NATURA IMPACT STATEMENT

FOR

PROPOSED DEVELOPMENT

AT

BALLYMACAULA, CIRCULAR ROAD,
ENNIS, CO. CLARE

ON BEHALF OF

Glenveagh Homes Ltd.

Prepared by
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1 INTRODUCTION

1.1 Background

Enviroguide Consulting was commissioned by Glenveagh Homes Ltd. to undertake a screening for Appropriate Assessment (AA) in relation to a Proposed Development at Ballymacaula, Circular Road, Ennis, Co. Clare. The AA Screening could not screen out the likelihood of significant effects on European Sites arising from the Proposed Development, and subsequently a Natura Impact Statement has been prepared.

1.2 Legislative Context

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 Protected 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.

Member States are required to designate SACs and SPAs under the EU Habitats and Birds Directives, respectively. The Birds and Habitats Directives have been transposed into Irish law through the EC (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011). SACs and SPAs are collectively known as “Natura 2000” or “European Sites”. 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.

An ‘Appropriate Assessment’ (AA) is a required assessment to determine the likelihood of significant effects, based on best scientific knowledge, of any plans or projects on European Sites.

An Appropriate Assessment is required under Article 6 of the Habitats Directive where a project or plan may give rise to significant effects upon a European Site. Paragraph 3 states that:

“*6(3) Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site, in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.”*

These obligations in relation to Appropriate Assessment have been implemented in Ireland under Part XAB of the Planning and Development Act 2000, as amended (“the 2000 Act“),

and in particular Section 177U and Section 177V thereof. The relevant provisions of Section 177U in relation to AA screening have been set out below:

"***177U.—*** *(1) A screening for appropriate assessment of a draft Land use plan or application for consent for proposed development shall be carried out by the competent authority to assess, in view of best scientific knowledge, if that Land use plan or proposed development, individually or in combination with another plan or project is likely to have a significant effect on the European Site.*

(2)…

(3)…

(4) The competent authority shall determine that an appropriate assessment of a draft Land use plan or a proposed development, as the case may be, is required if it cannot be excluded, on the basis of objective information, that the draft Land use plan or proposed development, individually or in combination with other plans or projects, will have a significant effect on a European Site.

(5) The competent authority shall determine that an appropriate assessment of a draft Land use plan or a proposed development, as the case may be, is not required if it can be excluded, on the basis of objective information, that the draft Land use plan or proposed development, individually or in combination with other plans or projects, will have a significant effect on a European Site."

1.3 Stages of AA

The AA process is a four-stage process, with issues and tests at each stage. An important aspect of the process is that the outcome at each successive stage determines whether a further stage in the process is required.

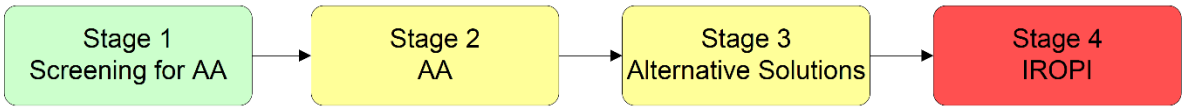

FIGURE 1. THE FOUR STAGES OF THE APPROPRIATE ASSESSMENT PROCESS (DEHLG, 2010 REVISION).

The four stages of an AA can be summarised as follows:

- Stage 1: *Screening*. The first stage of the AA process is to determine the likelihood of significant effects of the proposal.
- **Stage 2: *Natura Impact Statement (NIS)*.** The second stage of the AA process assesses the effect of the proposal (either alone or in combination with other projects or plans) on the integrity of the European Site, with respect to the conservation objectives of the site and its ecological structure and function. A Natura Impact Statement containing a scientific examination of the proposal is required and includes any mitigation measure to avoid, reduce or offset negative impacts.
- Stage 3: *Assessment of alternative solutions*. If the outcome of Stage 2 is negative, i.e., adverse impacts to the sites cannot be scientifically ruled out, despite mitigation,

the plan or project should proceed to Stage 3 or be abandoned. This stage examines alternative solutions to the proposal.

- Stage 4: *Assessment where no alternative solutions exist and where adverse impacts remain.* The final stage is the main derogation process examining whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project to adversely affect a European Site, where no less damaging solution exists.

The Habitats Directive promotes a hierarchy of avoidance, mitigation, and compensatory measures. First the project should aim to avoid any negative effects on European Sites by identifying possible effects early in the planning stage and designing the project to avoid such effects. Second, mitigation measures should be applied, if necessary, during the AA process to the point where no adverse impacts on the site(s) remain. If the project is still likely to result in adverse effects, and no further practicable mitigation is possible, a refusal for planning permission may be recommended. In this case, the project will generally only be considered where no alternative solutions are identified and the project is required for imperative reasons of overriding public interest (IROPI test), or, in the case of priority habitats, considerations of health or safety, or beneficial consequences of primary importance for the environment or to other imperative reasons of overriding public interest. Then compensation measures are required for any remaining adverse effects.

1.4 Guidance

This NIS has been undertaken in accordance with the following guidance:

- *Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities.* (Department of Environment, Heritage and Local Government, 2010 revision),
- *Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities.* Circular NPW 1/10 & PSSP 2/10,
- *Communication from the Commission on the precautionary principle* (European Commission, 2000),
- *Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC* (European Commission, 2019),
- *Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (European Commission, 2021), and,
- *Appropriate Assessment Screening for Development Management, OPR Practice Note PN01,* (Office of the Planning Regulator March 2021).

2 STAGE 1: APPROPRIATE ASSESSMENT SCREENING

The conclusion of the Stage 1 Screening Assessment is presented below:

The Proposed Development at Ballymacaula, Circular Road, Ennis, Co. Clare has been assessed taking into account:

- *the nature, size and location of the proposed works and possible impacts arising from the construction works.*
- *the qualifying interests and conservation objectives of the European Sites*
- *the potential for in-combination effects arising from other plans and projects.*

In conclusion, upon the examination, analysis and evaluation of the relevant information and applying the precautionary principle, it is concluded by the authors of this report that, on the basis of objective information; the possibility may be excluded that the Proposed Development will have a significant effect on any of the European Sites listed below:

Toonagh Estate SAC (002247)

Knockanira House SAC (002318)

Old Domestic Building (Keevagh) SAC (002010)

Ballycullinan, Old Domestic Building SAC (002246)

Old Farm Buildings, Ballymacrogan SAC (002245)

Old Domestic Buildings, Rylane SAC (002314)

Newgrove House SAC (002157)

Slieve Aughty Mountains SPA (004168)

However, upon examination of the relevant information including in particular the nature of the Proposed Development and the likelihood of significant effects on European Sites, the possibility may not be excluded that the Proposed Development will have a likely significant effect on any of the European Sites listed below:

Lower River Shannon SAC (002165)

Newhall and Edenvale Complex SAC (002091)

Pouladatig Cave SAC (000037)

Ballyallia Lake SAC (000014)

Dromore Woods And Loughs SAC (000032)

Ballycullinan Lake SAC (000016)

East Burren Complex SAC (001926)

Poulnagordon Cave (Quin) SAC (000064)

Lough Gash Turlough SAC (000051)

Moyree River System SAC (000057)

Ballyogan Lough SAC (000019)

Ballyallia Lough SPA (004041)

River Shannon and River Fergus Estuaries SPA (004077)

Corofin Wetlands SPA (004220)

There is a hydrological connection between the Site of the Proposed Development and the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA via surface water discharge. In the event of heavy, sustained rainfall, and in the absence of standard, appropriate mitigation measures, there is potential for sediments/pollutants from the Site to enter these European Sites via surface water run-off during both the Construction and Operational Phases of the Proposed Development. This could result in impacts on water quality in Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA.

There is a hydrogeological link between the Site and the Lower River Shannon SAC, Newhall and Edenvale Complex SAC, Pouladatig Cave SAC, Ballyallia Lake SAC, Dromore Woods And Loughs SAC, Ballycullinan Lake SAC, East Burren Complex SAC, Poulnagordon Cave (Quin) SAC, Lough Gash Turlough SAC, Moyree River System SAC, Ballyogan Lough SAC, Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, and Corofin Wetlands SPA via groundwater flow. There is potential 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. This could result in impacts on water quality in these European Sites.

The Site of the Proposed Development is located within the 2.5km foraging range of the Lesser Horseshoe Bat population associated with Newhall and Edenvale Complex SAC and Pouladatig Cave SAC. There is potential for an indirect impact on this species during the Construction and Operational Phases of the Proposed Development via habitat loss and fragmentation, and disturbance due to human activity, including noise and lighting.

As such, this NIS will focus on the potential impacts of the Construction Phase and Operational Phase (i.e., run-off which could enter via the Inch River, groundwater contamination, and disturbance to Lesser Horseshoe Bat) on **Lower River Shannon SAC**, **Newhall and Edenvale Complex SAC**, **Pouladatig Cave SAC**, **Ballyallia Lake SAC**, **Dromore Woods And Loughs SAC**, **Ballycullinan Lake SAC**, **East Burren Complex SAC**, **Poulnagordon Cave (Quin) SAC**, **Lough Gash Turlough SAC**, **Moyree River System SAC**, **Ballyogan Lough SAC**, **Ballyallia Lough SPA**, **River Shannon and River Fergus Estuaries SPA**, and **Corofin Wetlands SPA**.

