



Enviroguide
CONSULTING

ECOLOGICAL IMPACT ASSESSMENT REPORT

FOR

PROPOSED SOCIAL AND
TRAVELLER HOUSING

AT

SITE AT HEADFORD ROAD,
BALLINFOYLE, CO. GALWAY

ON BEHALF OF



Comhairle Cathrach na Gaillimhe
Galway City Council

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1 INTRODUCTION

Enviroguide Consulting was commissioned to prepare an Ecological Impact Assessment for a Proposed Social and Traveller Housing Scheme at Headford Road, Ballinfoyle, Co. Galway on behalf of Galway City Council.

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. Dr Siobhán Atkinson, Ecologist with Enviroguide undertook the habitat, mammal and invasive species surveys for this report. Shannen O'Brien, Ecologist with Enviroguide compiled this report and undertook the desktop research.

Dr Siobhán Atkinson has a B.Sc. (Hons) in Environmental Biology and a Ph.D. in Freshwater Biology from University College Dublin, and extensive experience in desktop research, literature review and reporting, as well as practical field and laboratory experience including environmental DNA analysis, freshwater macroinvertebrate sampling and identification, fish sampling and processing and habitat surveying. Siobhán has prepared Ecological Impact Assessments (EcIA), Stage I and Stage II Appropriate Assessment Reports, Habitat Surveys and Invasive Species Surveys and input and reviewed Ecological and Environmental assessments for several EIA Reports.

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 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 Competent Authority with its decision making in respect of the Proposed Development.

2.1 National Legislation

2.1.1 Wildlife Act 1976 and amendments

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

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

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

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

regards 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 Flora (Protection) Order, 2015

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

2.2 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 environmental legislation which aims to protect and improve water quality. It applies to rivers, lakes, groundwater, estuaries, and coastal waters. The Water Framework Directive was agreed by all individual EU member states in 2000, and its first cycle ran from 2009 – 2015. The Directive runs in 6-year cycles. The second cycle ran from 2016 – 2021, and the 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, which is approximately 1.15Ha, is located 3.2km north of Galway city centre by road. It is beyond the current edge of denser suburban estate development, the nearest such development being approximately 200m to the south, in an area characterised by low density one-off housing. Access is provided from the N84, a national trunk road. The Galway City Ring Road is planned to pass immediately to the north of the site. The GCRR road level will be elevated at approximately the median height of the sloping site, with the N84 passing below as an underpass.

3.2 Description

The Proposed Development entails the construction of a social housing development of 24 no residential units, comprising:

- *Provision of a 3.no. storey apartment block comprising –
 - 3 no. 1-bedroom units, 14 no. 2-bedroom units, 4 no. 3-bedroom units*
- *Provision of 3 no. 2-storey, 4-bedroom TAA (Traveller Appropriate Accommodation) units.*
- *Provision of roof mounted Solar PV panels on proposed apartment block.*
- *Provision of a foul water pumping station, carparking and bicycle parking, landscaping, children's play area, multi-use games area, connections to existing services and all ancillary/enabling site development works.*

Construction Phase

It is predicted that the entire development will be undertaken in one phase. The sequencing will be decided by the contractor, but it is envisaged that the houses and apartment block will progress at the same time, following a considerable site clearance. The anticipated construction stage duration will be 17 months.

It will be necessary to connect the proposed pumping station to the existing mains sewer on Headford Road, approximately 560m south of the Proposed Development. The installation of the rising main proposed in the N84 roads reserve will entail excavation in the N84 road reserve (within the sidewalk) for 560m and laying and testing of the new 80mmØ rising main to the indicated tie in point.

Traffic management along the N84 south of the site for 560m all the way to the tie in will be provided.

All existing pavement layer works thicknesses and types will be reinstated and as per existing and tested as per testing schedule, all layers will be keyed in where the trench intrudes onto the N84. All pipe and road pavement layer works (as per testing schedule) will be done and approved by the engineer.

The incorporation of Sustainable Urban Drainage Systems (SUDS) into the design of the Proposed Development is required, where possible, as stated in the Galway City Council Development Plan 2017 – 2023. 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 wetlands¹.

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

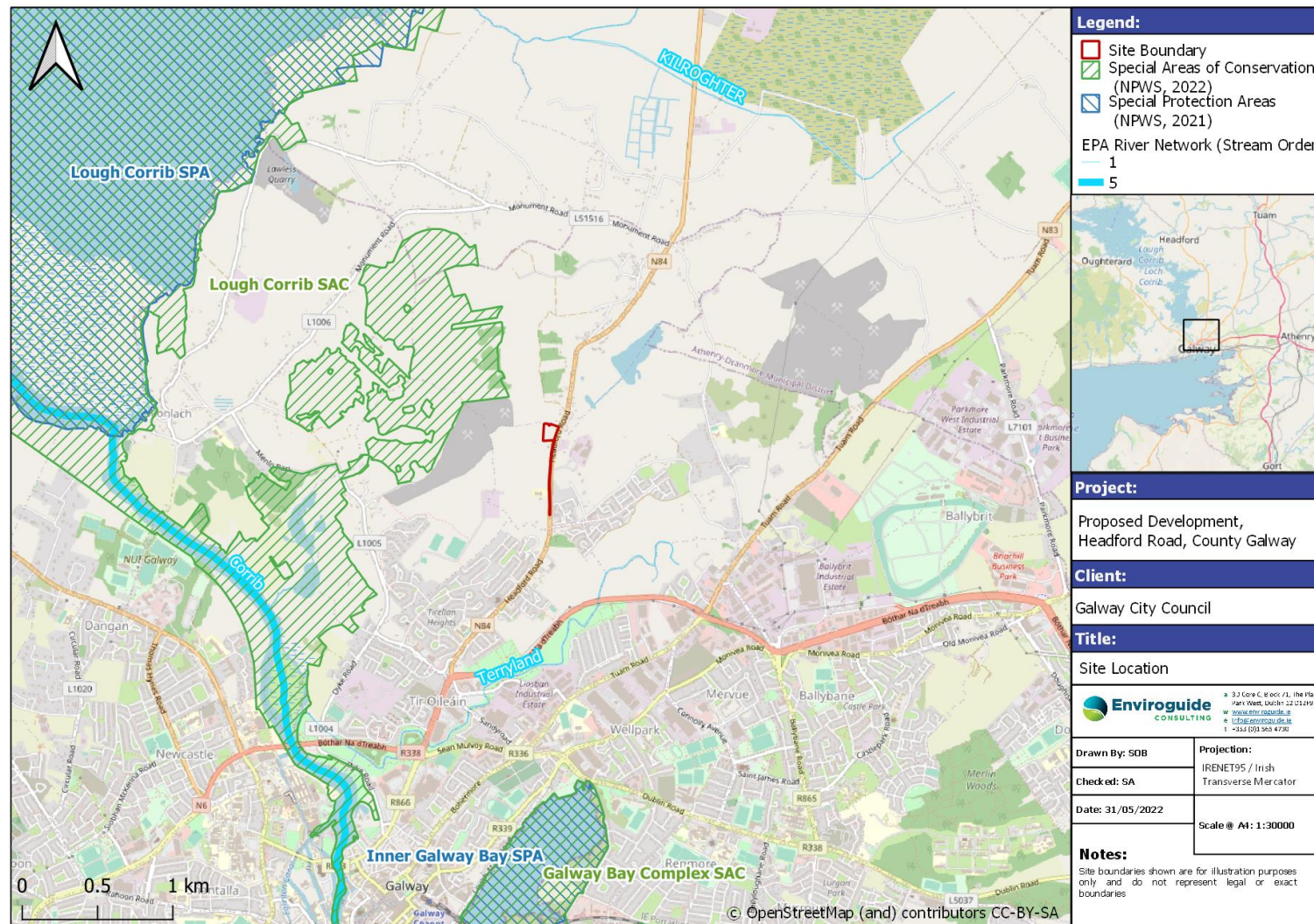


FIGURE 1. SITE LOCATION.

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.qis.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 Galway City Council available at: <https://www.galwaycity.ie/online-planning-system>
- 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
- Galway City Biodiversity Action Plan 2014-2024
- Galway City Council Development Plan 2017-2023
- Environmental Impact Assessment Report Volume 2 for N6 Galway City Ring Road from Galway City Council (2018)

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

A multi-disciplinary field survey was carried out on the 3rd March 2022 by Enviroguide Senior Ecologist Dr Siobhán Atkinson. 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. An android mobile device enabled with built-in GPS and mobile data connectivity, and loaded with QField GIS software was used to record data and to navigate the Site. Habitat categories, characteristic plant species, invasive species and other ecological features were recorded.

4.3.2 Bird Surveys

Bird surveys of the Site were carried out in conjunction with the habitat survey. All bird encounters were recorded, through audio and visual means.

4.3.3 Mammal Surveys

Mammal surveys of the Site were carried out in conjunction with the habitat survey. 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.

4.3.4 Invasive Species Surveys

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

4.4 Consultation

Contact was made with the Development Applications Unit regarding the Proposed Development. Whereas observations/recommendations regarding archaeology were received, no observations or recommendations regarding matters relating to ecology were received.

