo salar*), Brown Trout (*Salmo trutta*) and Arctic Char (*Salvelinus alpinus*), the latter of which is only associated with lake waterbodies in Ireland. The Atlantic salmon is listed as an Annex II species under the Habitat Directive.

The River Griffeen was surveyed by Inland Fisheries Ireland in September 2011 for the Water Framework Directive. The closest sample site to the Site of the Proposed Development is at Grange Castle, located 4.8km north, and only the Three-Spined Stickleback (*Gasterosteus aculeatus*) was recorded at this Site. Further downstream, at the Griffeen Avenue site, two ages classes (0+, 1+ and older), were recorded (Kelly et al., 2012).

The River Camac was surveyed in September of 2017 and three age classes of Brown Trout (0+, 1+ and 2+) were recorded at the survey site located closest to the Site of the Proposed Development, which was the Moneenalion Commons Bridge, 2.6km north of the Site (Matson et al., 2018).

Petromyzonidae (Lamprey sp.)

There are three lamprey species native to Ireland including Sea Lamprey (*Petromyzon marinus*), River Lamprey (*Lampetra fluviatilis*) and Brook Lamprey (*Lampetra planeri*). All

three species are listed under Annex II of the Habitats Directive and are protected by the Fisheries Acts 1959 to 2006. Lamprey was not recorded were recorded within the Griffeen River in 2011 (Kelly et al., 2012), or at the Moneenalion Commons Bridge survey site in 2017 (Matson et al., 2018).

European eel (*Anguilla anguilla*)

European eel is a red listed species[4] and are currently considered to be one of the most threatened fish species in Ireland (King *et al.* 2011). Eels were recorded within the Griffeen River in 2011 (Kelly et al., 2012), but were not recorded at the Moneenalion Commons Bridge survey site in 2017 (Matson et al., 2018).

There are no waterbodies within the Site of the Proposed Development itself.

5.3.1.6 Amphibians

Common Frog *Rana temporaria* was recorded within the 2km (O02I) grid square (NBDC: *Amphibians and reptiles of Ireland*). No suitable habitat exists for either species at the Site, with no pooling, ditches or wet grassland type habitats present. The Site is considered unsuitable for amphibian usage and therefore these species are not assessed further in this report.

5.3.1.7 Invertebrates

There is one record of Freshwater White-clawed Crayfish (*Austropotamobius pallipes*) within the 2km (O02I) grid square, 1.1km east of the Site within the River Camac There are also records of one *Medium Impact* invasive invertebrate species, Jenkins' Spire Snail (*Potamopyrgus antipodarum*), which was recorded at the same Site as the White-clawed Crayfish.

5.3.1.8 Other species and species groups

There are no records of Common Lizard *Zootoca vivipara* within the 2km grid square (O02I). In addition, this species is associated with coastal and heathland habitats, but also locally in rural gardens, stone walls and roadside verges (King et al., 2011). The habitat at the Site of the Proposed Development is not considered suitable for this species.

5.4 Field Surveys

5.4.1 Habitats & Flora

The habitats encountered and identified at the Site of the Proposed Development have been classified and coded as per Fossitt (2000). These are described below.

- Dry Meadows and Grassy Verges (GS2)
- Hedgerows (WL1)
- Recolonising Bare Ground (ED3)
- Spoil and Bare Ground (ED2)
- Improved Agricultural Grassland (GA1)

[4] The status of a species is designated by the relevant authorities as Red. Amber or Green. Red list species range from vulnerable to extinct, Amber list species with unfavourable conservation status or declining population, and Green list species are those which are not currently of conservation concern.

- Buildings and Artificial Surfaces (BL3)

The predominant habitat on the Site of the Proposed Development is *Dry Meadows and Grassy Verges GS2* habitat, with Buttercup (*Ranunculus sp.*), Dock (*Rumex sp.*), Spear Thistle (*Cirsium vulgare*), Rosebay Willowherb (*Chamaenerion angustifolium*), Red Clover (*Trifolium pratense*), White Clover (*Trifolium repens*), and Narrow-Leaved Hawk's Beard (*Crepis tectorum*) recorded throughout. A small number of young Elder (*Sambucus nigra*) specimens were observed within this grassland. *Spoil and Bare Ground ED2* habitat exists on Site in the form of a dirt track that extends from the north of the Site towards the centre and enters an area of *Recolonising Bare Ground ED3*. The species recolonising this zone include the floral species mentioned above, along with Poppy (*Papaver somniferum*) and Ramping Fumitory (*Fumaria muralis*). A patch of construction spoil was also observed immediately south of the area of recolonisation.

Hedgerow WL1 habitat bounds the northwest and east of the meadow habitat, and is comprised of Willow (*Salix sp.*), Elder, Hawthorn (*Crataegus monogyna*), and Bramble (*Rubus fruticosus agg.*). This habitat also bounds the residential property that falls within the east of the Site. *Improved Agricultural Grassland GA1* was observed on Site to the east and south of the residential property, with Buttercup, Dock, Ragwort (*Senecio jacobaea*), and Ribwort Plantain (*Plantago lanceolata*) recorded throughout. An area of *Buildings and Artificial Surfaces BL3* consisting of Stoney Hill Road is present along the west of the Site, extending north.

FIGURE 4. DRY MEADOWS AND GRASSY VERGES GS2 HABITAT AT THE SITE OF THE PROPOSED DEVELOPMENT – PHOTO TAKEN ON THE 15TH OF JUNE 2022

FIGURE 5. RECOLONISING BARE GROUND ED3 HABITAT ON SITE, WITH SPOIL AND BARE GROUND ED2 (LEFT BACKGROUND) – PHOTO TAKEN ON THE 15TH OF JUNE 2022

FIGURE 6. HEDGEROW WL1 HABITAT BOUNDING THE SITE OF THE PROPOSED DEVELOPMENT - PHOTO TAKEN ON THE 15TH OF JUNE 2022

5.4.1.1 Invasive Plant Species

Non-native species in Ireland have been assessed and assigned an impact rating of either 'High', 'Medium' or 'Low' impact based on a number of factors that determine a species' potential to become established in this country and have significant impacts (Kelly et al., 2013). Invasive species can also be rated as an 'Amber-list species', which signifies a 'Medium' impact potential or established invasive species that may pose a threat to conservation goals (Invasive Species Ireland).

No non-native/invasive species were observed on the Site of the Proposed Development.

No species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations (S.I. 477 of 2011) including Japanese Knotweed (*Reynoutria japonica*) were recorded at the Site.

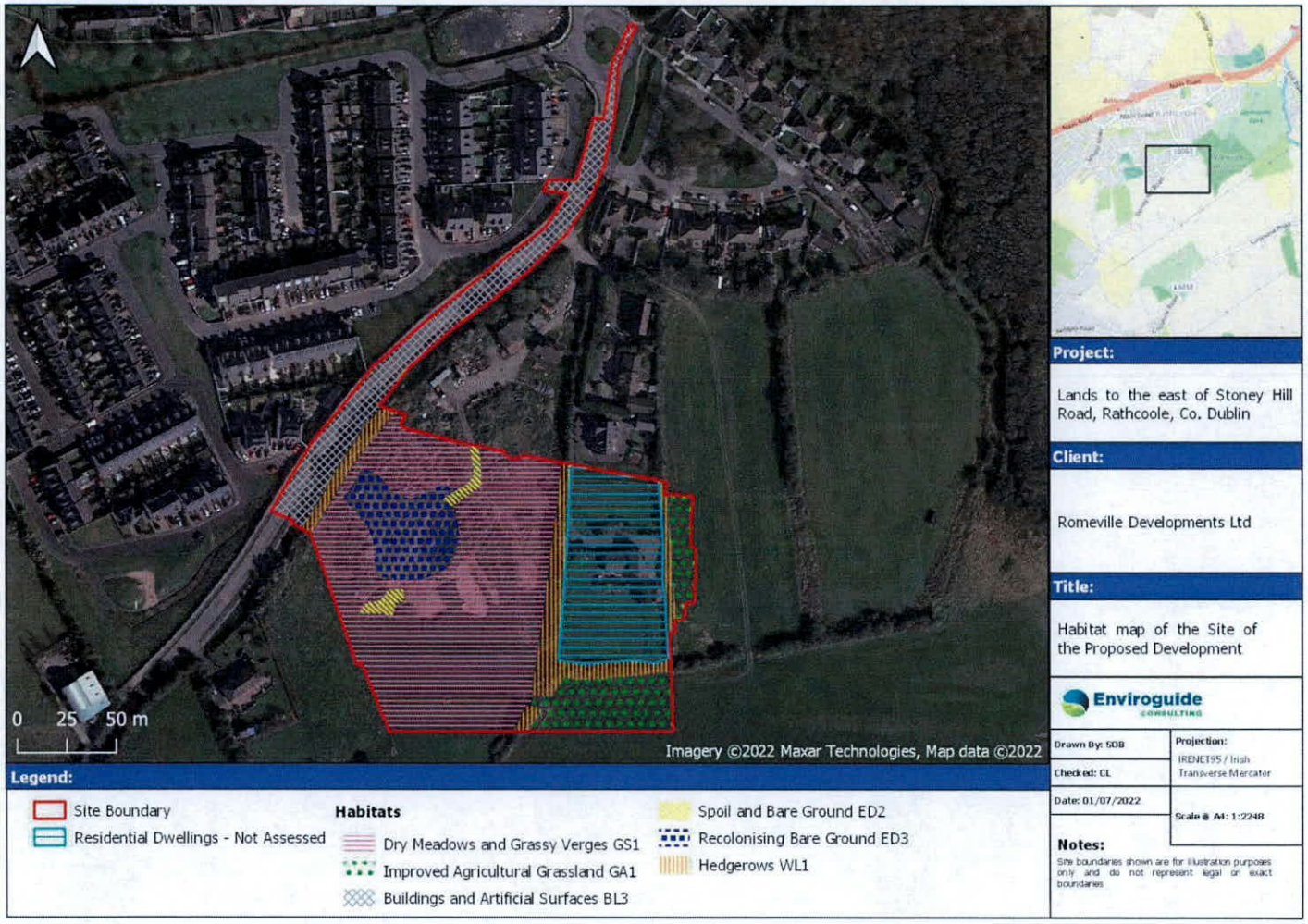

FIGURE 7. HABITATS FOUND WITHIN SITE OF THE PROPOSED DEVELOPMENT

5.4.2 Bats

Five bat species were recorded on Site on the 24th of August 2021, namely Soprano Pipistrelle (*Pipistrellus pygmaeus*), **Natterer's Bat** (*Plecotus auritus*), Common Pipistrelle (*Pipistrellus pipistrellus*), and Brown Long Eared Bat (*Myotis nattereri*), with **Leisler's Bat** (*Nyctalus leisleri*) recorded within the surrounding environment. A '***Moderate***' level of bat activity was recorded on Site, with the majority of the activity recorded along the mature hedgerow habitat within the east of the Site. The vegetation on Site does not offer bat roosting potential, however this linear habitat provides potential commuting and foraging habitat, as does the grassland on Site. This hedgerow also acts as an ecological corridor, connecting the Site to the Four Districts Woodlands.

5.4.3 Birds

The bird species recorded on the Site visit on the 23rd of July 2021 are outlined in Table 4.

TABLE 4. BIRD SPECIES OBSERVED ON SITE – 23RD OF JULY 2021

Species	Conservation Concern	Observations/Notes
Swallow (*Hirundo rustica*)	Amber	This species was recorded on Site through the presence of an old nest within the derelict shed in the northwest of the Site.
House Martin (*Delichon urbicum*)	Amber	This species was recorded as breeding within the nearby residential properties, but not within the Site itself.
Linnet (*Linaria cannabina*)	Amber	Several individuals observed within the grassland and hedgerows on Site.
House Sparrow (*Passer domesticus*)	Amber	Several individuals observed within the grassland and hedgerows on Site.
Wren (*Troglodytes troglodytes*)	Green	Individuals heard calling from the hedgerow on Site.
Goldfinch (*Carduelis carduelis*)	Green	Several individuals observed foraging within the grassland and hedgerows on Site.
Blackbird (*Turdus merula*)	Green	A number of individuals were observed within the hedgerows on Site.
Jackdaw (*Corvus monedula*)	Green	Observed flying over the Site.
Dunnock (*Prunella modularis*)	Green	Several individuals observed within the grassland and hedgerows on Site.
Chiffchaff (*Phylloscopus collybita*)	Green	Heard calling throughout the Site.
Blackcap (*Sylvia atricapilla*)	Green	Several individuals observed within the grassland and hedgerows on Site.
Magpie (*Pica pica*)	Green	Observed flying over the Site.

The bird species recorded on the Site visit on the 15th of June 2022 are outlined in Table 5.