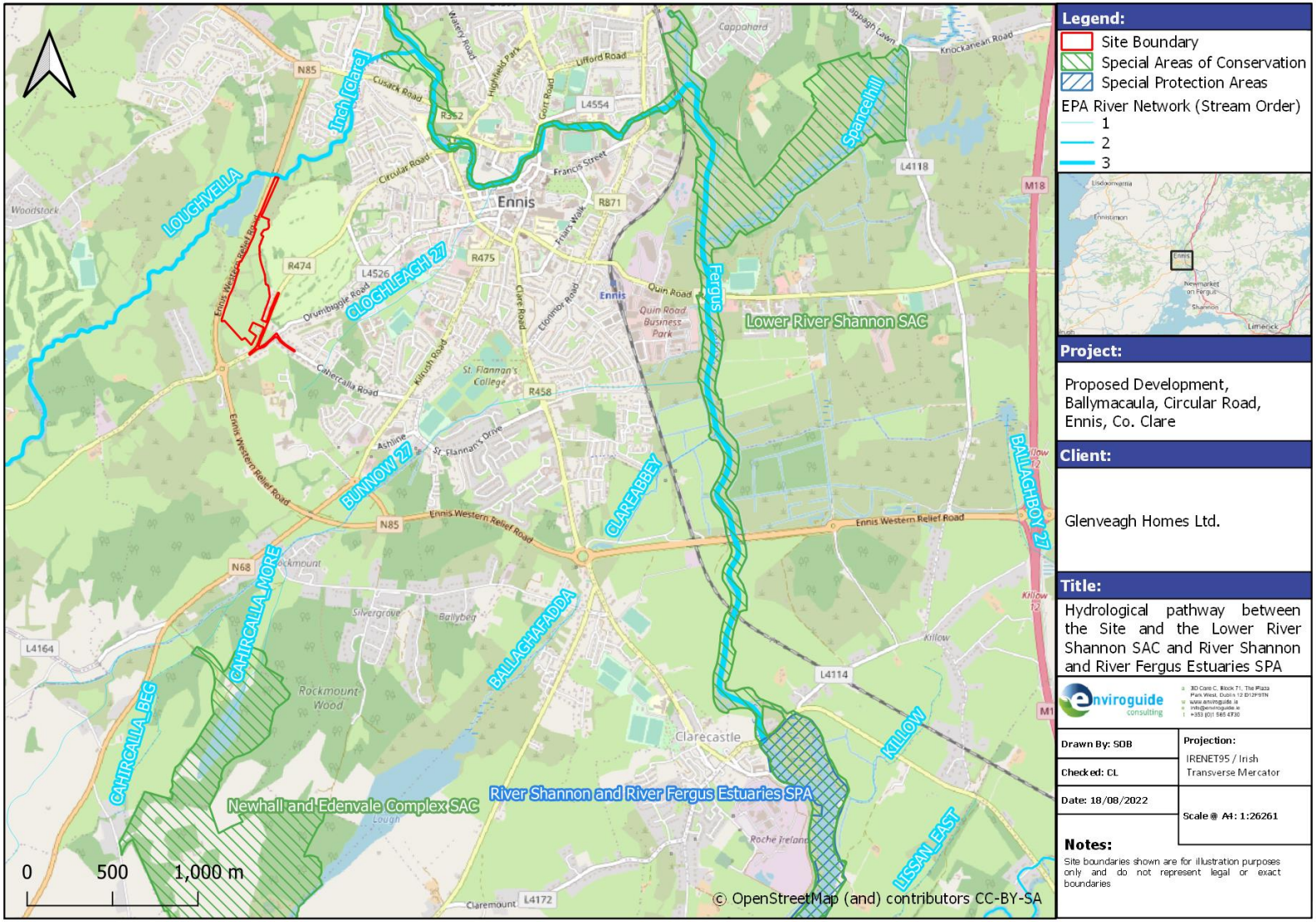

FIGURE 2. EUROPEAN SITES HYDROLOGICALLY LINKED TO THE PROPOSED DEVELOPMENT

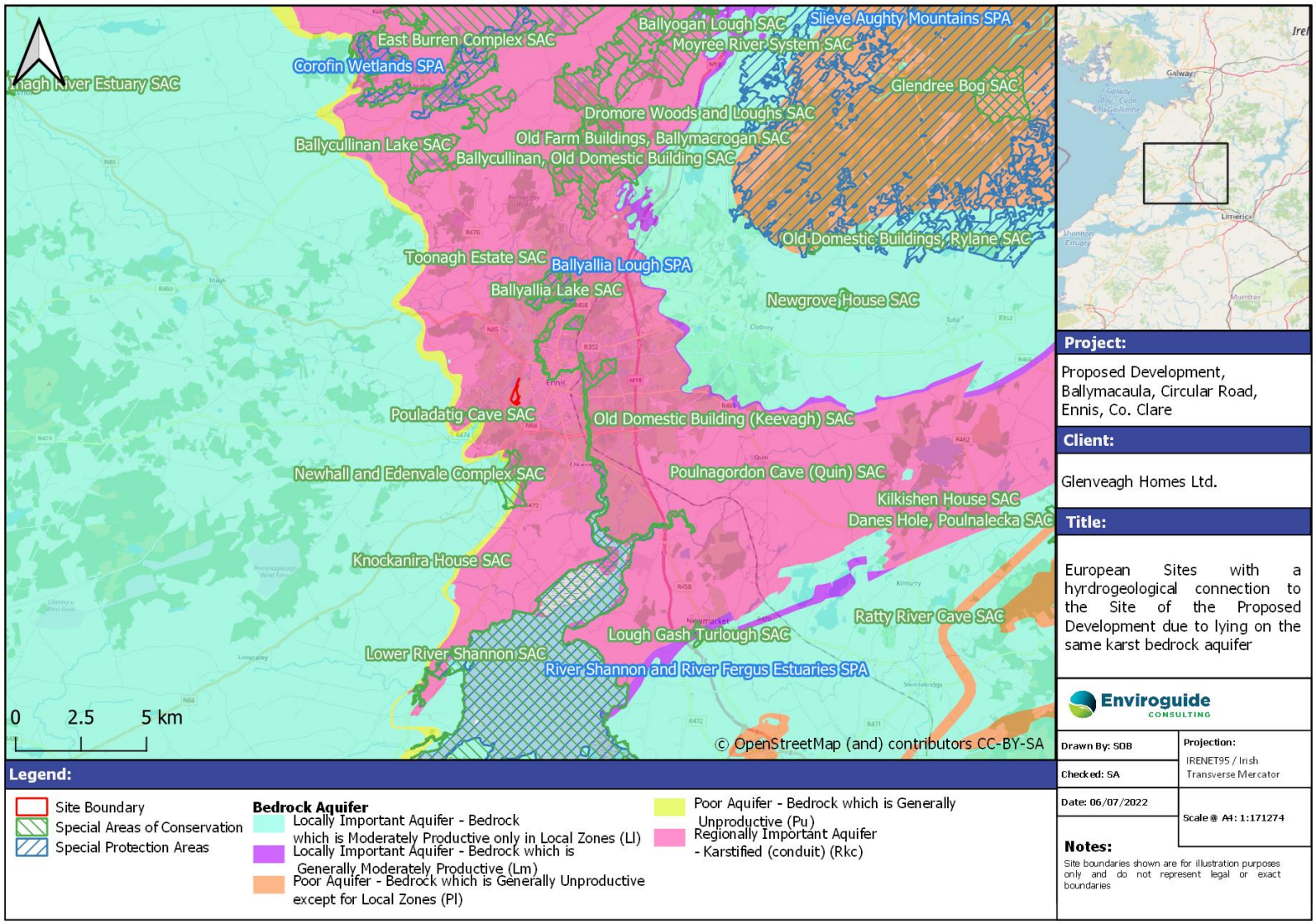

FIGURE 3. EUROPEAN SITES WITH A HYDROGEOLOGICAL LINK TO THE SITE OF THE PROPOSED DEVELOPMENT

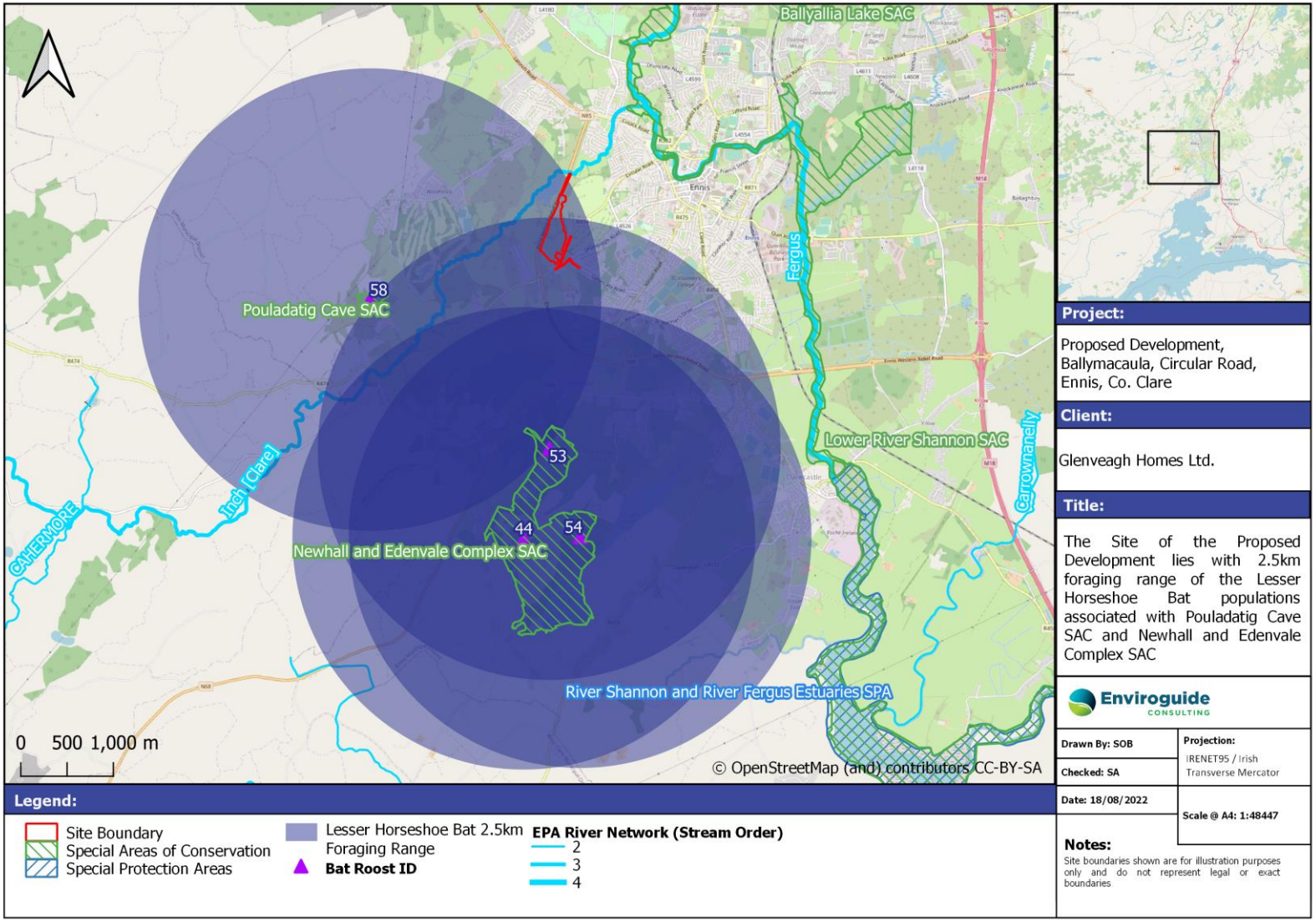

FIGURE 4. KNOWN LESSER HORSESHOE BAT POPULATIONS WITH FORAGING RANGES THAT INTERSECT THE SITE OF THE PROPOSED DEVELOPMENT

3 DESCRIPTION OF THE PROJECT

3.1 Description of the Development

3.1.1 Location and Size

The Site is comprised of 9 discrete areas of agricultural land separated by hedgerows and treelines, measuring 11.32ha (gross), and located 1.3km southwest of Ennis. The Site is bounded to the west by the N85, to the south by a live construction site, with a portion of the eastern boundary abutted by residential dwellings, and the remaining eastern and north boundaries are bordered by Ennis Golf Club. The lands to the west and south are predominantly agricultural in nature, while the lands to the north and east are urbanised.

3.1.2 Description

The Proposed Development will consist of the following components:

1. The construction of 289 no. residential units comprising a mixture of 12 no. 1 bed apartments, 78 no. 2 bed townhouse/duplex units, 165 no. 3 bed dwelling houses, and 34 no. dwelling houses which will have an option of a 3 or 4 bedroom house-type;
2. A 400.7m^2 creche/childcare facility;
3. The provision of landscaping, open space and amenity areas, including play/exercise equipment, a linear amenity walkway, informal play areas and local play areas;
4. The provision 2 no. pedestrian connections to the existing public footpath along the N85, 2 no. pedestrian connections into Ballymacaula View Estate, improvements/upgrades to the pedestrian footpaths along Circular Road including an uncontrolled pedestrian crossing and pedestrian footpath provision along part of the Drumbiggle and Cahercalla Roads;
5. All associated infrastructure and services including 1 no. vehicular access point onto Circular Road, car parking and bin storage, lighting, 2 no. ESB substations, drainage and 1 pumping station, boundary treatments at Ballymacaula, Drumbiggle, Circular Road, Ennis, Co. Clare.

FIGURE 5. PROPOSED SITE LAYOUT (DG ARCHITECTS, 2022).

3.2 Existing Environment

The Site of the Proposed Development is within the Shannon Estuary North catchment and Fergus_SC_050 sub catchment. The closest watercourse to the Site is the Inch River (also referred to as Claureen River), which flow adjacent to the north boundary of the Site. Inch River then discharges into Fergus River 1.3km northeast of the Site, and ultimately enters the Shannon Estuary. The status of the Inch River was designated as *Poor* by the EPA in 2019 (station code: RS27I010800), and, during the most recent survey period of 2013-2018, this watercourse was classified as A*t Risk* of not meeting its WFD objectives.

The Site is situated on the Ennis groundwater body, which is A*t Risk* of not meeting its WFD objectives. The aquifer type within the Site boundary is a *Regionally Important Aquifer* (Rkc) aquifer on bedrock which is *Karstified*. The groundwater rock units underlying the aquifer are classified as *Dinantian Pure Bedded Limestones* (GSI, 2022). The level of vulnerability of the Site to groundwater contamination via human activities is predominantly *Rock at or near surface*, followed by *Extreme*, with a small area of *High* along the east of the Site, and the northern area of Golf Links Road is designated as *Moderate*.

The soil in the north of the Site is classified as *Burren* (Loamy over limestone bedrock), while the south is *Kilrush* (Fine loamy drift with siliceous stones), and the Golf Links Road is designated as *Urban*. The subsoil within the southwest and north of the Site is Karstified limestone bedrock at surface (*KaRck*), while the centre and southeast of the Site is Limestone till (Carboniferous) (*TLs*), and Golf Links Road is *Made* ground (EPA, 2022).

4 METHODOLOGY

4.1 Desk Study

A desktop study was carried out to collate and review available information, datasets and documentation sources relevant for the completion of the Natura Impact Statement. The desktop study, completed in March 2022, relied on the following sources:

- Information on the network of European Sites, relevant boundaries, qualifying interests and conservation objectives, obtained from the National Parks and Wildlife Service (NPWS) at *www.npws.ie*.
- Information on the status of EU protected habitats and species in Ireland, obtained from the NPWS Article 17 reports.
- Text summaries of the relevant European Sites taken from the respective Standard Data Forms and Site Synopses for each site, available at *www.npws.ie*.
- Information on species records and distributions, obtained from the National Biodiversity Data Centre (NBDC) at *www.maps.biodiversityireland.ie*.
- Information on waterbodies, catchment areas and hydrological connections obtained from the Environmental Protection Agency (EPA) at www.*gis.epa.ie* .
- Information on bedrock, groundwater, aquifers and their statuses, obtained from Geological Survey Ireland (GSI) at *www.gsi.ie* .
- Satellite imagery and mapping obtained from various sources and dates including Google, Digital Globe, Bing and Ordnance Survey Ireland.
- Information on the extent, nature and location of the Proposed Development, provided by the applicant and their design team.

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

5 SUMMARY OF RELEVANT EUROPEAN SITES

The following is extracted from the Site Synopsis forms for each European Site outlined below.

