5 BIODIVERSITY

5.1 Introduction

5.1.1 Background

This chapter assesses the ecology of the receiving environment for a mixed-use development located at Mervue, Co. Galway.

This chapter quantifies any potential effects relating to biodiversity and identifies the measures required to avoid, reduce and mitigate likely significant effects. The results of ecological surveys have been employed to inform the design of the proposed development, thereby minimising potential effects on sensitive habitats and species of conservation interest.

The ecology of the area surrounding the proposed development was first assessed in terms of habitats and species. The area over which the proposed development has the potential to result in effects (zone of influence) was then determined.

The assessment of the development site began with a desk study of available published data on sites designated for nature conservation, other ecologically sensitive sites, habitats, and species of interest in the vicinity of the proposed development. A review of OSI mapping, online environmental web-mappers and ortho-photography was also undertaken. The baseline information obtained from the desk study was the first stage in defining a zone of influence of the proposed development.

Following the desk study, multi-disciplinary ecological walkover surveys (As per Section 4.2 of *Ecological Survey Techniques for Protected Flora and Fauna during the Planning of National Schemes*' (NRA, 2009)) were conducted of the development site. A multi-disciplinary survey undertakes habitat assessment through classification, mapping and compilation of flora species lists and habitat suitability assessments for faunal species. The ecological surveys undertaken provided vital baseline information regarding the existing ecology of the study area.

In terms of definitions, a habitat is the environment in which an animal or plant lives, generally defined in terms of vegetation and physical structures. Habitats and species of ecological significance occurring/likely to occur within the zone of influence (ZOI) study area are classified as Key Ecological Receptors. Key ecological receptors are defined as sensitive sites, habitats, ecological features, assemblages, species or individuals that occur within the vicinity of a proposed development upon which effects are likely.

The ZOI has been determined by careful scientific analysis of the receiving environment within which the development is located. Given that this site does not support connectivity with any surface waters or habitats of ecological sensitivity, the ZOI is limited to the development site, potential pathways to groundwaters and to surface and foul waters via pumping to the public storm and foul sewers.

In August 2018, October 2018, March 2019 and June 2019, a range of specialist ecological survey work was carried out to provide comprehensive information on all ecological aspects of the ZOI. The studies and survey work undertaken provide a comprehensive inventory of the habitats, flora and fauna of the study area.

Using the comprehensive assessment of the existing environment (baseline conditions), it has been possible to accurately predict the likely effects of the proposed development on the KERs and correctly assign an ecological significance to them.

The information provided in this EIAR chapter, accurately and comprehensively describes the baseline ecological environment and provides an accurate prediction of the likely ecological effects of the proposed development. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines as fully described in the methodology section below.

5.1.2 Statement of Authority

Baseline ecological surveys were carried out by Pat Roberts (B.Sc. MCIEEM), John Hynes (B.Sc M.Sc MCIEEM) John Staunton (BSc., PhD., Irene Sullivan (BSc.) and Luke Dodebier (Ecologist with MKO).

This EIAR chapter has been prepared by a competent expert, John Hynes and reviewed by Pat Roberts (B.Sc. Environmental Science) who has over 13 years' experience in management and ecological assessment.

5.1.3 Relevant Legislation

National Legislation

The Wildlife Acts of 1976-2018 are the Acts of the Oireachtas protecting wildlife (including game) and flora in the Republic of Ireland. The basic designation for wildlife in Ireland is the Natural Heritage Area (NHA). This is an area considered important for the habitats present or which holds species of plants and animals whose habitat needs protection. Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation.

In addition, there are proposed NHAs (pNHAs), which were published on a non-statutory basis in 1995, but have not since been statutorily proposed or designated. These sites are of significance for wildlife and habitats.

Prior to statutory designation, pNHAs are subject to limited protection, in the form of:

- Agri-environmental farm planning schemes
- Forest Service requirement for NPWS approval before they will pay afforestation grants on pNHA lands
- Recognition of the ecological value of pNHAs by Planning and Licencing Authorities.

Section 21 of the Wildlife Act is set out in the Flora (Protection) Order, 2015, which supercedes orders made in 1980, 1987 and 1999. It is illegal to cut, uproot or damage the listed species in any way, or to offer them for sale. This prohibition extends to the taking or sale of seed. In addition, it is illegal to alter, damage or interfere in any way with their habitats. This protection applies wherever the plants are found and is not confined to sites designated for nature conservation.

Designated Sites of European Importance

The Habitats Directive, together with the Birds Directive forms the cornerstone of Europe's nature conservation policy. It is built around two pillars: the Natura 2000 network of protected sites and the strict system of species protection. The aim of the Habitats Directive is to contribute towards maintaining biodiversity throughout Member States through the conservation of natural habitats and wild flora and fauna.

The Birds Directive seeks to protect all wild birds and their most important habitats across their entire natural range within the EU.

With the introduction of the EU Habitats Directive (92/43/EEC) and Birds Directive (79/409/EEC) (replaced with 2009/147/EC) which were transposed into Irish law as S.I. No. 94/1997 European Communities (Birds and Natural Habitats) Regulations 1997, the European Union formally recognised the significance of protecting rare and endangered species of flora and fauna, and also their habitats. The 1997 Regulations and their amendments were subsequently revised and consolidated in S.I. No. 477/2011- European Communities (Birds and Natural Habitats) Regulations 2011. This legislation requires the establishment and conservation of a network of sites of particular conservation value that are to be termed 'European Sites'.

Habitats Directive/Special Areas of Conservation
Articles 3 – 9 of the EU Habitats Directive (92/43/EEC) provide the EU legislative framework of protecting rare and endangered species of flora and fauna, and habitats. Annex I of the Directive lists habitat types whose conservation requires the designation of Special Areas of Conservation (SAC). Priority habitats, such as Turloughs, which are in danger of disappearing within the EU territory are also listed in Annex I. Annex II of the Directive lists animal and plant species (e.g. Marsh Fritillary, Atlantic Salmon, and Killarney Fern) whose conservation also requires the designation of SAC. Annex IV lists animal and plant species in need of strict protection such as Lesser Horseshoe Bat and Otter, and Annex V lists animal and plant species whose taking in the wild and exploitation may be subject to management measures. In Ireland, species listed under Annex V include Irish Hare, Common Frog and Pine Marten.

Species can be listed in more than one Annex, as is the case with Otter and Lesser Horseshoe Bat which are listed on both Annex II and Annex IV.

Birds Directive/Special Protection Areas
Council Directive 79/409/EEC of 2 April 1979 on the conservation of wild birds (Birds Directive) has been substantially amended several times. In the interests of clarity and rationality the said Directive was codified in 2009 and is now cited as Directive 2009/147/EC. The Directive instructs Member States to take measures to maintain populations of all bird species naturally occurring in the wild state in the EU (Article 2). Such measures may include the maintenance and/or re-establishment of habitats in order to sustain these bird populations (Article 3).

A subset of bird species has been identified in the Directive and are listed in Annex I as requiring special conservation measures in relation to their habitats. These species have been listed on account of inter alia: their risk of extinction; vulnerability to specific changes in their habitat; and/or due to their relatively small population size or restricted distribution. Special Protection Areas (SPAs) are to be identified and classified for these Annex I listed species and for regularly occurring migratory species, paying particular attention to the protection of wetlands (Article 4).

Invasive Species Legislation

At an international level Ireland has signed up to a number of treaties and conventions, including the Convention on Biological Diversity. Such treaties and conventions require the Irish Government to address issues of invasive alien species. This has been implemented through the Wildlife Act 1976 and 2000 and further regulated through the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011).

Regulations 49 and 50 of these regulations include legislative measures to deal with the dispersal and introduction of invasive alien species:

Regulation 49

> "*any person who plants, disperses, allows or causes to disperse, spreads or otherwise causes to grow in any place specified in relation to such plant in the third column of Part 1 of the Third Schedule, any plant which is included in Part 1 of the Third Schedule, shall be guilty of an offence*."