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 draft EPA Guideline (EPA, 2017), 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

General habitat surveys and invasive species surveys were carried out outside the optimum timeframe for general botanical field surveying (i.e., March). It was not possible to undertake breeding bird surveys. No bat activity surveys were undertaken. However, ecological assessments of the Site were carried out previously as part of the N6 Galway City Ring Road Project, and reference was made to these surveys as they provide information on the species recorded on the Site during the summer months.

Mammal surveys were undertaken within the appropriate time of year. Mammal surveys can be undertaken at any time of year but are less likely to provide reliable results during mid- to late-summer, when the presence of dense vegetation, such as bramble scrub, may make it difficult to find field signs and burrows.

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 Corrib catchment and the Corrib_SC_010 subcatchment. A small unnamed lake is located c. 240m to the north-east of the Site, and Ballindooly Lough is located c. 540m to the north-east of the Site. The closest river waterbody to the Site is the Terryland stream (EPA Code: 30T01), located approximately 700m to the south of the Proposed Development Site. This stream flows into the Corrib River, just north of the N6 bridge over the Corrib River. There is no hydrological connection between the Site and this stream.

The status of the Inner Galway Bay North coastal waterbody was classified as “unpolluted” during the 2018-2020 reporting period and has a WFD status of *Good* (EPA, 2022). The status of the Corrib Estuary transitional waterbody was also classified as “unpolluted” during the 2018-2020 reporting period and has a WFD status of *Good* (EPA, 2022). These waterbodies are *Not At Risk* of not achieving their status objectives under the Water Framework Directive (EPA, 2022).

The Site of the Proposed Development is situated on the Clare-Corrib groundwater body, which has *Good* status, but is *At Risk* of not meeting its WFD objectives. The Site is on a *Regionally Important Aquifer - Karstified (conduit)*. The groundwater rock units underlying the aquifer are classified as *Dinantian Pure Bedded Limestones*. The subsoils at the Site are classified as *Karstified bedrock outcrop or subcrop, with Limestone till (Carboniferous)* present within the southmost 180m of Headford Road included within the Site boundary. Groundwater vulnerability in the area is predominantly classified as *X- Rock at or Near Surface*, with an area of *Extreme* within the southmost 180m of Headford Road.

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 5 SACs, 3 SPAs, 2 NHAs and 10 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 Natura 2000 site or pNHA.

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		
Lough Corrib SAC (000297)	0.3km	Yes - Hydrogeological pathway via groundwater contamination during the Construction and Operational Phases of the Proposed Development, and an air pathway due to dust deposition during the Construction Phase of the Proposed Development.
Galway Bay Complex SAC (000268)	1.8km	Yes - Hydrogeological pathway via groundwater contamination during the Construction and Operational Phases of the Proposed Development.
Ross Lake And Woods SAC (001312)	13.0km	No – Refer to AA Screening Report accompanying this application.
Connemara Bog Complex SAC (002034)	13.7km	
Lough Fingall Complex SAC (000606)	14.8km	No – There is no direct hydrological connection. In addition, the intervening distance between the Site and the SAC are sufficient to exclude the possibility of significant effects on the SAC 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.
Special Protection Area		
Inner Galway Bay SPA (004031)	1.8km	Yes - Hydrogeological pathway via groundwater contamination during the Construction and Operational Phases of the Proposed Development.
Lough Corrib SPA (004042)	2.5km	

Site Name & Code (Receptor)	Distance to Proposed Development	Potential Pathway to receptor
Cregganna Marsh SPA (004142)	8.3km	No – Refer to AA Screening Report accompanying this application.
Natural Heritage Area		
Moycullen Bogs NHA (002364)	4.1km	No – There is no direct hydrological connection. In addition, the intervening distances between the Site and the NHAs are sufficient to exclude the possibility of significant effects on the NHAs 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.
Cregganna Marsh NHA (000253)	8.2km	
Proposed Natural Heritage Area		
Lough Corrib (000297)	1.3km	Yes – Hydrogeological pathway via groundwater contamination during the Construction and Operational Phases of the Proposed Development.
Galway Bay Complex (000268)	1.7km	
Kiltullagh Turlough (000287)	5.4km	No – There is no direct hydrological connection. In addition, the intervening distances between the Site and the pNHAs are sufficient to exclude the possibility of significant effects on the pNHAs 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.
Ballycuike Lough (000228)	7.9km	
Killarainy Lodge, Moycullen (002083)	10.4km	
Drimcong Wood (001260)	11.3km	
Ross Lake And Woods (001312)	12.9km	
Furbogh Wood (001267)	13.1km	
Connemara Bog Complex (002034)	13.7km	
Lough Fingall Complex (000606)	14.8km	

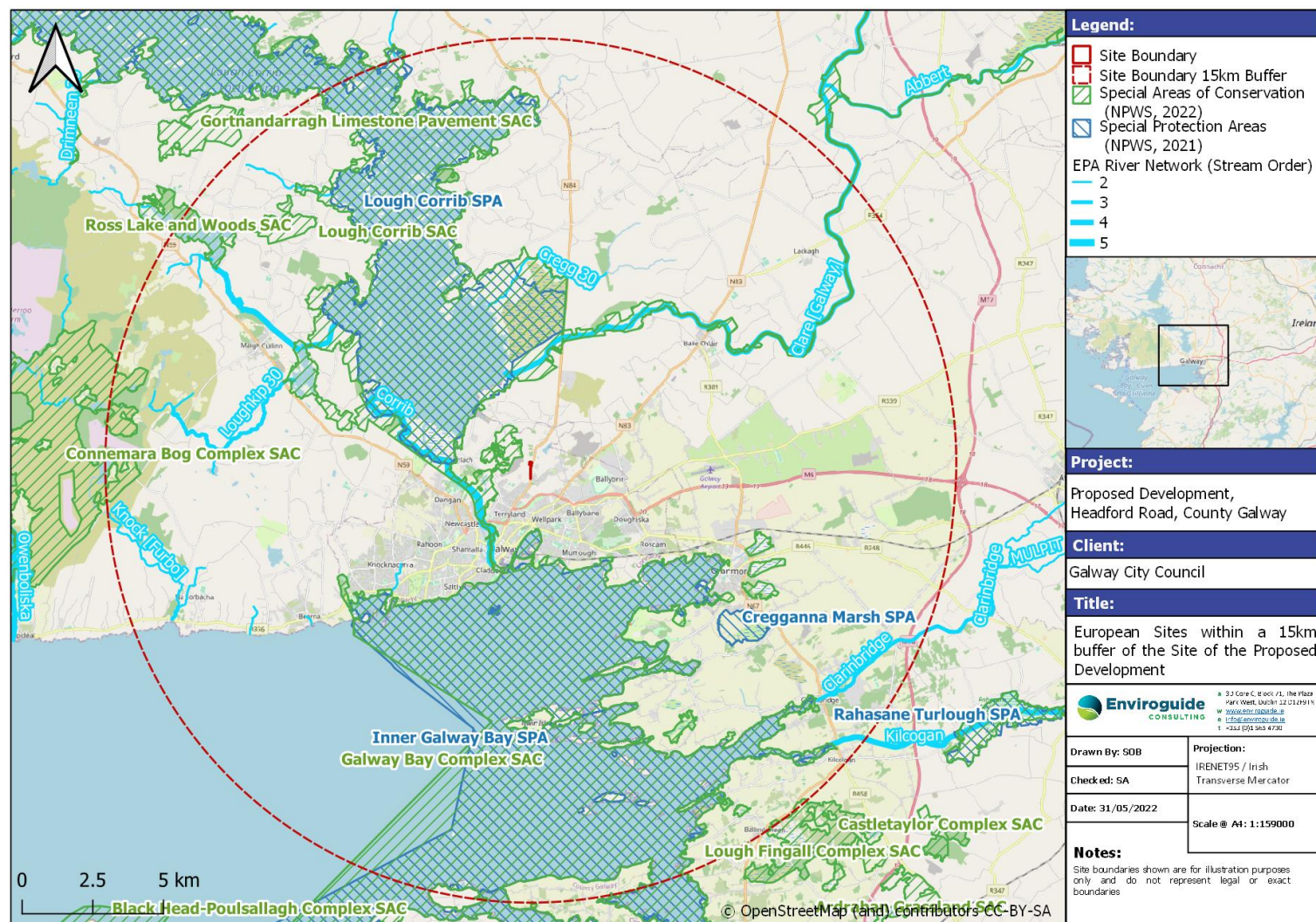


FIGURE 2. EUROPEAN SITES WITHIN 15KM OF THE PROPOSED DEVELOPMENT SITE.