5.1 Lower River Shannon SAC [002165]

*Both the Fergus and inner Shannon Estuaries feature vast expanses of intertidal mudflats, often fringed with saltmarsh vegetation. The smaller estuaries also feature mudflats, but have their own unique characteristics, e.g. Poulnasherry Bay is stony and unusually rich in species and biotopes. Plant species are typically scarce on the mudflats, although there are some eelgrass (*Zostera spp*.) beds and patches of green algae (e.g.* Ulva sp*. and* Enteromorpha sp*.). The main macro-invertebrate community which has been noted from the inner Shannon and Fergus estuaries is a* Macoma Scrobicularia-Nereis *community.*

*Saltmarsh vegetation frequently fringes the mudflats. Over twenty areas of estuarine saltmarsh have been identified within the site, the most important of which are around the Fergus estuary and at Ringmoylan Quay. The dominant type of saltmarsh present is Atlantic salt meadow occurring over mud. Characteristic species occurring include Common Saltmarsh-grass (*Puccinellia maritima*), Sea Aster (*Aster tripolium*), Thrift (*Armeria maritima*), Sea-milkwort (*Glaux maritima*), Sea Plantain (*Plantago maritima*), Red Fescue (*Festuca rubra*), Creeping Bent (*Agrostis stolonifera*), Saltmarsh Rush (*Juncus gerardi*), Long-bracted Sedge (*Carex extensa*), Lesser Sea-spurrey (*Spergularia marina*) and Sea Arrowgrass (*Triglochin maritima*). Areas of Mediterranean salt meadows, characterised by clumps of Sea Rush (*Juncus maritimus*) occur occasionally. Two scarce species are found on saltmarshes in the vicinity of the Fergus estuary: a type of robust saltmarsh-grass (*Puccinellia foucaudii*), sometimes placed within the species Common Saltmarsh-grass (*P. maritima*) and Hard-grass (*Parapholis strigosa*).*

*A number of plant species that are listed in the Irish Red Data Book occur within the site, and several of these are protected under the Flora (Protection) Order, 1999. These include Triangular Club-rush (*Scirpus triquetrus*), a species which is only found in Ireland only in the Shannon Estuary, where it borders creeks in the inner estuary. Opposite-leaved Pondweed (*Groenlandia densa*) is found in the Shannon where it passes through Limerick City, while Meadow Barley (*Hordeum secalinum*) is abundant in saltmarshes at Ringmoylan and Mantlehill. Hairy Violet (*Viola hirta*) occurs in the Askeaton/Foynes area. Golden Dock (*Rumex maritimus*) is noted as occurring in the River Fergus estuary. Finally, Bearded Stonewort (*Chara canescens*), a brackish water specialist, and Convergent Stonewort (*Chara connivens*) are both found in Shannon Airport Lagoon.*

Overall, the Shannon and Fergus Estuaries support the largest numbers of wintering waterfowl in Ireland. The highest count in 1995-96 was 51,423 while in 1994-95 it was 62,701. Species listed on Annex I of the E.U. Birds Directive which contributed to these totals include: Great Northern Diver (3; 1994/95), Whooper Swan (201; 1995/96), Pale-bellied Brent Goose (246; 1995/96), Golden Plover (11,067; 1994/95) and Bartailed Godwit (476; 1995/96). In the past, three separate flocks of Greenland Whitefronted Goose were regularly found, but none were seen in 1993/94. Other wintering waders and wildfowl present include Greylag Goose (216; 1995/96), Shelduck (1,060; 1995/96), Wigeon (5,976; 1995/96), Teal (2,319; 1995-96), Mallard (528; 1995/96), Pintail (45; 1995/96), Shoveler (84; 1995/96), Tufted Duck (272; 1995/96), Scaup (121; 1995/96), Ringed Plover (240; 1995/96), Grey Plover (750; 1995/96),

Lapwing (24,581; 1995/96), Knot (800; 1995/96), Dunlin (20,100; 1995/96), Snipe (719, 1995/96), Black-tailed Godwit (1,062; 1995/96), Curlew (1,504; 1995/96), Redshank (3,228; 1995/96), Greenshank (36; 1995/96) and Turnstone (107; 1995/96). A number of wintering gulls are also present, including Black-headed Gull (2,216; 1995/96), Common Gull (366; 1995/96) and Lesser Black-backed Gull (100; 1994/95). This is the most important coastal site in Ireland for a number of the waders including Lapwing, Dunlin, Snipe and Redshank. It also provides an important staging ground for species such as Black-tailed Godwit and Greenshank. A number of species listed on Annex I of the E.U. Birds Directive breed within the site. These include Peregine Falcon (2-3 pairs), Sandwich Tern (34 pairs on Rat Island, 1995), Common Tern (15 pairs: 2 on Sturamus Island and 13 on Rat Island, 1995), Chough (14-41 pairs, 1992) and Kingfisher. Other breeding birds of note include Kittiwake (690 pairs at Loop Head, 1987) and Guillemot (4,010 individuals at Loop Head, 1987).

*Five species of fish listed on Annex II of the E.U. Habitats Directive are found within the site. These are Sea Lamprey (*Petromyzon marinus*), Brook Lamprey (*Lampetra planeri*), River Lamprey (*Lampetra fluviatilis*), Twaite Shad (*Allosa fallax fallax*) and Salmon (*Salmo salar*). The three lampreys and Salmon have all been observed spawning in the lower Shannon or its tributaries. The Fergus is important in its lower reaches for spring salmon, while the Mulkear catchment excels as a grilse fishery, though spring fish are caught on the actual Mulkear River. The Feale is important for both types. Twaite Shad is not thought to spawn within the site. There are few other river systems in Ireland which contain all three species of lamprey.*

*Freshwater Pearl Mussel (*Margaritifera margaritifera*), a species listed on Annex II of the E.U. Habitats Directive, occurs abundantly in parts of the Cloon River.*

5.2 Newhall and Edenvale Complex SAC [002091]

Newhall and Edenvale Caves are natural fossil limestone caves. Newhall is a narrow, dry passage formed along an inclined joint. The main passage of Edenvale Cave runs into a cliff for 15 m and is crossed by a number of other passages. The side passages run in two directions at acute angles to each other, forming many intersections, hence the local name "The Catacombs". The two caves are used as winter hibernation sites by the bats, while a two-storey farm out-building is used as a breeding site. Two of the locations, Newhall Cave and the farm building, are in the grounds of Newhall House, and the second cave, Edenvale Cave, is in the grounds of Edenvale House, within 1 km of Newhall House. The bats have uninterrupted access to all sites. In 1983 grilles were fitted to both caves.

The surrounding areas of mature mixed woodland, parkland and lakes provide ideal foraging habitat and shelter for the bats throughout the year and are included within the site.

Bats have been recorded at this site since 1983 and the population is estimated at more than 500 individuals. The site is of international importance for Lesser Horseshoe Bat, and ranks as one of the most important sites in Europe for the species.

5.3 Pouladatig Cave SAC [000037]

*The site comprises a relatively short, active stream cave with some rock falls and small chambers. The cave entrance is small and is sheltered by Hawthorn (*Crataegus monogyna*) trees. After the entrance there is a low bedding crawl but the cave then opens out into roomier passageways. Cave habitats include flowing water, mud banks, boulders, rock roof and walls.*

The bats hang from the roof and along the walls of the main passageway. The surrounding scrub vegetation and hedgerows are included in the site as they provide suitable foraging habitat areas and shelter for the bats.

Lesser Horseshoe Bats have been using this cave for many years and approximately 100 bats have been recorded at this site each winter since 1986. The site is therefore of international importance.

Although there is an active stream in the cave, this does not pose any threat of flooding to the bats. This site is not subject to visitor disturbance and is considered to be a safe hibernating site for the Lesser Horseshoe Bat

5.4 Ballyallia Lake SAC [000014]

*Habitat and species diversity around the lake is low and only a few emergent plants are found, e.g. Common Club-rush (*Scirpus lacustris*) and Common Reed (*Phragmites australis*). Lough Girroga, about 1 km to the south of Ballyallia, is included in the site. It is a small lake with a high diversity of vegetation communities and plant species. Here there is a well-developed reed fringe with a fen-like community of Great Fensedge (*Cladium mariscus*), Common Club-rush, Purple Moor-grass (*Molinia caerulea*) and the less common Black Bog-rush (*Schoenus nigricans*). A well-established Hazel (*Corylus avellana*) woodland slopes down to the northern lakeshore.*

Ballyallia Lake is also a Special Protection Area (SPA) for birds and a Wildfowl Sanctuary. The lake and the floodplain to the west hold nationally important numbers of Shoveler (120), Wigeon (1,200), Coot (300), Mallard (600) and Gadwall (76). Significant numbers of Whooper Swan (80), an Annex I species under the Birds Directive, also use the site. Other regular wintering species include Teal (170), Lapwing (1100), Tufted Duck (188), Pintail (35) and Little Grebe (38) (all counts are maxima from 1994/95 - 1995/96).

Agricultural improvement to the lands surrounding the lakes poses a significant threat to the water quality of the system.

5.5 Dromore Woods and Loughs SAC [000032]

The site is very diverse and contains a mosaic of different habitats: limestone pavement, scrub, dry broadleaved woodland, mixed woodland, lakes, rivers, grasslands, cut-away bog, fen, freshwater marsh and reedbeds.

*The site contains extensive areas of limestone pavement, with a covering of soil which is thin or absent, interrupted by corridors and pockets of slightly deeper soil. The limestone pavement on the site is floristically species-rich and occurs in association with calcareous grassland, Hazel (*Corylus avellana*)/Ash (*Fraxinus excelsior*) scrub, lakes and fen.*

*The lakes on the site are naturally eutrophic, a habitat listed on Annex I E.U. Habitats Directive, and contain some fringing reed beds of Common Reed (*Phragmites australis*) and Common Club-rush (*Scirpus lacustris*) and large beds of Pondweed (*Potamogeton*), including* P. lucens *and* P. perfoliatus*.*

The site supports a wide range of plants and animals, including several rarities and important populations. The rare lichen, Usnea glabrescens*, known from counties Clare, Cork and Galway has been recorded from the site. Dromore Lough holds regionally/locally important*

numbers of waterfowl (numbers are the average of two counts made in one season, between 1984 and 1987): Little Grebe (20), Whooper Swan (73), a species listed on Annex I of the E.U. Birds Directive, Wigeon (130), Gadwall (4), Teal (80), Tufted Duck (169), Coot (152), Lapwing (350) and Curlew (50). The site also provides ideal habitat for birds of prey; Kestrel, Sparrowhawk and Hen Harrier, a species also listed on Annex I of the E.U. Birds Directive, have all been recorded.

Mammals found on the site include Pine Marten, Otter, Badger, Fox and Stoat. The site is of particular importance for its population of Pine Marten, an uncommon, Red Data Book species. Otter is a species that is listed on Annex II of the E.U. Habitats Directive. The site also includes a nursery roost for a population (more than 400 individuals) of Lesser Horseshoe Bat. This nursery colony is one of the biggest in the country and of international importance. Lesser Horseshoe Bat is a rare and threatened species that is listed on Annex II of the E.U. Habitats Directive. The roost is owned and managed by the Heritage Council.

The site is also of importance for its invertebrate fauna, which includes several rarities: Agonum lugens *(Order* Coleoptera*),* Anasimyia transfuga *(Order* Diptera*, Family* Syrphidae*),* Xylota tarda *(Order* Diptera*, Family* Syrphidae*),* Dyschirius luedersi *(Order* Coleoptera*),* Pherbellia argyra *(Order* Diptera*, Family* Syrphidae*) and* Geomyza majuscule *(Order* Diptera*).*

Dromore Woods and Loughs is of considerable conservation significance for the wide diversity of habitats found (including three listed on Annex I of the E.U. Habitats Directive) and for the important populations of rare and threatened mammals, birds and invertebrates that it supports. Part of the site has been designated as a Statutory Nature Reserve.

5.6 Ballycullinan Lake SAC [000016]

At Ballycullinan Lake, the area of open water is of particular interest for the presence of the alga Cladophora sauteri*. This forms spherical aggregations that sometimes become buoyant and float. Otherwise they are found on marl or rocks on the lake bed.*

*The large areas of reedbed around the lakes are composed of Common Reed (*Phragmites australis*) and Great Fen-sedge. Behind them, Bottle Sedge (*Carex rostrata*) is frequent, growing in marl deposits with stoneworts (*Chara spp.*) and the moss* Fontinalis antipyretica*. The adjacent marsh vegetation is characteristic of a limestone lake and contains Yellow Water-lily (*Nuphar lutea*), Water Plantain (*Alisma plantagoaquatica*), Lesser Spearwort (*Ranunculus flammula*), Water Mint (*Mentha aquatica*), Marsh Ragwort (*Senecio aquaticus*), Tufted Forget-me-not (*Myosotis laxa subsp. caespitosa*), Greater Tussock-sedge (*Carex paniculata*), Water Dock (*Rumex hydrolapathum*) and the moss* Calliergon giganteum*.*

*In-flowing ditches allow Reed Canary-grass (*Phalaris arundinacea*), Brooklime (*Veronica beccabunga*), Yellow Iris (*Iris pseudacorus*) and Bog Stitchwort (*Stellaria alsine*) to colonise in places. On sloping limestone pavement Hazel (*Corylus avellana*) scrub is the dominant vegetation, with Ash (*Fraxinus excelsior*), Holly (*Ilex aquifolium*) and occasional Yew (*Taxus baccata*). The uncommon plant Dog's Mercury (*Mercurialis perennis*) occurs in scrub woodland in the northern part of the site. A species-rich calcareous grassland occurs in mosaic with the limestone pavement.*

The site is of conservation value for its range of calcareous wetland habitats, particularly for the presence of Cladium fen. The occurrence of limestone pavement adds greatly to the importance of the site.

5.7 East Burren Complex SAC [001926]

*The limestone pavement at this site includes smooth blocky and shattered types. The bare pavement is interspersed with species-rich calcareous vegetation communities. Typical grassland species found on or near the pavement include Blue Moor-grass (*Sesleria albicans*), Mountain Everlasting (*Antennaria dioica*), Bloody Crane's-bill (*Geranium sanguineum*) and Wild Thyme (*Thymus praecox*). Where soil cover is more extensive purer grassland communities are found, and these are often orchid-rich. Species such as Pyramidal Orchid (*Anacamptis pyramidalis*), Frog Orchid (*Coeloglossum viride*), Fragrant Orchid (*Gymnadenia conopsea*), Bee Orchid (*Ophyrs apifera*), Fly Orchid (*Ophyrs insectifera*), Butterfly Orchid (*Platathera chlorantha*) and Dense-flowered Orchid (*Neotinea maculata*) have all been recorded. Limestone heath is well developed in parts of the uplands where Heather (*Calluna vulgaris*) and Bell Heather (*Erica cinerea*) are common, along with St. John's-wort species (*Hypericum spp.*) and Tormentil (*Potentilla erecta*). Two rare plant species found in this habitat are the Hoary Rock-rose (*Helianthemum canum*) and Pyramidal Bugle (*Ajuga pyramidalis*); both species are listed in the Red Data Book. To the southeast around the western shores of Lough Bunny an interesting alpine heath community occurs. Here Bearberry (*Arctostaphylos uva-ursi*) is found at one of its few inland, lowland locations in the Burren. Juniper scrub is sometimes found associated with areas of heath at this site, with Juniper (*Juniperus communis*) and Crowberry (*Empetrum nigrum*) both found here.*

Some of the best and most extensive calcareous swamp fen communities in the country occur within this complex and further north-east around the shores of Lough Bunny. Between this lake and the Coole-Garryland turlough complex to the north-east of the site, another area of oligotrophic limestone wetlands occurs. This type of ecosystem is now very rare in Europe and many of the habitats found are listed on Annex I of the E.U. Habitats Directive.