Regulation 50

> *"a person shall be guilty of an offence if he or she has in his or her possession for sale, or for the purposes of breeding, reproduction or propagation, or offers or exposes for sale, transportation, distribution, introduction or release*
>
> *(a) an animal or plant listed in Part 1 or Part 2 of the Third Schedule,*
>
> *(b) anything from which an animal or plant referred to in subparagraph (a), can be reproduced or propagated, or*
>
> *(c) a vector material listed in Part 3 of the Third Schedule,"*

Two vector materials are referred to in the regulations (Third Schedule Part 3), one is blue mussel seed and the second is:

> *''Soil or spoil taken from places infested with Japanese knotweed, Giant knotweed or their hybrid Bohemian knotweed''*.

Non-native species subject to restrictions under Regulations 49 and 50 are included in the third schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). The Third Schedule Invasive species include: Japanese Knotweed, Giant Hogweed, Giant Knotweed, Giant Rhubarb, Himalayan Balsam, Himalayan Knotweed, Bohemian Knotweed and Rhododendron.

5.1.4 Relevant Guidance

The assessment methodology is based primarily upon the National Road Authority (NRA)'s Guidelines for Assessment of Ecological Impacts of National Road Schemes Rev 2 (NRA, 2009) (referred to hereafter as the NRA Ecological Impact Assessment Guidelines), and the survey methodology is based on the NRA Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes (NRA, 2009).

In addition, regard was paid to the guidelines listed below in the preparation of this document to provide the scope, structure and content of the assessment. They are among the recognised guidance in Environmental Impact Assessment and National Road Scheme assessments.

- *Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater and Coastal* (CIEEM, 2018).
- *Advice Notes on Current Practice (in preparation of Environmental Impact Statements)* (Environmental Protection Agency (EPA), 2003).
- *Guidelines on the information to be contained in Environmental Impact Statements* (EPA, 2002).
- *Draft Revised guidelines on the information to be contained in Environmental Impact Statements* (EPA, 2015).
- *Environmental Impact Assessment of National Road Schemes –A Practical Guide* (NRA, 2009).
- *Guidelines for assessment of Ecological Impacts of National Road Schemes*, (NRA, 2009).
- *Environmental Assessment and Construction Guidelines* (NRA, 2006).

5.2 Methodology

This section describes the methodologies followed in the compilation of this EIAR chapter. Recognised guidelines were followed in relation to every aspect of the scoping, survey and assessment.

5.2.1 Desk Study

The desk study undertaken for this assessment included a thorough review of the available ecological data including the following:

- Review of online web-mappers: National Parks and Wildlife Service (NPWS), EPA envision
- Review of the Bat Conservation Ireland (BCI) Private Database
- Review of the publically available National Biodiversity Data Centre (NBDC) web-mapper

5.2.2 Fieldwork

Habitat surveys have been conducted for the site. These surveys were undertaken on the 29th of August 2018, 9th of October 2018, 14th of March 2019 and 11th of June 2019. Surveys were undertaken by John Hynes, Pat Roberts, Irene Sullivan, John Staunton and Luke Dodebier.

The methodologies for these surveys are described in the sections below.

Multi-disciplinary walkover survey (as per NRA Guidelines, 2009)

The multi-disciplinary ecological walkover survey of the study area incorporated habitat mapping and evaluation. Where relevant, surveys were undertaken within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith *et al.*, 2011).

Habitats were classified in accordance with the Heritage Council's *'Guide to Habitats in Ireland'* (Fossitt, 2000). Habitat mapping was undertaken with regard to guidance set out in '*Best Practice Guidance for Habitat Survey and Mapping*' (Smith *et al.*, 2011).

Plant nomenclature for vascular plants follows '*New Flora of the British Isles*' (Stace, 2010), while mosses and liverworts nomenclature follows, '*Mosses and Liverworts of Britain and Ireland - a field guide'* (British Bryological Society, 2010).

Faunal Surveys

During the multi-disciplinary ecological walkover surveys, the potential for the study area to support protected mammals, amphibians and additional fauna was assessed. The existing structure on-site as well as any landscape features along the site boundary were subject to an ecological appraisal for bats in accordance with in BCT *Bat Surveys for Professional Ecologists: good practice Guidelines (3rd edn)* (Collins , J (ed.), 2016).

Invasive Alien Species

During field surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted. Regulations 49 and 50 of these Regulations include legislative measures to deal with the dispersal and introduction of invasive alien species. Regulation 50 has not yet been commenced. IAS are also addressed by EU Regulation 1143/2014, which seeks to address the problem of invasive alien species in a comprehensive manner so as to protect native biodiversity and ecosystem services, as well as to minimise and mitigate the human health or economic impacts that these species can have.

5.2.3 Methodology for Assessment of Effects

Ecological Evaluation

Ecological evaluation and Effect assessment within this chapter follows a methodology that is set out in Chapter 3 of the *'Guidelines for Assessment of Ecological Impacts of National Roads Schemes'* (NRA, 2009). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The guidelines provide a basis for determination of whether any particular site is of importance on the following scales:

- International
- National
- County
- Local Importance (Higher Value)
- Local Importance (Lower Value)

The NRA Ecological Impact Guidelines (2009) clearly sets out the criteria by which each geographic level of importance can be assigned. Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and of any importance only in the local area. Internationally Important sites are either designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna.

All habitats and species within the development site were assigned a level of significance on the above basis and the ZOI and KERs were established and classified on this basis.

Assessment of Effects

As per the EPA, 2017 document '*Guidelines on the information to be contained in environmental impact assessment reports*', specifically Table 3.3 of the guidelines, the below paragraphs outline the methodology used to assess the effects of the project on the receiving environment.

Reference is made to the following parameters wherever appropriate when characterising effects:

- Magnitude relates to the quantum of effect, for example the number of individuals affected by an activity;
- Extent should also be predicted in a quantified manner and relates to the area over which the effect occurs;
- Duration is intended to refer to the time during which the effect is predicted to continue, until recovery or re-instatement;
- Reversibility should be addressed by identifying whether an effect is ecologically reversible either spontaneously or through specific action; and,
- Timing/frequency of effects in relation to important seasonal and/or life-cycle constraints should be evaluated. Similarly, the frequency with which activities (and associated effects) would take place can be an important determinant of the effect on receptors.

It is necessary to ensure that any assessment of effect takes account of construction and operational phases; direct, indirect and synergistic effects; and, those that are temporary, reversible and irreversible. The criteria for assessment of effect magnitude, type and significance are given in Tables 5.1 and 5.2. The following terms are defined when quantifying duration (EPA, 2017):

- Momentary effects - Effects lasting from seconds to minutes
- Brief effects - Effects lasting less than a day
- Temporary effects - Effects lasting less than a year
- Short-term – 1 to 7 years
- Medium term – 7 to 15 years
- Long term – 15 to 60 years
- Permanent – over 60 years
- Reversible effects - Effects that can be undone, for example through remediation or restoration.

Table 5.1 Criteria for assessing significance of effects, as per (EPA, 2017) guidelines

Effect Magnitude	Definition
No change	No discernible change in the ecology of the affected feature
Imperceptible effect	An effect capable of measurement but without noticeable consequences
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate effect	An effect that alters the character of the environment that is consistent with existing and emerging trends
Significant effect	An effect which, by its character, its magnitude, duration or intensity alters a sensitive aspect of the environment
Very significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound effect	An effect which obliterates sensitive characteristics

Table 5.2 Criteria for assessing effect quality as per (EPA, 2017)

Effect Type	Criteria
Positive	A change which improves the quality of the environment e.g. increasing species diversity, improving reproductive capacity of an ecosystem or removing nuisances
Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative	A change which reduces the quality of the environment e.g. lessening species diversity or reducing the reproductive capacity of an ecosystem or by causing nuisance.