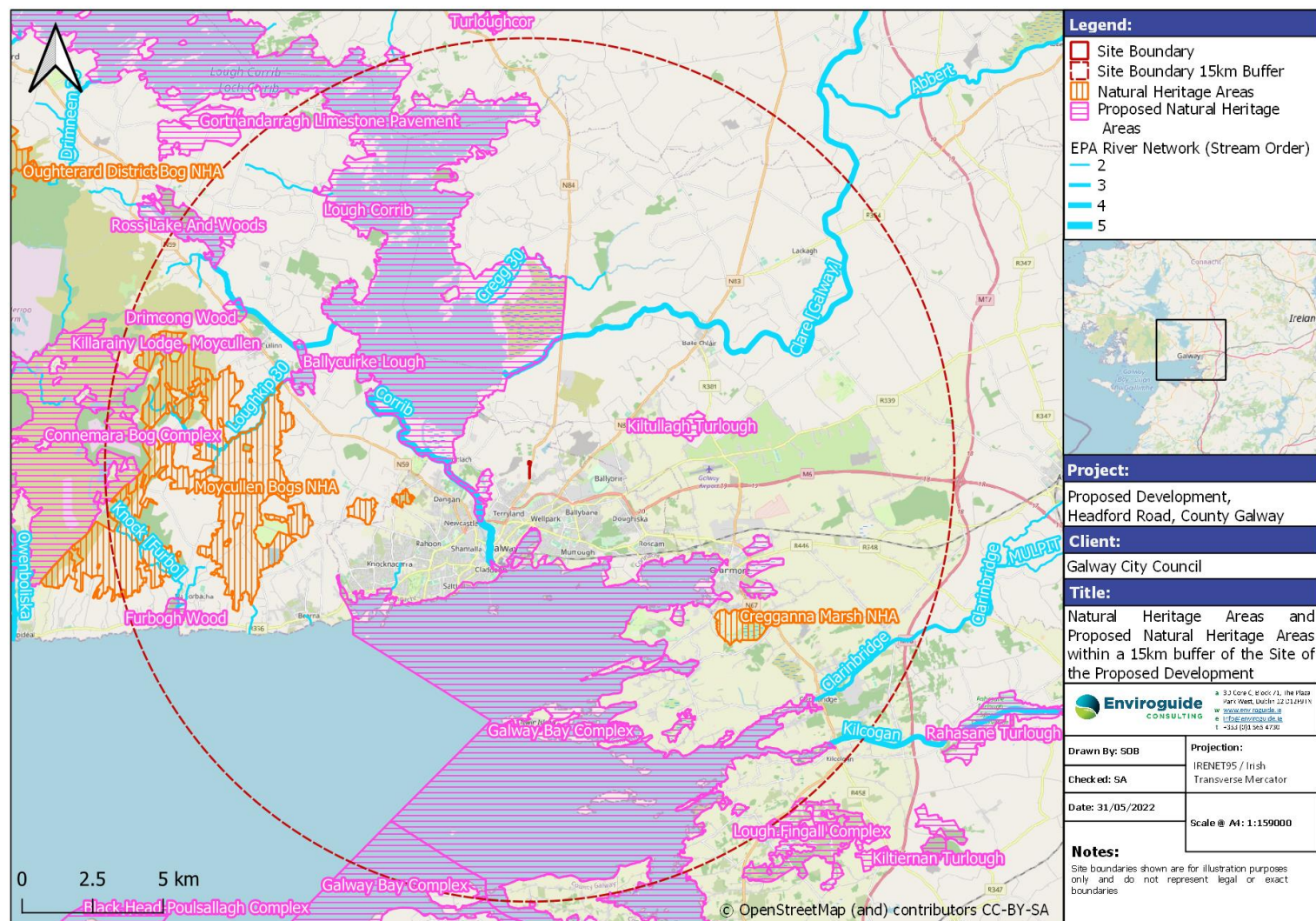


FIGURE 3. NATURAL HERITAGE AREAS AND PROPOSED NATURAL HERITAGE AREAS WITHIN 15KM OF THE PROPOSED DEVELOPMENT SITE

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 squares M32E and M32D. 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 or protected flora and no records were found. There are no records for protected bryophytes within the area².

Invasive Plant Species

The NBDC have records (dated within the last 20 years) of 2 *High Impact* and 2 *Medium Impact* invasive plant species within the 2km (M32E and M32D) grid squares (2).

TABLE 2 INVASIVE PLANT SPECIES WITHIN THE 2KM (M32E AND M32D) GRID SQUARES. THE RECORDS ARE DATED WITHIN THE LAST 20 YEARS AND ARE PROVIDED BY THE NBDC.

Name	Date of last record	Database	Legal status / Designation
Japanese Knotweed <i>Reynoutria japonica</i>	21/11/2019	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	- High Impact Invasive - Regulation S.I. 477 (Ireland)
Giant Hogweed <i>Heracleum mantegazzianum</i>	02/07/2019	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	- High Impact Invasive - Regulation S.I. 477 (Ireland)
Butterfly-bush <i>Buddleja davidii</i>	20/07/2019	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	- Medium Impact Invasive
Wall Cotoneaster <i>Cotoneaster horizontalis</i>	23/04/2020	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	- Medium Impact Invasive

² <https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=71f8df33693f48edbb70369d7fb26b7e>

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. Five native terrestrial mammals were recorded within the 2km grid squares (M32E and M32D), four of which, Badger, Irish Hare, Pine Marten, and Hedgehog, are afforded protection under the Wildlife (Amendment) Act, 2000. There are several records of Badger, observed as roadkill, along Headford Road within 1km of the Site of the Proposed Development, and along the N6 less than 800m of the Site. Irish Hare was also recorded as roadkill along Headford Road 425m north of the Site. Pine Marten was recorded within agricultural land 875m northeast of the Site, while Hedgehog was observed as roadkill where Headford Road intersects with Monument Road and School Road, 1.4km northeast of the Site, and both live animals and roadkill were recorded throughout Galway City, 1.3km southwest of the Site

Three invasive species was recorded, namely Rabbit, American Mink, and Brown Rat, with Rabbit present throughout the landscape surrounding the Site of the Proposed Development. Mink was recorded as roadkill along the N6, 1km southwest of the Site. Brown Rat was recorded along the shore of Lough Atalia, 1.7km south of the Site.

TABLE 3. TERRESTRIAL MAMMAL SPECIES WITHIN THE 2KM (M32E AND M32D) GRID SQUARES. THE RECORDS ARE DATED WITHIN THE LAST 20 YEARS AND ARE PROVIDED BY THE NBDC.

Name	Date of last record	Database	Legal Status / Designation
American Mink <i>Mustela vison</i>	04/06/2016	Mammals of Ireland 2016-2025	- High Impact Invasive - Regulation S.I. 477 (Ireland)
Brown Rat <i>Rattus norvegicus</i>	01/08/2017	Mammals of Ireland 2016-2025	- High Impact Invasive - Regulation S.I. 477 (Ireland)
Eurasian Badger <i>Meles meles</i>	18/05/2018; 29/03/2007	Mammals of Ireland 2016-2025; Road Kill Survey	- Wildlife (Amendment) Act, 2000
European Rabbit <i>Oryctolagus cuniculus</i>	24/09/2018; 03/04/2077	Mammals of Ireland 2016-2025; Road Kill Survey	- Medium Impact Invasive
Irish Hare <i>Lepus timidus subsp. hibernicus</i>	30/06/2018	Mammals of Ireland 2016-2025	- EU Habitats Directive Annex V - Wildlife (Amendment) Act, 2000
Pine Marten <i>Martes martes</i>	11/08/2020	Mammals of Ireland 2016-2025	- EU Habitats Directive Annex V - Wildlife (Amendment) Act, 2000
Red Fox <i>Vulpes vulpes</i>	01/08/2018; 20/12/2013	Mammals of Ireland 2016-2025; Atlas of Mammals in Ireland 2010-2015	- n/a
West European Hedgehog <i>Erinaceus europaeus</i>	29/07/2017; 19/05/2021	Mammals of Ireland 2016-2025; Hedgehogs of Ireland	- Wildlife (Amendment) Act, 2000

The ecological surveys undertaken as part of the Environmental Impact Assessment Report (EIAR) for the N6 Galway City Ring Road observed a high level of badger activity within the area between Headford Road and Lackagh Quarry, which is within the vicinity of the Site of the Proposed Development. These surveys were undertaken from April to June and October and November 2015, October 2016, and October and November 2017.

5.3.1.3 Bats

There are records for one bat species, namely Lesser Horseshoe Bat, within the M32D grid square and no records for bat species within the M32E 2km grid square associated with the Site. 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 45.33. The species with the highest individual suitability scores for the area encompassing the Site are Brown Long-eared Bat *Plecotus auritus* and Leisler's Bat *Nyctalus leisleri*, with 61 and 60, respectively.

TABLE 4 BAT SPECIES WITHIN THE 2KM (M32D) 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
Lesser Horseshoe Bat <i>Rhinolophus hipposideros</i>	30/01/2015	National Lesser Horseshoe Bat Database	- EU Habitats Directive Annex II & IV - Wildlife (Amendment) Act, 2000

Bat surveys carried out as part of the EIAR for the N6 Galway City Ring Road recorded nine species of Bat, namely Lesser Horseshoe Bat, Leisler's Bat, the Common Pipistrelle Bat, the Soprano Pipistrelle Bat, Nathusius' Pipistrelle Bat, the Brown Long-Eared Bat, Daubenton's Bat, Natterer's Bat and the Whiskered Bat. Winter hibernation surveys were carried out March 2014, February 2015, February 2016, and January 2018, and building surveys were carried out from July to October 2014, August and September 2015, and July and August 2016. No buildings exist on the Site of the Proposed Development.

It was found Menlo Castle, 2.5km southwest of the Site, and Cooper's Cave, 1.2km southeast of the Site, are key mating and hibernation roosts for the local Lesser Horseshoe Bat population. The Site of the Proposed Development does not offer suitable roosting habitat for the Lesser Horseshoe Bat, as this species mainly roosting within old houses, cottages, and stables. This species was also recorded commuting through and foraging within the limestone pavement habitat found west of the Site.