*The site has an excellent array of turloughs, with at least eight known examples including those at Carran, Knockaunroe, Lough Mannagh, Castle Lough, Lough Aleenaun, Turloughmore, Tulla and Roo. These turloughs represent some of the best examples of this habitat type found in Ireland and display a wide diversity in trophic status, water fluctuations, water retention and vegetation types. The aquatic plant communities are well developed and the rare, Red Data Book species, Mudwort (*Limosella aquatica*), occurs here. This species is listed in the Flora (Protection) Order, 1999.*

Most of the lakes in the southern part of this site are considered examples of hard water lakes, a type listed in Annex II of the E.U. Habitats Directive. These are classic marl lakes, often surrounded by limestone pavement and scrub. They range from extreme oligotrophic types, such as Lough Bunny, to more mesotrophic or even eutrophic systems.

The occurrence of petrifying springs at this site is of note. Good examples of this rare habitat type are found at the cliffs at Slieve Carran. Well developed bryophyte and lichen communities are found in association with the springs.

*Another uncommon habitat type found at this site is lowland hay meadow. These grasslands typically have a low, open sward dominated by herbs and poor-yield grasses, and are mown rather than grazed. Some common species include Oxeye Daisy (*Leucanthemum vulgare*), Yellow-rattle (*Rhinanthus minor*), eyebrights (*Euphrasia spp.*) and Common Knapweed (*Centaurea nigra*). A well-developed metallophyte plant community, ascribable to the Annex I habitat type Calaminarian Grassland, is present over an area of about 180 m² at an old mine*

site in Shesodonnell (East), with indicator bryophytes Cephaloziella stellulifera *and* Weissia controversa var. densifolia*.*

*A narrow band of alluvial woodland occurs along the karstic stream at the north-east corner of Lough Gortlecka. This is considered to be a unique variant of this uncommon woodland type. The wood is dominated by Hazel, Ash, Wych Elm (*Ulmus glabra*) and Rusty Willow (*Salix cinerea subsp. oleifolia*), with Ramsons (*Allium ursinum*) and a variety of other herbs occupying the flooded areas of the woodland floor.*

Caves are a feature of this site, with four known natural limestone caves showing a variety of formations and passage types. Vigo Cave has one of the best undisturbed cave entrance facies in Ireland and is considered a valuable karst heritage landform. Glencurrane Cave shows some fine phreatic solution features and one passageway, known as "Crinoid Tower" shows an abundance of crinoids which have been etched out by splashing water. Gortlecka Cave and a series of small caves above Lough Inchiquin are other fine examples of this habitat.

In the east Burren wetlands Mute Swan and Whooper Swan occur in internationally important concentrations, while Wigeon, Lapwing, Dunlin, Black-tailed Godwit and Goldeneye are also very numerous. Also found in wetlands on the site (e.g. Lough Atedaun, Carran Turlough, Lough Aleenaun, Lough Inchiquin, Lough Bunny, Lough Cullaun, Muckanagh Lough) are Bewick's Swan, Teal, Mallard, Gadwall, Shoveler, Tufted Duck, Curlew, Golden Plover, Coot and Little Grebe. The site also supports a flock of Greenland White-fronted Goose. Several of these species are listed in the Red Data Book and on Annex I of the E.U. Birds Directive.

A nesting pair of Peregrine Falcon, a species listed on Annex I of the E.U. Birds Directive, occur on Glasgeivnagh Hill. The east Burren wetlands are frequented by Sparrowhawk, Kestrel and Hen Harrier, a rare species which is also listed on Annex I of the E.U. Birds Directive. Pine Marten and Otter have been recorded regularly within the site - both are listed in the Red Data Book as they are considered threatened in Europe, the latter also on Annex II of the E.U. Habitats Directive.

The site supports an internationally important population of Lesser Horseshoe Bat, with an estimated 400 individuals. There are two known nursery roosts, a transition roost and four known winter sites, the latter all in natural limestone caves. Pipistrelle and Brown Long-eared Bats also occur. All of these species are listed in the Red Data Book, the former also on Annex II of the E.U. Habitats Directive. The Lesser Horseshoe Bat is a small, delicate bat which is confined to six western counties, Mayo, Galway, Clare, Limerick, Kerry and Cork. It forages close to woodland and at the edges of water. The Irish population of this species is estimated to be about 12,000 individuals and may be the largest national population in Europe. The Pipistrelle Bat is the smallest bat to occur in Ireland and is the commonest and most widespread species. Pipistrelle Bats forage where small insects gather, in gardens, along hedgerows and trees, over ponds and along rivers. The Brown Long-eared Bat is the second most common bat in Ireland and is easily identified by its long ears which are nearly as long as its body. The Brown Long-eared Bat forages in and along woodland where they glean insects off foliage.

*The site includes a large population of Marsh Fritillary, a species of butterfly listed on Annex II of the E.U. Habitats Directive. The site also supports the only known populations of Slow Worm (*Anguis fragilis*) in Ireland - this lizard is believed to have been introduced in about 1970.*

*Arctic Char (*Salvelinus alpinus*), a Red Data Book fish species, has been recorded from Lough Inchiquin.*

The East Burren Complex is of international scientific interest owing to the presence of fine examples of typical Burren habitats, together with an oligotrophic wetland complex of lakes, turloughs, fen, cut-over bog and calcareous marsh. The Ballyeighter complex represents an excellent example of a nutrient-poor calcareous lake and fen system, of European significance. Some of the only remaining woodland habitats to be found in the Burren occur within the site. The site contains fourteen habitats that are listed on Annex I of the E.U. Habitats Directive (six of which have priority status) and three species of animal listed on Annex II of this Directive and, as such, is of major conservation significance. The occurrence of many rare plants and animals within the site adds considerably to its scientific and conservation value. The site is of high ornithological interest too, for the internationally and nationally important numbers of waterfowl that use it.

5.8 Poulnagordon Cave (Quin) SAC [000064]

The cave consists of a large entrance which leads into a wide chamber from which there are three passages. The cave is a fine example of a phreatic rift maze formed by solution along the joints by very slow moving water. There are large numbers of fossil corals which have been left outstanding while the limestone around them has been removed. Cave habitats include slow moving water, thick mud, boulders, pools of water, rock walls and roof. Bats have been found in all three passages although most of the bats seem to prefer to roost in the most sheltered passage to the left of the entrance.

*The entrance to the cave is sheltered with Hawthorn (*Crataegus monogyna*) trees and the surrounding vegetation is scrub and hedgerows which provides suitable foraging habitat and shelter for the bats.*

The number of Lesser Horseshoe Bats hibernating here varies from over 50 to less than 20. As over 50 have been recorded, the site is of international importance. This site is also important as it is at the eastern limit of the species' distribution in Ireland. The site is a fine example of a natural cave, a habitat listed on Annex I of the E.U. Habitats Directive.

5.9 Lough Gash Turlough SAC [000051]

This turlough is particularly late-draining, and as a result supports a very distinctive plant community: Rivers with muddy banks with Chenopodion rubri p.p*. and* Bidention p.p*. vegetation. The central zone is covered by an open vegetation of Red Goosefoot (*Chenopodium rubrum*), Small Water-pepper (*Polygonum minus*), Trifid Burmarigold (*Bidens tripartita*), Fine-leaved Water-dropwort (*Oenanthe aquatica*), Toad Rush (*Juncus bufonius*) and the rare Northern Yellow-cress (*Rorippa islandica*). The rare annual moss* Ephemerum cohaerens *occurs on open mud.*

*Parts of the shore have a more grassy vegetation, comprising Floating Sweet-grass (*Glyceria fluitans*), Creeping Bent (*Agrostis stolonifera*), Marsh Foxtail (*Alopecurus geniculatus*) and the rare Orange Foxtail (*Alopecurus aequalis*) (listed in the Flora (Protection) Order, 1999). This grades into a narrow fringe of Hairy Sedge (*Carex hirta*) and cinquefoil (*Potentilla spp.*) species.*

Gadwall, Pochard and Tufted Duck are regular in winter; Coot, Moorhen, Mallard, Snipe and a high number of Mute Swan (71 individuals, average peak from 3 counts, 1984/85 - 1986-87) are also found.

Lough Gash Turlough is one of the latest turloughs to dry out in any year and may fail to do so sometimes; as such it is highly rated for being at one of the extremes of turlough variation, i.e. wetness. It is also of considerable ecological interest for its eutrophic nutrient status. The annual flora found at the site is highly distinctive and well-developed: there are only fragments of such vegetation at other turloughs. The presence of an abundance of the rare Northern Yellow-cress and of the protected Orange Foxtail (in its only Clare site) is notable.

5.10 Moyree River System SAC [000057]

*Where the stream first emerges, a small, relatively eutrophic area of floodplain grassland is developed over alluvial soils. Further downstream the soils are fen peat and marl, and fen vegetation dominated by the Black Bog-rush (*Schoenus nigricans*) occurs within the floodplain of the river. The stream is bordered by floating scraw, and pool areas, and eroding and accumulating banks and meandering stretches occur. Tall Reeds (*Phragmites australis*) fringe the river; the open water supports Yellow Water-lily (*Nuphar lutea*), Bogbean (*Menyanthes trifoliata*) and Common Duckweed (*Lemna minor*).*

*Rathvergin Wood, at the southern end of the site, is a large area of Ash-Hazel woodland (c. 40 ha). The north-eastern part of this woodland consists of a mosaic of open limestone pavement, under-grazed calcareous grassland, scrub and woodland, with more mature woodland occurring to the south-west. The canopy of the mature woodland is 7-11 m high and dominated by Hazel, with emergent Ash (13 m high). Hawthorn (*Crataegus monogyna*) is frequent in the canopy, and there are abundant saplings of this species, along with Blackthorn (*Prunus spinosa*) and Spindle (*Euonymus europaeus*), in the understorey. Rusty willow (*Salix cinerea subsp. oleifolia*) is frequent along the river. The diverse field layer occurs, and notable species include Woodruff (*Galium odoratum*), Wood Melic (*Melica uniflora*), Toothwort (*Lathraea squamaria*), Goldilocks Buttercup (*Ranuncula auricomus*), Adder's-tongue (*Ophioglossum vulgatum*) and Broad-leaved Helleborine (*Epipactis helleborine*). At the southern end of the wood, just before the Moyree River goes underground, a margin of alluvial woodland occurs. In places it consists of a narrow fringe only a few metres wide, but at the southern end the river floods more extensively into the woodland. Additional species here include Buckthorn (*Rhamnus catharticus*) and Guelder-rose (*Viburnum opulus*). The herb layer includes extensive carpets of Wood Anemone (*Anemone nemorosa*) and Lesser Celandine (*Ranunculus ficaria*), with Marsh-marigold (*Caltha palustris*) and Water Horsetail (*Equisetum fluviatile*) in more open sites.*

This site is an internationally important summer roosting and hibernation site for Lesser Horseshoe Bat, a species listed in Annex II of the E.U. Habitats Directive. The bats hibernate in a series of natural limestone river caves in the site. The caves are short, low and wet passages that have developed on the water table below limestone ridges. Several other mammal species frequent the Moyree River valley, including Otter and Pine Marten. Both of these species are listed in the Red Data Book as threatened in Europe, and the Otter is listed on Annex II of the E.U. Habitats Directive. The secluded nature of the river valley is ideal for sheltering wildfowl, especially Teal and Mallard. The rare Hen Harrier is a regular visitor to the area.

This site is of international importance owing to the presence of a colony of Lesser Horseshoe Bats in a network of underground caves. The Irish population of 12,000 animals is thought to be the largest national population in Europe. After the Caher River in the north-west Burren, the Moyree River is the best example of a karstic river in the country. The floating scraw vegetation is unusual as this type of habitat is normally destroyed by dredging operations. The river exhibits an excellent example of nutrient gradients associated with silt deposition. Fine examples of typical Burren habitats including limestone pavement, a priority habitat on Annex I of the E.U. Habitats Directive, and its associated calcareous grasslands, are also of major conservation significance.

5.11 Ballyogan Lough SAC [000019]

*The dominant vegetation around the lake margin is Common Reed (*Phragmites australis*), with large stands of the Great Fen-sedge (*Cladium mariscus*) nearby. Black Bog-rush (*Schoenus nigricans*) is abundant some distance from the water, together with Bog-myrtle (*Myrica gale*), Purple Moor-grass (*Molinia caerulea*) and several plant species of note including Marsh Helleborine (*Epipactis palustris*), Dioecious Sedge (*Carex dioica*), Blunt-flowered Rush (*Juncus subnodulosus*) and Lesser Tussock-sedge (*Carex diandra*). Adjacent damp fields contain frequent Heather (*Calluna vulgaris*). Further away from the lake, on the west side of the bog road, this fen-type vegetation gives way to extensive, abandoned cutover bog. Although some transitional areas are marshy, drainage to parts of this area at the north-east end of the site has facilitated the spread of drier heath plants such as Gorse (*Ulex europaeus*).*

*The scrub and limestone pavement, which is situated in the southern part of the site, is dominated by Hazel (*Corylus avellana*) and Ash (*Fraxinus excelsior*). Other plants of note include Yew (*Taxus baccata*) and Spindle (*Euonymus europaeus*), both of which are relatively rare on site. Small-leaved Cotoneaster (*Cotoneaster microphyllus*) is frequent on the pavement where it has become fully naturalised. The site holds an exceptional invertebrate assemblage including many of the Burren-restricted species of insect and invertebrate.*

5.12 Ballyallia Lough SPA [004041]

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Wigeon, Gadwall, Teal, Mallard, Shoveler, Coot and Black-tailed Godwit. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The site supports a good diversity of wintering waterfowl, including swans, dabbling duck, diving duck and some waders. Seven of the species have populations of national importance (all figures given are mean peaks for the 4 winters 1995/96-1998/99): Wigeon (1,469), Gadwall (68), Mallard (502), Teal (863), Shoveler (288), Coot (331) and Black-tailed Godwit (278). The Shoveler population is the largest in the country (9.6% of the All-Ireland total), while that of Gadwall is also very notable (10.3% of the All-Ireland total). Other species which occur include Little Grebe (37), Whooper Swan (65), Pintail (18), Pochard (33), Tufted Duck (153), Lapwing (930), Mute Swan (28), Grey Heron (11), Cormorant (13), Greylag Goose (9) and Black-headed Gull (443).