Incorporation of Mitigation

The proposed development is situated in existing brownfield lands thereby avoiding potential impacts on sensitive ecological receptors. Section 5 of this chapter assesses the potential impacts of the proposal to ensure that all impacts on Key Ecological Receptors are adequately addressed. Where significant impacts on ecologically sensitive receptors are predicted, mitigation is incorporated into the project design or layout to address such impacts. Mitigation is also included to prevent groundwater being negatively impacted by the proposed development (See chapter 7 of this EIAR (Hydrology)). Any mitigation measures aim to result in no residual impacts post implementation.

Limitations

The information provided in this EIAR chapter accurately and comprehensively describes the baseline ecological environment; provides an accurate prediction of the likely ecological effects of the proposed development; prescribes mitigation as necessary; and, discusses potential for residual ecological effects. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines.

No limitations in the scope, scale or context of the assessment have been identified.

5.3 Description of the Baseline Environment

5.3.1 Scoping and Consultation

MKO undertook a scoping and consultation exercise during preparation of this EIAR, as described in Section 2.9. Table 5.3 provides a list of the organisations consulted, with regard to Flora and Fauna, during the scoping process. Copies of all scoping responses are included in Appendix 2-1 of this EIAR. Table 2.3 of Chapter 2 presents the key points in relation to the scoping responses received from all additional consultees. If further responses are received, the comments of the consultees will be considered in the construction and operation of the proposed development, subject to a grant of planning permission.

The recommendations of the consultees have informed the EIAR preparation process and the contents of this Biodiversity Chapter of the EIAR.

Table 5.3 Scoping Response Summary

Consultee	Response (Phase 1 Scoping)	Response (Phase 2 Scoping)
An Taisce	Letter on 18th November 2018 requesting clarification on a number of points.	No response
Development Applications Unit, Dept. of Culture, Heritage & the Gaeltacht	Response received 1st November 2018 They stated: It appears that EIA scoping is being undertaken on a non-statutory basis. Any opportunity to Consult Galway City Council (or An Bord Pleanala), as the EIA authority, at pre-planning stage should be availed of, including in relation to formal EIA scoping, available environmental data and any plan-level mitigation that may apply whether to the location, or the type of site or development. -In relation to nature conservation and biodiversity the 'planning' section of the NPWS website should be reviewed as well as the habitat mapping that is available for the area. -Any new standards, guidance and legislation of relevance should be taken into account, noting any changes in approach or application arising from case law relating to the EIA and AA processes in particular.	18/01/19 - Response focused on likely significant effects on the environment, including European sites, biodiversity and implications for proper planning and sustainable development in the area. key potential concerns in relation to likely significant effects of the proposed development alone (Phase 1 and/or 2) upon Galway Bay complex SAC and Inner Galway Bay SPA include: ▪ Effects of further excavations on groundwater, inc. flows ▪ Effects on groundwater quality, inc. as a result of contamination during construction or operation ▪ Added pressures on existing water services which are linked to EU sites ie. water abstraction from and discharges of treated effluent to SACs and SPAs ▪ Added pressures on other existing services and infrastructure, including amenity, recreational and transport infrastructure, and the need for future developments in the city which may be unable to avoid European sites, e.g. the proposed N6 Galway City Ring Road, and the network of cycleways in the Galway Transport Strategy.
Environmental co-ordination unit, Dept. Agriculture, Food and the Marine	Letter received 05/10/18 – No submissions or observations	Email acknowledgement on 31st December 2018 repeating Phase 1 response
Geological Survey of Ireland	Response received 18th October 2018. They stated: -County Geological Sites (CGS) include additional sites that may also be of national importance, but which were no selected as the very best example for NHA designation.	No response

Consultee	Response (Phase 1 Scoping)	Response (Phase 2 Scoping)
	The GSI has identified two GCSs within 2.25km of the proposed site. 1. Roadstone Quarry on the Tuam Road 2. Merlin Park Quarry With the current plans, there is no envisaged impact on the integrity of County Geological Sites by the proposed developments. Should development go ahead, GSI would appreciated a copy of reports detailing any site investigations carried out.	
Fáilte Ireland	Email received 09/10/18	No response
Irish Water	No response	No response
Inland Fisheries Ireland	No response	No response
Dr. Julie Fossitt, National Parks and Wildlife Service	Email received 01/11/18	
Office of Public Works	No response	No response
The Heritage Council	No response	No response

5.3.2 Desk Study

The following sections describe the results of a survey of published material that was consulted as part of the desk study for the purposes of the ecological assessment. It provides a baseline reference for the ecology of the existing environment.

5.3.2.1 Designated Sites in Relation to the Study Area

Using the GIS software, MapInfo (Version 10.0), designated sites within the potential zone of influence were identified. The following rationale was used to identify the potential zone of influence. Initially, sites within a 15km radius of the proposed development were identified (as per the DoEHLG Guidance (2010)). In addition, using the precautionary principle, European Sites located outside the 15km buffer zone were also taken into account but no pathway for impact on such sites was identified. The designated sites in the potential zone of influence are listed below in Tables 5.4 and 5.5 and are displayed on Figures 5.1. and 5.2.

Nationally Designated Sites

The locations of the Nationally designated sites within the identified ZOI of the proposed development are displayed on Figure 5.1. The potential for the proposed development to cause adverse effects on these NHAs and pNHAs was considered and is presented in Table 5.4.

Table 5.4 Designated sites in the Zone of Influence

Designated site with distance from proposed development	Features of Interest	Zone of Influence Yes/No
Natural Heritage Area (NHA)		
Moycullen Bogs NHA (002364) 4.9km	Peatlands (4)	No - There is no surface water connectivity between the proposal and the NHA and no potential for significant effect given the nature, scale and separation of the proposal from the designated site.
Cregganna Marsh NHA (000253 6.6km	Birds (12)	
Proposed Natural Heritage Area (pNHA)		
Galway Bay Complex 0.8km	Not defined	A potential pathway for effect exists between the site of proposed development and Galway Complex pNHA via pollution of surface and groundwaters which could indirectly impact upon this site. However, mitigation and preventative measures have been designed to ensure these pathways for effect are robustly blocked. Given that this pNHA occurs within the boundary of Galway Bay Complex SAC, potential for effects upon this site are considered within the NIS which accompanies this application.
Lough Corrib 2.2km		No - There is no surface water connectivity between the proposal and the pNHAs and no potential for significant effect upon features of interest given the nature, scale and separation of the proposal from the designated sites.
Kiltullagh Turlough 4.9km		
Ballycuirke Lough 9.3km		
Killarainy Lodge, Moycullen 11.9km		
Drimcong Wood 12.8km		
Lough Fingall Complex 13.3km		
Furbogh Wood 13.4km		
Ross Lake And Woods 14.6km		
Connemara Bog Complex 14.6km		

Where nationally designated sites occur within the boundary of European Sites (e.g. Creganna Marsh, Galway Bay etc.) potential for effects is considered under the SAC/SPA designation.

European Sites

A Natura Impact Statement has been prepared to provide the competent authorities with the information necessary to complete an Appropriate Assessment for the proposed development in compliance with Article 6(3) of the Habitats Directive.

As per EPA draft Guidance 2017, *"a biodiversity section of an EIAR, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement"* but should *"incorporate their key findings as available and*

appropriate". Section 5.5 of this EIAR provides a summary of the key assessment findings with regard to European Sites.

As with Nationally designated sites described above, using GIS software, European sites designated for nature conservation within the potential ZOI of the proposed development were identified. The ZOI was derived using a precautionary approach. Initially, sites within a 15 kilometre radius of the proposed works were identified as per DoEHLG Guidance (2010). European Sites located outside the 15km buffer zone were also taken into account and assessed. In this case, no potential for impacts outside the 15km buffer was identified.