5.3.1.4 Birds

A total of 49 bird species have been recorded within the 2km grid squares by the NBDC. Of these, 6 are listed as *Red* and 17 are listed as *Amber* in *Birds of Conservation Concern in Ireland 2020-2026* (Gilbert et al., 2021).

Red listed species include:

Swift *Apus apus*
Corn Crane *Crex crex*
Dunlin *Calidris alpina*
Oystercatcher *Haematopus ostralegus*
Kestrel *Falco tinnunculus*
Shoveler *Anas clypeata*

Amber listed species include:

Swallow *Hirundo rustica*
Black-headed Gull *Larus ridibundus*
Starling *Sturnus vulgaris*
Coot *Fulica atra*
Teal *Anas crecca*
Wigeon *Anas penelope*
Greenfinch *Carduelis chloris*
Goldcrest *Regulus regulus*
Cormorant *Phalacrocorax carbo*
House Martin *Delichon urbicum*
House Sparrow *Passer domesticus*
Mallard *Anas platyrhynchos*
Common Gull *Larus canus*
Mute Swan *Cygnus olor*
Turnstone *Arenaria interpres*
Tufted Duck *Aythya fuligula*
Willow Warbler *Phylloscopus trochilus*

The Breeding Bird survey undertaken as part of the EIAR for the N6 Galway City Ring Road recorded a total of 62 species, including 3 species listed as SCIs for nearby SPAs, 2 Birds Directive Annex I species, 6 *Red*, 23 *Amber* and 33 *Green* listed bird species. These surveys were undertaken in May and June 2015, and June 2016.

TABLE 5 BREEDING BIRDS OF CONSERVATION CONCERN RECORDED DURING THE BREEDING BIRD SURVEY CARRIED OUT AS PART OF THE N6 RING ROAD (OBTAINED FROM N6 RING ROAD EIAR, 2018)

Common name / Latin name/BoCCI Code	Distribution in the study area	Conservation Importance			Common name / Latin name/BoCCI Code	Distribution in the study area	Conservation Importance		
		BoCCI (breeding)	Annex I	SCI ¹			BoCCI (breeding)	Annex I	SCI ¹
Barn owl <i>Tyto alba</i> (BO)	One nest site known at Menlo Castle	Red	-	-	Kestrel <i>Falco tinnunculus</i> (K.)	Observed near Bearna Woods, Letteragh Road, Lackagh Quarry and the existing N6	Amber	-	-
Black-headed gull <i>Larus ridibundus</i> (BH)	Widespread throughout	Red	-	Lough Corrib SPA	Lesser black-backed gull <i>Larus fuscus</i> (LB)	Observed once near Ballymoneen	Amber	-	-
Curlew <i>Numenius arquata</i> (CU)	Observed once at Ballindooly Lough	Red	-	-	Little grebe <i>Tachybaptus ruficollis</i> (LG)	Observed at the proposed River Corrib Bridge and Ballindooly Lough	Amber	-	-
Grey wagtail <i>Motacilla cinerea</i> (GL)	Observed once west of the Galway Racecourse	Red	-	-	Linnet <i>Carduelis cannabina</i> (LI)	Widespread throughout	Amber	-	-
Herring gull <i>Larus argentatus</i> (HG)	Widespread throughout, more frequent west of the River Corrib	Red	-	-	Mistle thrush <i>Turdus viscivorus</i> (M.)	Observed at Ballard West, Knocknafroska, Menlough and Lackagh Quarry	Amber	-	-
Meadow pipit <i>Anthus pratensis</i> (MP)	Widespread west of the River Corrib, and between Ballybrit and the existing N6	Red	-	-	Peregrine <i>Falco peregrinus</i> (PE)	Observed near Lackagh Quarry and the N83 Tuam Road	Green	√	-
Whinchat <i>Saxicola rubetra</i> (WC)	Ballagh area (single record)	Red	-	-	Robin <i>Erithacus rubecula</i> (R.)	Widespread throughout	Amber	-	-
Cormorant <i>Phalacrocorax carbo</i> (CA)	Widespread west of the River Corrib	Amber	-	Inner Galway Bay SPA & Connemara Bog SPA	Skylark <i>Alauda arvensis</i> (S.)	Observed at Troscaigh Thiar, Cappagh and Ballybrit	Amber	-	-
Common tern <i>Sterna hirundo</i> (CN)	Observed once at the proposed River Corrib Bridge	Amber	√	Inner Galway Bay SPA & Lough Corrib SPA	Stonechat <i>Saxicola torquata</i> (SC)	Observed west of Bearna, near Cappagh, Knocknafroska and between Ballybrit and the existing N6	Amber	-	-
Coot <i>Fulica atra</i> (CO)	Observed between the River Corrib and Bóthar Nua, and once near Ballybrit	Amber	-	-	Stock dove <i>Columba oenas</i> (SD)	Observed once near Clybaun Road	Amber	-	-
Great black-backed gull <i>Larus marinus</i> (GB)	Observed west of Bearna, at the River Corrib, and once at Ballindooly Lough	Amber	-	-	Starling <i>Sturnus vulgaris</i> (SG)	Widespread throughout	Amber	-	-
Goldcrest <i>Regulus regulus</i> (GC)	Widespread west of the River Corrib	Amber	-	-	Sparrowhawk <i>Accipiter nisus</i> (SH)	Observed once at Galway Racecourse	Amber	-	-
Greenfinch <i>Carduelis chloris</i> (GR)	Widespread west of the River Corrib and east of the River Corrib, only recorded at Ballybrit	Amber	-	-	Swift <i>Apus apus</i> (SI)	Observed twice near the NUI Galway Sports Campus	Amber	-	-
House martin <i>Delichon urbicum</i> (HM)	Observed near the Letteragh Road and between Ballindooly Lough and Ballybrit	Amber	-	-	Swallow <i>Hirundo rustica</i> (SL)	Widespread west of the River Corrib, and observed near Ballybrit	Amber	-	-
House sparrow <i>Passer domesticus</i> (HS)	Observed near the Letteragh Road and at Ballybrit	Amber	-	-	Sand martin <i>Riparia riparia</i> (SM)	Observed around Lackagh Quarry and Ballindooly Lough	Amber	-	-
					Wheatear <i>Oenanthe oenanthe</i> (W.)	Rahoon area (single record)	Amber	-	-

5.3.1.5 Fish

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

Salmonidae

The Atlantic salmon is listed as an Annex II species under the Habitat Directive. Salmon and Brown Trout were recorded within Lower Lough Corrib, 2.5km northwest of the Site, during fish stock surveys carried out by Inland Fisheries Ireland in 2018 (Connor 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. Sea Lamprey was recorded within Lower Lough Corrib during fish stock surveys carried out by Inland Fisheries Ireland in 2011 (Kelly et al., 2012).

European eel (*Anguilla anguilla*)

European eel is a red listed species³ and are currently considered to be one of the most threatened fish species in Ireland (King *et al.* 2011). European Eel was recorded within Lower Lough Corrib surveys undertaken in 2018 (Connor *et al.*, 2018).

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

5.3.1.6 Amphibians

There are no records of the Common Frog (*Rana temporaria*) or Smooth Newt (*Lissotriton vulgaris*) within the 2km (M32E and M32D) grid squares. 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.

Both Common Frog and Smooth Newt were recorded in 2014 as part of the EIAR for the N6 Galway City Ring Road within surface water/drainage channels and along the River Corrib. These amphibian populations were valued as Local Importance (higher value).

5.3.1.7 Invertebrates

There are no NBDC records of White-clawed crayfish (*Austropotamobius pallipes*) within the 2km (M32E and M32D) grid squares encompassing the Site of the Proposed Development. The EIAR for the N6 Galway City Ring Road also found no evidence of this species in 2014, despite the River Corrib offering suitable habitat for White-clawed crayfish.

There are no records of Marsh Fritillary butterfly (*Euphydryas aurinia*) within the last 30 years for the 2km (M32E and M32D) grid squares and no individuals of this species were recorded during the field surveys. Suitable Marsh Fritillary butterfly habitat was recorded within by the EIAR ecological surveys for the N6 Galway City Ring Road approximately 700m northwest of the Site. However, the habitats present at the Site are deemed unsuitable for this species and therefore it is not assessed further in this report.

Four *Near Threatened* invertebrate species have been recorded within the 2km grids:

Wood White *Leptidea sinapis*

Dingy Skipper *Erynnis tages*

Large Red Tailed Bumble Bee *Bombus lapidarius*

Moss Carder-bee *Bombus muscorum*

One *Medium Impact* invasive species has been recorded within the M32D grid square:

Landhopper *Arcitalitrus dorrieni*

³ 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.

5.3.1.8 Other species and species groups

There are no records of common lizard *Zootoca vivipara* within the 2km grid squares (M32E and M32D). 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 common lizard surveys, undertaken in September and October of 2015, carried out as part of the EIAR for the N6 Galway City Ring Road found evidence for the common lizard west of the River Corrib, however no individuals were recorded within the survey sites east of this watercourse.

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.