The quality of the habitat for the birds is good and the site provides both feeding and roost sites for them. Some of the birds, especially Black-tailed Godwit, commute to the nearby River Fergus-River Shannon estuary.

Ballyallia Lough SPA is of considerable conservation significance for wintering waterfowl, having seven species with populations of national importance, those of Shoveler and Gadwall being of especial note. Also of note is the occurrence of Whooper Swan, a species that is listed on Annex I of the E.U. Birds Directive. Ballyallia Lough is a Ramsar Convention site and a Wildfowl Sanctuary.

5.13 River Shannon and River Fergus Estuaries SPA [004077]

The site has vast expanses of intertidal flats which contain a diverse macroinvertebrate community, e.g. Macoma-Scrobicularia-Nereis*, which provides a rich food resource for the wintering birds. Salt marsh vegetation frequently fringes the mudflats and this provides important high tide roost areas for the wintering birds. Elsewhere in the site the shoreline comprises stony or shingle beaches.*

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Cormorant, Whooper Swan, Lightbellied Brent Goose, Shelduck, Wigeon, Teal, Pintail, Shoveler, Scaup, Ringed Plover, Golden Plover, Grey Plover, Lapwing, Knot, Dunlin, Black-tailed Godwit, Bar-tailed Godwit, Curlew, Redshank, Greenshank and Black-headed Gull. It is also of special conservation interest for holding an assemblage of over 20,000 wintering waterbirds. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the site and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

The site is the most important coastal wetland site in the country and regularly supports in excess of 50,000 wintering waterfowl (57,133 - five year mean for the period 1995/96 to 1999/2000), a concentration easily of international importance. The site has internationally important populations of Light-bellied Brent Goose (494), Dunlin (15,131), Black-tailed Godwit (2,035) and Redshank (2,645). A further 17 species have populations of national importance, i.e. Cormorant (245), Whooper Swan (118), Shelduck (1,025), Wigeon (3,761), Teal (2,260), Pintail (62), Shoveler (107), Scaup (102), Ringed Plover (223), Golden Plover (5,664), Grey Plover (558), Lapwing (15,126), Knot (2,015), Bar-tailed Godwit (460), Curlew (2,396), Greenshank (61) and Black-headed Gull (2,681) - figures are five year mean peak counts for the period 1995/96 to 1999/2000. The site is among the most important in the country for several of these species, notably Dunlin (13 % of national total), Lapwing (6% of national total) and Redshank (9% of national total).

The site also supports a nationally important breeding population of Cormorant (93 pairs in 2010).

Other species that occur include Mute Swan (103), Mallard (441), Red-breasted Merganser (20), Great Crested Grebe (50), Grey Heron (38), Oystercatcher (551), Turnstone (124) and Common Gull (445) - figures are five year mean peak counts for the period 1995/96 to 1999/2000.

The River Shannon and River Fergus Estuaries SPA is an internationally important site that supports an assemblage of over 20,000 wintering waterbirds. It holds internationally important populations of four species, i.e. Light-bellied Brent Goose, Dunlin, Black-tailed Godwit and

Redshank. In addition, there are 17 species that have wintering populations of national importance. The site also supports a nationally important breeding population of Cormorant. Of particular note is that three of the species which occur regularly are listed on Annex I of the E.U. Birds Directive, i.e. Whooper Swan, Golden Plover and Bar-tailed Godwit. Parts of the River Shannon and River Fergus Estuaries SPA are Wildfowl Sanctuaries.

5.14 Corofin Wetlands SAC [004220]

The site is a Special Protection Area (SPA) under the E.U. Birds Directive, of special conservation interest for the following species: Little Grebe, Whooper Swan, Wigeon, Teal and Black-tailed Godwit. The E.U. Birds Directive pays particular attention to wetlands and, as these form part of this SPA, the wetlands and its associated waterbirds are of special conservation interest for Wetland & Waterbirds.

Corofin Wetlands SPA is of high ornithological importance for supporting nationally important numbers of Whooper Swan (127) and Black-tailed Godwit (329) - all figures are mean peaks for the five year period 1995/96 to 1999/2000. Nationally important populations of a further three waterbird species occur here, i.e. Little Grebe (87), Wigeon (2,828) and Teal (800).

Other species that occur include Mute Swan (223), Mallard (270), Gadwall (47), Shoveler (35), Tufted Duck (111), Coot (59), Golden Plover (56) and Curlew (222).

Corofin Wetlands SPA is of high ornithological importance and supports nationally important populations of five species: Little Grebe, Whooper Swan, Wigeon, Teal and Black-tailed Godwit. The regular presence of Whooper Swan and Golden Plover is of note as both species are listed on Annex I of the E.U. Birds Directive.

6 IMPACT PREDICTION

This section evaluates the potential impacts of the Proposed Development on the Qualifying Interests and Special Conservation Interests of Lower River Shannon SAC, Newhall and Edenvale Complex SAC, Pouladatig Cave SAC, Ballyallia Lake SAC, Dromore Woods And Loughs SAC, Ballycullinan Lake SAC, East Burren Complex SAC, Poulnagordon Cave (Quin) SAC, Lough Gash Turlough SAC, Moyree River System SAC, Ballyogan Lough SAC, Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, and Corofin Wetlands SPA. Potential impacts are based on information regarding the Qualifying Interests and Conservation Objectives of the Sites and have been informed by a desk study. Impact prediction is based on the Source-Pathway-Receptor model. Where no pathway exists, there is no possibility for significant effects on any qualifying interest of the European Sites in question.

6.1 Sources

Sources for significant effects from the Proposed Development have been identified as follows:

- Construction Phase
  - Uncontrolled releases of silt, sediments and/or other pollutants to air due to earthworks.
  - Surface water run-off containing silt, sediments and/or other pollutants into nearby waterbodies.
  - Surface water run-off containing silt, sediments and/or other pollutants into the local groundwater.
  - Groundwater containing pollutants, such as hydrocarbons or a high concentration of suspended solids.
  - Habitat loss and fragmentation of potential Lesser Horseshoe Bat foraging habitat.
  - Disturbance to Lesser Horseshoe Bat due to increased human activity, including noise and lighting.

- Operational Phase
  - Surface water drainage from the Site of the Proposed Development.
  - Groundwater infiltration from the Site of the Proposed Development.
  - Disturbance to Lesser Horseshoe Bat due to increased human activity, including noise and lighting.

6.2 Pathway

Pathways between the Proposed Development and the qualifying interests of Lower River Shannon SAC, Newhall and Edenvale Complex SAC, Pouladatig Cave SAC, Ballyallia Lake SAC, Dromore Woods And Loughs SAC, Ballycullinan Lake SAC, East Burren Complex SAC, Poulnagordon Cave (Quin) SAC, Lough Gash Turlough SAC, Moyree River System SAC, Ballyogan Lough SAC, Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, and Corofin Wetlands SPA were identified. Each Qualifying Interest and potential pathways for significant effects between the qualifying interest and Proposed Development are highlighted in Table 1.

6.3 Receptor

The receptors are identified in Table 1 and are the Qualifying Interests and Special Conservation Interests associated with the European Sites assessed in this NIS.

6.4 Direct Effects

The Proposed Development is not within any European Site. Therefore, it can be concluded that there will be no direct impacts during the Construction or Operational Phases of the Proposed Development that will affect the Qualifying Interests of any European sites.

6.5 Indirect Effects

There is potential for indirect effects on Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA due to the hydrological pathway between the Site of the Proposed Development and these European Sites during the Construction and Operational Phases via surface water discharges to the Inch River.

There is potential for indirect effects on Lower River Shannon SAC, Newhall and Edenvale Complex SAC, Pouladatig Cave SAC, Ballyallia Lake SAC, Dromore Woods And Loughs SAC, Ballycullinan Lake SAC, East Burren Complex SAC, Poulnagordon Cave (Quin) SAC, Lough Gash Turlough SAC, Moyree River System SAC, Ballyogan Lough SAC, Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, and Corofin Wetlands SPA due to the hydrogeological pathway between the Site of the Proposed Development and these European Sites during the Construction and Operational Phases via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer.

There is potential for indirect effects on Newhall and Edenvale Complex SAC and Pouladatig Cave SAC as the Site is located within the 2.5km foraging range of the Lesser Horseshoe Bat populations associated with these European Sites due to the loss and fragmentation of potential foraging and commuting habitat, along with disturbance due to increased human activity, including noise and lighting.

No other pathways between the Site and the European Sites exist.

TABLE 1. THE POTENTIAL PATHWAYS FOR SIGNIFICANT EFFECTS OF THE PROPOSED DEVELOPMENT ON THE QUALIFYING INTERESTS OF THE EUROPEAN SITES IDENTIFIED ABOVE.

Qualifying Interests	QI Habitat Location and Extent/Species Distribution	Potential Pathway for Significant Effects
Lower River Shannon SAC (002165)		
[1110] Sandbanks which are slightly covered by sea water all the time	Closest recorded habitat located almost 57km southwest (as the crow flies) of the Site and covers 1,353ha.	There is *no potential for significant effects* on this habitat due to the Proposed Development. There is a significant distance between the Site and recorded locations of this habitat within the Lower River Shannon SAC. In addition, the intervening distance between the Site and this habitat is sufficient to exclude the possibility of significant effects on the habitat 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.
[1130] Estuaries	Closest recorded habitat located 4km southeast (as the crow flies) of the Site and covers 24,273ha.	**Yes** – there is a hydrological connection between the Site and these habitats via the Inch River and Fergus River. It is proposed to discharge surface water from the northmost catchment of the Site to the Inch River. There is also a hydrogeological connection between the Site and these habitats via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer. **No other pathways exist** - The intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on these habitats arising from: emissions of noise, dust, airborne 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.
[1140] Mudflats and sandflats not covered by seawater at low tide	Closest recorded habitat located 4km southeast (as the crow flies) of the Site and covers 8,808ha.	
[1150] Coastal lagoons	Closest recorded habitat is Shannon Airport Lagoon, located 17.5km southeast (as the crow flies) of the Site and covers 24.2ha[2].	There is *no potential for significant effects* on this habitat due to the Proposed Development. There is a significant distance between the Site and recorded locations of this habitat within the Lower River Shannon SAC and there is no hydrological connection. In addition, the intervening distance between the Site and this habitat is sufficient to exclude the possibility of significant effects on the habitat 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.

Qualifying Interests	QI Habitat Location and Extent/Species Distribution	Potential Pathway for Significant Effects
[1160] Large shallow inlets and bays	Closest recorded habitat within this SAC is located 40km southwest (as the crow flies) of the Site and covers 35,282ha.	There is *no potential for significant effects* on this habitat due to the Proposed Development. There is a significant distance between the Site and recorded locations of this habitat within the Lower River Shannon SAC. In addition, the intervening distance between the Site and this habitat is sufficient to exclude the possibility of significant effects on the habitat 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.
[1170] Reefs	Closest recorded habitat located 4km southeast (as the crow flies) of the Site and covers 21,421ha.	**Yes** – there is a hydrological connection between the Site and these habitats via the Inch River and Fergus River. It is proposed to discharge surface water from the northmost catchment of the Site to the Inch River. There is also a hydrogeological connection between the Site and these habitats via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer. **No other pathways exist** - The intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on these habitats arising from: emissions of noise, dust, airborne 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.
[1220] Perennial vegetation of stony banks	Closest recorded habitat located 49km southwest (as the crow flies) of the Site although the full extent and distribution of this habitat is currently unknown.	There is *no potential for significant effects* on this habitat due to the Proposed Development. There is a significant distance between the Site and recorded locations of this terrestrial habitat within the Lower River Shannon SAC. In addition, the intervening distance between the Site and this habitat is sufficient to exclude the possibility of significant effects on the habitat 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.

Qualifying Interests	QI Habitat Location and Extent/Species Distribution	Potential Pathway for Significant Effects
[1230] Vegetated sea cliffs of the Atlantic and Baltic coasts	Closest recorded habitat is located 35km southwest (as the crow flies) of the Site and covers 67.3km.	There is *no potential for significant effects* on this habitat due to the Proposed Development. There is a significant distance between the Site and recorded locations of this habitat within the Lower River Shannon SAC. In addition, the intervening distance between the Site and this habitat is sufficient to exclude the possibility of significant effects on the habitat 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.
[1310] Salicornia and other annuals colonising mud and sand	Closest recorded habitat is located 21.6km southwest (as the crow flies) of the Site and covers 0.22ha.	
[1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	Closest recorded habitat located 5km southeast (as the crow flies) of the Site and covers 495.43ha.	**Yes** – there is a hydrological connection between the Site and these habitats via the Inch River and Fergus River. It is proposed to discharge surface water from the northmost catchment of the Site to the Inch River. There is also a hydrogeological connection between the Site and these habitats via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer. **No other pathways exist** - The intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on these habitats arising from: emissions of noise, dust, airborne 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.
[1410] Mediterranean salt meadows (*Juncetalia maritimi*)	Closest recorded habitat located 5.9km southeast (as the crow flies) of the Site and covers 48.025ha.	
[3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation	The full distributions of this habitat and its sub-types in this SAC are currently unknown. The high conservation value areas for this habitat influenced by the tide are found within the River Fergus.	