The locations of the European designated sites within a 15km buffer of the development along with the potential for the proposed development to have an effect on these European sites was considered and is presented in Table 5.5. Potential pathways for impact on European Sites in the ZOI were identified and discussed in the Natura Impact Statement which accompanies this application

The locations of the European designated sites within a 15km buffer of the development are displayed on Figure 5.2. The qualifying interests of these sites, and the respective distances between them and the site of proposed development, are presented in Table 5.5.

Table 5.5. European sites within the likely zone of impact of the proposed development.

European Sites	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 05/07/2019)	Zone of Likely impact determination
Special Areas of Conservation (SAC)		
Galway Bay Complex SAC 0.8km	▪ Mudflats and sandflats not covered by seawater at low tide [1140] ▪ Coastal lagoons [1150] ▪ Large shallow inlets and bays [1160] ▪ Reefs [1170] ▪ Perennial vegetation of stony banks [1220] ▪ *Salicornia* and other annuals colonising mud and sand [1310] ▪ Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] ▪ Mediterranean salt meadows (*Juncetalia maritimi*) [1410] ▪ Turloughs [3180] ▪ *Juniperus communis* formations on heaths or calcareous grasslands [5130] ▪ Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] ▪ Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] ▪ Alkaline fens [7230] ▪ Limestone pavements ▪ *Lutra lutra* (Otter) [1355] ▪ *Phoca vitulina* (Harbour Seal) [1365]	Given the distance between the site of proposed development and this SAC, direct effects upon the SAC can be excluded. However, indirect effects of the development are also considered within the NIS. No potential pathway for effect on any of the terrestrial habitats for which the SAC is designated was identified. Though no watercourses were identified on-site, the construction phase of the proposed development may result in pollution to groundwaters via the percolation of polluting materials through the limestone bedrock underlying the site. Groundwater flows are generally to the west and southwest towards potentially toward this SAC (see Ch. 7 of the EIAR which accompanies this application). Surface waters may require pumping out of the site to the local public storm sewer (which ultimately discharges to the SAC) during construction works, thus creating potential for impact upon this receptor via siltation and pollution. ▪

European Sites	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 05/07/2019)	Zone of Likely impact determination
		The proposed development will also lead to the production of foul sewage and surface water. If discharged untreated, this has the potential to result in adverse effects on this SAC during the operation of the proposed development. ▪ As there is a surface and ground water connection to this SAC, it is therefore **within the likely zone of impact**, due to the potential for pollutants to be transmitted to it indirectly via ground and surface water during construction and operation.
Lough Corrib SAC 2.1km	▪ Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] ▪ Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or Isoeto-Nanojuncetea [3130] ▪ Hard oligo-mesotrophic waters with benthic vegetation of Chara spp. [3140] ▪ Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260] ▪ Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) [6210] ▪ Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410] ▪ Active raised bogs [7110] ▪ Degraded raised bogs still capable of natural regeneration [7120] ▪ Depressions on peat substrates of the Rhynchosporion [7150] ▪ Calcareous fens with Cladium mariscus and species of the Caricion davallianae [7210] ▪ Petrifying springs with tufa formation (Cratoneurion) [7220] ▪ Alkaline fens [7230]	The proposed development site does not contain or support connections to foraging and commuting habitat for Lesser Horseshoe bats or otter. There will therefore be no potential for effects on these qualifying interests. No pathway for effect exists between the site of proposed development and the terrestrial habitats within this SAC (as identified), therefore the potential for effects upon those QI's can be excluded. No hydrological connection between the site of the proposed development and this SAC was identified and therefore no potential pathway for effects on any aquatic receptor was identified.

European Sites	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 05/07/2019)	Zone of Likely impact determination
	▪ Limestone pavements [8240] ▪ Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] ▪ Bog woodland [91D0] ▪ Margaritifera margaritifera (Freshwater Pearl Mussel) [1029] ▪ Austropotamobius pallipes (White-clawed Crayfish) [1092] ▪ Petromyzon marinus (Sea Lamprey) [1095] ▪ Lampetra planeri (Brook Lamprey) [1096] ▪ Salmo salar (Salmon) [1106] ▪ Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303] ▪ Lutra lutra (Otter) [1355] ▪ Drepanocladus vernicosus (Slender Green Feather-moss) [1393] ▪ Najas flexilis (Slender Naiad) [1833]	No complete impact source-pathway-receptor chain for impact was identified. Potential for direct and indirect impact on the European Site can be excluded. **The site is therefore not located within the Zone of Likely Impact and no further assessment is required.**
Lough Fingall Complex SAC 13.3km	▪ Turloughs ▪ Alpine and Boreal heaths [4060] ▪ *Juniperus communis* formations on heaths or calcareous grasslands [5130] ▪ Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) [6210] ▪ Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* [7210] ▪ Limestone pavements [8240] ▪ *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303]	This SAC is located over 13km away from the site of proposed development and is separated by a landscape of varied land-use, topography, hydrology, and the expanse of Galway Bay. No complete impact source-pathway-receptor chain between this SAC and the site of proposed development was identified. **This site is not in the zone of likely impact, therefore no further assessment is required.**
Ross Lake and Woods SAC 14.6km	▪ *Rhinolophus hipposideros* (Lesser Horseshoe Bat) [1303] ▪ Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. [3140]	This SAC is located over 14km away from the site of proposed development and is separated by a landscape of varied land-use and topography. It is in an entirely separate hydrological catchment.

European Sites	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 05/07/2019)	Zone of Likely impact determination
		No complete impact source-pathway-receptor chain between this SAC and the site of proposed development was identified. **This site is not in the zone of likely impact, therefore no further assessment is required.**
Connemara Bog Complex SAC (002034) 14.6km	▪ Coastal lagoons [1150] ▪ Reefs [1170] ▪ Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] ▪ Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or *Isoeto-Nanojuncetea* [3130] ▪ Natural dystrophic lakes and ponds [3160] ▪ Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] ▪ Northern Atlantic wet heaths with *Erica tetralix* [4010] ▪ European dry heaths [4030] ▪ *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] ▪ Blanket bogs (* if active bog) [7130] ▪ Transition mires and quaking bogs [7140] ▪ Depressions on peat substrates of the *Rhynchosporion* [7150] ▪ Alkaline fens [7230] ▪ Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] ▪ *Euphydryas aurinia* (Marsh Fritillary) [1065] ▪ *Salmo salar* (Salmon) [1106] ▪ *Lutra lutra* (Otter) [1355] ▪ *Najas flexilis* (Slender Naiad) [1833]	This SAC is located over 14km away from the site of proposed development and is separated by a landscape of varied land-use and topography. It is in an entirely separate hydrological catchment No complete impact source-pathway-receptor chain between this SAC and the site of proposed development was identified. **This site is not in the zone of likely impact, therefore no further assessment is required.**
Special Protected Areas (SPA)		
Inner Galway Bay SPA 0.8km	▪ Great Northern Diver (*Gavia immer*) [A003] ▪ Cormorant (*Phalacrocorax carbo*) [A017]	Given the distance between the site of proposed development and this SPA,