- Improved Agricultural Grassland (GA1)
- Scrub (WS1)
- Hedgerow (WL1)
- Stone Walls and Other Stonework (BL1)
- Spoil and Bare Ground (ED2)
- Buildings and artificial surfaces (BL3)

5.4.1.1 Improved Agricultural Grassland (GA1)

Agricultural grassland was one of the dominant habitat types at the Site. It is unclear whether or not the grassland at the Site has been “improved” (i.e., reseeded or fertilised), however, the grassland at the Site has been heavily grazed and poached by livestock. According to Fossitt (2000), low levels of improvement and high levels of grazing can influence sward composition, reduce species diversity and lead to increased representation of ‘agricultural’ herbs. Agricultural herbs were recorded within the grassland at the Site. Given the poached nature of the grassland, and the species recorded within it, it is classified here as (improved) agricultural grassland (as opposed to GS1 dry calcareous and neutral grassland, which is the habitat that was recorded at the Site as part of the N6 Galway City Ring Road habitat surveys⁴). Herb species recorded within the grassland included creeping buttercup *Ranunculus repens*, clover *Trifolium* sp., dock *Rumex* sp., dandelions *Taraxacum vulgaria* and greater plantain *Plantago major*.

5.4.1.2 Scrub (WS1)

Scrub habitat was recorded throughout the Site. The scrub recorded towards the eastern Site boundary was typically immature and was comprised of blackthorn *Prunus spinosa* and bramble *Rubus fruticosus*, which was beginning to colonise the agricultural grassland at the Site (Plate 1 (b)). The scrub habitat towards the south, west and centre of the Site was comprised of blackthorn, brambles, hawthorn *Crataegus monogyna*, ivy *Hedera helix*, bracken

⁴ ARUP (2018) N6 Galway City Ring Road. Habitat Survey Results – Fossitt (2000) Habitat Classifications Sheet 08 of 15. Figure 8.14.8.

Pteridium aquilinum and hazel *Corylus avellana*. Hazel dominated the scrub habitat within the centre of the Site. The understorey of the hazel scrub was degraded as a result of poaching/trampling of the vegetation by livestock (Plate 1 (c)). Herbs recorded within the understorey included herb robert *Geranium robertianum*, ivy, mosses, and *Hypericum* sp.

5.4.1.3 Hedgerow (WL1)

Hedgerows were recorded along the southern and eastern boundaries of the Proposed Development. Stone walls were recorded along the base of both hedgerows. Blackthorn, hazel, bramble, ivy, hawthorn, bracken, willow *Salix* sp. and box honeysuckle *Lonicera nitida* were recorded within this habitat.

5.4.1.4 Stone walls and other stonework (BL1)

As well as the stone walls recorded along the base of both hedgerows described above, a stone wall was recorded within the scrub habitat along the west Site boundary as shown in the habitat map (Figure 4).

5.4.1.5 Spoil and bare ground (ED2)

Spoil and bare ground occurred where the agricultural grassland had been heavily poached by livestock to the point that very little vegetation was recorded. The majority of this habitat was recorded towards the centre of the Site (Plate 1(d)).

5.4.1.6 Buildings and Artificial Surfaces (BL3)

Approximately 560m of Headford Road falls within the boundary of the Site of the Proposed Development, which is best described as artificial surfaces habitat.



PLATE 1. (A) AGRICULTURAL GRASSLAND AT THE SITE (SCRUB VISIBLE IN BACKGROUND); (B) AGRICULTURAL GRASSLAND TRANSITIONING TO BLACKTHORN SCRUB ALONG THE EASTERN BOUNDARY; (C) DEGRADED HAZEL SCRUB HABITAT TOWARDS THE WESTERN SITE BOUNDARY (STONEWALL VISIBLE); (D) SPOIL AND BARE GROUND HABITAT WITHIN THE SITE. IMAGES TAKEN 3/03/2022.



PLATE 2. (A) STONE WALL WITHIN SCRUB HABITAT; (B) HIMALAYAN HONEYSUCKLE RECORDED AT THE SITE; (C) MONBRETIA RECORDED AT THE SITE; (D) MAMMAL BURROW RECORDED ADJACENT TO THE SITE. IMAGES TAKEN 3/03/2022.



FIGURE 4. HABITATS AT THE SITE OF THE PROPOSED DEVELOPMENT.

5.4.1.7 Invasive Plant Species

No significant species of non-native/invasive plant were recorded at the Site during the survey on 3rd of March 2022. Non-native species in Ireland to date have been assessed by Kelly, O' Flynn and Maguire (2013) and attributed 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. 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).

Two 'Medium Impact' plant species were recorded on Site:

- Himalayan Honeysuckle *Leycesteria formosa* was recorded within the south of the Site. There are no documented impacts recorded for this species, although it can form dense thickets that may exclude native vegetation.
- Montbretia *Crocasmia X crocosmiiflora* was observed within the along the southeast boundary of the Site, along Headford Road. This species is an 'Amber-list' species' according to Invasive Species Ireland, which is a Medium Impact species that may pose a risk to conservation goals (Kelly et al., 2013). This species has the ability to dominate the habitat in which it grows, potentially outcompeting native plant species.

No 'High Impact' invasive species listed in the Third Schedule of *European Communities (Birds and Natural Habitats) Regulations 2011* (SI 477 of 2011, as amended) e.g., Japanese Knotweed, were recorded at the Site during the survey.

5.4.2 Bats

No bat surveys were carried out. Whereas there is commuting and foraging habitat at the Site, roosting habitat is deemed to be limited due to the lack of mature trees and buildings on Site.

5.4.3 Birds

The bird species recorded on Site during the 3rd of March 2022 survey are recorded in Table 6.

TABLE 6 BIRD SPECIES RECORDED ON SITE – 3RD OF MARCH 2022

Species	Conservation Concern
Blackbird <i>Turdus merula</i>	Green
Robin <i>Erithacus rubecula</i>	Green
Great Tit <i>Parus major</i>	Green
Goldcrest <i>Regulus regulus</i>	Amber
Woodpigeon <i>Columba palumbus</i>	Green
Jackdaw <i>Corvus monedula</i>	Green

5.4.4 Mammals (excl. bats)

Mammal trails (from small, non-volant mammals) were recorded towards the northern site boundary. It is possible that trails also occurred within the scrub habitat, however, these would have been obscured by the trails left by the cattle currently in the field and as such could not be identified. A mammal burrow (possibly fox) was recorded in an adjoining field along the northern site boundary (Plate 2 (d)). Mammal prints were recorded within mud at the Site. These mostly appeared to be from cats and fox/dogs. However, a number of paw prints that are likely from badgers were also observed (Figure 5). No badger setts or latrines were recorded within the Site.



FIGURE 5. POTENTIAL BADGER PRINTS AT THE PROPOSED DEVELOPMENT SITE. IMAGE TAKEN 3/03/2022.

5.4.5 Common Lizard and Amphibians

There is potential habitat for common lizard within the Site (stone walls, hedgerows, scrub).

No significant amphibian habitat is present within the Site. No drainage ditches or ponds were recorded.

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

Designated Sites/Species/Habitats	Evaluation ⁵	Key Ecological Receptor (KER)	Rationale
Designated Sites			
SACs & SPAs	International Importance	Yes	Hydrogeological pathway to Lough Corrib SAC, Galway Bay Complex SAC, Inner Galway Bay SPA, and Lough Corrib SPA via groundwater contamination during the Construction and Operational Phases. Air pathway to Lough Corrib SAC and associated Annex I habitats.
NHA & pNHAs	National Importance	Yes	Hydrogeological pathway to Lough Corrib pNHA and Galway Bay Complex pNHA via groundwater contamination during the Construction and Operational Phases
Habitats			
Scrub (WS1)	Local importance (higher value)	Yes	Scrub habitat located within the Site of this Proposed Development. Sections of this habitat will be removed to allow for the proposed works.
Spoil and Bare Ground (ED2)	Local importance (lower value)	No	Habitat created via poaching by livestock, and of negligible biodiversity value.
Improved Agricultural Grassland (GA1)	Local importance (lower value)	No	Low diversity grassland habitat of low biodiversity value. This habitat is also abundant throughout the surrounding landscape.
Hedgerow (WL1)	Local importance (higher value)	Yes	Hedgerows present on Site which provide habitat for a range of fauna and form ecological corridors. This linear vegetation may be impacted during the Construction Phase of the Proposed Development.
Stone Walls and Other Stonework (BL1)	Local importance (higher value)	Yes	Old stone walls may offer habitat for local lizards and will be impacted by the Proposed Development.
Buildings and Artificial Surfaces (BL3)	Local importance (lower value)	No	Man-made habitat of negligible biodiversity value.
Fauna			
Eurasian Badger <i>Meles meles</i>	Local importance (higher value)	Yes	The badger is an adaptable species of lowland grassland and woodland habitats, and also occasionally occurs in upland and suburban areas (Marnell et al., 2009). Evidence of Badger was recorded on Site and in the surrounding area as part of the N6 Ring Road EIAR.
Irish Hare <i>Lepus timidus subsp. hibernicus</i>	Local importance (lower value)	No	No evidence of these species recorded during the Site survey and while suitable grassland and hedgerow habitat for this species exists on Site and will be removed, this will not be a significant loss due to the abundance of grassland and hedgerows within the surrounding environment.