TABLE 5. BIRD SPECIES OBSERVED ON SITE - 15TH OF JUNE 2022

Species	Conservation Concern	Observations/Notes
House Martin (*Delichon urbicum*)	Amber	This species was recorded as breeding within the nearby residential properties, but not within the Site itself.
Starling (*Sturnus vulgaris*)	Amber	Several individuals observed within the grassland and hedgerows on Site.

Species	Conservation Concern	Observations/Notes
House Sparrow (*Passer domesticus*)	Amber	Several individuals observed within the grassland and hedgerows on Site.
Wren (*Troglodytes troglodytes*)	Green	Individuals heard calling from the hedgerows on Site.
Robin (*Erithacus rubecula*)	Green	Individuals both observed within and heard calling from the hedgerows on Site.
Goldfinch (*Carduelis carduelis*)	Green	Several individuals observed foraging within the grassland and hedgerows on Site.
Blackbird (*Turdus merula*)	Green	A number of individuals were observed within the hedgerows on Site.
Jackdaw (*Corvus monedula*)	Green	Observed flying over the Site.
Dunnock (*Prunella modularis*)	Green	Several individuals observed within the grassland and hedgerows on Site.
Chiffchaff (*Phylloscopus collybita*)	Green	Heard calling throughout the Site.
Whitethroat (*Sylvia communis*)	Green	Heard calling and observed throughout Site.
Magpie (*Pica pica*)	Green	Observed flying over the Site.

5.4.4 Mammals (excl. bats)

No rare or protected mammals were recorded within the Site of the Proposed Development. An adult Fox *Vulpes vulpes* was observed commuting through the grassland on Site and entering the hedgerow that bounds the east of the Site. Mammal trails were recorded throughout the grassland habitat on Site, primarily along the west and east boundaries of the Site.

5.5 Designated sites, habitat and species evaluation

Fauna which have the potential to utilise habitat within the immediate area of the Proposed Development, or for which records exist in the wider area, have been evaluated below in Table 6 for their conservation importance. In addition, designated sites and habitats have been evaluated. This evaluation follows the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009b). The rationale behind these evaluations is also provided. **The term 'ecological receptors'** is used when impacts upon them are likely.

TABLE 6. EVALUATION OF DESIGNATED SITES, HABITATS AND FAUNA RECORDED WITHIN THE SURROUNDING AREA.

Designated Sites/Species/Habitats	Evaluation	Key Ecological Receptor (KER)	Rationale
Designated Sites			
SACs & SPAs	International Importance	No	Significant effects on European Sites ruled out in AA Screening.
pNHAs	National Importance	No	Refer to Table 1
Dublin Bay Biosphere	International Importance	No	No significant hydrological connection or otherwise to Dublin Bay Biosphere
Habitats			
Dry Meadows and Grassy Verges (GS2)	Local importance (lower value)	No	Low diversity grassland of relatively low biodiversity value.
Hedgerows (WL1)	Local importance (higher value)	**Yes**	Hedgerow habitat which acts as an ecological corridor for local wildlife. This habitat will be impacted by the Proposed Development.
Recolonising Bare Ground (ED3)	Local importance (lower value)	No	Anthropogenically disturbed habitat of low biodiversity value.
Spoil and Bare Ground (ED2)	Local importance (lower value)	No	Anthropogenically disturbed habitat of negligible biodiversity value.
Improved Agricultural Grassland (GA1)	Local importance (lower value)	No	Low diversity grassland of relatively low biodiversity value.
Buildings and Artificial Surfaces (BL3)	Local importance (lower value)	No	Man-made habitat of negligible biodiversity value.
Fauna			
Red Fox *Vulpes vulpes*	Local importance (lower value)	No	This species is not considered to be of conservation concern, and therefore is not assessed further in this report.
West European Hedgehog *Erinaceus europaeus*	Local importance (higher value)	**Yes**	Suitable habitat for this species exists on Site.
Bat Assemblage	Local importance (higher value)	**Yes**	A moderate level of bat activity was recorded on Site.
Bird Assemblage	Local importance (higher value)	**Yes**	Several bird species recorded utilising the Site of the Proposed Development in July 2021 and June 2022.
Amphibian Assemblage	Local importance (lower value)	No	No suitable habitat for this species group was observed on Site.
Aquatic Fauna	Local importance (higher value)	**Yes**	Hydrological connection to the River Griffeen and potential hydrogeological connections to the River Camac.

6 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

As per the relevant guidelines, likely significant effects have been assessed for Key Ecological Receptors only, as listed in Table 6. An impact is considered to be significant if it is predicted to affect the integrity or conservation status of a KER at a given geographical scale. All impacts are described in the absence of mitigation.

6.1 Construction Phase

6.1.1 Impacts on habitats

The majority of the hedgerow habitat within the east of the Site will be removed during the Construction Phase to facilitate the Proposed Development. In the absence of suitable mitigation, the removal of this linear vegetation, and fragmentation of an ecological corridor, will have a *negative, permanent, moderate* impact.

6.1.2 Impacts on fauna

6.1.2.1 Mammals

The Proposed Development could have a potential *negative*, *permanent*, *moderate* impact at a local level on small mammal species, if they are present, such as Hedgehog, in the absence of mitigation measures, through the removal hedgerow habitat within the Site of the Proposed Development.

Small mammal species, such as Hedgehog, have the potential to become entangled in construction materials such as netting and plastic sheeting, as well as other waste materials, causing entrapment and injury or death. This constitutes a *negative*, *short-term*, *moderate* impact at a *local* level.

Disturbance of species due to noise and dust generated during the Construction Phase, although unlikely, is possible and, as such, a precautionary approach is adopted with these disturbances representing potential *negative*, *short-term*, *slight* impacts at a *local* scale.

6.1.2.2 Bats

There is potential for loss of foraging and commuting habitat for local bats through the removal of hedgerow habitat on Site as part of the Proposed Development. This may result in a *negative, permanent, moderate* impact on bats in the area.

Noise generated during the Construction Phase has the potential to cause *negative, short-term, slight* impacts in the form of disturbance to mammals at a local level, potentially including bats should they roost in the surrounding landscape.

6.1.2.3 Birds

There will be some loss of foraging and nesting habitat for birds at the Site of the Proposed Development through the removal grassland and hedgerow habitat. This could have a *negative, permanent, moderate* impact on birds in the locality.

The increased noise and dust levels associated with the Construction Phase of the Proposed Development may have the potential to cause *negative, short-term, slight* impacts to local bird populations.

6.1.2.4 Aquatic Fauna

Surface water discharges and groundwater flow associated with the Construction Phase of the Proposed Development may have the potential to cause *negative*, *short-term*, *slight* impacts to aquatic fauna within the River Griffeen and River Camac in the absence of suitable mitigation.

6.2 Operational Phase

6.2.1 Impacts on Fauna

6.2.1.1 Mammals

During the Operational Phase, there is potential for disturbance to mammals utilising the Site in general through night-time light pollution. This could have a *negative*, *permanent*, *slight* impact on mammals in the locality.

6.2.1.2 Bats

During the Operational Phase, there is potential for disturbance to bats utilising the Site in general through light pollution during the Operational Phase. Given the urban context of the Site, this could have a *negative, permanent, slight* impact on bats in the locality. In addition, there is potential for a *negative, permanent, slight* impact on bats in the locality through the loss of foraging resources.

6.2.1.3 Birds

No significant impacts on birds are anticipated during the Operational Phase. The residential properties within the Proposed Development have the potential to provide nesting habitat for the House Martins present within the Site surroundings.

6.2.1.4 Aquatic Fauna

No significant effects on fish species are anticipated during the Operational Phase. Mandatory SuDS measures have been incorporated into the design to treat and minimise surface water runoff from the site.

6.3 Do nothing impact

Under the do-nothing scenario, the Site would continue to evolve. The grassland would continue to offer foraging and commuting habitat for local wildlife and pollinating insects and would recolonise the remaining bare soil on Site. The mature hedgerow on Site would persist as an ecological corridor, offering nesting, foraging and commuting habitat to local birds and mammals.

7 MITIGATION AND ENHANCEMENT MEASURES

7.1 Construction Phase

7.1.1 Planting of native flora and protecting pollinators

The planting of pollinator-friendly flora will improve local biodiversity and increase insect abundance. This will provide additional food for bats and birds at the Site.

The following measures have been incorporated into the landscape design:

- Retention of the existing hedgerows within the southeast of the Site, along with the supplemental hedge and woodland planting consisting of species such as Alder *Alnus glutinosa*, Downy Birch *Betula pubescens*, Red Oak *Quercus rubra*, and Hawthorn *Crataegus monogyna*, will provide potential commuting and foraging habitat for wildlife, including local bats.
- A wildflower mix, comprised of species such as Birdsfoot Trefoil *Lotus corniculatus*, Red Clover *Trifolium pratense*, Foxglove *Digitalis purpurea*, and Common Vetch *Vicia sativa ssp. segetalis*, will be planted along the east boundary of the Site to encourage foraging pollinators.
- The southwest and south of the Site will include a meadow, separate from the amenity grassland on Site, to provide foraging and commuting habitat for wildlife, along with potential nesting habitat for local pollinators.

7.1.2 Aquatic Fauna & Surface Waters

The following measures set out below will protect surface waters throughout the Construction Phase:

General Surface water mitigation measures

- Storm drain inlets which could receive stormwater from the project will be protected throughout the Construction Phase. Inlet protection will be installed before soil-disturbing activities begin.
- Any imported materials will, as much as possible, be placed on site in their proposed location and double handling will be avoided. Where this is not possible designated temporary material storage areas will be used.
- Refuelling of plant during Construction Phase will only be carried out at designated refuelling station locations on site. Each station will be fully equipped for spill response and a specially trained and dedicated Environmental and Emergency Spill Response team will be appointed before the commencement of works on site.
- Only emergency breakdown maintenance will be carried out on site. Drip trays and spill kits will be available on site to ensure that any spills from vehicles are contained and removed off site.
- All personnel working on site will be trained in pollution incident control response.
- Any other diesel, fuel or hydraulic oils stored on site will be stored in bunded storage tanks- the bunded area will have a volume of at least 110% of the volume of the stored materials as per best practice guidelines (Enterprise Ireland, BPGCS005).

- Portaloos and/or containerised toilets and welfare units will be used to provide facilities for site personnel. All associated waste will be removed from site by a licenced waste management contractor.
- Runoff from machine service and concrete mixing areas will not enter the nearby drainage network.

All wastewater generated on-site during the Construction Phase will be stored and disposed of appropriately. Under no circumstances will any untreated wastewater generated onsite (from equipment washing, road sweeping etc.) be released into the foul/surface water drainage network.

Contaminated soils if encountered will be segregated. If dewatering is required groundwater will be treated as required prior to discharge as agreed with Local Authority.

7.1.3 Mammals

As best-practice, all construction-related rubbish on site e.g., plastic sheeting, netting etc. should be kept in a designated area on site and kept off ground level to protect Hedgehogs from entrapment and death. The above measures will also act to mitigate potential negative impacts on other small mammal species which may be present in the vicinity of the Site.

Work likely to cause disturbance during Hedgehog hibernation – for example removal of hibernation habitats such as hedgerow habitat – **will not take place during November to March**.

7.1.4 Birds

7.1.4.1 Habitat removal

Any clearance of vegetation should ideally be carried out outside the main breeding season, i.e., 1st March to 31st August, in compliance with the Wildlife Act 2000. Should any vegetation removal be required during this period, the NPWS will be consulted, and instruction taken from them.

7.1.5 Reduction of noise and dust related impacts

Reduction of noise impacts

Short-term increases in disturbance levels as a direct result of human activity and through increased generation of noise during the Construction Phase can have a range of impacts depending upon the sensitivity of the ecological receptor, the nature and duration of the disturbance and its timing.

Noise generated during the Construction Phase of the Proposed Development could cause temporary disturbance to a number of faunal species in the vicinity of the Site of the Proposed Development. To mitigate this disturbance, the following measures will be implemented:

- Selection of plant with low inherent potential for generating noise.
- Siting of plant as far away from sensitive receptors as permitted by site constraints.
- Avoidance of unnecessary revving of engines and switch off plant items when not required.
- Keep plant machinery and vehicles adequately maintained and serviced.

- Proper balancing of plant items with rotating parts.
- Keep internal routes well maintained and avoid steep gradients.
- Minimise drop heights for materials or ensure a resilient material underlies.
- Use of alternative reversing alarm systems on plant machinery.
- Where noise originates from resonating body panels and cover plates, additional stiffening ribs or materials should be safely applied where appropriate.
- Limiting the hours during which site activities likely to create high levels of noise are permitted.
- Appointing a site representative responsible for matters relating to noise.
- Monitoring typical levels of noise during critical periods and at sensitive locations.

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

Reduction of dust related impacts

The following general dust control measures will be followed for the duration of the Construction Phase of the Proposed Development and will ensure no significant dust related impacts occur to nearby sensitive receptors including local faunal species.