European Sites	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 05/07/2019)	Zone of Likely impact determination
	▪ Grey Heron (*Ardea cinerea*) [A028] ▪ Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] ▪ Wigeon (*Anas penelope*) [A050] ▪ Teal (*Anas crecca*) [A052] ▪ Shoveler (*Anas clypeata*) [A056] ▪ Red-breasted Merganser (*Mergus serrator*) [A069] ▪ Ringed Plover (*Charadrius hiaticula*) [A137] ▪ Golden Plover (*Pluvialis apricaria*) [A140] ▪ Lapwing (*Vanellus vanellus*) [A142] ▪ Dunlin (*Calidris alpina*) [A149] ▪ Bar-tailed Godwit (*Limosa lapponica*) [A157] ▪ Curlew (*Numenius arquata*) [A160] ▪ Redshank (*Tringa totanus*) [A162] ▪ Turnstone (*Arenaria interpres*) [A169] ▪ Black-headed Gull (*Chroicocephalus ridibundus*) [A179] ▪ Common Gull (*Larus canus*) [A182] ▪ Sandwich Tern (*Sterna sandvicensis*) [A191] ▪ Common Tern (*Sterna hirundo*) [A193] ▪ Wetlands [A999]	direct impacts upon the SPA can be excluded. However, indirect impacts of the development are also considered within the NIS. The site of proposed development does not provide any habitat suitable for foraging/commuting birds that are SCI species of the SPA. Though no watercourses were identified on-site, the construction and operational phases of the proposed development may result in pollution to groundwaters and surface waters, as described in the "zone of likely impact," determination for Galway Bay SAC. Galway Bay Complex SPA lies to the south-west of the proposed development site. This SPA is **within the likely zone of impact**, due to the potential for pollutants to be transmitted to it indirectly via ground and surface water.
Lough Corrib SPA 3.9km	▪ Gadwall (*Anas strepera*) [A051] ▪ Shoveler (*Anas clypeata*) [A056] ▪ Pochard (*Aythya ferina*) [A059] ▪ Tufted Duck (*Aythya fuligula*) [A061] ▪ Common Scoter (*Melanitta nigra*) [A065] ▪ Hen Harrier (*Circus cyaneus*) [A082] ▪ Coot (*Fulica atra*) [A125] ▪ Golden Plover (*Pluvialis apricaria*) [A140] ▪ Black-headed Gull (*Chroicocephalus ridibundus*) [A179]	This SPA is located more than 3km from the site of the proposed development and is separated from it by various urban land uses and supports no suitable habitat for SCI species. There is no hydrological connection to the site of the proposed development and the SPA.

European Sites	Qualify Interests/Special Conservation Interests for which the European site has been designated (Sourced from NPWS online Conservation Objectives, www.npws.ie on the 05/07/2019)	Zone of Likely impact determination
	▪ Common Gull (*Larus canus*) [A182] ▪ Common Tern (*Sterna hirundo*) [A193] ▪ Arctic Tern (*Sterna paradisaea*) [A194] ▪ Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395] ▪ Wetland and Waterbirds [A999]	No complete impact source-pathway-receptor chain for impact between this SPA and the site of proposed development was identified. Based on the nature and scale of works and the distance from this SPA, potential for direct or indirect impact on the European Site can be excluded. **This site is not in the zone of likely impact, therefore no further assessment is required.**
Cregganna Marsh SPA 6.6km	▪ Greenland White-fronted Goose (*Anser albifrons flavirostris*) [A395]	This SPA is over 6.6 km away from the site of proposed development, separated by a landscape of varied land-use, topography and hydrology. The site is urban in nature and supports no suitable habitat for the SCI species (Greenland White-fronted geese) and effects thereon can be excluded. No complete impact source-pathway-receptor chain between this SPA and the site of proposed development was identified. **This site is not in the zone of likely impact, therefore no further assessment is required.**

With regard to European Sites, a NIS (Natura Impact Statement) has been completed to provide the competent authority with the information necessary to complete an Appropriate Assessment for the proposed development in compliance with Article 6(3) of the Habitats Directive. As part of this assessment, the potential for the proposed development to have an effect on any European sites in the ZOI was considered. The NIS concluded as follows:

> *"It can be objectively concluded that the Proposed Development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site."*

5.3.2.2 Habitats and Flora

The following sections describe the desk study sources consulted and results obtained during the assessment.

Habitats

The NPWS Article 17 datasets for Annex I habitats were downloaded from the NPWS website and reviewed. There were no records for EU Annex I habitats recorded within or immediately adjacent to the proposed development site.

National Parks and Wildlife Service Map Viewer

The NPWS map viewer was employed in a search for records of flora and fauna within hectad M32. One record of Small white orchid (*Pseudorchis albida*) was found. No suitable habitat for this species occurs at the proposed development site.

Galway City Ring Rd. (Galway City Transport Project). EIAR

Habitat surveys were carried out as part of the ecological constraints study for the N6 Galway city ring road, Galway City Transport Plan (GCTP, 2015). The study has no records of Annex I or other habitats of ecological significance within or adjacent to the proposal site. Results of bat surveys carried out as part of the Galway City Transport project were also consulted. No bat roosts or foraging areas were recorded within or adjacent to the study area, nor were any individual bat species recorded within or adjacent to the study area over the course of surveys carried out as part of the Galway City Transport project assessment.

National Biodiversity Data Centre

National Biodiversity Data Centre records were consulted to provide information on the flora recorded within the hectad in which the site of proposed development is situated (hectad M32). Table 5.6 shows a record of the only protected plant species recorded within hectad M32. Table 5.7 includes records of non-native invasive species listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2011) for hectad M32.

Table 5.6 Protected plant species recorded within hectad M32

Common Name	Scientific Name	Conservation Status
Saltmarsh Thread-moss	*Bryum salinum*	FPO; CE

Annex II, Annex IV, Annex V – Of EU Habitats Directive, Wildlife Acts – Irish Wildlife Acts (1976, 2000); FPO – Flora Protection Order; CE- Critically Endangered (Red List).

Table 5.7 Non-native invasive species records for hectad M32

Common Name	Scientific Name
Wireweed	*Sargassum muticum*
Himalayan Knotweed	*Persicaria wallichii*
Japanese Knotweed	*Fallopia japonica*
Rhododendron ponticum	*Rhododendron ponticum*
Three-cornered Garlic	*Allium triquetrum*

5.3.2.3 Fauna

National Biodiversity Data Centre

A search of the National Biodiversity Data Centre (NBDC) website was conducted with a focus on records of protected flora and fauna recorded from hectad M32. The results of the database search are provided in Table 5.8. Records of avifauna are presented in Table 5.9.

Table 5.8 NBDC records for protected species records in hectad M32

Common Name	Scientific Name	Conservation Status
Grey Seal	*Halichoerus grypus*	HD Annex II, V, WA
Common Seal	*Phoca vitulina*	HD Annex II, V, WA
Long-finned Pilot Whale	*Globicephala melas*	HD Annex IV, WA
Sperm Whale	*Physeter macrocephalus*	HD Annex IV, WA
Striped Dolphin	*Stenella coeruleoalba*	HD Annex IV, WA
Common Lizard	*Zootoca vivipara*	WA
Brown long-eared bat	*Plecotus auritus*	HD Annex IV, WA
Eurasian Pygmy Shrew	*Sorex minutus*	WA
Eurasian Red Squirrel	*Sciurus vulgaris*	WA
European Otter	*Lutra lutra*	HD Annex II, IV, WA
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	HD Annex II, IV, WA
Lesser Noctule	*Nyctalus leisleri*	HD Annex IV, WA
Pine Marten	*Martes martes*	HD Annex V, WA
Common Pipistrelle	*Pipistrellus pipistrellus sensu lato*	HD Annex IV, WA
Marsh Fritillary	*Euphydrya aurinia*	HD Annex II
Smooth Newt	*Lissotriton vulgaris*	WA
Common Frog	*Rana temporaria*	HD Annex V, WA
Soprano Pipistrelle	*Pipistrellus pygmaeus*	HD Annex IV, WA
Badger	*Meles meles*	WA
Hedgehog	*Erinaceus europaeus*	WA
Bottle-nosed Dolphin	*Tursiops truncatus*	HD Annex II, IV, WA
Atlantic White-sided Dolphin	*Lagenorhynchus acutus*	HD Annex IV, WA
Common Dolphin	*Delphinus delphis*	HD Annex IV, WA
Common Porpoise	*Phocoena phocoena*	HD Annex II, IV, WA

Annex II, Annex IV, Annex V – Of EU Habitats Directive, Wildlife Acts – Irish Wildlife Acts (1976, 2000).