⁵ See Appendix I for details

Designated Sites/Species/Habitats	Evaluation ⁵	Key Ecological Receptor (KER)	Rationale
Pine Marten <i>Martes martes</i>	Local importance (lower value)	No	No evidence of these species recorded during the Site survey and while suitable grassland and hedgerow habitat for this species exists on Site and will be removed, this will not be a significant loss due to the abundance of grassland and hedgerows within the surrounding environment.
Red Fox <i>Vulpes vulpes</i>	Local importance (lower value)	No	These species are not considered to be of conservation concern and are not afforded legal protection in Ireland.
West European Hedgehog <i>Erinaceus europaeus</i>	Local importance (higher value)	Yes	No evidence of these species recorded during the Site survey, however this hedgerow species may be impacted by the removal of hedgerow and scrub on Site.
Bat Assemblage	Local importance (higher value)	Yes	The removal of potential commuting and foraging habitat during the Construction Phase, along with increased lighting during the Operational Phase, local bats may be impacted by the Proposed Development
Bird Assemblage	Local importance (higher value)	Yes	Several bird species recorded on Site, with potential foraging, commuting, and nesting habitat on Site.
Common Frog	Local importance (lower value)	No	No suitable habitat at the Site for this species (e.g. ditches, ponds).
Common Lizard	Local importance (higher value)	Yes	Suitable habitat (old stone walls) for this species was recorded on Site, with areas of this wall to be removed as part of the Proposed Development.
Aquatic Fauna	Local importance (higher value)	Yes	Weak hydrogeological connections to the River Corrib

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 7. 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 Designated Sites

Lough Corrib SAC, Galway Bay Complex SAC, Inner Galway Bay SPA, and Lough Corrib SPA are hydrogeologically linked to the Site via groundwater flow. There is potential, although slight, for pollutants, such as hydrocarbons or a high concentration of suspended solids, to migrate through the aquifer and surface waterbodies into these European Sites, and negatively impact them via water quality deterioration. The potential impact to these European Sites as a result of the Construction Phase of the Proposed Development is considered to be *negative, short-term, moderate* in the absence of suitable mitigation.

Lough Corrib pNHA and Galway Bay Complex pNHA are hydrogeologically linked to the Site via groundwater flows. During the Construction Phase, there is potential for surface water run-off containing silt and/or pollutants from the Site to negatively impact these pNHAs via water quality deterioration. The potential impact to these pNHAs as a result of the Construction Phase of the Proposed Development is considered to be *negative, short-term, moderate-significant* in the absence of suitable mitigation.

Lough Corrib SAC, along with several Annex I habitats associated with this SAC, lie within close proximity to the Site of the Proposed Development, and therefore there is an airborne pathway. During the Construction Phase, there is potential for airborne pollutants, such as dust from the Site, to negatively impact Lough Corrib SAC and the associated habitats via dust deposition. This potential impact as a result of the Construction Phase is considered to be in *negative, short-term, slight* in the absence of suitable mitigation.

6.1.2 Impacts on Habitats

- Scrub (WS1)
- Hedgerow (WL1)
- Stone Walls and Other Stonework (BL1)

Areas of scrub habitat on Site will be removed to facilitate the Proposed Development. Sections of hedgerow habitat, particularly along the south and east of the Site, will also be removed to accommodate the Proposed Development. Areas of the stone wall habitat associated with the hedgerows on Site will also be removed, namely the stone wall along the east boundary of the Site, and partial removal along the south boundary of the Site. The removal of this vegetation, and the fragmentation of an ecological corridor, will result in a *negative, permanent, moderate* impact in the absence of suitable mitigation.

6.1.3 Impacts on fauna

6.1.3.1 Mammals (excluding bats)

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 of scrub habitat within the Site of the Proposed Development. Due to the absence of badger setts at the Site, the abundance of suitable badger habitat within the surrounding environment and the relatively small size of the Site, any habitat loss associated with the Proposed Development will have a *neutral* impact on badger.

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, significant* impact at a local level.

Disturbance of mammal 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*.

6.1.3.2 Bats

There is potential for a loss of foraging and commuting habitat for bats that reside within the vicinity of the Site of the Proposed Development through the decrease of scrub, open grassland and hedgerow habitat. However, as these habitats are widespread throughout the surrounding landscape, this loss of habitat will not be significant and the impact is deemed *negative, permanent, slight*.

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 bat populations.

6.1.3.3 Birds

There will be some loss of foraging and nesting habitat for birds at the Site of the Proposed Development through the removal of vegetation at the Site, and disturbance of species during the Construction Phase is possible. This could have a *negative, permanent, moderate impact* on birds on a *local scale*.

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.

6.1.3.4 Lizard

There will be some loss of foraging, nesting and hibernacula habitat for local lizards at the Site of the Proposed Development through the removal of vegetation at the Site, the partial removal of old stone walls, and disturbance of species during the Construction Phase is possible. This could have a *negative, permanent, moderate impact* on lizards in the vicinity of the Site.

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 lizard populations.

6.1.3.5 Aquatic Fauna

Groundwater discharges associated with the Construction Phase of the Proposed Development may impact aquatic fauna located within the River Corrib corridor as potential pollutants could migrate through the aquifer and surface waterbodies into this watercourse and surrounding habitat. This deterioration in water quality may have the potential to cause *negative, short-term, moderate impacts* to aquatic fauna within the River Corrib in the absence of suitable mitigation.

6.2 Operational Phase

6.2.1 Impacts on Designated Sites

No significant effects on Designated Sites are anticipated during the Operational Phase. SUDS measures, including swales, green roofs, petrol interceptors, silt trap chambers, and a cellular system, have been incorporated into the design to remove the potential for pollutant sources entering the underlying aquifer and the Designated Sites connected to it during the Operational Phase.

6.2.2 Impacts on Fauna

6.2.2.1 Mammals (excluding bats)

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, moderate* impact on mammals in the locality.

6.2.2.2 Bats

During the Operational Phase, there is potential for disturbance to bats utilising the Site in general through light pollution during the Operational Phase. 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 and commuting resources.

6.2.2.3 Birds

No significant effects on birds are anticipated during the Operational Phase.

6.2.2.1 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, habitats at the Site of the Proposed Development would continue to evolve. The hedgerows would continue to serve as a biodiversity corridor providing habitat connectivity, nesting/roosting and foraging habitat for birds and mammals. The grassland would continue to be used for grazing livestock, and the scrub would persist in offering habitat for local wildlife.

7 MITIGATION AND ENHANCEMENT MEASURES

7.1 Construction Phase

7.1.1 Planting of native flora and protecting pollinators

The planting of native 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:

- Wildflower meadows will include pollinator-friendly floral species, which will offer forage for local pollinating insects.
- Ornamental shrub and perennial planting will also provide floral resources for local pollinators, with a minimum of 75% of this vegetation pollinator-friendly, in accordance with the All Ireland Pollinator Plan.
- Native hedgerow and woodland embankment planting offers commuting, foraging, and nesting habitat for local wildlife.

7.1.2 Designated Sites and Aquatic Fauna

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

7.1.2.1 Dewatering

Groundwater may be encountered during the construction works. Where water must be pumped from the excavations, water will be managed in accordance with best practice standards (i.e., CIRIA – C750) and regulatory consents.

7.1.2.2 Pollution Prevention

All works carried out as part of the Proposed Development will comply with all Statutory Legislation including the Local Government (Water Pollution) acts, 1977 and 1990 and the contractor will cooperate fully with the Environment Section of Galway City Council in this regard.

Personnel working on the Site will be trained in the implementation of environmental control and emergency procedures. Procedures and relevant documents produced will be formulated in consideration of standard best international practice including but not limited to:

- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors;

- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (C650), 2005;
- BPGCS005, Oil Storage Guidelines;
- CIRIA 697, The SUDS Manual, 2007;
- UK Pollution Prevention Guidelines (PPG) UK Environment Agency, 2004;
- Construction Industry Research and Information Association CIRIA C648: Control of water pollution from linear construction projects: Technical guidance (Murnane et al. 2006);
- CIRIA C648: Control of water pollution from linear construction projects: Site guide (Murnane et al. 2006); and
- Inland Fisheries Ireland (2016). Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters.

The following measures will protect groundwaters during the Construction Phase of the Proposed Development:

- As noted previously, according to the Engineering Services Report (DBFL, 2022) at present “all pluvial storm water that falls onto the site currently soaks away to ground or flows as sheet flow overland toward Headford Road. It then flows south along Headford Road and discharges to an existing marsh area. The marsh area is 150m south of the site on Headford Road, on the east side of Headford Road”. Trenched silt fences will be installed along the southern and eastern boundaries of the Site to prevent run-off of silty water to this marsh area. Run-off from the working site or any areas of exposed soil will be channelled and intercepted at regular intervals for discharge to temporary settling depressions area (e.g. a shallow infiltration basin lined with a geotextile membrane) with over-flows directed to land. Alternatively, silt laden waters will be tankered off site to a licenced facility.
- If karst features are encountered during construction works these will be assessed by a qualified hydrogeologist, and appropriate mitigation measures prepared.
- Any oil and lubricant changes and maintenance will take place offsite;
- Refuelling of plant and machinery on Site will take place in a designated, impermeable area;
- All containment and treatment facilities will be regularly inspected and maintained.
- Refuelling of plant during the 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. Emergency silt control & spillage response procedures contained within the CEMP will

ensure that appropriate information will be available on site outlining the spillage response procedures and a contingency plan to contain silt during an incident;

- 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 disposal contractor;
- As this is a greenfield site, it is unlikely contaminated material will exist onsite. However, in the unlikely event material becomes contaminated, by for example a fuel spill onsite or a burst / leaking hydraulic hose, a documented procedure for contaminated material will be prepared and adopted by the appointed contractor prior to excavation works commencing on Site. These documents will detail how potentially contaminated material will be dealt with during the excavation phase.
- Stockpiling of contaminated material is not permitted.
- No direct untreated point discharge of construction runoff to groundwater will be permitted.
- Where a pollution incident is detected, construction works will be stopped until the source of the construction pollution has been identified and remedied
- Excavations and potentially contaminated stockpiled soils will be constructed/located/sheeted in a manner that ensures water is contained within the site boundary.