- In situations where the source of dust is within 25m of sensitive receptors screens (permeable or semi-permeable) will be erected.
- Haulage vehicles transporting gravel and other similar materials to site will be covered by a tarpaulin or similar.
- Access and exit of vehicles will be restricted to certain access/exit points.
- Vehicle speed restrictions of 20km/hr will be in place.
- Bowsers will be available during periods of dry weather throughout the construction period.
- During dry and windy periods, and when there is a likelihood of dust nuisance, a bowser will operate to ensure moisture content is high enough to increase the stability of the soil thereby reducing the amount of dust.
- Stockpiles will be stored in sheltered areas of the site, covered, and watered regularly or as needed if exposed during dry weather.
- Gravel should be used at site exit points to remove caked-on dirt from tyre tracks.
- Equipment should be washed at the end of each workday.
- Hard surfaced roads will be wet swept to remove any deposited materials.
- Unsurfaced roads will be restricted to essential traffic only.
- If practical, wheel-washing facilities should be located at all exits from the construction site.
- Dust production as a result of site activity will be minimised by regular cleaning of the site access roads using vacuum road sweepers and washers. Access roads should be cleaned at least 0.5km on either side of the approach roads to the access points.
- Public roads outside the site shall be regularly inspected for cleanliness, as a minimum daily, and cleaned as necessary. A road sweeper will be made available to ensure that public roads are kept free of debris.
- The frequency of cleaning will be determined by the site agent and is weather and activity dependent

- The height of stockpiles will be kept to a minimum and slopes should be gentle to avoid windblown soil dust.
- The following will be dampened during dry weather:
    - Unpaved areas subject to traffic and wind
    - Stockpiles
    - Areas where there will be loading and unloading of dust-generating materials
- Under no circumstances will wastewater from equipment, wheel or surface cleaning be allowed enter the surface water drainage network.

7.1.6 Invasive Species

While no invasive species were recorded on Site of the Proposed Development, it is recommended that any non-native/invasive flora species, if encountered at the Site be controlled/removed as per the appropriate best-practice guidelines and in consultation with the relevant qualified invasive species professional. Removal and disposal should be carried out in accordance with appropriate guidelines such as TII (formerly NRA) Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads (2010), with consideration given to the prevention of spread of these plants.

7.1.7 Biosecurity

The following will be adhered to, to avoid the introduction of invasive species to the Proposed Development site.

- Any material required on the site will be sourced from a stock that has been screened for the presence of any invasive species by a suitably qualified ecologist and where it is confirmed that none are present.
- All machinery will be thoroughly cleaned and disinfected prior to arrival on site to prevent the spread of invasive species.

7.2 Operational Phase

7.2.1 Bats

In order to minimise disturbance to bats within the general surrounding landscape, the lighting and layout of the Proposed Development has been designed to minimise light-spill onto habitats used by the local bat population foraging or commuting. This has be achieved by ensuring that the design of lighting accords with guidelines presented in the Bat Conservation Trust & Institute of Lighting Engineers *'Bats and Lighting in the UK - Bats and Built Environment Series'*, the Bat Conservation Trust *'Artificial Lighting and Wildlife Interim Guidance'* and the Bat Conservation Trust *'Statement on the impact and design of artificial light on bats'*. Therefore, the lighting scheme has included the following:

- Light spillage and glare will be minimised by utilising shielded, downward directed lighting and by using narrow spectrum lighting types with no UV or luminaire accessories.
- All non-essential lighting will be switched off during hours of darkness.
- The colour temperature of the lighting will be 3000K, with columns moved away from areas with bat activity.

7.2.2 Birds

It is recommended that Swift Boxes or Bricks are incorporated into the Proposed Development where possible. The incorporation of Swift Boxes or Bricks would help recover the declining swift population, which are now Red Listed in Ireland (Gilbert et al., 2021). The following **recommendations are extracted from "Saving Swifts" by Birdwatch Ireland**[5].

Swift bricks/boxes:

- should be constructed of long-lasting material and securely fixed in position.
- should be erected at least five metres above ground level
- should be erected in sheltered cool areas out of the sun, or under an overhang and /or under the eaves. Bricks can be placed at any aspect, however, as they tend not to overheat the way that externally fitted boxes can.
- should have a clear airspace in front for access
- should be grouped (side by side in rows) as swifts are colony nesters
- should avoid sites which can be accessed by predators- cats, squirrels, magpies, rats.
- should avoid sites near plate glass windows because they are a known collision hazard for birds.
- should not be placed directly above ledges or other obstructions. Swifts drop before taking flight and can collide with obstacles below the nest entrance.
- should not be one above the other.
- should not be near spotlights or later fit spotlights near them.

It is advised to install a Swift calling system to attract Swifts and encourage them to take up residence at a new site.

[5] https://birdwatchireland.ie/app/uploads/2019/10/Saving-Swifts-Guide_pdf.pdf

8 CUMULATIVE IMPACTS

If the Proposed Development and existing or proposed projects or plans impact on the same KERs, there is potential to lead to cumulative impacts which could be of a higher level of significance. This applies to potential impacts on bats due to the combined loss of suitable commuting and/or foraging habitat in the locality and potential impacts on birds due to the combined loss of nesting or foraging habitat in the locality.

8.1.1 Existing granted planning permissions

There are several existing planning permissions on record in the area ranging from small-scale extensions and alterations to existing residential properties to some larger-scale developments. The larger-scale developments within the area are outlined below:

Planning Application Reference: SHD3ABP-307698-20

Demolition of 5 existing residential properties and associated outbuildings and the construction of a residential development of 204 units, comprising 151 Houses (including Duplexes) and 53 Apartments. The basement for the apartment block includes 49 car parking spaces, 87 bicycle parking spaces, circulation, plant areas, refuse storage areas and other associated facilities. There are an additional 12 visitor bicycle parking spaces for the apartment block provided at surface level. Access to the apartment block is directly from Stoney Hill Road via a new access from an existing dropped kerb. The development also includes 306 surface car parking spaces, 169 bicycle parking spaces (comprising of 99 spaces at basement and surface for the apartment block, 60 secure spaces for the apartments in the duplex units and 10 visitor parking spaces at surface level), communal open space for the apartments, public open space including a childrens playground and a linear park to the south of the site. New vehicular entrances from Stoney Hill Road (one to the apartment building to the north of Stoney Hill Road and a second to the remainder of the development further south on Stoney Hill Road). The proposed development also includes a 2 storey creche building plus and outdoor play area located on an existing undeveloped portion of the Peyton site located to the west of Stoney Hill Road. **(Decision: Grant Permission. Decision Date: 21/09/2020).**

Planning Application Reference: SD16A/0029/EP

(1) Phased demolition of existing school buildings (a) Block 1: single storey main school building 3,720sq.m (b) Block 2: two storey PE hall 771sq.m (c) Block 3: single storey temporary classroom 400sq.m (d) Block 4: single storey temporary classroom 1155sq.m. (2) Phased construction of a new part three, part two and part single storey school building (10,429sq.m). (3) The refurbishment of the existing vehicular entrance and the provision of a new pedestrian entrance off Kilteel Road and the provision of a new vehicular entrance (emergency and service vehicles) off St. Anne's Terrace. (4) The provision of 97 car parking spaces. (5) The provision of a new ESB substation to the south east of the site with access off St. Anne's Terrace. (6) Associated ancillary site works including new landscaping and hardplay areas. **(Decision: Grant Extension of Duration of Permission. Decision Date: 15/06/2021).**

Planning Application Reference: SD21A/0231

Removal of all existing temporary accommodation and construction of a new 16 classroom part three storey, part two storey primary school (Roll No 19503H); including GP Hall, 2

classroom Special Educational Needs Unit and all ancillary site works. The proposed project also incorporates associated staff car parking, delivery aces, drop off areas, pedestrian/bicycle access, construction of 2 external ball courts, acoustic boundary wall plus additional boundary treatments, landscaping, connection to public services and all associated site works. **(Decision: Grant Permission. Decision Date: 12/10/2021).**

Planning Application Reference: SD20A/0080

Temporary single storey prefabricated building to be linked to the existing single storey prefabricated building granted under Ref. SD19A/0075; 2 general classrooms each with toilet accommodation (one containing accessible WC); 1 store; entrance lobbies; 1 user assisted toilet; 2 staff toilets and 4 car park spaces all located to the north-rear of the existing school and existing prefabs together with all other ancillary and associated siteworks. **(Decision: Grant Permission. Decision Date: 03/07/2020).**

Planning Application Reference: SD19A/0214

Raising the height of the fascia on the existing shopfront canopy and cladding it with a new varnished hardwood finish to accommodate new signage consisting of built up lettering with the name "Rathcoole Shopping Centre"; the existing circular steel columns to the single storey canopy will be clad with varnished hardwood panels to match the existing shopfronts; installation of a new curved top totem sign at the Main Street car park entrance, measuring 1.5 meters wide x 5 metres overall height; raising of the front boundary wall facing Main Street and the side boundary wall facing Coolamber Road; replacing the existing dashed wall finish on these walls with a pigmented render finish; installing reconstituted stone cappings on these walls; installation of new stainless steel handrails to the top of part of the front and side boundary walls; resurfacing the existing car park area; reduction in width of the existing Main Street car park entrance; provision of new trees on site together with all associated site works. **(Decision: Grant Permission. Decision Date: 27/08/2019).**

Planning Application Reference: SD21A/0171

Land recontouring/infilling works on C. 38,000sq.m of a folio size of C.5.3HA (allowing buffers); the volume of material to be placed on the site C.91,000m3 with an average fill level of C.3.5m above existing. **(Decision: Grant Permission. Decision Date: 28/02/2022).**

Planning Application Reference: SD20A/0153

Permission for 609.5sq.m, 16-bed extension to existing Nursing Home which consists of new 443sq.m two storey 14 bedroom extension adjoining existing building to the west, new 64.3sq.m single storey 2 bedroom extension to south west wing of existing, new 102.2sq.m 2 storey extension of existing dining areas to the north, new garden lawns and walkway with hard landscaped areas to north west of site, 8 new car parking spaces to existing car park to east of site and all associated site works. **(Decision: Grant Permission. Decision Date: 14/01/2021).**

Planning Application Reference: SD21A/0301

Additional floor area of 82sq.m ground floor and 35sq.m first floor to allow reconfiguration of 4 double rooms to 8 single rooms, new ground floor storeroom and enclosing fire exit stairs; relocation of 8 car parking spaces to extended existing car park; all associated site works;

proposed material finishes to match previously approved changes to previously granted permission SD20A/0153. **(Decision: Grant Permission. Decision Date: 02/03/2022).**

These sites lie within 500m from the Proposed Development Site. The distance between the Proposed Development Site, the permitted development sites above and the closest European Site is approximately 5.9km. This distance, in addition to the significant urban buffer between the sites and European Sites, is sufficient to exclude the possibility of significant effects on the European Site arising from combined emissions of noise, dust, pollutants and/or vibrations emitted from the Site during the Construction Phase; increased traffic volumes during the Construction and Operational Phase and associated emissions; potential increased lighting emitted from the Site during Construction and Operational Phase; and increased human presence at the Site during Construction and Operational Phase.

At the time of writing, there are no proposed or permitted forestry operations (thinning, clear felling, road construction) in close proximity to the Site of the Proposed Development[6].

Relevant Policies and Plans

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

- Connecting with Nature – Draft Biodiversity Action Plan for South Dublin County 2020-2026
- South Dublin County Development Plan 2022-2028

The Connecting with Nature – Draft Biodiversity Action Plan for South Dublin County 2020-2026 is set out to protect and improve biodiversity, and as such will not result in negative in-combination effects with the Proposed Development. The South Dublin County Council Development Plan 2012-2028 has directly addressed the protection of biodiversity through specific policies (NCBH1 Obj2, NCBH2 Obj1-Obj4). The relevant recommendations and mitigation measures have been integrated into the plan.

On examination of the above it is considered that there are no means for the Proposed Development to act in-combination with any plans or projects, that would cause any likely significant effects on any European Sites.

8.1.2 Operation of Ringsend WwTP

The Site will be served by Ringsend WwTP via a newly constructed foul water connection.

In June 2018 Irish Water applied for and subsequently received planning permission in 2019 for upgrade works to the Ringsend WwTP facility. The first phase of upgrade works to Ringsend WWTP was completed in December 2021, which increased the capacity of the facility by 400,000 P.E. These works, together with the further works permitted in 2019 will ultimately increase the capacity of the facility from 1.6 million PE to 2.4 million PE. This plant upgrade will result in an overall reduction in the final effluent discharge of several parameters from the facility including BOD, suspended soils, ammonia, DIN and MRP. An Environmental Impact Assessment Report (EIAR) was submitted by Irish Water as part of that application. The EIAR contains sections relating to Marine Biodiversity and Terrestrial Biodiversity, and each contains a section on the 'do-nothing scenario'. These review the effects of the WwTP

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

on biodiversity in Dublin Bay in the absence of the upgrade works and so are relevant to this report.