Table 5.9 NBDC records for protected avifauna records in hectad M32

Common Name	Scientific Name	Conservation Status
Arctic Tern	*Sterna paradisaea*	BD Annex I
Barn Owl	*Tyto alba*	Red List
Bar-tailed Godwit	*Limosa lapponica*	BD Annex I

Common Name	Scientific Name	Conservation Status
Black Guillemot	*Cepphus grylle*	BD Annex I
Black-headed Gull	*Larus ridibundus*	Red List
Black-throated Diver	*Gavia arctica*	BD Annex I
Common Kingfisher	*Alcedo atthis*	BD Annex I
Common Redshank	*Tringa totanus*	Red List
Common Tern	*Sterna hirundo*	BD Annex I
Corn Crake	*Crex crex*	BD Annex I, Red List
Dunlin	*Calidris alpina*	BD Annex I
Curlew	*Numenius arquata*	Red List
European Golden Plover	*Pluvialis apricaria*	BD Annex I, Red List
Great Northern Diver	*Gavia immer*	BD Annex I
Greater White-fronted goose	*Anser albifrons*	BD Annex I
Grey partridge	*Perdix perdix*	Red List
Hen Harrier	*Circus cyaneus*	BD Annex I
Herring Gull	*Larus argentatus*	Red List
Little Egret	*Egretta garzetta*	BD Annex I
Little Gull	*Larus minutus*	BD Annex I
Little Tern	*Sternula albifrons*	BD Annex I
Mediterranean Gull	*Larus melanocephalus*	BD Annex I
Merlin	*Falco columbarius*	BD Annex I
Northern Lapwing	*Vanellus vanellus*	Red List
Northern Pintail	*Anas acuta*	Red List
Northern Shoveler	*Anas clypeata*	Red List
Peregrine Falcon	*Falco peregrinus*	BD Annex I
Red Grouse	*Lagopus lagopus*	Red List
Red Knot	*Calidris canutus*	Red List
Red-throated Diver	*Gavia stellata*	BD Annex I
Ruff	*Philomachus pugnax*	BD Annex I
Sandwich Tern	*Sterna sandvicensis*	BD Annex I
Twite	*Carduelis flavirostris*	Red List
Whooper Swan	*Cygnus cygnus*	BD Annex I
Yellowhammer	*Emberiza citrinella*	Red List

Annex I, Annex II, Annex III – Of EU Birds Directive (BD), Red List – BoCCI 2014-2019

Bat Conservation Ireland Database

A search of the Bat Conservation Ireland (BCI) Database for all bat records for the area within and surrounding the proposed development site was conducted on the 05th of July 2019. The BCI database can be searched in relation to identified *Roosts*, *Survey Transects* and *Other Observations*. Searches can be conducted for refined areas e.g. 1km buffer of a specific location or for wider areas including hectads and entire grid squares. *Roost* data details identified roosts and bat species recorded utilising the roost sites. *Transect* survey data include results of the BCI Car Based Bat Monitoring Scheme, All Ireland Daubenton's Bat Waterways Survey and additional surveys completed by private organisations and individuals.

A search of a 1km buffer from the proposed development site returned a single AD-HOC observation of a Common Pipistrelle (*Pipistrellus pipistrellus*). A search of a 10km buffer from the proposed development site returned 5 roost records, 17 transect records and 24 additional ad hoc observations for bat species. Roosts were found to

contain Lesser Horseshoe Bat (*Rhinolophus hipposideros)* and Leisler's Bat *(Nyctalus leisleri).* The transect records included Daubenton's bats (*Myotis daubentonii*), Leisler's Bat *(Nyctalus leisleri)* and Pipistrelles (*Pipistrellus* spp.), Soprano Pipistrelles (*Pipistrelles pygmaeus)* and , unidentified bats. Ad hoc records included the following species: Brown long-eared bats (*Plecotus auritus*), Daubenton's bats (*Myotis daubentonii*), Natterer's bat (*Myotis natterreri*), Lesser Horseshoe Bat *(Rhinolophus hipposideros*), Soprano Pipistrelle (*Pipistrelles pygmaeus*), Common Pipistrelle (Pipistrellus pipistrellus), Leislers Bat *(Nyctalus leisleri),* Pipistrelles *(Pipistrellus)* spp. and *Myotis* spp. The information provides for a baseline understanding of bat species in the area and indicates that the region has been previously surveyed for bats.

EPA Data

The EPA online map viewer was consulted on the 5th of July 2019 to locate any water courses on or near the proposed development site. The closest watercourse is the Terryland River (approx. 630m North of the proposed development). No watercourses were found on-site, and no surface water connectivity exists between the site of proposed development and sensitive ecological receptors.

5.3.2.4 Conclusions of the Desk Study

The desktop study has provided information about the existing environment in hectad M32, within which the proposed development is located. The site of proposed development is a brown-field site located in an urban setting, which does not appear to support habitats of conservation importance.

Mammalian species recorded within the relevant hectad have widespread range and distributions in Ireland (Marnell *et al* 2009) and are likely to be recorded frequently throughout the country. The site of proposed development (brown-field site in an urban area) does not share connectivity with habitats suitable for use by protected mammalian species, following consultation with maps and aerial photography. Bat records within 10km of the proposed development site revealed that the wider area is used by foraging and commuting bats, and that a number of bat roosts for a variety of species have been recorded.

A number of protected bird species have been recorded within hectad M32, however, many of these species are generalist species and occur throughout a wide range of habitats. Given a lack of suitable habitat and foraging opportunities within and adjacent to the site of proposed development, most of those bird species recorded within hectad M32 are unlikely to frequent the proposed development site, while those species afforded the highest levels of protection are very unlikely to occur within the proposed development site.

5.3.3 Field Assessment

5.3.3.1 Habitats and Flora in the Existing Environment

Overview of Site

Dedicated habitat surveys of the area within and in the vicinity of the proposed development were undertaken on the 29th of August 2018, 9th of October 2018, 14th of March 2019 and 11th of June 2019. A habitat map, based on the June 2019 visit, is provided as Figure 5.3. The results of the 2019 field study presented in this chapter concern an assessment of the entire site.

The Phase 2 development area is currently a brown-field building-site. The majority of the site is graveled and is classified as ***Spoil and bare ground (ED2)***. ***Buildings and artificial surfaces (BL3)*** in the form of construction foundations and existing buildings are also present within the wider site (Plates 5.1-5.3). The proposed development builds upon the previous planning permissions and construction works carried out at the site in c2008. Almost the entire site has already been excavated to structural formation level and exposed limestone rockface is present surrounding the site (Plate 2.4). The site is an active construction site, with works associated with the permitted Phase One of the Crown Square development already underway.

Most of the site is devoid of any vegetation. Some grassy areas which were classified as ***Dry Meadows and Grassy verges (GS2)*** occur in isolated locations surrounding the site (Plate 5.3). Species recorded in these areas included red clover (*Trifolium pretense*), bramble (*Rubus fruticosus*), plantain (*Plantago* sp.), white clover (*Trifolium repens*), butterfly bush (*Buddleja davidii*) and cock's-foot (*Dactylis glomerata*).

A cypress (*Cupressus leylandii*) ***Treeline (WL2)*** grows along the southern boundary of the Phase 1 development area. The loss of the treeline has been fully assessed and mitigated for as part of the permitted Phase 1 development (Pl Ref 18/363).

There are no natural ponds, springs, streams, drains or other waterbodies present within the development site boundary. No stonewort communities were recoded and no Annex I tufa forming spring heads were identified.