7.1.3 Bats

7.1.3.1 Tree Removal

A pre-felling bat survey will be carried out the night before the removal of vegetation on Site, along with the felling methodology outlined below:

- Tree-felling will 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 will be avoided as this creates the additional risk that bats may be in hibernation and thus unable to escape from a tree that is being felled. Additionally, disturbance during winter may reduce the likelihood of survival as the bats' body temperature is too low and they may have to consume too much body fat to survive.
- Tree-felling will be undertaken using heavy plant and chainsaw. There is a wide range of machinery available with the weight and stability to safely fell a tree. Normally trees are pushed over, with a need to excavate and sever roots in some cases. In order to ensure the optimum warning for any roosting bats that may still be present, an affected tree will be pushed lightly two to three times, with a pause of approximately 30 seconds between each nudge to allow bats to become active. Any affected trees should then

be pushed to the ground slowly and should remain in place for a period of at least 24 hours, and preferably 48 hours to allow bats to escape.

7.1.4 Birds

7.1.4.1 Habitat removal

Any clearance of vegetation will 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 Protection of Common Lizard

In order to minimise the risk of site clearance and construction works disturbing, or causing the mortality of Common lizard, the following mitigation will be undertaken at the Site:

- A site-specific survey for common lizard will be undertaken prior to the construction phase commencing. Appropriate mitigation measures will be recommended by the surveyor, however, they are likely to include the following, extracted from NRA (n.d.):
 - Any habitats identified as potentially suitable for lizard (e.g., meadow or scrub habitat) will be removed during the winter period, where possible, avoiding potential Common lizard hibernacula sites (dry sites which provide frost-free conditions e.g. underground small mammal burrows, piles of dead wood or rubble)
 - Where this is not possible and clearance must be undertaken during the active season (March through to September, inclusive), vegetation will be cut first to approximately 15cm, and then to the ground, under supervision of an ecologist. This will allow the opportunity for lizards to be displaced by the disturbance and leave the affected area
 - Potential hibernacula sites identified by the surveyor will be removed during the active season (March through to September, inclusive) under the supervision of an ecologist, when they are less likely to be in use by torpid lizards.

7.1.6 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 will be safely applied where appropriate.
- Limiting the hours during which site activities likely to create high levels of noise are permitted.
- Appointing a site representative responsible for matters relating to noise.
- Monitoring typical levels of noise during critical periods and at sensitive locations.

These measures will ensure that any noise disturbance to 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.
- Bowsters 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 bowster 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 will be used at site exit points to remove caked-on dirt from tyre tracks.
- Equipment will be washed at the end of each work day.
- 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 will 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 will 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 enter the surface water drainage network.

7.1.7 Invasive Species

Although not considered to be 'High Impact' invasive species, it is recommended that non-native/invasive flora species recorded at the Site are controlled/removed as per the appropriate best-practice guidelines. 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.

The following outlines how the invasive Himalayan Honeysuckle and Montebretia recorded at the Site will be treated:

7.1.7.1 Himalayan Honeysuckle

The following is extracted from Atlas of Living Australia (2007) Weeds Australia - Profiles:

- *Originally from western China, India, Nepal and Burma Himalayan Honeysuckle (Leycesteria formosa) is a soft wooded multi-stemmed shrub 2 metres high.*
- *Forms dense thickets that smother and shade out native vegetation and prevent the regeneration of native plant species.*
- *It has become a serious environmental weed in south-eastern Australia.*
- *It spreads mostly by bird dispersed seeds, and vegetatively when dislodged stem pieces are in contact with moist soil and form roots.*
- *Control of Himalayan Honeysuckle requires an integrated program that includes manual removal and herbicide application.*

Physical control

Seedlings and smaller plants of Himalayan Honeysuckle can be hand pulled or dug out.

Chemical control

A range of treatments can be used on larger plants, including cutting stems back to near ground level and painting the cut stem with a suitable herbicide (the cut-paint method) or injection of a suitable herbicide into drill holes at the base of the plant (the drill-fill method). Plants can also be sprayed with selective or non-selective herbicides. Herbicide treatments should be used in late spring before the plants produce flowers and fruits. Follow-up treatments may be needed, as larger plants often re-shoot. Dense infestations can be slashed in winter before they bear fruit, the cut material disposed of safely and the regrowth sprayed in spring (Muyt 2001).

7.1.7.2 *Montebretia*

The following is extracted from NRA (2010) guidelines:

Physical Control

Physical control of montbretia is difficult as the corms break up from their chains very readily and can result in ready re-infestation or further spread. Where infestations are limited in extent, the entire stand can be excavated and buried at a depth of at least 2m, incinerated or disposed of to licensed landfill. The corms are very hardy and are not suitable for composting. Due to the potential for reinfestation from corms, regular follow-up will be required over a period of at least 2 years to deal with any regrowth.

Chemical Control

*Control can be achieved using glyphosate. **All Plant Protection Products should be used in accordance with the product label and with Good Plant Protection Practice as prescribed in the European Communities (Authorization, Placing on the Market, Use and Control of Plant Protection Products) Regulations, 2003 (S.I. No. 83 of 2003). It is an offence to use Plant Protection Products in a manner other than that specified on the label.***

7.1.8 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

7.2.1.1 *Lighting for Bats*

In order to minimise disturbance to bats utilising the site in general, the lighting and layout of the Proposed Development will be designed to minimise light-spill onto habitats used by the local bat population foraging or commuting. Luminaire design is extremely important to achieve an appropriate lighting regime. Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following will be considered when choosing luminaires. This is taken from the most recent BCT Lighting Guidelines (BCT, 2018).

- All luminaires used will lack UV/IR elements to reduce impact.
- LED luminaires will be used due to the fact that they are highly directional, lower intensity, good colour rendition and dimming capability.

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

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 Ireland⁶.

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.

7.2.3 Groundwater Protection

There are a number of SuDS features proposed which have been designed in accordance with CIRIA documents C753, C697 and C60, which will serve to protect groundwater quality at the Site, **thereby removing the potential for pollutant sources entering the underlying aquifer and European Sites connected to it during the Operational Phase:**

⁶ https://birdwatchireland.ie/app/uploads/2019/10/Saving-Swifts-Guide_pdf.pdf

- **Swales (wet):** Broad, shallow drainage channels covered in grass which can treat, convey and attenuate runoff, at source, and can infiltrate to the ground where the subgrade is suitable. Swales also can promote biodiversity. These are located adjacent to roads and hard-standing areas.
- **Cellular System:** Proprietary modular block with an inspection manhole for providing underground surface water soakaway infiltration of runoff to the ground where the subgrade is suitable. This will be the primary attenuation system for the site and will be located underneath the parking area.
- **Green roof:** Green roofs provide ecological, aesthetic and amenity benefits and intercept and retain rainfall, at source, reducing the volume of runoff and attenuating peak flows. Green roofs absorb most of the rainfall that they receive during ordinary events although they will only contribute to attenuation of flows for larger events. Additionally, green roofs treat surface water through removal of atmospherically deposited urban pollutants. Finally, green roofs may reduce heating (by adding mass and thermal resistance value) and cooling (by evaporative cooling) loads on a building. An extensive green roof provides an area with low growing, low maintenance plants consisting of selfsustaining mosses, sedums, succulents, herbs or grasses over a drainage layer and waterproofing membrane. Extensive green roofs provide ecological, aesthetic and amenity benefits and intercept, treat and retain rainfall, reducing the volume of runoff and attenuation peak flows. Extensive roofs are usually only accessed for maintenance.
- **Petrol Interceptor:** A proprietary oil/water separator which prevents hazardous chemical and petroleum products from entering watercourses and public sewers. These are proposed at each outfall from the site in addition to a silt trap chamber.
- **Silt Trap Chamber:** A proprietary hydrodynamic vortex separator which removes settleable solids and oils from runoff. These are proposed at outfalls from the site in addition to a petrol interceptor.