Qualifying Interests	QI Habitat Location and Extent/Species Distribution	Potential Pathway for Significant Effects
[6410] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)	Closest recorded habitat located 34km southwest (as the crow flies) of the Site, the full extent and distribution of this habitat is currently unknown.	There is *no potential for significant effects* on this habitat due to the Proposed Development. There is a significant distance between the Site and recorded locations of this terrestrial habitat within the Lower River Shannon SAC. In addition, the intervening distance between the Site and this habitat is sufficient to exclude the possibility of significant effects on the habitat 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.
[91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)	Closest habitat located 15.1km southeast (as the crow flies) of the Site and covers 8.5ha.	There is *no potential for significant effects* on this habitat due to the Proposed Development. There is a significant distance between the Site and recorded locations of this habitat within the Lower River Shannon SAC. In addition, the intervening distance between the Site and this habitat is sufficient to exclude the possibility of significant effects on the habitat 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.
[1029] *Margaritifera margaritifera* (Freshwater Pearl Mussel)	The Freshwater Pearl Mussel population within this SAC is confined within the main channel of the Cloon River, approximately 22.5km southwest of the Site.	There is *no potential for significant effects* on this species due to the Proposed Development. There is no hydrological connection between the Site and the Freshwater Pearl Mussel population in Cloon River. In addition, the intervening distance between the Site and this population is sufficient to exclude the possibility of significant effects on the habitat 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.
[1095] *Petromyzon marinus* (Sea Lamprey)	*Lamprey sp*. have been recorded within the Fergus River.	**Yes** – there is a hydrological connection between the Site and these species via the Inch River and Fergus River. It is proposed to discharge surface water from the northmost catchment of the Site to the Inch River. There is also a hydrogeological connection between the Site and these species via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer.
[1096] *Lampetra planeri* (Brook Lamprey)		
[1099] *Lampetra fluviatilis* (River Lamprey)		

Qualifying Interests	QI Habitat Location and Extent/Species Distribution	Potential Pathway for Significant Effects
[1106] *Salmo salar* (Salmon)	Salmon has been recorded within the Fergus River.	The water quality of the Fergus River is characterized as 'Moderate', and in the absence of pollution control/water attenuation measures, surface water run-off/discharges from the Proposed Development may have the potential to impact the status of the Fergus River, which may, in turn, impact these species. Thus, it cannot be excluded that the Proposed Development will have a likely significant effect on these species.
[1349] *Tursiops truncatus* (Common Bottlenose Dolphin)	Bottlenose Dolphin has been recorded within the Shannon Estuary.	There is *no potential for significant effects* on this species due to the Proposed Development. The potential for surface water generated at the Site of the Proposed Development and impacting water quality of the Shannon Estuary is negligible due to the distance and consequent potential for dilution within this estuary. In addition, the intervening distance between the Site and this species' habitat is sufficient to exclude the possibility of significant effects on the habitat 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.
[1355] *Lutra lutra* (Otter)	The NBDC have records of sightings of Otter within the River Fergus in the urban area of Ennis.	**Yes** – there is a hydrological connection between the Site and this species via the Inch River and Fergus River. It is proposed to discharge surface water from the northmost catchment of the Site to the Inch River. There is also a hydrogeological connection between the Site and this species via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer. The water quality of the Fergus River is characterized as 'Moderate', and in the absence of pollution control/water attenuation measures, surface water run-off/discharges from the Proposed Development may have the potential to impact the status of the Fergus River, which may, in turn, impact this species. Thus, it cannot be excluded that the Proposed Development will have a likely significant effect on this species.
Newhall and Edenvale Complex SAC (002091)		
[8310] Caves not open to the public	Closest recorded habitat is the Edenvale Cave, located 2km south, and the main passage of this cave runs 15m into a cliff and is crossed by a number of other passages	**Yes** – there is a potential hydrogeological connection between the Site and this habitat via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer. **No other pathways exist** - The intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on these habitats arising from: emissions of noise, dust, airborne 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.

Qualifying Interests	QI Habitat Location and Extent/Species Distribution	Potential Pathway for Significant Effects
[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	Population has been estimated at over 500 individuals within this SAC and these bats have a 2.5km foraging range.	**Yes** – There may be loss and fragmentation of potential foraging and commuting habitat, along with disturbance to this due to increased human activity, including noise and lighting, during the Construction and Operational Phase of the Proposed Development.
Pouladatig Cave SAC (000037)		
[8310] Caves not open to the public	Closest recorded habitat is located 2km south, and a is comprised of a relatively short, active stream cave with some rock falls and small chambers	**Yes** – there is a potential hydrogeological connection between the Site and this habitat via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer. **No other pathways exist** - The intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on these habitats arising from: emissions of noise, dust, airborne 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.
[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	Population of approximately 100 individuals recorded each winter for almost 40 years and these bats have a 2.5km foraging range.	**Yes** – There may be loss and fragmentation of potential foraging and commuting habitat, along with disturbance to this due to increased human activity, including noise and lighting, during the Construction and Operational Phase of the Proposed Development.
Ballyallia Lake SAC (000014)		
[3150] Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	Closest recorded habitat is located 2.8km northeast of the Site within Lough Girroga	**Yes** – there is a potential hydrogeological connection between the Site and this habitat via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer. **No other pathways exist** - The intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on these habitats arising from: emissions of noise, dust, airborne 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.
Dromore Woods And Loughs SAC (000032)		
[3150] Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	Closest recorded habitat is located 6.7km northeast of the Site	**Yes** – there is a potential hydrogeological connection between the Site and these habitats via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer.

Qualifying Interests	QI Habitat Location and Extent/Species Distribution	Potential Pathway for Significant Effects
[6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	Closest recorded habitat is located 9.2km northeast of the Site and the communities that comprise this habitat have an estimated area of 8.51ha.	**No other pathways exist** - The intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on these habitats arising from: emissions of noise, dust, airborne 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.
[8240] Limestone pavements	The closest habitat to the Site located within this SAC is 7.7km northeast and is estimated to cover approximately 90.3ha.	
[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	The nursery colony of over 400 individuals within this SAC is one of the biggest in the country and is of international importance	There is *no potential for significant effects* on the Lesser Horseshoe Bat population within this SAC due to the Proposed Development. The Site of the Proposed Development is located outside the 2.5km foraging range of this bat population. In addition, the intervening distance between the Site and this species' habitat is sufficient to exclude the possibility of significant effects on the habitat 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.
[1355] *Lutra lutra* (Otter)	The NBDC have records of sightings of Otter within this SAC	**Yes** – there is a potential hydrogeological connection between the Site and this species via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer.
Ballycullinan Lake SAC (000016)		
[7210] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*	The closest habitat to the Site located within this SAC is 8.5km northwest, however this habitat has not been mapped in detail within this SAC and therefore the total area is currently unknown	**Yes** – there is a potential hydrogeological connection between the Site and this habitat via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer. **No other pathways exist** - The intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on these habitats arising from: emissions of noise, dust, airborne 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.
East Burren Complex SAC (001926)		
[3140] Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp	The closest habitat to the Site located within this SAC is 10.7km north and has not been fully mapped for this SAC	**Yes** – there is a potential hydrogeological connection between the Site and these habitats via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer.

Qualifying Interests	QI Habitat Location and Extent/Species Distribution	Potential Pathway for Significant Effects
[3180] Turloughs	The closest habitat to the Site located within this SAC is 15.7km north and a complex of turloughs exist within this SAC	**No other pathways exist** - The intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on these habitats arising from: emissions of noise, dust, airborne 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.
[3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation	The full distribution of this habitat in this SAC is currently unknown.	
[4060] Alpine and Boreal heaths	The closest habitat to the Site located within this SAC is 25.6km northeast. These habitats cannot be easily mapped or considered separately.	There is *no potential for significant effects* on these habitats due to the Proposed Development. There is a significant distance between the Site and recorded locations of these terrestrial habitats within the East Burren Complex SAC. In addition, the intervening distance between the Site and this habitat is sufficient to exclude the possibility of significant effects on the habitat 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.
[5130] *Juniperus communis* formations on heaths or calcareous grasslands	The closest habitat to the Site located within this SAC is 13.3km north and is currently estimated to be 527.4ha.	
[6130] Calaminarian grasslands of the *Violetalia calaminariae*	The closest habitat to the Site located within this SAC is 20.2km northwest at a former lead and ainc mine, and is currently estimated to be 0.009ha.	
[6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)	The closest habitat to the Site located within this SAC is 16.9km northwest and the full area and distribution of this habitat is currently unknown.	
[6510] Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)	The closest habitat to the Site located within this SAC is 21.8km north and the full area and distribution of this habitat is currently unknown.	
[7210] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*	The full area and distribution of this habitat in this SAC is currently unknown.	**Yes** – there is a potential hydrogeological connection between the Site and these habitats via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer.
[7220] Petrifying springs with tufa formation (Cratoneurion)	The closest habitat to the Site located within this SAC is 17km	

Qualifying Interests	QI Habitat Location and Extent/Species Distribution	Potential Pathway for Significant Effects
	north and the full area and is currently estimated to be 680m^2.	**No other pathways exist** - The intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on these habitats arising from: emissions of noise, dust, airborne 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.
[7230] Alkaline fens	The full area and distribution of this habitat in this SAC is currently unknown.	
[8240] Limestone pavements	The closest habitat to the Site located within this SAC is 9.6km north and is estimated, along with mosaics of associated habitats, to cover 11,390.5ha	
[8310] Caves not open to the public	The closest habitat to the Site located within this SAC is 14.4km northwest, which is Gortlecka Cave, along with a series of small caves above Lough Inchiquin	
[91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)	The closest recorded habitat to the Site located within this SAC is 17.8km north, however the total area and distribution of this habitat is currently unknown	
[1065] *Euphydryas aurinia* (Marsh Fritillary)	Confirmed records of this species exist across 22 1km grid squares within this SAC, the closest of which is 13.5km north of the Site	There is *no potential for significant effects* on this species due to the Proposed Development. The intervening distance between the Site and this species' habitat is sufficient to exclude the possibility of significant effects on the habitat 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.
[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	Estimated population of over 400 individuals within this SAC, with two known nursery roosts and four winter roosts	There is *no potential for significant effects* on the Lesser Horseshoe Bat population within this SAC due to the Proposed Development. The Site of the Proposed Development is located outside the 2.5km foraging range of this bat population. In addition, the intervening distance between the Site and this species' habitat is sufficient to exclude the possibility of significant effects on the habitat 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.
[1355] *Lutra lutra* (Otter)	The NBDC have records of sightings of Otter within this SAC	**Yes** – there is a hydrogeological connection between the Site and this species via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer.

Qualifying Interests	QI Habitat Location and Extent/Species Distribution	Potential Pathway for Significant Effects
Poulnagordon Cave (Quin) SAC (000064)		
[8310] Caves not open to the public	Closest recorded habitat is located 10.2km southeast, and consists of a wide chamber and three passages	**Yes** – there is a potential hydrogeological connection between the Site and this habitat via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer. **No other pathways exist** - The intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on these habitats arising from: emissions of noise, dust, airborne 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.
[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	Hibernating population varies between over 50 to less than 20 each year.	There is *no potential for significant effects* on the Lesser Horseshoe Bat population within this SAC due to the Proposed Development. The Site of the Proposed Development is located outside the 2.5km foraging range of this bat population. In addition, the intervening distance between the Site and this species' habitat is sufficient to exclude the possibility of significant effects on the habitat 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.
Lough Gash Turlough SAC (000051)		
[3180] Turloughs	The closest habitat to the Site located within this SAC is 10.7km southeast and covers approximately 21.9ha	**Yes** – there is a potential hydrogeological connection between the Site and these habitats via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer. **No other pathways exist** - The intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on these habitats arising from: emissions of noise, dust, airborne 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.
[3270] Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation	The closest habitat to the Site located within this SAC is 10.8km southeast, with wet annuals covering approximately 5.8ha	
Moyree River System SAC (000057)		
[3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and	The full area and distribution of this habitat within this SAC is currently unknown.	**Yes** – there is a potential hydrogeological connection between the Site and these habitats via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer.

Qualifying Interests	QI Habitat Location and Extent/Species Distribution	Potential Pathway for Significant Effects
Callitricho-Batrachion vegetation		**No other pathways exist** - The intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on these habitats arising from: emissions of noise, dust, airborne 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.
[7230] Alkaline fens	The full area and distribution of this habitat within this SAC is currently unknown.	
[8240] Limestone pavements	The closest habitat to the Site located within this SAC is 11.5km northeast and is estimated, along with mosaics of associated habitats, to cover 154.36ha	
[8310] Caves not open to the public	Closest recorded habitat is located 15.4km northeast and is comprised of short, low, wet passages under limestone ridges	
[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	Internationally important summer roosting and hibernation roosts for this species are found within this SAC	
[1355] *Lutra lutra* (Otter)	This species has been recorded frequenting this SAC (NPWS, 2018f)	
Ballyogan Lough SAC (000019)		
[7210] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*	The full area and distribution of this habitat within this SAC is currently unknown.	**Yes** – there is a potential hydrogeological connection between the Site and this habitat via groundwater flow as the SAC and the Site of the Proposed Development are located on the same karst bedrock aquifer. **No other pathways exist** - The intervening distance between the Site and the SAC is sufficient to exclude the possibility of significant effects on these habitats arising from: emissions of noise, dust, airborne 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.
Ballyallia Lough SPA (004041)		
[A050] Wigeon *Anas penelope* [A051] Gadwall *Anas strepera* [A052] Teal *Anas crecca*	Ballyallia Lough SPA is of considerable conservation significance for a good diversity of wintering waterfowl, having seven	**Yes** – These bird species may forage/roost/breed in the wetland habitat associated with the SPA. There is a hydrogeological connection between the Site and these habitats via groundwater flow as the SPA and the Site of the Proposed Development are located on the same karst bedrock aquifer.