Plate 5.1 Spoil and bare ground (ED2) (June 2019)

Plate 5.2 Spoil and bare ground (ED2) & existing buildings (BL3) (June 2019)

Plate 5.3 Spoil and bare ground (ED2), Buildings and artificial surfaces (BL3) & Dry meadows and grassy verges (GS2) in left background (June 2019)

Plate 5.4 Spoil and bare ground (ED2) and exposed limestone rock face. (June 2019)

Botanical Species Present

None of the species recorded are listed in Annex II of the EU Habitats Directive or the Flora (Protection) Order (2015), neither are they considered to be of ecological importance.

Invasive Alien Species

During field surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted. No third schedule invasive species were recorded.

Significance of Flora

Flora of conservation ecological significance were not recorded within the site.

Significance of Habitats

Ecological evaluation within this section follows a methodology that is set out in Chapter three of the *'Guidelines for Assessment of Ecological Impacts of National Roads Schemes'* (NRA, 2009).

The habitats within and adjacent to the development site were evaluated in accordance with the criteria developed by the National Roads Authority (NRA) ––outlined in *Guidelines for Assessment of Ecological Impacts of National Road Schemes* (NRA, 2009) which classifies sites in terms of their ecological importance, *i.e*. International Importance, National Importance, County Importance, Local Importance (Higher Value) or Local Importance (Lower Value). The evaluation methodology also took cognisance of the geological context evaluation criteria outlined in Chapter 4 of CIEEM 2016.

None of the habitats within the development site boundary correspond to habitats listed on Annex I of the EU Habitats Directive. Grassy verges, spoil and bare ground, and buildings and artificial surfaces within the development site were assigned *Local Importance (Lower Value)* status.

The treeline along the southern site boundary is composed of a line of non-native conifer trees (*Cupressus leylandii*). The treeline grows uniformly and does not support a biodiverse understory. For these reasons, the treeline is unlikely to be of significant use to fauna. It has therefore also been determined to be of *Local Importance (Lower Value)*. This treeline will be lost as part of the permitted phase 1 development.

Whilst there is no watercourse on the site, there may be the requirement to pump excess waters arising on the site to the public storm sewer. This provides a potential link to Lough Atalia, which is designated for conservation as part of the Galway Bay Complex SAC and Inner Galway Bay SPA. These designated sites are assigned *International* importance.

5.3.3.2 Fauna

The site of proposed development does not provide significant territory and foraging opportunities for fauna due to the fact that it is:

- A brown-field site in a highly-developed urban setting subject to continuous human disturbance
- does not support habitats of ecological significance or conservation importance
- does not share connectivity with suitable habitats e.g. Hedgerows, watercourses.

No evidence of protected fauna was recorded on-site.

Bats

The building on the site were subject to an external and internal inspection with regard to bats in August 2018, March 2019 and June 2019. The building was found not to have any potential to support roosting bats and was assigned the status of *"Negligible Suitability,"* as per Table 4.1 of Collins 2016.

The cypress treeline along the southern site boundary was not found to contain suitable crevices or complex structures suitable for roosting bats. It is unlikely to be used by commuting/foraging bats given its isolation from suitable habitat. The treeline was therefore assessed to be of low suitability for bats. Bats have therefore been excluded as an ecologically sensitive receptor.

No other suitable habitat for bats was found on site. Overall the site of proposed development is of negligible suitability for bats.

Birds

During the site visits the following species were recorded: Jackdaw (*Corvus monedula*) and Herring Gull (*Larus argentatus*) (29.08.2018) and Pied Wagtail (*Motacilla alba*) (09.10.2018). These few bird species recorded within the site boundary during the site visits comprise a small assemblage of common birds, likely to be common and widespread in the area. None of the bird species recorded within the site during the site visit are Red listed under the Birds of Conservation Concern in Ireland (BoCCI) or in Annex I of the EU Birds Directive.

The majority of the site is open bare ground and devoid of vegetation suitable for nesting, foraging, or provision of cover, while the grassy verges onsite are low in floral diversity and are unlikely to provide significant foraging opportunities for avifauna. The treeline along the southern site boundary is of low habitat suitability for bird species, given its single-species uniform nature and isolation from suitable surrounding habitat.

Thus, bird species have been assessed as of *local importance (lower value)* and have not been identified as a KER.

Other Fauna

The site of proposed development offers little suitable habitat for other fauna, nor does it connect with any suitable habitat at a landscape level. No signs of mammal species passing through the site (scats, prints, etc.) were recorded during site visits, nor were signs of site occupation (setts, burrows, latrines etc.). There are no suitable watercourses for aquatic species within the proposed development site, nor is there

significant habitat for amphibious species such as common frog and common newt, or invertebrates of conservation concern such as Marsh Fritillary. No other faunal species of significance were recorded on the site.

Significance of Fauna

Ecological evaluation within this Section follows a methodology that is set out in Chapter three of the '*Guidelines for Assessment of Ecological Impacts of National Roads Schemes*' (NRA, 2009).

Overall, it is considered that the proposed study area is of low value to faunal species due to the nature of the habitats identified at the site (e.g. predominantly built land and disturbed ground). For this reason, faunal species have not been assessed as an ecologically sensitive receptor. However, assessment of likely impacts to faunal species has been considered in Section 5.4 of this report, from a precautionary point of view.

5.3.3.3 Likely and Significant Effects on Flora and Fauna

Ecological evaluation and assessment of effects within this chapter follows a methodology that is set out in Chapter 3 of the *'Guidelines for Assessment of Ecological Impacts of National Roads Schemes'* (NRA, 2009). These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The assessment of effects also follows the guidance outlined in EPA 2017 (See section 5.2.3 for further details).

This assessment of effects is as follows:

- Assessment of 'Do nothing' Effect
- Assessment of effects relating to habitats
- Assessment of effects in relation to flora and fauna
- Assessment of effects in relation to surface and groundwater

All elements of the proposed development have been considered in assessing effects on ecological receptors.

Do-Nothing Effect

The site currently comprises an active construction site. Construction of the permitted Phase 1 of the development (which includes Commercial Offices (Blocks A-E), Hotel and Site Infrastructure, including all basement structures for the entire site) is underway. In the absence of the construction of Phase 2, the entire site including all basement areas will be developed as part of Phase One and will then be likely be the subject of alternative development proposals.

5.4 Impacts During Construction Phase

5.4.1 Potential effects on Habitats

The proposed development is located within a brown-field site in an urban area. The development footprint will be confined to habitats on built and disturbed ground (i.e. *Spoil and bare ground (ED2)*, and *Buildings and artificial surfaces (BL3)*) classified as being of *local importance (lower value).*

A cypress (*Cupressus leylandii*) ***Treeline (WL2)*** grows along the southern boundary of the Phase 1 development area. The loss of the treeline has been fully assessed and mitigated for as part of the permitted Phase 1 development (Pl Ref 18/363).

There are no treelines or hedgerows within the Phase 2 development area and there will be no loss of linear landscape features associated with the development.

There are no habitats of ecological significance in the Phase 2 development area and no significant effects are anticipated.

As the proposal currently comprises a brown field site, habitat diversity will be increased as a result of the proposed landscaping measures and therefore the proposal is considered likely to have a *long-term slight positive* impact.

5.4.2 Potential Impacts on Fauna

The site of the proposed development supports very little habitat for faunal species and no signs of significant faunal activity were recorded during the surveys undertaken. There will be no loss of linear landscape features likely to be utilseid by bats . There will be no loss of any breeding or resting places for protected faunal species.

There are no habitats of ecological significance to faunal species in the Phase 2 development area and no significant effects are anticipated.

The landscaping plan associated with the proposed development, which will be implemented during the construction phase, is likely to benefit local fauna and flora in the long-term by providing greater habitat diversity than that which currently exists on-site. Therefore, the proposal is considered likely to have a *long-term slight positive* impact.