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 development within the area is outlined below:

Planning Application Reference: 21370

Permission for development which will consist of: to amend planning approval reference 19/42 consisting of (i) replacing Blocks Q & R, which consisted of 1.No. house and 12 No. duplex units over 3 storeys, with Block N, consisting of 18 No. apartments over 3 storeys and (ii) additional car parking and associated site works. **(Location: 560m southwest of the Site. Decision: Further Information Requested. Decision Date: n/a).**

Planning Application Reference: 1942

Permission to amend Phase II of planning approval reference 0658, with; (i) the omission of all underground parking; (ii) the omission of 13 no. 4-bedroom Type G3 and G4 houses;(iii) the omission of 15 no. 3-bedroom Type G1 and 4 no. 1-bedroom Type J apartments; (iv) the re-alignment of the internal secondary access road; (v) the re-design of the previously approved 32 no. 2 bedroom and 8 no. 1-bedroom apartments to 26 no. 2 bedroom and 14 no. 1 bed-room enhanced apartments with in-house Care Support facilities; (vi) the provision of 70 no. surface car parking spaces; 9 no. 3 bedroom houses; 18 no. 3-bedroom upper duplex apartments; 16 no. 2-bedroom ground floor apartments; a childrens crèche; a central amenity play area; and all associated site works. **(Location: 560m southwest of the Site. Decision: Conditional Permission. Decision Date: 17/10/2019).**

Planning Application Reference: ABP-302848-18

The site is located adjacent to the proposed N6 Galway City Ring Road (GCRR) route. The GCRR will link the western side of Galway City to the eastern side from Bearna in the west, to the N6 junction at the Coolagh Roundabout to the east and vice versa through a newly constructed road which will bypass the city centre through a corridor to the north of the city. The GCRR forms part of the Galway Transport Strategy (GTS) which is the current adopted strategy for transport within Galway City. The GCRR was approved with conditions by An Bord Pleanala (APB). **(Decision Date: 06/12/2021).**

These sites lie within 500m of the Proposed Development Site. Given the distance between the Proposed Development site and the above-mentioned permitted developments, and the mitigation measures which will be in place for the GCRR, it is concluded that there is no

potential for in-combination effects to arise as a result of the Proposed Development on local ecology.

Considering the absence of direct effects on European sites by the Proposed Development, the mitigation measures which are listed below to protect European sites from indirect effects and the mitigation measures which will be in place for the GCRR, there are no means for the Proposed Development to act in-combination with the GCRR that would cause any likely significant effects on any European sites.

8.1.2 Relevant policies and plans

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

- Galway City Biodiversity Action Plan 2014-2024
- Galway City Council Development Plan 2017-2023

The Galway City Biodiversity Action Plan 2014-2024 is set out to protect and improve biodiversity, and as such will not result in negative in-combination effects with the Proposed Development. The Galway City Council Development Plan 2017-2023 has directly addressed the protection of European Sites and local biodiversity through Policy 4.2, which states:

- *Protect European sites that form part of the Natura 2000 network (including Special Protection Areas and Special Areas of Conservation) in accordance with the requirements in the EU Habitats Directive (92/43/EEC), EU Birds Directive (2009/147/EC) and associated national legislation.*
- *Ensure that plans or projects within the Plan area will only be authorised and /or supported after the competent authority has ascertained based on scientific evidence, screening for appropriate assessment and /or a Habitats Directive Assessment that:*
 1. *The plan or project will not give rise to an adverse direct, indirect or secondary effect on the integrity of any European site (either individually or in combination with other plans or projects); or*
 2. *The plan or project will have an adverse effect on the integrity of any European site (that does not host a priority natural habitat type/and or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons of overriding public interest, including those of a social or economic nature. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory measures necessary to ensure the protection of the overall coherence of Natura 2000; or*
 3. *The plan or project will have an adverse effect on the integrity of any European site (that hosts a natural habitat type and/or a priority species) but there are no alternative solutions and the plan or project must nevertheless be carried out for imperative reasons of overriding public interest, restricted to reasons of human health or public safety, to beneficial consequences of primary importance for the environment or, further to an opinion from the Commission, to other imperative reasons of overriding public interest. In this case, it will be a requirement to follow procedures set out in legislation and agree and undertake all compensatory*

measures necessary to ensure the protection of the overall coherence of Natura 2000.

- Protect, conserve and promote the nationally designated sites of ecological importance, including existing and proposed Natural Heritage Areas (NHAs and pNHAs) in the city.*
- Protect, conserve and support the development of an ecological network throughout the city which will improve the ecological coherence of the Natura 2000 network in accordance with Article 10 of the Habitats Directive.*
- Protect from inappropriate development the County Geological Sites in the city.*
- Protect Local Biodiversity Areas, wildlife corridors and stepping stones identified in the Galway City Habitat Inventory 2005 and Galway Biodiversity Action Plan 2014-2024 in supporting the biodiversity of the city and in the Council's role/responsibilities, works and operations, where appropriate.*
- Encourage, in liaison with the NPWS, the sustainable management of features which are important for the ecological coherence of the network of European Sites and essential, by their linear or continuous nature or as stepping stones for the migration, dispersal and genetic exchange of wild species.*
- Support the actions of the Galway City Heritage Plan 2016-2021 and Biodiversity Action Plan 2014-2024 relating to the promotion of ecological awareness and biodiversity, the protection of wildlife corridors and the prevention of wildlife habitat fragmentation.*
- Co-operate with the NPWS, landowners and stakeholders in the preparation and implementation of management plans for designated sites.*
- Protect and conserve rare and threatened flora and fauna and their key habitats, (wherever they occur) listed on Annex I and Annex IV of the EU Habitats Directive (92/43/EEC) and listed for protection under the Wildlife Acts 1976-2000.*
- Ensure that plans and projects with the potential to have a significant impact on European Sites (SACs or SPAs) whether directly, indirectly or in combination with other plans or projects are subject to Appropriate Assessment under Article 6 of the Habitats Directive (92/43 EEC) and associated legislation and guidelines to inform decision making.*
- Achieve a sustainable balance between meeting future recreational needs (both passive and active) and the protection of the city's ecological heritage.*
- Support the inclusion of natural features, such as trees, hedgerows, stones walls, ponds and the use of green design features in development layouts.*
- Commission an audit of County Geological Sites in partnership with GSI.*
- Support and implement measures to control and manage alien/invasive species within the city boundary, where appropriate.*
- Protect the ecological integrity of Statutory Nature Reserves, refuges for fauna and Annex 1 Habitats.*

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.

9 RESIDUAL IMPACTS

Residual impacts are impacts that remain once mitigation has been implemented or impacts that cannot be mitigated. Table 8 provides a summary of the impact assessment for the identified Key Ecological Resources (KERs) or local biodiversity 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 8. SUMMARY OF POTENTIAL IMPACTS ON KER(S) OR LOCAL BIODIVERSITY, MITIGATION PROPOSED AND RESIDUAL IMPACTS.

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
Lough Corrib pNHA Galway Bay Complex pNHA	National Importance	Deterioration in water quality due to groundwater contamination	Negative	Local	Short-term	Moderate-Significant	Mitigation measures to protect groundwater as outlined in 7.1.2	Neutral
		Deterioration in Annex I habitats due to dust deposition during the Construction Phase of the Proposed Development				Slight	Construction related dust control/minimisation measures to be implemented as outlined in 7.1.6	
Scrub (WS1) Hedgerow (WL1) Stone Walls and Other Stonework (BL1)	Local Importance (higher value)	Habitat loss during the Construction Phase of the Proposed Development	Negative	Local	Permanent	Moderate	Retention of north and west hedgerows and planting of shrub and native tree species to take place as part of project design. Retention of north and west stone walls.	Negative, long-term, slight at local scale due to time required for planted vegetation to become established.
Badger	Local Importance (higher value)	Loss of sections of potential foraging and commuting habitat.	Negative	Local	Permanent	Slight	Retention of north and west hedgerows and planting of shrub and native tree species to take place as part of project design.	Neutral
		Disturbance due to noise and dust generated during Construction Phase.			Short-term		Construction related noise control/minimisation measures to be implemented.	

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
Small Mammals	Local Importance (higher value)	Mortality during Construction Phase	Negative	Local	Permanent	Significant	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 .	Neutral
		Loss of sections of potential foraging and commuting habitat.			Permanent	Moderate	Retention of north and west hedgerows and planting of shrub and native tree species to take place as part of project design.	
		Disturbance due to noise and dust generated during Construction Phase.			Short-term	Slight	Construction related noise control/minimisation measures to be implemented.	
Bat assemblage	Local Importance (higher value)	Loss of sections of potential foraging and commuting habitat.	Negative	Local	Permanent	Slight	Retention of north and west hedgerows and planting of shrub and native tree species to take place as part of project design.	Neutral
		Disturbance due to noise generated during Construction Phase.			Short-term		Construction related noise control/minimisation measures to be implemented.	

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
		Disturbance/removal of foraging routes/habitat due to increased lighting as a result of the Proposed Development.			Permanent		Wildlife-friendly lighting measures to be included as part of the Operational Phase of the Proposed Development as outlined in 7.2.1	
Bird assemblage	Local Importance (higher value)	Loss of nesting and foraging habitat during the Construction Phase.	Negative	Local	Permanent	Slight	Retention of north and west hedgerows and planting of shrub and native tree species to take place as part of project design.	Neutral
		Disturbance due to noise generated during Construction Phase.			Short-term		Construction related noise control/minimisation measures to be implemented.	
Aquatic Fauna	County Importance	Deterioration in water quality due to groundwater contamination associated with the Construction Phase	Negative	Local	Short-term	Significant	Mitigation measures to protect groundwater as outlined in 7.1.2	Neutral
Lizard	Local importance (higher value)	Loss of nesting/hibernacula and foraging habitat during the Construction Phase.	Negative	Local	Permanent	Moderate	Retention of north and west hedgerows and stonewalls, and planting of shrub and native tree species to take place as part of project design.	Neutral
		Disturbance due to noise generated during Construction Phase.			Short-term	Slight		

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation			Significance	Proposed Mitigation	Residual Impact
			Quality	Magnitude / Extent	Duration			
							Construction related noise control/minimisation measures to be implemented.	

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.

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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, 2017), 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, 2017), 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 significantly alters most of 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, 2017), 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.