Qualifying Interests	QI Habitat Location and Extent/Species Distribution	Potential Pathway for Significant Effects
[A053] Mallard *Anas platyrhynchos* [A056] Shoveler *Anas clypeata* [A125] Coot *Fulica atra* [A156] Black-tailed Godwit *Limosa limosa* [A999] Wetland and Waterbirds	species with populations of national importance	**No other pathways exist** - The Proposed Development Site does not provide suitable ex-situ habitat for any of the bird species listed for this SPA. The intervening distance between the Site and the SPA is sufficient to exclude the possibility of significant effects on the SPA arising from: emissions of noise, dust, airborne 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.
River Shannon and River Fergus Estuaries SPA (004077)		
[A017] Cormorant *Phalacrocorax carbo* [A038] Whooper Swan *Cygnus cygnus* [A046] Light-bellied Brent Goose *Branta bernicla hrota* [A048] Shelduck *Tadorna tadorna* [A050] Wigeon *Anas penelope* [A052] Teal *Anas crecca* [A054] Pintail *Anas acuta* [A056] Shoveler *Anas clypeata* [A062] Scaup *Aythya marila* [A137] Ringed Plover *Charadrius hiaticula* [A140] Golden Plover *Pluvialis apricaria* [A141] Grey Plover *Pluvialis squatarola* [A142] Lapwing *Vanellus vanellus* [A143] Knot *Calidris canutus* [A149] Dunlin *Calidris alpina* [A156] Black-tailed Godwit *Limosa limosa* [A157] Bar-tailed Godwit *Limosa lapponica*	The River Shannon and River Fergus Estuaries SPA is an internationally important site that supports an assemblage of over 20,000 wintering waterbirds	**Yes** – These bird species may forage/roost/breed in the wetland habitat associated with the SPA. There is a hydrological connection between the Site and the wetland habitat via the Inch River and the Fergus River. It is proposed to discharge surface water from the northmost catchment of the Site to the Inch River, which has the potential to impact the SPA via water quality deterioration during the Construction Phase and Operational Phase of the Proposed Development. There is also a hydrogeological connection between the Site and these habitats via groundwater flow as the SPA and the Site of the Proposed Development are located on the same karst bedrock aquifer. **No other pathways exist** - The Proposed Development Site does not provide suitable ex-situ habitat for any of the bird species listed for this SPA. The intervening distance between the Site and the SPA is sufficient to exclude the possibility of significant effects on the SPA arising from: emissions of noise, dust, airborne 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.

Qualifying Interests	QI Habitat Location and Extent/Species Distribution	Potential Pathway for Significant Effects
[A160] Curlew *Numenius arquata* [A162] Redshank *Tringa totanus* [A164] Greenshank *Tringa nebularia* [A179] Black-headed Gull *Chroicocephalus ridibundus* [A999] Wetland and Waterbirds		
Corofin Wetlands SPA (004220)		
[A004] Little Grebe *Tachybaptus ruficollis* [A038] Whooper Swan *Cygnus cygnus* [A050] Wigeon *Anas penelope* [A052] Teal *Anas crecca* [A156] Black-tailed Godwit *Limosa limosa* [A999] Wetland and Waterbirds	Corofin Wetlands SPA is of high ornithological importance and supports nationally important populations of the five named species	**Yes** – These bird species may forage/roost/breed in the wetland habitat associated with the SPA. There is a hydrogeological connection between the Site and these habitats via groundwater flow as the SPA and the Site of the Proposed Development are located on the same karst bedrock aquifer. **No other pathways exist** - The Proposed Development Site does not provide suitable ex-situ habitat for any of the bird species listed for this SPA. The intervening distance between the Site and the SPA is sufficient to exclude the possibility of significant effects on the SPA arising from: emissions of noise, dust, airborne 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.

7 CONSERVATION OBJECTIVES

7.1 Identified key habitats and species potentially at risk from the Proposed Development in European Sites

Section 6 identified the qualifying interests and special conservation interests from the relevant European Sites that could be affected by the Proposed Development.

As per the Habitats Directive, the focus of the AA at this second stage should be on the integrity of European Sites *in light of their conservation objectives*. Site specific conservation objectives (SSCO) have been compiled for the relevant European Sites. Site-specific conservation objectives define the condition to be achieved by species and habitat types within the respective sites in order to maximise the contribution of the sites to achieving favourable conservation status at the appropriate level (e.g., national, biogeographical or European) (EC, 2012).

The "favourable conservation status" of a habitat or species is defined by Articles 1(e) and 1(i) of the Habitats Directive as follows:

"*The conservation status of a natural habitat is the sum of the influences acting on it and its typical species that may affect its long-term natural distribution, structure and functions as well as the long-term survival of its typical species. The conservation status of a natural habitat will be taken as favourable when:*

- *its natural range, and area it covers within that range, are stable or increasing, and*
- *the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and*
- *the conservation status of its typical species is favourable.*

The conservation status of a species is the sum of the influences acting on the species that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' when:

- *population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and*
- *the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and*
- *there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.*"

7.2 Potential impacts of the Proposed Development on key habitats and species

Table 2 outlines the relevant QIs and the associated conservation objectives for the European Sites assessed. The Target and Attributes for the habitats, as described in the corresponding Conservation Objectives supporting documents, were reviewed and considered in this assessment. The assessment outlined below does not consider mitigation measures that will be implemented as part of the project.

TABLE 2. CONSERVATION OBJECTIVES OF RELEVANT QI HABITATS AND SPECIES WITHIN THE EUROPEAN SITES UNDER ASSESSMENT.

Qualifying Interests	Conservation Objectives
Lower River Shannon SAC (002165)	
[1110] Sandbanks which are slightly covered by sea water all the time	To **maintain** the favourable conservation condition of Sandbanks which are slightly covered by sea water all the time in the Lower River Shannon SAC
[1130] Estuaries	To **maintain** the favourable conservation condition of Estuaries in the Lower River Shannon SAC.
[1140] Mudflats and sandflats not covered by seawater at low tide	To **maintain** the favourable conservation condition of Mudflats and sandflats not covered by seawater at low tide in the Lower River Shannon SAC.
[1150] Coastal lagoons	To **restore** the favourable conservation condition of Coastal lagoons in the Lower River Shannon SAC.
[1160] Large shallow inlets and bays	To **maintain** the favourable conservation condition of Large shallow inlets and bays in the Lower River Shannon SAC.
[1170] Reefs	To **maintain** the favourable conservation condition of Reefs in the Lower River Shannon SAC.
[1220] Perennial vegetation of stony banks	To **maintain** the favourable conservation condition of Perennial vegetation of stony banks in the Lower River Shannon SAC.
[1230] Vegetated sea cliffs of the Atlantic and Baltic coasts	To **maintain** the favourable conservation condition of Vegetated sea cliffs in the Lower River Shannon SAC.
[1310] Salicornia and other annuals colonising mud and sand	To **maintain** the favourable conservation condition of Salicornia and other annuals colonizing mud and sand in the Lower River Shannon SAC.
[1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	To **restore** the favourable conservation condition of Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) in the Lower River Shannon SAC
[1410] Mediterranean salt meadows (*Juncetalia maritimi*)	To **restore** the favourable conservation condition of Mediterranean salt meadows (*Juncetalia maritimi*) in the Lower River Shannon SAC
[3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation	To **maintain** the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation in the Lower River Shannon SAC
[6410] Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)	To **maintain** the favourable conservation condition of Molinia meadows on calcareous, peaty or clayey-silt laden soils (*Molinion caeruleae*) in the Lower River Shannon SAC.
[91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)	To **restore** the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) in the Lower River Shannon SAC
[1029] *Margaritifera margaritifera* (Freshwater Pearl Mussel)	To **restore** the favourable conservation condition of Freshwater Pearl Mussel in the Lower River Shannon SAC
[1095] *Petromyzon marinus* (Sea Lamprey)	To **restore** the favourable conservation condition of Sea Lamprey in the Lower River Shannon SAC
[1096] *Lampetra planeri* (Brook Lamprey)	To **maintain** the favourable conservation condition of Brook Lamprey in the Lower River Shannon SAC
[1099] *Lampetra fluviatilis* (River Lamprey)	To **maintain** the favourable conservation condition of River Lamprey in the Lower River Shannon SAC
[1106] *Salmo salar* (Salmon)	To **restore** the favourable conservation condition of Salmon in the Lower River Shannon SAC
[1349] *Tursiops truncatus* (Common Bottlenose Dolphin)	To **maintain** the favourable conservation condition of Common Bottlenose Dolphin in the Lower River Shannon SAC
[1355] *Lutra lutra* (Otter)	To **restore** the favourable conservation condition of Salmon in the Lower River Shannon SAC

Qualifying Interests	Conservation Objectives
Newhall and Edenvale Complex SAC (002091)	
[8310] Caves not open to the public	Caves not open to the public (8310) is integrally linked to lesser horseshoe bat (*Rhinolophus hipposideros*) (1303) as part of the habitat for the species; therefore, a separate conservation objective has not been set for the habitat in Newhall and Edenvale Complex SAC.
[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	To **maintain** the favourable conservation condition of Lesser Horseshoe Bat in Newhall and Edenvale Complex SAC
Pouladatig Cave SAC (000037)	
[8310] Caves not open to the public	Caves not open to the public (8310) is integrally linked to lesser horseshoe bat (*Rhinolophus hipposideros*) (1303) as part of the habitat for the species; therefore, a separate conservation objective has not been set for the habitat in Pouladatig Cave SAC.
[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	To **maintain** the favourable conservation condition of Lesser Horseshoe Bat in Pouladatig Cave SAC
Ballyallia Lake SAC (000014)	
[3150] Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	To **maintain** the favourable conservation condition of Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation in Ballyallia Lake SAC
Dromore Woods And Loughs SAC (000032)	
[3150] Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	To **maintain** the favourable conservation condition of Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation in Dromore Woods And Loughs SAC
[6430] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	To **restore** the favourable conservation condition of Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels in Dromore Woods And Loughs SAC
[8240] Limestone pavements	To **maintain** the favourable conservation condition of Limestone pavements in Dromore Woods And Loughs SAC
[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	To **maintain** the favourable conservation condition of Lesser Horseshoe Bat in Dromore Woods And Loughs SAC
[1355] *Lutra lutra* (Otter)	To **maintain** the favourable conservation condition of Otter in Dromore Woods And Loughs SAC
Ballycullinan Lake SAC (000016)	
[7210] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*	To **maintain** the favourable conservation condition of Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* in Ballycullinan Lake SAC.
East Burren Complex SAC (001926)	
[3140] Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp	To **restore** the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp in East Burren Complex SAC
[3180] Turloughs	To **restore** the favourable conservation condition of Turloughs in East Burren Complex SAC
[3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation	To **maintain** the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation in East Burren Complex SAC
[4060] Alpine and Boreal heaths	To **maintain** the favourable conservation condition of Alpine and Boreal heaths in East Burren Complex SAC
[5130] *Juniperus communis* formations on heaths or calcareous grasslands	To **maintain** the favourable conservation condition of *Juniperus communis* formations on heaths or calcareous grasslands in East Burren Complex SAC
[6130] Calaminarian grasslands of the *Violetalia calaminariae*	To **restore** the favourable conservation condition of Calaminarian grasslands of the *Violetalia calaminariae* in East Burren Complex SAC

Qualifying Interests	Conservation Objectives
[6210] Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)	To **restore** the favourable conservation condition of Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) in East Burren Complex SAC
[6510] Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)	To **restore** the favourable conservation condition of Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*) in East Burren Complex SAC
[7210] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*	To **maintain** the favourable conservation condition of Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* in East Burren Complex SAC
[7220] Petrifying springs with tufa formation (Cratoneurion)	To **maintain** the favourable conservation condition of Alkaline fens in East Burren Complex SAC
[7230] Alkaline fens	To **maintain** the favourable conservation condition of Petrifying springs with tufa formation (Cratoneurion)* in East Burren Complex SAC
[8240] Limestone pavements	To **restore** the favourable conservation condition of Limestone pavements in East Burren Complex SAC
[8310] Caves not open to the public	Caves not open to the public (8310) is integrally linked to lesser horseshoe bat (*Rhinolophus hipposideros*) (1303) as part of the habitat for the species; therefore, a separate conservation objective has not been set for the habitat in East Burren Complex SAC
[91E0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)	To **maintain** the favourable conservation condition of Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) in East Burren Complex SAC
[1065] *Euphydryas aurinia* (Marsh Fritillary)	To **maintain** the favourable conservation condition of Marsh Fritillary in East Burren Complex SAC
[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	To **maintain** the favourable conservation condition of Lesser Horseshoe Bat in East Burren Complex SAC
[1355] *Lutra lutra* (Otter)	To **maintain** the favourable conservation condition of Otter in East Burren Complex SAC
Poulnagordon Cave (Quin) SAC (000064)	
[8310] Caves not open to the public	Caves not open to the public (8310) is integrally linked to lesser horseshoe bat (*Rhinolophus hipposideros*) (1303) as part of the habitat for the species; therefore, a separate conservation objective has not been set for the habitat in Poulnagordon Cave (Quin) SAC
[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	To **maintain** the favourable conservation condition of Lesser Horseshoe Bat in Poulnagordon Cave (Quin) SAC
Lough Gash Turlough SAC (000051)	
[3180] Turloughs	To **maintain** the favourable conservation condition of Turloughs in Lough Gash Turlough SAC
[3270] Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation	To **maintain** the favourable conservation condition of Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation in Lough Gash Turlough SAC
Moyree River System SAC (000057)	
[3260] Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation	To **maintain** the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation in Moyree River System SAC.
[7230] Alkaline fens	To **maintain** the favourable conservation condition of Alkaline fens in Moyree River System SAC.
[8240] Limestone pavements	To **maintain** the favourable conservation condition of Limestone pavements in Moyree River System SAC.
[8310] Caves not open to the public	Caves not open to the public (8310) is integrally linked to lesser horseshoe bat (*Rhinolophus hipposideros*) (1303) as part of the