The EIAR report acknowledges that under the do-nothing scenario "the areas in the Tolka Estuary and North Bull Island channel will continue to be affected by the cumulative nutrient loads from the river Liffey and Tolka and the effluent from the Ringsend WwTP", which could result in a decline in biodiversity (Irish Water, 2018). Nevertheless, the negative impacts of nutrient over-enrichment, which could result in the deterioration of the biological status of Dublin Bay are considered "unlikely" (Irish Water, 2018). This is because historical data suggests that pollution in Dublin Bay has had little or no effect on the composition and richness of the benthic macroinvertebrate fauna. The EIAR notes that "although a localised decline could occur, it is not envisaged to be to a scale that could pose a threat to the shellfish, fish, bird or marine mammal populations that occur in the area." Furthermore, the EIAR notes that significant impacts on waterbird populations foraging on invertebrates in Dublin Bay due to nutrient over-enrichment are "unlikely" to occur (Irish Water, 2018). What is important in the context of this EcIA is that the do-nothing scenario predicts that nutrient and suspended solid loads from the WwTP will "continue at the same levels and the impact of these loadings should maintain the same level of effects on marine biodiversity" and that "if the status quo is maintained there will be little or no change in the majority of the intertidal faunal assemblages found in Dublin Bay which would likely continue to be relatively diverse and rich across the bay."

Therefore, it can be concluded that significant effects on marine biodiversity and the European sites within Dublin Bay from the current operation of Ringsend WwTP are unlikely. Importantly, this conclusion is not dependent upon any future works to be undertaken at Ringsend. Thus, in the absence of any upgrading works, significant effects to habitats, fauna and European Sites are not likely to arise.

On examination of the above it is considered that there are no means for the Proposed Development to act in-combination with any plans or projects..

9 Residual Impacts

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

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

TABLE 7 SUMMARY OF POTENTIAL BIODIVERSITY IMPACTS, MITIGATION PROPOSED AND RESIDUAL IMPACTS

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation	Residual Impact
			Quality	Scale	Duration	Significance		
Hedgerow (WL1)	Local Importance (higher value)	Habitat loss during the Construction Phase of the Proposed Development.	Negative	Local	Permanent	Moderate	Planting of native hedgerow, trees, and woodland habitat to take place as part of project design.	**Negative, permanent, slight at a local scale, due to habitat fragmentation**
Small Mammals	Local Importance (higher value)	Mortality during Construction Phase. Loss of sections of potential foraging and commuting habitat. Disturbance due to noise and dust generated during Construction Phase.	Negative	Local	Permanent Permanent Short-term	Moderate Slight	Best practise construction waste storage/handling measures to be implemented. Work likely to cause disturbance during hibernation (removal of hibernation habitats such as log piles and dense scrub) will not take place during **November** to **March**. Planting of native hedgerow, trees, and woodland habitat to take place as part of project design. Construction related noise control/minimisation measures to be implemented.	**Neutral**
Bat assemblage	Local Importance (higher value)	Loss of sections of potential foraging and commuting habitat. Disturbance due to noise generated during Construction Phase.	Negative	Local	Short-term Permanent	Moderate Slight	Planting of native hedgerow, trees, and woodland habitat to take place as part of project design. Construction related noise control/minimisation measures to be implemented.	**Negative, permanent, slight at a local scale, due to habitat fragmentation**

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation	Residual Impact
			Quality	Scale	Duration	Significance		
		Disturbance/removal of foraging routes/habitat due to increased lighting as a result of the Proposed Development.					Bat sensitive lighting measures incorporated into the Construction Phase and public lighting design described in **section 7.2.1**	
Breeding-Bird assemblage	Local Importance (higher value)	Loss of potential foraging and nesting habitat. Disturbance due to noise generated during Construction Phase.	Negative	Local	Permanent Short-term	Moderate Slight	Planting of native hedgerow, trees, and woodland habitat to take place as part of project design. Construction related noise control/minimisation measures to be implemented.	**Neutral**
Aquatic Fauna	Local Importance (higher value)	Deterioration in water quality due to surface water discharges and groundwater flow associated with the Construction Phase.	Negative	Local	Short-term	Moderate	Mitigation measures to protect surface waters as outlined in **section 7.1.2**	**Neutral**

10 CONCLUSION

It is considered that provided the mitigation measures proposed are carried out in full, there will be no significant negative impact to any valued habitats, designated sites or individual or group of species as a result of the Proposed Development.

Based on the successful implementation of these measures and proposed works, to be carried out in accordance with the landscape plan, there will be no significant negative ecological impacts arising from Construction and Operational Phases of the Proposed Development.

11 REFERENCES

CIEEM. (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester, UK.

City of Toronto. (2016). Bird-Friendly Best Practices: Glass. City Planning, Toronto, Canada.

City of Toronto. (2017). Best Practices Effective Lighting. City Planning, Toronto, Canada.

Department of the Environment, Heritage and Local Government. (2010). Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities. DEHLG, Dublin. (Rev. Feb 2010).

Dublin City Council (DCC). (2019). Basement Development Guidance Document Version 1.0. [ONLINE]. Available at: https://www.dublincity.ie/sites/default/files/content/Planning/Documents/Basement/BasementDevelopmentGuidanceDocument.pdf

Eastern Regional Fisheries Board. (2004). Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites. Blackrock, Dublin, Ireland.

Environmental Protection Agency. (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports. Published by the Environmental Protection Agency, Ireland.

Environmental Protection Agency. (2022). Environmental Protection Agency Online Mapping [ONLINE] Available at: http://www.epa.ie/ [Accessed July 2022].

European Commission. (2000). Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats' Directive 92/43/EEC. European Communities, Luxembourg.

European Communities. (2021). Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. European Communities, Luxembourg.

Fossitt, J. (2000). A *Guide to Habitats in Ireland*. The Heritage Council, Kilkenny.

Gauthreaux, S. A., and Belser, C. G. (2006). Effects of artificial night lighting on migrating birds. Pages 67–93 in C. Rich and T. Longcore, editors. Ecological consequences of artificial night lighting. Island Press, Washington, D.C., USA.

Geological Survey Ireland. (2022). Geological Survey of Ireland website [ONLINE] Available at: http://www.gsi.ie/ [Accessed July 2022].

Gilbert, G., Stanbury, A. and Lewis, L. (2021). Birds of Conservation Concern in Ireland 4: 2020–2026. *Irish Birds* 43: 1–22

Greater Dublin Strategic Drainage Study. (2005). Final Strategy Report. [ONLINE] Available at: http://www.greaterdublindrainage.com/wp-content/uploads/2011/11/GDSDS-Final-Strategy-Report-April-051.pdf [Accessed January 2022].

Igoe F., Quigley D.T.G., Marnell F., Meskell E., O'Connor W. & Byrne C. 2004. The sea lamprey *Petromyzon marinus* (L.), river lamprey *Lampetra fluviatilis* (L.) and brook lamprey

Lampetra planeri (Bloch) in Ireland: General biology, ecology, distribution and status with recommendations for conservation. *Biology and Environment* 104: 43–56.

Inland Fisheries Ireland. (2016). Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters. Available at: https://www.fisheriesireland.ie/documents/624-guidelines-on-protection-of-fisheries-during-construction-works-in-and-adjacent-to-waters/file.html

Institute of Lighting Professionals (ILP). (2018). Guidance note 08/18: Bats and artificial lighting in the UK. Bats and the Built Environment Series. [Online] Available at: https://cdn.bats.org.uk/pdf/Resources/ilp-guidance-note-8-bats-and-artificial-lighting-compressed.pdf?mtime=20181113114229

Kelleher, C. and Marnell, F. (2006). Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Kelly, F.L., Matson, R., Connor, L., Feeney, R., Morrissey, E., Wogerbauer, C. and Rocks, K. (2012). Water Framework Directive Fish Stock Survey of Rivers in the Eastern River Basin District. Inland Fisheries Ireland, Swords Business Campus, Swords, Co. Dublin, Ireland.

King, J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., FitzPatrick, Ú., Gargan, P.G., Kelly, F.L., O'Grady, M.F., Poole, R., Roche, W.K. & Cassidy, D. (2011). Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Lundy, M.G., Aughney, T., Montgomery, W.I., & Roche, N. (2011). Landscape conservation for Irish bats and species specific roosting characteristics. Bat Conservation Ireland.

Macklin, R., Brazier, B. & Sleeman, P. (2019). Dublin City otter survey. Report prepared by Triturus Environmental Ltd. for Dublin City Council as an action of the Dublin City Biodiversity Action Plan 2015- 2020.

Marnell, F., Looney, D. & Lawton, C. (2019). Ireland Red List No. 12: Terrestrial Mammals. National Parks and Wildlife Service, Department of the Culture, Heritage and the Gaeltacht, Dublin, Ireland.

Matson, R., Delanty, K., Gordon, P., O'Briain, R., Garland, D., Cierpal, D., Connor, L., Corcoran, W., Coyne, J., McLoone, P., Morrisey-McCaffrey, E., Brett, T., Ní Dhonnabhain, L. and Kelly, F.L. (2018). Sampling Fish in Rivers 2017 – Camac, Factsheet No. 3. National Research Survey Programme. Inland Fisheries Ireland.

NBDC. (2021). National Biodiversity Data Centre online mapping [ONLINE]. Available at: http://maps.biodiversity.ie/Map.aspx. [Accessed July 2022].

NPWS. (2010). Circular NPW 1/10 & PSSP 2/10. Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Department of Environment, Heritage and Local Government.

NPWS. (2013). The Status of Protected EU Habitats and Species in Ireland. Overview Volume 1. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. Editor: Deirdre Lynn

NRA. (2009a). Environmental Assessment and Construction Guidelines. National Roads Authority (now Transport Infrastructure Ireland), Dublin.

NRA. (2009b). Guidelines for Assessment of Ecological Impacts of National Road Schemes. National Roads Authority (now Transport Infrastructure Ireland), Dublin.

NRA. (2010). Guidelines on The Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads(now Transport Infrastructure Ireland), Dublin.

O'Boyle, S., Trodd, W., Bradley, C., Tierney, D., Wilkes, R., Ní Longphuirt, S., Smith, J., Stephens, A., Barry, J., Maher, P., McGinn, R., Mockler, E., Deakin, J., Craig, M. and Gurrie, M. 2019. Water Quality in Ireland 2013-2018. Environmental Protection Agency, Johnstown.

Smith, G.F., O'Donoghue, P., O'Hora, K. and Delaney, E. (2011). Best practice guidance for habitat survey and mapping. The Heritage Council, Kilkenny.

Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. & Wright, M. (2016) Ireland Red List No. 10: Vascular Plants. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.

APPENDIX I – 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, were used for assigning value to designated sites, habitats and species within the Site of the Proposed Development and surrounding area.

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 fulfills 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:
	  - Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or
	  - 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:
	  - Species protected under the Wildlife Acts; and/or
	  - Species listed on the relevant Red Data list.
	- 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 (Biodiversity Action Plan), 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
	  - 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 are of some importance in maintaining habitat links.

APPENDIX II – EPA IMPACT ASSESSMENT CRITERIA

Criteria used to define quality of effects.

In line with the draft EPA Guidelines (EPA, 2022), the following terms are defined when quantifying the quality of effects:

Quality	Definition
Positive Effects	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 Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative/adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property by causing nuisance).

Criteria used to define significance of effects.

In line with the draft EPA Guidelines (EPA, 2022), the following terms are defined when quantifying significance of impacts:

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 which 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.

Criteria used to define duration of effects.

In line with the draft EPA Guidelines (EPA, 2022), the following terms are defined when quantifying duration and frequency of effects:

Quality of Effects	Definition
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 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.

APPENDIX III – BAT REPORT

August 2021

Bat Survey Report

Stoney Hill Road, Rathcoole, Co. Dublin

ASH Ecology & Environmental

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1. INTRODUCTION

1.1 Purpose of the Report

Ash Ecology and Environmental Ltd (AEE) was commissioned to carry out a bat activity survey on behalf of Enviroguide Consulting during August 2021as part of a proposed housing development.

The site is located east of Stoney Hill Road, Rathcoole, Co. Dublin (Grid Ref 53.277657, -6.467247); see Figure 1. An aerial photo with existing layout and surrounding landscape is shown in Figure 2. An existing schematic site layout is shown in Figure 3.

A bat survey was required to assess the value of the habitats on site for bats. The buildings present onsite, occupied during the survey, were not surveyed.