5.4.3 Pollution of Surface and Ground Waters

No surface watercourses were identified onsite. However, during the construction phase, a number of activities will take place on the proposed development site, some of which will have the potential to affect the hydrological regime or water quality at the site or its vicinity. These potential impacts are fully described in Chapter 7 of this EIAR. There will be no significant excavations associated with the proposed development, that could potentially result in effects on surface or ground waters.

Impacts include the potential to pollute groundwaters as a result of percolation of polluting materials such as hydrocarbons through the limestone karst bedrock, which underlies the site and has been exposed during the preparation of construction on-site. It is also likely that accumulations of surface water may require pumping out of the site during the construction phase. Any such waters will be pumped to the local, public storm sewer, thus creating the potential to impact on this receptor in the form of siltation and pollution. There is a potential connection via surface (public storm sewer) and ground waters to the European Sites Galway Bay Complex SAC and Inner Galway Bay SPA. These are receptors of *International* importance.

In the absence of mitigation, a *Short-term, moderate/Significant, negative impact* is anticipated.

Mitigation

Mitigation measures have been detailed in the Hydrology chapter of this report (Ch. 7). These measures include:

- Best practice measures to prevent spillage of polluting materials such as cement, hydrocarbons and wastewater

- Measures to remove silt and other pollutants from waters prior to discharge to the storm sewer
- Measures to attenuate any surface waters on site to allow treatment and containment of any contamination prior to discharge to the storm sewer.
- A Construction and Environmental Management Plan (CEMP) has been prepared and is included as Appendix 3-2 of this EIAR. The CEMP outlines clearly the mitigation measures and monitoring proposals that are required to be adhered to in order to complete the works in an appropriate manner.

Residual Impact
No significant impacts on surface or ground water quality are expected due to the construction works (including only minor excavations). There is no hydrological connectivity between the site and open watercourses. Mitigation measures will be employed on a precautionary basis to protect the storm sewer. The potential impacts on the storm sewer will be minimial as the flow and quality will be controlled for the short-term duration of any potential discharge.

There will be no significant residual effects are anticipated on surface or ground water following the implementation of the mitigation described.

5.5 Impacts during the Operational Phase

5.5.1 Potential Impacts on Habitats

Long-term Neutral impact
Direct or indirect impacts upon habitats, flora and fauna within and adjacent to the site of proposed development are not anticipated during the operational phase. The habitats assessed within the EIAR study area have been identified as being of Local Importance (Lower Value) from an ecological perspective. There will be no additional habitat loss associated with the operational phase of the proposed development.

There will be no significant effects on habitats during the operational phase of the development.

5.5.2 Pollution of Surface and Ground Waters

Foul water drainage has been designed in compliance with Irish Water standards (see Technical Appendix 3-3 of this EIAR). It is proposed to collect all foul water from ground level upwards and discharge to the public foul water sewer network by gravity via an external below ground drainage system. Further information on foul water reduction measures, the proposed external foul water drainage system, and proposed foul water drainage system are available in the engineering planning report relevant to the proposed development. Surface waters from un-trafficked areas will be connected directly into the public storm sewer. Surface water from the trafficked basement areas will be attenuated and will pass through a hydrocarbon interceptor before being ultimately pumped to the public storm water system.

There will be no significant effects on surface and ground waters during the operational phase of the development.

5.5.3 Potential Impacts on Fauna

Direct impacts upon fauna within and adjacent to the site of proposed development are not anticipated during the operational phase. Significant effects via disturbance/displacement of fauna are not anticipated during the operational phase of the development.

5.5.4 Spread of Invasive Species

No Third Schedule invasive species were recorded on the site; therefore, no impacts from invasive species are anticipated. However, guidelines for best practice will be followed, as will the CEMP (Construction and Environmental Management Plan) associated with the proposed development, to ensure no invasive species material will be brought on-site during construction.

5.5.5 Impacts upon Designated Areas

A Natura Impact Statement (NIS) has been prepared which presents the data and information on the project and provides an analysis of the potential impacts on European Sites within a zone of influence of the development. The NIS concluded:

> *Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction and operation of the proposed development does not adversely affect the integrity of European sites*
>
> *Therefore, it can be objectively concluded that the Proposed Development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site.*

Table 5.4 of this EIAR assesses the potential for the proposed development to result in effects on Nationally Designated Sites (NHA and pNHA) and finds that no such sites are located within the likely zone of impact of the proposed development, with the exception of those that are also designated as European Sites (SAC and SPA). Where pNHAs are also designated as SAC/SPAs the potential for effect is considered as part of the assessment of the corresponding SAC or SPA.

5.6 Cumulative Impacts

5.6.1 Projects Considered in Cumulative Assessment

This Environmental Impact Assessment Statement (EIAR) includes a description of likely significant impacts of the project, includes an assessment of cumulative impacts that may arise. The factors considered in relation to cumulative impacts include human beings, flora and fauna, soil, water, climatic factors, landscape, cultural heritage and material assets.

The potential for cumulative impacts arising from the proposed development in combination with other projects has therefore been fully considered throughout this Environmental Report. Chapter 2, which describes the background to this report, provides an overview of other projects located within the wider area that have been considered within the cumulative impact assessments.

Assessment material for this cumulative impact assessment was compiled on the relevant developments within the vicinity of the proposed development. The material was gathered through a search of the Galway City Council online Planning Register, reviews of relevant Environmental Report, or Environmental Impact Assessment Report (EIAR) documents, planning application details and planning drawings, and served to identify past and future projects, their activities and their environmental impacts. These projects are listed below:

- Permitted Phase I Development Crown Square (18/363)
- N6 Galway City Ring Road
- Office Development Ballybrit Business Park – PL Ref 18/338
- Mixed Use Development Bonham Quay – Pl Ref 17/83 / ABP Ref PL 61 .300275 - Granted
- Mixed-Use Development Monivea Road – Pl Ref 16/332 / ABP Ref PL 61 .248815 - Granted

Also considered as part of the cumulative impact assessment are local small-scale developments such as alterations to single dwellings houses and commercial and industrial premises, as well as future and proposed developments. The proposed development has been strategically designed to minimise, and avoid where possible, additional pressures on existing services and infrastructure, including amenity, recreational and otherwise.

Details for each project are presented in Section 2.6.2 of this EIAR.

5.6.2 Results of Assessment of Cumulative Impacts

It is considered that the scale of the works and implementation of appropriate design avoids all adverse impacts on the biodiversity of the existing environment within and adjacent to the site of proposed development. There is no potential for cumulative impacts arising in combination with any other or projects and therefore no potential for cumulative impacts on the habitats, flora or fauna of the ecology of the existing environment within and adjacent to the site of proposed development.

A number the developments listed above lie within the same surface water catchment as the proposed development. Impacts upon surface and groundwaters will be avoided as part of the project design and mitigated for where necessary during the construction and operational phases of proposed development, as described above. Therefore, there will be no significant cumulative impacts of the development with other proposed projects on water quality.

There will be no loss of ecologically sensitive habitats associated with works involved in the proposed development and no ecological effects are anticipated.

Based on the above, it can be objectively concluded in view of best scientific knowledge, on the basis of objective information that the proposed development, individually or cumulatively with other projects, will not have a significant adverse effect on the habitats, flora and fauna of the existing environment.

5.7 Conclusion

Following consideration of the residual impacts (post mitigation), it is noted that the proposed development will not result in any significant effects on any ecological receptors of International, National, County, or Local (Higher value) Importance.

The potential for impacts upon designated sites are fully described in the Natura Impact Statement that accompanies this application and this concludes:

> *Where the potential for any adverse effect on any European Site has been identified , the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures*

ensure that the construction and operation of the proposed development does not adversely affect the integrity of European sites

Therefore, it can be objectively concluded that the Proposed Development, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site.

Provided that the proposed development is constructed and operated in accordance with the design and best practice that is described within this application, significant effects on biodiversity are not anticipated at geographical scale.