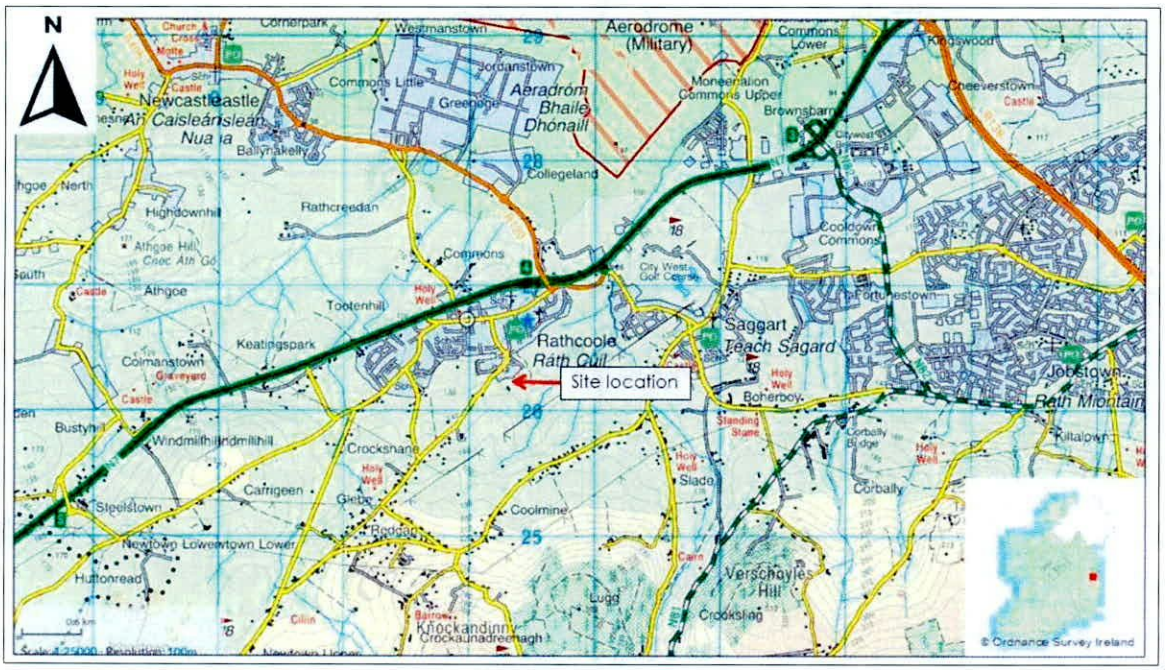

Figure 1 Site Location Map

Figure 2 Aerial Photo of Site showing existing layout and surrounding landscape

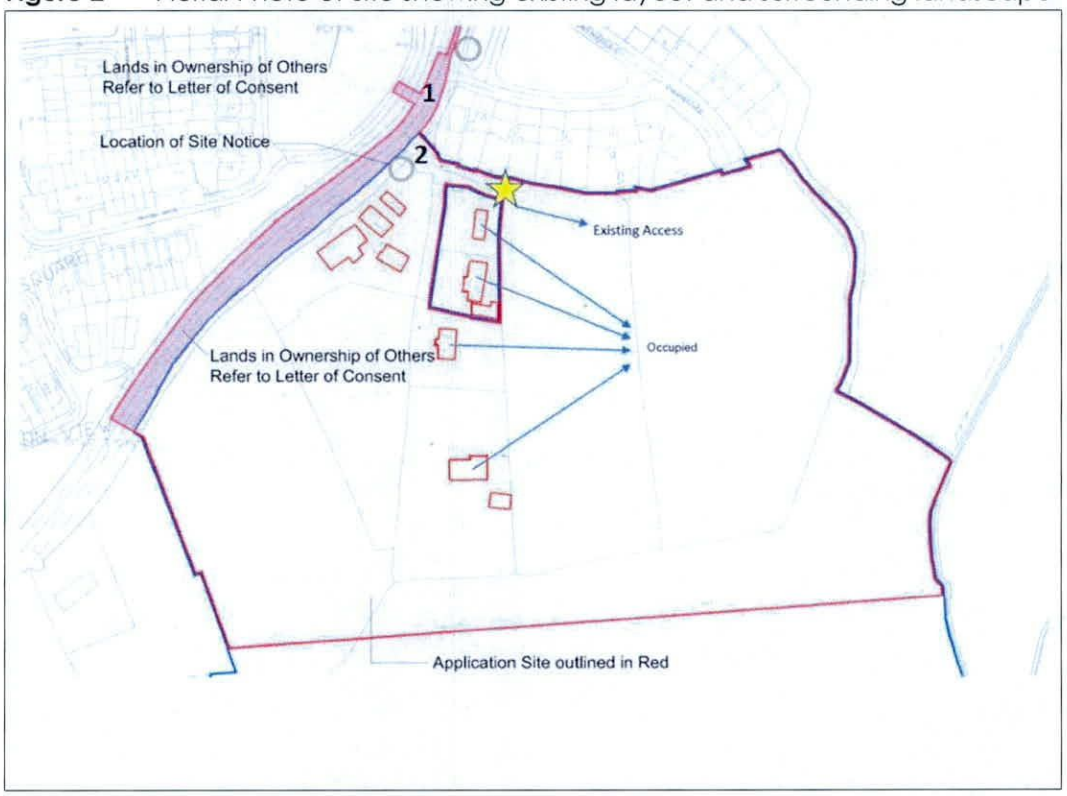

Figure 3 Existing Schematic Site Layout showing locations of Buildings onsite.

1.2 Competency of Assessor

This report has been prepared by Ash Ecology & Environmental Ltd (AEE) whose managing director and leading ecologist is Aisling Walsh who is a full member of the Chartered Institute of Ecological & Environmental Management (CIEEM) while the company, AEE, is a Registered Practice by the CIEEM.

Aisling's qualifications include M.Sc. (Dist) in Biodiversity and Conservation (TCD) and B.Sc. (Hons) Zoology (NUIG), a diploma in Applicated Aquatic Science (GMIT) and a Certificate in Applied Biology (GMIT). Aisling has over 14 years of experience providing environmental consultancy and environmental assessment services. Aisling has written numerous Ecological Impact Assessments (EcIA), Screening for Appropriate Assessment Stage I and Stage II Natura Impact Statements, chapters for Environmental Impact Assessments/Statements (EIAR), Badger Surveys, Bat Surveys, Bird and Habitat Surveys. Academically Aisling has also spent several years working in Forestry and Biodiversity Research at TCD (BIOPLAN and FORESTBIO programmes) and as a Teaching Assistant in the Life Sciences Department of the University of Limerick.

Aisling is a licenced bat ecologist (example of recent: DER/BAT 2020 – 46 EUROPEAN, DER/BAT 2020 – 48 EUROPEAN) and a member of Bat Conservation Ireland. In addition, she has completed several bat courses to continue her training and CPD with most recently (May 2021) a Lantra-accredited course, developed by the Bat Conservation Trust and supported by the Arboricultural Association to access bat tree roost features. Over the past 14 years Aisling has completed 100s of bat surveys providing her with more than adequate experience in the profession.

1.3 Bat Legislation

In view of their sensitive status across Europe, all species of bat have been listed on Annex IV of the EC 'Habitats and Species Directive' and some, such as the lesser horseshoe bat, are given further protection and listed on Annex II of this Directive. This Directive was transposed into Irish law as the European Communities (Natural Habitats) Regulations, 1997, and combined with the Wildlife Acts (1976 to 2018), ensures that individual bats and their breeding sites and resting places are fully protected. This has important implications for those who own or manage sites where bats occur.
All bat species are protected under the Wildlife Acts 1976-2018 which make it an offence to wilfully interfere with or destroy the breeding or resting place of these species; however, the Acts permit limited exemptions for certain kinds of development.

All species of bats in Ireland are listed on Schedule 5 of the 1976 Act, and are therefore subject to the provisions of Section 23, which make it an offence to:

1. *Intentionally kill, injure or take a bat,*
2. *Possess or control any live or dead specimen or anything derived from a bat,*
3. *Wilfully interfere with any structure or place used for breeding or resting by a bat,*
4. *Wilfully interfere with a bat while it is occupying a structure or place which it uses for that purpose.*

1.4 Derogation licences

In order to obtain a licence to allow the destruction of bat roosts etc., in advance of any otherwise legitimate development which may impact on the favourable conservation status of bats, Section 25 of the Habitats Regulations must be satisfied. It must therefore be demonstrated by the applicant that all reasonable steps have been taken to minimise the impact and that any remaining damage will be adequately compensated for. The first aim of the developer, working with professional advice, should be to entirely avoid or minimise the potential impact of a proposed development on bats and their breeding and resting places.

Current NPWS advice is that there should be no net loss in local bat population status, taking into account factors such as population size, viability and connectivity. Hence, when it is unavoidable that a development will affect a bat population, the mitigation should aim to maintain a population of equivalent status in the area.

One of the key aims of the Directive is to encourage member states to maintain at, or restore to, favourable conservation status those species of community interest (Article 2(2)). 'Favourable conservation status' is defined in the Habitats and Species Directive (Article 1(i)). Conservation status is defined as "the sum of the influences acting on the species concerned that may affect the long term distribution and abundance of its population within the territory." It is assessed as favourable when: "population dynamics data on the species concerned indicate that it is maintaining itself on a long term basis as a viable component of its natural habitats, and the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and there is, or will probably continue to be, a sufficiently large habitat to maintain its populations on a long term basis." Note that even though there is apparent overlap between the Wildlife Acts and the Habitats Regulations, they run concurrently. No action in relation to bats that would not be permitted under the Habitats Regulations may be licensed under the Wildlife Acts.

Derogation licences granted under the Regulations include reference to the relevant provisions of the Wildlife Acts to ensure that all requirements for licensing are covered in the one document. It should also be noted that a licence only allows what is permitted within its terms and conditions; it does not legitimise all actions related to bats at a given site.[7]

[7] Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

2. METHODOLOGY

2.1 Information Sources

A desk-based review of information sources was completed. Information contained on the websites of the National Parks and Wildlife Service (NPWS)[8] and the National Biodiversity Data Centre (NBDC)[9] was reviewed.

The following publications and websites were also reviewed and consulted:

- Bat Conservation Ireland https://www.batconservationireland.org/
- Bat Roosts in Trees: A Guide to Identification and Assessment for Tree-Care and Ecology Professionals (2018)
- Bat Conservation Trust (2018) Bats and artificial lighting in the UK Bats and the Built Environment series[10]
- Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.
- Mitchell-Jones, A.J, & McLeish, A.P. (eds). 2004., 3rd Edition Bat Workers' Manual, JNCC, Peterborough, ISBN 1 86107 558 8
- Bat Conservation Ireland (2012) Bats and Appropriate Assessment Guidelines, Version 1, December 2012. Bat Conservation Ireland, www.batconservationireland.org[11]
- Bat Conservation Trust (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition
- Bat Conservation Ireland (2010) Bats & Lighting Guidance Notes for: Planners, engineers, architects and developers[12]
- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes (National Roads Authority, 2005).
- Guidelines for the Treatment of Bats during the Construction of National Road Schemes (National Roads Authority, 2005).
- Bats and Lighting in the UK – Bats and the Built Environment Series (Institute of Lighting Professionals, September 2011
- Guidance Notes for the Reduction of Obtrusive Light GN01 (Institute of Lighting Professionals, 2011.
- Bats and Lighting – Guidance Notes for Planners, Engineers, Architects and Developers (Bat Conservation Ireland);
- The Eurobats Mitigation of Lighting Document

[8] The National Parks and Wildlife Services map viewer http://webgis.npws.ie/npwsviewer/

[9] The National Biodiversity Data Centre www.NBDC.ie

[10] https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/

[11] https://www.batconservationireland.org/wp-content/uploads/2013/09/BCIreland-AA-Guidelines_Version1.pdf

[12] https://www.batconservationireland.org/wp-content/uploads/2013/09/BCIrelandGuidelines_Lighting.pdf

2.2 Desk Study

2.2.1 *Previous Records*

A desktop review was carried out to identify the previous records of Bat species within the Proposed Development Site and its environs. The study area occurs in 10km² Grid Square O02. The website the NBDC (www.nbdc.ie) was accessed on 20/07/2021 to establish any previous bat records and shown below in Table 1.

Table 1 Historical Bat Records in 10km² Grid Square O02 (NBDC website www.nbdc.ie accessed 20/07/2021)

Species Name - Common	*Species Name - Latin*	Last Documented Record O02
Brown Long-eared Bat	*Plecotus auritus*	05/07/2012
Daubenton's Bat	*Myotis daubentonii*	21/08/2014
Lesser Noctule	*Nyctalus leisleri*	18/09/2012
Natterer's Bat	Myotis nattereri	14/09/2011
Common Pipistrelle	*Pipistrellus pipistrellus*	15/10/2012
Soprano Pipistrelle	*Pipistrellus pygmaeus*	05/08/2012

2.2.2 *Species Background*

Ireland had ten known bat species until February 2013, when a single live greater horseshoe bat (*Rhinolophus ferrumequinum)* was found roosting in Co. Wexford[13]. On 8th June 2020, a single audio recording was confirmed in the Glendaough area, Co. Wicklow. It was found on two more occasions in the same area in early July 2020 (Bat Conservation Ireland, July 2020).

The ten species (excluding the greater horseshoe) are briefly described overleaf. For a more comprehensive overview see McAney, 2006.[14]

The dependence of Irish bat species on insect prey has left them vulnerable to habitat destruction, land drainage, agricultural intensification and increase use of pesticides. Also, their reliance on buildings as roosting sites has made them particularly vulnerable to renovation works and the use of timber chemical treatment. Buildings are highly important as roosting sites for bats and all Irish bat species use buildings for all roost types. Most significant in terms of roosts in houses are maternity roosts, but cellars and even attics may serve as hibernation sites for bats. Roosts within buildings can far exceed the numbers encountered in trees, bridges, caves or cliffs and roosts of over 1,000 bats have been recorded in buildings.[15]

[13] National Biodiversity Data Centre http://www.biodiversityireland.ie/new-bat-species-found-in-ireland/

[14] McAney, K. (2006) *A Conservation Plan for Irish Vesper Bats.* Irish Wildlife Manual No.20. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government.

[15] NRA (2005) Guidelines for the Treatment of Bats Prior to the Construction of National Road Schemes. National Roads Authority, Dublin

2.2.2.1 Family Vespertilionidae:

Common pipistrelle *Pipistrellus pipistrellus*
This species was only recently separated from its sibling, the soprano or brown pipistrelle P. pygmaeus [16], which is detailed below. The common pipistrelle's echolocation calls peak at 45 kHz. The species forages along linear landscape features such as hedgerows and treelines as well as within woodland.

Soprano pipistrelle *Pipistrellus pygmaeus*
The soprano pipistrelle's echolocation calls peak at 55 kHz, which distinguishes it readily from the common pipistrelle on detector. The pipistrelles are the smallest and most often seen of our bats, flying at head height and taking small prey such as midges and small moths. Summer roost sites are usually in buildings, but tree holes and heavy ivy are also used. Roost numbers can exceed 1,500 animals in mid-summer.

Nathusius' pipistrelle *Pipistrellus nathusii*
Nathusius' pipistrelle is a recent addition to the Irish fauna and has mainly been recorded from the north-east of the island in Counties Antrim and Down[17] and also in Fermanagh, Longford and Cavan. It has also recently been recorded in Counties Cork and Kerry.[18] However, the known resident population is enhanced in the autumn months by an influx of animals from Scandinavian countries. The status of the species has not yet been determined.

Leisler's bat *Nyctalus leisleri*
This species is Ireland's largest bat, with a wingspan of up to 320mm; it is also the third most common bat, preferring to roost in buildings, although it is sometimes found in trees and bat boxes. It is the earliest bat to emerge in the evening, flying fast and high with occasional steep dives to ground level, feeding on moths, caddisflies and beetles. The echolocation calls are sometimes audible to the human ear being around 15 kHz at their lowest. The audible chatter from their roost on hot summer days is sometimes an aid to location. This species is uncommon in Europe and as Ireland holds the largest national population the species is considered as Near Threatened here.

Brown long-eared bat *Plecotus auritus*
This species of bat is a 'gleaner', hunting amongst the foliage of trees and shrubs, and hovering briefly to pick a moth or spider off a leaf, which it then takes to a sheltered perch to consume. They often land on the ground to capture their prey. Using its nose to emit its echolocation, the long-eared bat 'whispers' its calls so that the insects, upon which it preys, cannot hear its approach (and hence, it needs oversize ears to hear the returning echoes). As this is a whispering species, it is extremely difficult to monitor in the field as it is seldom heard on a bat detector.

[16] Barratt, E. M., Deauville, R., Burland, T. M., Bruford, M. W., Jones, G., Racey, P. A., & Wayne, R. K. (1997) *DNA Answers the Call of Pipistrelle Bat Species. Nature* 387: 138 - 139.

[17] Richardson, P. (2000) *Distribution Atlas of Bats in Britain and Ireland 1980 - 1999.* The Bat Conservation Trust, London, England.

[18] Kelleher, C. (2005) *International Bat Fieldcraft Workshop, Killarney, Co. Kerry.* National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government.

Furthermore, keeping within the foliage, as it does, it is easily overlooked. It prefers to roost in old buildings.

Natterer's bat *Myotis nattereri*
This species has a slow to medium flight, usually over trees but sometimes over water. It usually follows hedges and treelines to its feeding sites, consuming flies, moths, caddisflies and spiders. Known roosts are usually in old stone buildings but they have been found in trees and bat boxes. The Natterer's bat is one of our least studied species and further work is required to establish its status in Ireland.

Daubenton's bat *Myotis daubentonii*
This bat species feeds close to the surface of water, either over rivers, canals, ponds, lakes or reservoirs but it can also be found foraging in woodlands. Flying at 15 kilometres per hour, it gaffs insects with its over-sized feet as they emerge from the surface of the water - feeding on caddis flies, moths, mosquitoes, midges etc. It is often found roosting beneath bridges or in tunnels and also makes use of hollows in trees.

Whiskered bat *Myotis mystacinus*
This species, although widely distributed, has been rarely recorded in Ireland. It is often found in woodland, frequently near water. Flying high, near the canopy, it maintains a steady beat and sometimes glides as it hunts. It also gleans spiders from the foliage of trees. Whiskered bats prefer to roost in buildings, under slates, lead flashing or exposed beneath the ridge beam within attics. However, they also use cracks and holes in trees and sometimes bat boxes. The whiskered bat is one of our least studied species and further work is required to establish its status in Ireland.

Brandt's bat *Myotis brandtii*
This species is known from five specimens found in Counties Wicklow (Mullen, 2007), Cavan, and Clare in 2003, a specimen in Kerry in 2005[19] and another in Tipperary in 2006.[20] No maternity roosts have yet been found. It is very similar to the whiskered bat and cannot be separated by the use of detectors. Its habits are similar to its sibling.

2.2.2.2 *Family Rhinolophidae:*

Lesser horseshoe bat *Rhinolophus hipposideros*

This species is the only representative of the Rhinolophidae or horseshoe bat family in Ireland. It differs from our other species in both habits and looks, having a unique nose leaf with which it projects its echolocation calls. It is also quite small and, at rest, wraps its wings around its body. Lesser horseshoe bats feed close to the ground, gleaning their prey from branches and stones. It often carries its prey to a perch to consume, leaving the remains beneath as an indication of its presence.

The echolocation call of this species is of constant frequency and, on a heterodyne bat detector, sounds like a melodious warble. The species is confined to six counties along the Atlantic seaboard: Mayo, Galway, Clare, Limerick, Kerry and Cork. The current Irish national population is estimated at 12,500 animals. This species is listed

[19] Kelleher, C. 2006a Nathusius pipistrelle Pipistrellus nathusii and Brandt's Bat Myotis brandtii - New Bat Species to Co. Kerry – Irish Naturalists' Journal 28: 258.

[20] Kelleher, C. 2006b Brandt's Bat Myotis brandtii, New Bat Species to Co. Tipperary. Irish Naturalists' Journal 28: 345.

on Annex II of the EC Habitats Directive and 41 Special Areas of Conservation have been designated in Ireland for its protection. Where it occurs, it is often found roosting within farm buildings.

2.2.3 *Landscape Suitability*

The National Biodiversity Data Centre (NBDC) maps landscape suitability bats based on Lundy *et al.* (2011). The maps are a visualisation of the results of the analyses based on a 'habitat suitability' index. The index ranges from 0 to 100 with 0 being least favourable and 100 most favourable for individual bat species and between 36.44 - 58.56 for the highest average range. The overall average assessment of bat habitats for the current study area is given as 39.67 (High) with the highest average category ranging from 36.44 - 58.55. Table 2 gives the suitability of the study area for the bat species found in the study area (based on NBDC) along with their Irish Red List Status (from Marnell *et al.*, 2019).[21]

Table 2 Suitability of the study area for the bat species found in the Rathcoole area(based on the NBDC data) with Irish Red list status indicated.

Common name	Scientific name	Suitability index	Irish red list status
All bats	-	39.67	Least Concern
Soprano pipistrelle	*Pipistrellus pygmaeus*	50	Least Concern
Brown long-eared bat	*Plecotus auritus*	55	Least Concern
Common pipistrelle	*Pipistrellus pipistrellus*	59	Least Concern
Lesser-horseshoe bat	*Rhinolophus hipposideros*	0	Least Concern
Leisler's bat	*Nyctalus leisleri*	59	Least Concern
Whiskered bat	*Myotis mystacinus*	38	Least Concern
Daubenton's bat	*Myotis daubentonii*	34	Least Concern
Nathusius' pipistrelle	*Pipistrellus nathusii*	20	Least Concern
Natterer's bat	*Myotis nattereri*	42	Least Concern

2.2.4 *Bat Roosts*

Bats were originally cave and tree dwelling animals, but many now find buildings just as suitable for their needs. Bats are social animals, and most species congregate in large colonies during summer. These colonies consist mostly of females of every reproductive class, with some juvenile males from the previous year. Male bats normally roost individually or in small groups meeting up with the females in the late autumn-early winter, when it is time to mate. In summer, bats seek warm dry buildings in which they can give birth and suckle their young. In winter, they seek out places with a constant low temperature and high humidity where they can become torpid and hibernate during adverse weather conditions. However, bats do not hibernate continuously during winter and will awake and hunt during mild nights when there are insects available, and it is energetically advantageous to forage.

[21] Marnell, F., Looney, D. & Lawton, C. (2019) Ireland Red List No. 12: Terrestrial Mammals. National Parks and Wildlife Service, Department of the Culture, Heritage and the Gaeltacht, Dublin, Ireland.

2.2.4.1 Maternity Roosts

Maternity roosts are the most significant roosts, and they are predominantly all-female aggregations that are formed from late May onwards and remain as a relatively cohesive unit until mid to late August. Not all female bats give birth annually. These females that do bear young in a given year avail of a suitable building, tree and sometimes cave (or equivalent). The young are flightless for several weeks and hence are vulnerable to dangers such as tree felling and restoration, reinforcement or demolition of structures such as buildings and bridges.

2.2.4.2 Mating Roosts

Most bat species mate in autumn but pregnancy does not occur until the following spring. During this time males will take possession of a cavity in a building, tree, bridge, cave or mine and attract females to these sites to establish a harem. Male bats call both from a perch and in flight in much the same manner that male birds sing.

2.2.4.3 Hibernation Roosts

Bats have a high metabolic rate and in temperate countries, such as Ireland, flying insects are not available in sufficient numbers during winter to sustain bats. Therefore, bats hibernate during winter. In hibernation sites, bats are often completely inactive for several days and are extremely vulnerable to disturbance by human activities due to the time taken for them to become sufficiently active to allow escape. Hibernation may extend from November to the end of March, during which time bat activity will take place sporadically.

2.2.4.4 Night Roosts

These are roosts which are used as resting places for bats between foraging bouts. They also provide retreats for bats from predators or during inclement weather conditions. They also function as feeding perches and may be important for socialising.

2.3 General Activity Survey

A general bat activity survey was also undertaken on the 24th August 2021 from 20.00 to 22.30 (sunset was 20.33) by walking the Site boundaries. The weather was very optimal for a bat survey with temperatures on the night 16-17°C in calm conditions. Bat activity and emergence surveys are best carried out from April to mid-September in suitable weather conditions[22] which this survey was.

The equipment used for the bat activity survey included a Elekon Bat Logger M detector. Visual observations were taken with the aid of a powerful L.E.D. torch (AP Pros-Series 220 Lumens High Performance Spotlight).

General Site photos are contained in Appendix A.

[22] Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

2.4 Buildings Assessment Methodology

There were a number of buildings onsite, see Figure 2. These were occupied during the survey including what appeared to be a vacant house to the northwest of the site. From a visual assessment taken a distance away a preliminary rating was assigned to the housing clusters following the BCT guidelines with the assessment rating[23] and classification using Table 4.1 of the BCT guidelines (2016) which is shown as Table 3.

Table 3 Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of roost 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).

[23] *Bat Surveys for Professional Ecologists, Good Practice Guidelines (2016)*

2.5 Bat Potential Tree Assessment

A number of semi-mature trees were present at the site entrance. The treelines were assessed as a section for any 'Potential Roost Features' (PRFs) listed below and, to assess whether the treeline may be used as important commuting and foraging routes.

- Natural holes (e.g., knot holes) arising from naturally shed branches or branches previously pruned back to a branch collar.
- Man-made holes (e.g., cavities that have developed from flush cuts or cavities created by branches tearing out from parent stems).
- Cracks/splits in stems or braches (horizontal and vertical).
- Partially detached or loose bark plates.
- Cankers (caused by localised bark death) in which cavities have developed.
- Other hollows or cavities, including butt rots.
- Compression of forks with included bark, forming potential cavities.
- Crossing stems or branches with suitable roosting space between.
- Ivy stems with diameters in excess of 50mm with suitable roosting space behind (or where roosting space can be seen where a mat of thinner stems has left a gap between the mat and the trunk).
- Bat or bird boxes.
- Other suitable places of rest or shelter.

Certain factors such as orientation of the feature, height from the ground, the direct surroundings and its location in respect to other features may enhance or reduce the potential value.

Trees were then classified into general bat roost potential groups based upon the presence of these features. An evaluation table is shown as Table 4.

Table 4 Classification and Survey Requirements for Bats in Trees[24]

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey Work / Actions
Confirmed Roost	Evidence of roosting bats in the form of live / dead bats, droppings, urine staining, mammalian fur oil staining, etc.	A National Parks and Wildlife (NPWS) derogation licence application will be required if the tree or roost site is affected by the development or proposed arboricultural works. This will require a combination of aerial assessment by roped access bat workers (where possible, health and safety constraints allowing) and nocturnal survey during

[24] Bat Surveys for Professional Ecologists: Good Practice Guidelines (J., Collins (Bat Conservation Trust), 2016[24]).

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey Work / Actions
		appropriate periods (e.g. nocturnal survey - May to August) to inform on the licence. Works to tree undertaken under supervision in accordance with the approved good practice method statement provided within the licence. However, where confirmed roost site(s) are not affected by works, work under a precautionary good practice method statement may be possible.
High Potential	A tree with one or more Potential Roosting Features that are obviously suitable for larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter protection, conditions (height above ground level, light levels, etc.) and surrounding habitat. Examples include (but are not limited to); woodpecker holes, larger cavities, hollow trunks, hazard beams, etc.	Aerial assessment by roped access bat workers (if appropriate) and / or nocturnal survey during appropriate period (May to August). Following additional assessments, tree may be upgraded or downgraded based on findings. If roost sites are confirmed and the tree or roost is to be affected by proposals a licence from the NPWS will be required. After completion of survey work (and the presence of a bat roost is discounted), a precautionary working method statement may still be appropriate.
Moderate Potential	A tree with Potential Roosting Features which could support one or more potential roost sites due to their size, shelter protection, conditions (height above ground level, light levels, etc.) and surrounding habitat but unlikely to support a roost of high	A combination of aerial assessment by roped access bat workers and / or nocturnal survey during appropriate period (May to August). Following additional assessments,

Classification of Tree	Description of Category and Associated Features (based on Potential Roosting Features listed above)	Likely Further Survey Work / Actions
	conservation status (i.e., larger roost, irrespective of wider conservation status). Examples include (but are not limited to); woodpecker holes, rot cavities, branch socket cavities, etc.	tree may be upgraded or downgraded based on findings. After completion of survey work (and the presence of a bat roost is discounted), a precautionary working method statement may still be appropriate. If a roost site/s is confirmed a licence from the NPWS will be required.
Low Potential	A tree of sufficient size and age to contain Potential Roosting Features but with none seen from ground or features seen only very limited potential. Examples include (but are not limited to); loose/lifted bark, shallow splits exposed to elements or upward facing holes.	No further survey required but a precautionary working method statement may be appropriate.
Negligible/No potential	Negligible/no habitat features likely to be used by roosting bats	None.

2.6 Landscape Evaluation

Ecological survey results were evaluated to determine the significance of identified features located in the study area on an importance scale ranging from international-national-county-local (from NRA, 2009) The local scale is approximately equivalent to one 10km square but can be operationally defined to reflect the character of the area of interest. Because most sites will fall within the local scale, this is sub-divided into two categories: local importance (higher value) and local importance (lower value).

3. RESULTS

3.1 General Activity Survey

The results of the bat survey carried out on August 24th 2021 are summarized in Table 5 with the complete dataset of bat species identified in real time in the field using the Elekon Batlogger M detector presented in Appendix B. A map outlining the locations of the bat calls is shown in Figure 4.

In total five species of bat were detected. A moderate rate of bat activity was recorded which was expected with the high bat landscape suitability score assigned and presence of 'Four Districts Woodland' east of the site. The most frequent bat species heard was Soprano Pipistrelle and Common Pipistrelle.

The majority of bat activity was along the existing mature hedgerows present at the Site.

Table 5 Bat Results Summary Data – 24th August 2021

Species Name – Common	Species Name – Latin	Number of Passes	Peak Frequency (kHz)
Common Pipistrelle	*Pipistrellus pipistrellus*	17	46.5
Soprano Pipistrelle	*Pipistrellus pygmaeus*	21	55.5
Leisler's Bat	*Nyctalus leisleri*	4	26.9
Brown Long Eared Bat	*Myotis nattereri*	2	35.0
Natterer's Bat	*Plecotus auritus*	1	50.0

Figure 4 Bat Activity Map with Legend

3.2 Buildings Assessment Survey

The existing buildings onsite (see Figure 2 and Figure 5 below) were visually assessed from a distance as occupied. All houses, bar a house and shed located to the northwest of the site were deemed of Low importance (Table 3) as they appeared to be in good repair. The house to the northwest of site was observed to be in disrepair.

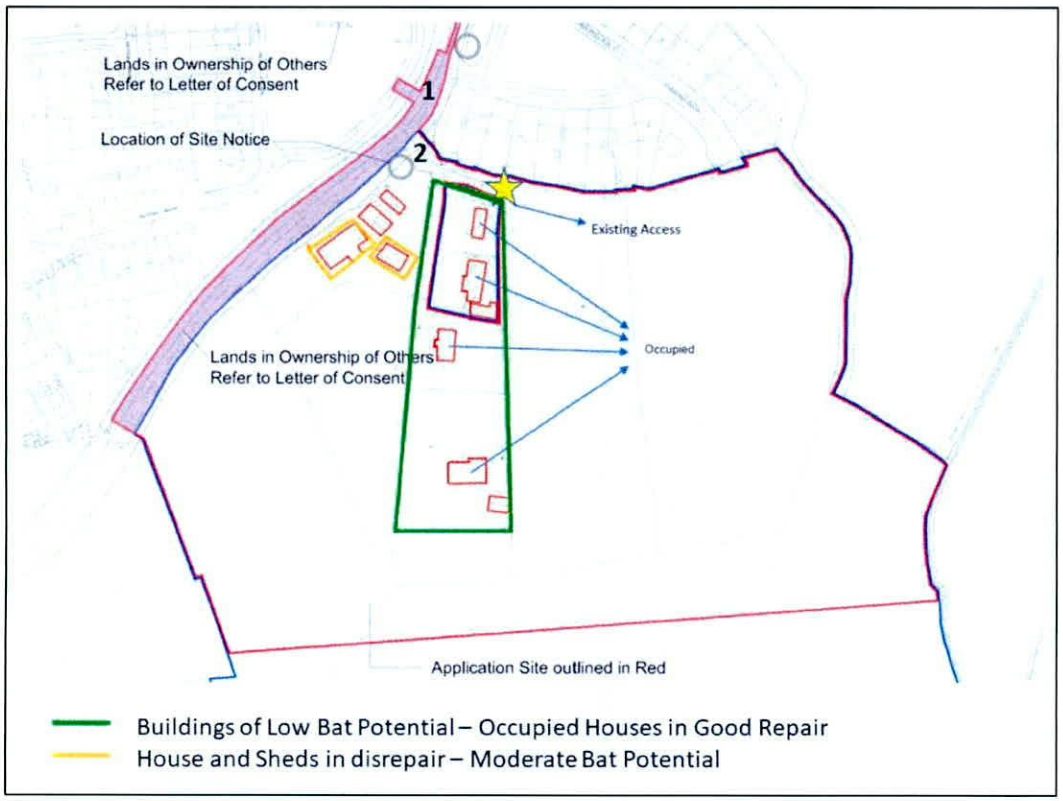

Figure 5 Existing buildings onsite and their roost potential.

3.3 Bat Potential Tree Assessment

Vegetation at the site was made up mainly of hedgerows with a lack of mature trees with bat potential, see Figure 4.

There was a short treeline at the entrance to site which contained trees of 'Moderate' bat potential due to a high cover of ivy or cracks, holes and crevices (See plates in Appendix A), as per Table 4 guidelines (Colins, 2016):

"A tree with Potential Roosting Features which could support one or more potential roost sites due to their size, shelter protection, conditions (height above ground level, light levels, etc.) and surrounding habitat but unlikely to support a roost of high conservation status (i.e., larger roost, irrespective of wider conservation status)."

3.4 Landscape Evaluation

The landscape is considered of local importance (Higher value) for bats due to a high score for landscape suitability for bats. The Four Districts Woodland to the east of the site adds to the landscape importance for bats with hedgerows within the site forming commuting and foraging corridors to this woodland.

4. RECOMMENDATIONS

4.1 Buildings Assessment

Most of the buildings onsite were deemed to be of 'Low' potential for roosting bats when assessed visually from a distance. A house to the northwest of the site was considered to have 'Moderate' potential. A pre-demolition bat survey and internal assessment of all budlings to be demolished on the site should be undertaken during the appropriate time of year and in the correct weather conditions.

If bats are uncovered during the pre-demolition survey, or during demolition works then works should cease and a derogation licence from the National Parks and Wildlife Services (NPWS) acquired to continue.

4.2 Tree Removal

Individual trees and hedgerows should be retained where possible for commuting, foraging and potentially roosting bats.

Specifically, where tree felling is absolutely necessary, the following protocol should be followed:

- Tree-felling should be undertaken in the period late August to late October/early November. During this period bats are capable of flight and this may avoid risks associated with tree-felling.

- Felling during the winter months should be avoided as this creates the additional risk that bats may be in hibernation and thus unable to escape from a tree that is being felled. Additionally, disturbance during winter may reduce the likelihood of survival as the bats' body temperature is too low and they may have to consume too much body fat to survive.

- Tree-felling should be undertaken using heavy plant and chainsaw. There is a wide range of machinery available with the weight and stability to safely fell a tree. Normally trees are pushed over, with a need to excavate and sever roots in some cases. In order to ensure the optimum warning for any roosting bats that may still be present, an affected tree will be pushed lightly two to three times, with a pause of approximately 30 seconds between each nudge to allow bats to become active. Any affected trees should then be pushed to the ground slowly and should remain in place for a period of at least 48 hours to allow bats/other wildlife to escape.

- A derogation licence from the National Parks and Wildlife Services (NPWS) will be required if bats are uncovered during tree felling.

4.3 Lighting for Bats

In order to minimise disturbance to bats utilising the site in general, the lighting and layout of the proposed development should be designed to minimise light-spill onto habitats used by the local bat population foraging or commuting. This can be achieved by ensuring that the design of lighting accords with guidelines presented in the Bat Conservation Trust & Institute of Lighting Engineers *'Bats and Lighting in the UK - Bats and Built Environment Series'*, the Bat Conservation Trust *'Artificial Lighting and Wildlife Interim Guidance'* and the Bat Conservation Trust *'Statement on the impact and design of artificial light on bats'*. Therefore, where possible, the lighting scheme should include the following:

- The avoidance of direct lighting of proposed areas of habitat creation / landscape planting, or on existing trees/hedgerows to be retained
- Unnecessary light spill controlled through a combination of directional lighting and hooded / shielded luminaires or strategic planting to provide screening vegetation.
- Lights should be of low intensity. It is better to use several low intensity lights than one strong light spilling light across the entire area.
- Narrow spectrum lighting should be used with a low UV component. Glass also helps reduce the UV component emitted by lights.
- The colour rendering of the selected light fitting should be 3000k making the LED fittings a warmer light, helping to further minimize the impact on the local wildlife

4.4 Roosting Opportunities

A series of 10+ bat boxes will be erected on suitable substrates around the Site to provide future roosting opportunities for bats. The type recommended is the 2F Schwegler Bat Box.

5. CONCLUSION

On the basis of the findings of the survey works it is concluded that the overall impact on bats, arising from the Proposed Development, will most likely be negligible for bats if:

- A bat friendly lighting design is implemented.
- Trees and Treelines/Hedgerows are retained where possible. In the case where tree felling is necessary to facilitate the development then a soft tree felling procedure outlined in Section 4.2 should be carried out and semi-mature native species of trees are planted to compensate.
- Bat boxes (~10) are erected on suitable substrates e.g. on trees if available (or walls if not), around the site during the operational phase.
- A pre-demolition bat emergence survey and internal assessment of the buildings are undertaken when vacant during the appropriate time of year and in the correct weather conditions.
- Works will cease if bats are uncovered during building demolition or tree felling and a Derogation Licence acquired from the NPWS.

APPENDICES

APPENDIX A

Plate 1 Entrance to site.

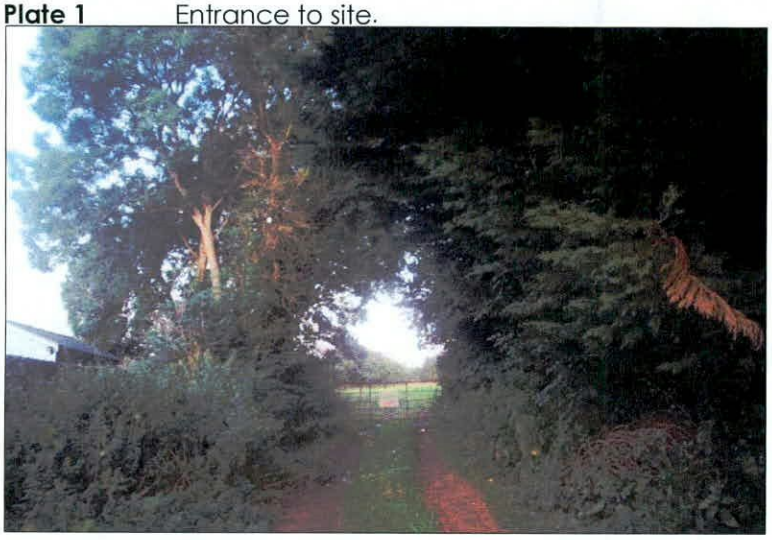

Plate 2 Laneway to field entrance.

Plate 3 Site is mainly Improved Grassland with Intersecting Hedgerows.

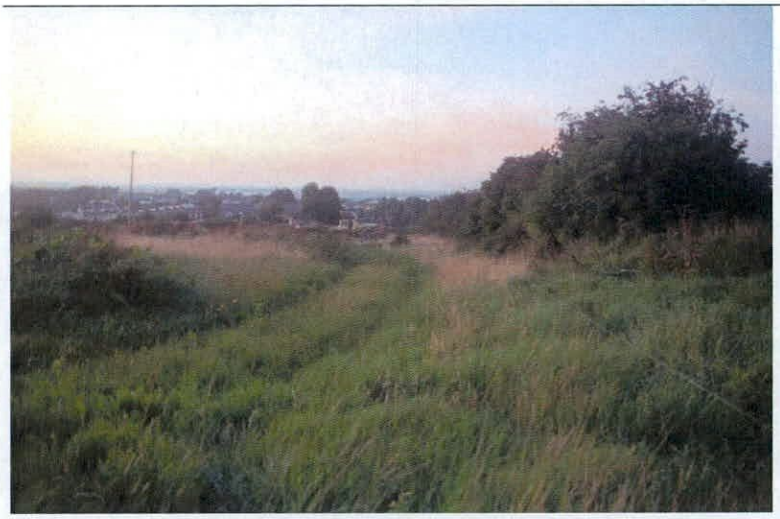

Plate 4 Site is mainly Improved Grassland with Intersecting Hedgerows.

Plate 5 Site is mainly Improved Grassland with Intersecting Hedgerows.

Plate 6 Tree with 'Moderate' bat potential located at field entrance.

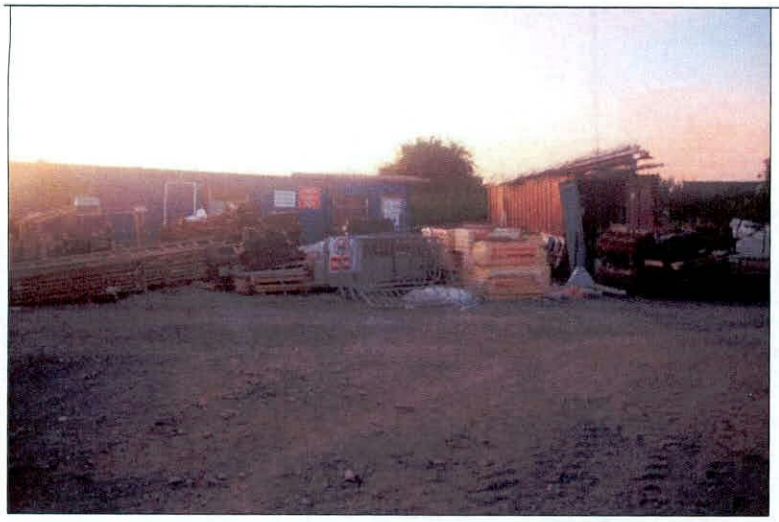

Plate 7 Structures at the northwest of site – Negligible Bat Potential.

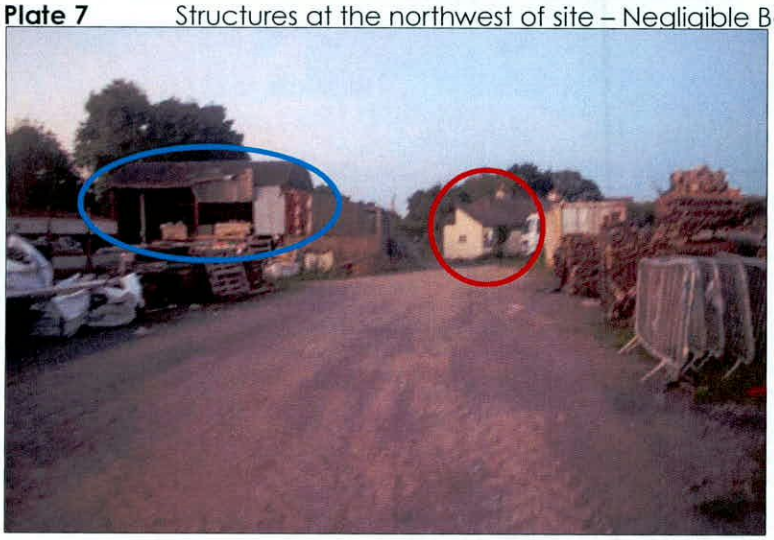

Plate 8 Structures at the northwest of site – Negligible Bat Potential for old haybarn (blue circle). Old house in disrepair to the right (red circle) has moderate Bat Potential. Not surveyed.

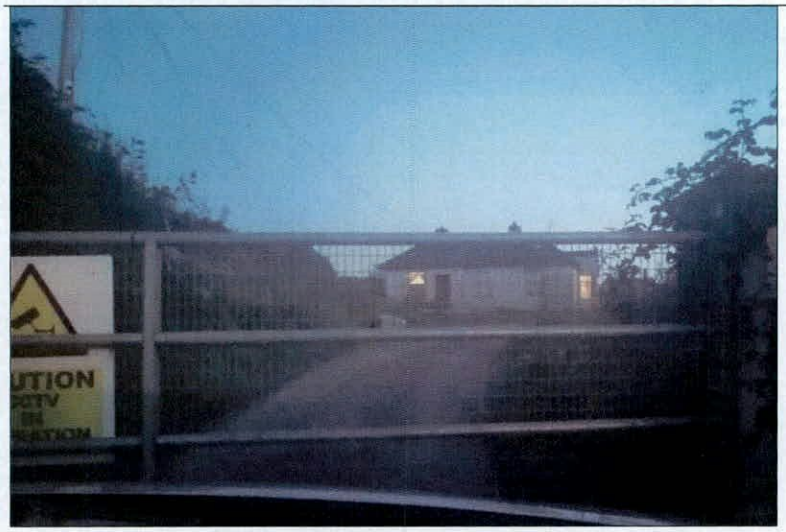

Plate 9 Old house in disrepair to the right (red circle) has moderate Bat Potential. Not surveyed.

APPENDIX B

24/08/2021	Classification source	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Latitude [WGS84]	Longitude [WGS84]
20:40:36	Leisler's Bat	3	25.9	24.5	28.7	9.8	360	17	53.276782	-6.46427
20:48:53	Soprano pipistrelle	1	54.6	54	61	3.3	0	17	53.276603	-6.46434
20:52:23	Soprano pipistrelle	2	54.9	54.4	60.1	2.9	398	17	53.276084	-6.46516
20:53:56	Soprano pipistrelle	2	53.5	53.1	56.1	2.9	82	17	53.27584	-6.4674
20:54:06	Common pipistrelle	15	48.3	47.5	57.7	7	100	17	53.276026	-6.46713
20:54:38	Common pipistrelle	12	47.4	46.5	55.8	7.2	90	17	53.277494	-6.46607
20:56:21	Leisler's Bat	22	24.7	26.5	23.6	14	250	17	53.277667	-6.46669
20:58:27	Soprano Pipistrelle	53	53.7	66.7	53.4	5	85	17	53.277487	-6.46598
21:00:02	Soprano Pipistrelle	4	54.5	66	54.2	4.4	133	17	53.277551	-6.46579
21:07:14	Leisler's Bat	17	25.6	28.9	24.9	12	110	17	53.277179	-6.46606
21:08:34	Soprano pipistrelle	1	59.2	58	62.2	2.6	0	17	53.277128	-6.46593
21:10:42	Soprano pipistrelle	2	53.4	51.9	55.5	2.3	285	17	53.277224	-6.46629
21:17:48	Soprano pipistrelle	23	54.1	52.8	66.5	6	94	17	53.276933	-6.46602
21:18:01	Common pipistrelle	19	47.4	46.9	49.3	8	166	17	53.276948	-6.46589
21:19:16	Common pipistrelle	15	43.5	42.6	48.6	5	270	17	53.277167	-6.46446

21:20:01	Soprano Pipistrelle	16	57	70.5	56.6	3	119	17	53.276884	-6.46601
21:28:54	Soprano Pipistrelle	9	54.9	71.9	54.4	3	93	17	53.276961	-6.46584

24/08/2021	Classification source	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Latitude [WGS84]	Longitude [WGS84]
21:37:35	Soprano Pipistrelle	14	53.9	62.4	53.4	4	90	17	53.27637	-6.46834
21:38:54	Common Pipistrelle	1	56.4	58.3	56.1	14.4	0	17	53.277506	-6.46482
21:39:10	Soprano Pipistrelle	16	59	73.6	57.5	3	84	17	53.277064	6.464212
21:40:40	Common Pipistrelle	2	53.1	59.8	52.9	3.3	163	17	53.27684	-6.4645
21:40:58	Soprano Pipistrelle	7	54	69.4	53.4	3	148	17	53.277609	-6.46456
21:42:02	Soprano Pipistrelle	11	57	62.9	55.7	2	155	17	53.277269	-6.46457
21:45:52	Common Pipistrelle	8	51.3	56.1	50.9	6	141	17	53.276201	-6.46846
21:47:59	Brown Long Eared Bat	11	28.9	34.5	27.8	5	146	17	53.276135	-6.46783
21:48:57	Common Pipistrelle	1	56.4	59.5	56.1	5.2	0	17	53.27609	-6.46496
21:50:16	Brown Long Eared Bat	3	27.8	32.3	27.3	1.3	741	17	53.275898	-6.46772
21:51:21	Soprano Pipistrelle	3	55.8	57.4	55.4	4.2	504	16	53.27618	-6.46388
21:52:48	Common Pipistrelle	31	53.3	57.1	52.4	7	85	16	53.276141	-6.46534
21:53:10	Soprano Pipistrelle	1	57.6	58	57.3	5.9	0	16	53.275764	-6.46766
21:58:26	Common Pipistrelle	9	51.4	60.7	51.2	5	178	16	53.275686	-6.46799
21:58:41	Common Pipistrelle	9	47.2	55.2	46.9	5	100	16	53.275776	-6.46784
22:00:22	Soprano Pipistrelle	21	55.8	56.1	55	5	90	16	53.276001	-6.46852

24/08/2021	Classification source	Calls [#]	Mean Peak Frequency [kHz]	Mean Max Frequency [kHz]	Mean Min Frequency [kHz]	Mean Call Length [ms]	Mean Call Distance [ms]	Temperature [°C]	Latitude [WGS84]	Longitude [WGS84]
22:03:42	Common Pipistrelle	7	50.3	50.8	49.9	6.6	425	16	53.276392	-6.46784
22:03:48	Soprano Pipistrelle	3	54.9	55.5	54.6	5.2	197	16	53.276	-6.46652
22:08:46	Common Pipistrelle	7	51	51.7	50.6	7	180	16	53.27611	-6.46787
22:12:18	Soprano Pipistrelle	14	55.4	64.7	55.2	5	90	16	53.276725	-6.46446
22:12:52	Common Pipistrelle	15	51.6	56.5	50.8	5	170	16	53.275975	-6.46727
22:13:38	Common Pipistrelle	3	52	54.9	51.5	7	213	16	53.27586	-6.4664
22:14:06	Soprano Pipistrelle	18	55.1	55.6	54.3	6	270	16	53.276059	-6.46626
22:17:29	Natterer's Bat	29	54.4	53.4	63	7	90	16	53.276384	-6.46833
22:22:45	Leisler's Bat	1	28.7	21.7	47	9.2	0	16	53.275859	-6.46433
22:23:10	Common Pipistrelle	19	53.3	55.3	52.8	7	175	16	53.276039	-6.46649
22:27:56	Common Pipistrelle	2	41.3	42.9	41	7.5	315	16	53.277007	-6.46509
22:30:16	Soprano Pipistrelle	2	57.5	59	56.7	5.6	358	16	53.277271	-6.46684