Qualifying Interests	Conservation Objectives
	habitat for the species; therefore, a separate conservation objective has not been set for the habitat in Moyree River System SAC
[1303] *Rhinolophus hipposideros* (Lesser Horseshoe Bat)	To **maintain** the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation in Moyree River System SAC.
[1355] *Lutra lutra* (Otter)	To **maintain** the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation in Moyree River System SAC.
Ballyogan Lough SAC (000019)	
[7210] Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*	To **maintain** the favourable conservation condition of Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae* in Ballyogan Lough SAC
Ballyallia Lough SPA (004041)	
[A050] Wigeon *Anas penelope* [A051] Gadwall *Anas strepera* [A052] Teal *Anas crecca* [A053] Mallard *Anas platyrhynchos* [A056] Shoveler *Anas clypeata* [A125] Coot *Fulica atra* [A156] Black-tailed Godwit *Limosa limosa*	To **maintain** or **restore** the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.
[A999] Wetland and Waterbirds	To **maintain** or **restore** the favourable conservation condition of the wetland habitat at Ballyallia Lough SPA as a resource for the regularly-occurring migratory waterbirds that utilise it
River Shannon and River Fergus Estuaries SPA (004077)	
[A017] Cormorant *Phalacrocorax carbo* [A038] Whooper Swan *Cygnus cygnus* [A046] Light-bellied Brent Goose *Branta bernicla hrota* [A048] Shelduck *Tadorna tadorna* [A050] Wigeon *Anas penelope* [A052] Teal *Anas crecca* [A054] Pintail *Anas acuta* [A056] Shoveler *Anas clypeata* [A062] Scaup *Aythya marila* [A137] Ringed Plover *Charadrius hiaticula* [A140] Golden Plover *Pluvialis apricaria* [A141] Grey Plover *Pluvialis squatarola* [A142] Lapwing *Vanellus vanellus* [A143] Knot *Calidris canutus* [A149] Dunlin *Calidris alpina* [A156] Black-tailed Godwit *Limosa limosa* [A157] Bar-tailed Godwit *Limosa lapponica* [A160] Curlew *Numenius arquata* [A162] Redshank *Tringa totanus* [A164] Greenshank *Tringa nebularia* [A179] Black-headed Gull *Chroicocephalus ridibundus*	To **maintain** the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA.
[A999] Wetland and Waterbirds	To **maintain** the favourable conservation condition of the wetland habitat in the River Shannon and River Fergus Estuaries SPA as a resource for the regularly-occurring migratory waterbirds that utilise it
Corofin Wetlands SPA (004220)	
[A004] Little Grebe *Tachybaptus ruficollis* [A038] Whooper Swan *Cygnus cygnus* [A050] Wigeon *Anas penelope*	To **maintain** or **restore** the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA

Qualifying Interests	Conservation Objectives
[A052] Teal *Anas crecca* [A156] Black-tailed Godwit *Limosa limosa*	
[A999] Wetland and Waterbirds	To **maintain** or **restore** the favourable conservation condition of the wetland habitat at Corofin Wetlands SPA as a resource for the regularly-occurring migratory waterbirds that utilise it.

During both the Construction and Operational Phases of the Proposed Development, there is potential for impacts on water quality within the River Inch and River Fergus due to surface water discharges containing pollutants from the Proposed Development to these water courses. Therefore, all QIs associated with Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA potentially influenced and/or indirectly affected by surface water are considered in this assessment. There is potential for sediments/pollutants from the Site to enter these European Sites via surface water and result in water quality deterioration. This may undermine the Conservation Objectives for these species. Mitigation is required to address these potential impacts

During the Construction Phase of the Proposed Development, there is a risk of groundwater pollution from accidental spillages at the Proposed Development Site, as well as from fine sediment/silt being transported and recharging to ground. Groundwater flow through karst areas is extremely complex and difficult to predict. In addition, groundwater flow in highly permeable karstified limestones is of a regional scale, and flow path lengths can be up to a several kilometres (GSI, 2004). As such, all QIs associated with Lower River Shannon SAC, Newhall and Edenvale Complex SAC, Pouladatig Cave SAC, Ballyallia Lake SAC, Dromore Woods And Loughs SAC, Ballycullinan Lake SAC, East Burren Complex SAC, Poulnagordon Cave (Quin) SAC, Lough Gash Turlough SAC, Moyree River System SAC, Ballyogan Lough SAC, Ballyallia Lough SPA, River Shannon and River Fergus Estuaries SPA, and Corofin Wetlands SPA potentially influenced and/or indirectly affected by groundwater are considered in this assessment. Spillages and runoff have a high risk to groundwater where karst pathways are present, as pollutants can travel significant distances relatively quickly. Mitigation is required to address these potential impacts.

The Site of the Proposed Development is located within the 2.5km foraging range of the Lesser Horseshoe Bat population associated with Newhall and Edenvale Complex SAC and Pouladatig Cave SAC. There is potential for an indirect impact on this species during the Construction and Operational Phases of the Proposed Development via habitat loss and fragmentation, and disturbance due to human activity, including noise and lighting.

8 MITIGATION MEASURES

8.1 Construction Phase

The following mitigation measures will be in place for the duration of the Proposed Development.

8.1.1 Bats

Tree-felling

Four of the trees to be felled to facilitate the Proposed Development have been identified as Potential Bat Roosts (PBR). The following measures have been extracted from the Bat Assessment report (Bat Eco Services, 2022) accompanying this application:

- "*A Phase Two PBR survey is recommended for the four trees identified as a PBR and proposed to be felled. This should be undertaken at least one month prior to tree felling in order to propose a tree felling plan in conjunction with tree contractors.*
- *Alternative roosting sites (i.e. summer bat boxes) will be erected prior to the removal of trees. These are recommended to be erected 6 months prior to tree felling to allow local bat populations to become aware of them prior to removal of the trees.*
- *Trees proposed to be removed, should be felled on mild days during the autumn months of September, October or November or Spring months of February and March (felling during the spring or autumn months avoids the periods when the bats are most active).*
- *An assessment of trees according to their PBR value determines the methodology of felling. Trees with PBR Category 1 are highly suitable for roosting bats and require more intensive procedures prior to felling. The trees identified within the survey area are PBR Category 2. The procedure to fell these is as follows:*
    - *Any Ivy covered trees which require felling will be left to lie to 24 hours after cutting to allow any bats beneath the cover to escape.*
    - *Any PBR with deadwood should be surveyed prior to felling and felling should entail slow dismantling of the tree (i.e. large dead limbs to be removed prior to felling of main tree)."*

8.1.2 Surface Water

Fuel and Chemical Storage

Appropriate storage facilities will be provided on Site. Areas of high risk include:

- Fuel and chemical storage.
- Refuelling Areas.
- Site Compound; and
- Waste storage areas.

Vehicle wheel wash facilities will be installed in the vicinity of any site entrances and road sweeping implemented as necessary in order to maintain the road network in the immediate vicinity of the site.

In order to mitigate against spillages contaminating underlying soils, all oils, fuels, paints and other chemicals will be stored in a secure bunded hardstand area.

Refuelling and servicing of construction machinery will take place in a designated hardstand area which is also remote from any surface water inlets (when not possible to carry out such activities off site).

All tank, container and drum storage areas shall be rendered impervious to the materials stored therein. Bunds shall be designed having regard to Environmental Protection Agency guidelines 'Storage and Transfer of Materials for Scheduled Activities' (2904). All tank and drum storage areas shall, as a minimum, be bunded to a volume not less than the greater of the following:

- 110% of the capacity of the largest tank or drum within the bunded area; or
- 25% of the total volume of substance that could be stored within the bunded area.

Concrete mixer trucks will not be permitted to wash out on Site with the exception of cleaning the chute into a container which will be removed off Site to an authorised facility.

Water will not be discharged to drainage ditches or open water courses.

General Protection Measures

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. The CEMP and the 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 standard operational measures will protect surface waters during the Construction Phase of the Proposed Development:

- Run-off from the working site or any areas of exposed soil will be channelled and intercepted at regular intervals for discharge to silt-traps or lagoons with over-flows directed to land rather than to a watercourse.
- Pumping of concrete will be monitored to ensure that there is no accidental discharge.
- There will be no mixer washings or excess concrete discharged on Site. All excess concrete is to be removed from Site and all washout of concrete chutes to be captured in a tank which shall be removed offsite for disposal at an authorised wastewater treatment facility.
- Silt fences will be appropriately located near watercourses to help prevent untreated surface water run-off entering any watercourse. A buffer zone will wherever possible remain between the silt fence and the watercourse with natural vegetation left intact.
- Any oil and lubricant changes and maintenance will take place offsite.
- All open water bodies adjacent to areas of proposed works will be protected by fencing including settlement ponds.
- A regular review of weather forecasts of heavy rainfall will be conducted, and a contingency plan will be prepared for before and after such events to minimise any potential nuisances. As the risk of the break-out of silt laden run-off is higher during these weather conditions, no work will be carried out during such periods where possible.
- The developer will ensure that erosion control measures i.e., the silt-traps are regularly checked and maintained during the Construction Phase.
- Any imported materials will, as much as possible, be placed on Site in their proposed location and double handling will be avoided. Where this is not possible designated temporary material storage areas will be used.
- Temporary storage areas will be located at least 10m away from any surface water features/drainage ditches etc.; and will be surrounded with silt fencing to filter out any suspended solids from surface water arising from these materials
- All containment and treatment facilities will be regularly inspected and maintained.
- If cast-in-place concrete is required, all work must be carried out in the dry and effectively isolated from any water courses or drainage ditches.
- If required, refuelling of plant during the Construction Phase will only be carried out at a designated refuelling location. Each location will be fully equipped for spill response. Prior to the commencement of works site personnel will be trained in Environmental and Emergency Spill Response procedures.
- 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.
- Site personnel working 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 management contractor.
- 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 works commencing on Site. These documents will detail how potentially contaminated material will be dealt with during the excavation phase.
- Temporary diversions may be used to facilitate working in the dry, the diversion channel will be formed in the dry, and arrangements will be made for authorised personnel to remove all fish from the natural channel before the flow is diverted if fish are present.
- Instream machine works will be minimised, and any machines working in the watercourse must be protected against leakage or spillage of fuels, oils, greases and hydraulic fuels.
- Instream earthworks must be executed so as to minimise the suspension of solids.
- When cofferdams are being kept dry by pumping, the discharge must be routed to an approved settlement facility before return to the river.
- Every care must be taken to insure against spillage of concrete or leakage of cement grout within cofferdams.

All wastewater generated on-site during the Construction Phase will be stored and disposed of appropriately by discharge to foul sewer or by tankering off site. Under no circumstances will any untreated wastewater generated onsite (from equipment washing, road sweeping etc.) be released into nearby ditches or watercourses.

8.1.3 Groundwater

Measures set out in Section 8.1.2 Surface Water- Fuel and Chemical Storage will serve to protect soil and groundwater.

If encountered, potentially contaminated soil will be stockpiled on site in stockpiles constructed/located/sheeted in a manner to reduce the likelihood of contaminated run-off and that ensures water is contained within the site boundary. All soil stockpiles will be situated at least 10m away from any drainage ditches or watercourses and will have silt-fencing installed as required to minimise run off containing sediment.

8.2 Operational Phase

8.2.1 Surface Water

Sustainable Drainage System (SuDS) measures are proposed within the project design. The SuDS measures will control surface water run-off from the Proposed Development and remove pollutants from surface water discharged from the Site during the Operational Phase.

The following SuDS element have been included within the Proposed Development:

- Oil/petrol interceptors
- Retention Ponds
- Silt traps

The proposed SuDS measures will therefore attenuate the flow of and improve the quality of surface water discharges to the Inch River, and therefore to European Sites located downstream of the Site of the Proposed Development.

8.2.2 Bats

The following measures have been extracted from the Bat Assessment report (Bat Eco Services, 2022) accompanying this application:

"*Luminaire design is extremely important to achieve an appropriate lighting regime. Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following should be considered when choosing luminaires. This is taken from the most recent BCT Lighting Guidelines (BCT, 2018). Consultation was undertaken with the lighting specialists to reduce the potential impact on local bat populations.*

- *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 (i.e. 2200 Kelvins) will be used to reduce the blue light component of the LED spectrum).*
- *Luminaires will feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.*
- *Column heights should be carefully considered to minimise light spill. The shortest column height allowed should be used where possible.*
- *Only luminaires with an upward light ratio of 0% and with good optical control will be used.*
- *Luminaires will be mounted on the horizontal, i.e. no upward tilt.*
- *Any external security lighting will be set on motion-sensors and short (1min) timers.*
- *As a last resort, accessories such as baffles, hoods or louvres will be used to reduce light spill and direct it only to where it is needed.*

Any external lighting for the Proposed Development should strictly follow the above guidelines and these should be strictly implemented during Construction and Operation phase of the Proposed Development.

Additional measures were also recommended:

- *Removal of specific luminaires to prevent light spillage on the boundary with the golf course*."

"Due to the presence of Lesser Horseshoe Bats within the survey area and the fact that the Proposed Development is within 2.5km radius of two SACs, it is important that additional measures are undertaken to conservation local Lesser Horseshoe Bat populations. These measures will entail the following:

- *Compensatory planting for the removal of linear habitats.*
- *Compensatory planting for the removal of scrub habitats.*
- *Specific measures to reduce lighting impacts.*
- *Lesser Horseshoe Bat conservation zone – zone of land along a linear strip to the north of the Proposed Development site and connected to the boundary of the Inch River.*

This area has been selected because it is outside the Lighting Plan zone and it is adjacent to the Inch River which is deemed as the likely commuting route for Lesser Horseshoe Bats to the Proposed Development area. This river also allows direction commuting to lands with the Ennis Golf Course where Lesser Horseshoe Bat activity was also recorded.

- *This area is approximately 20m wide and 170m long and it is proposed that the following measures are undertaken: Erection of Day* Roost."

A Day Roost consists of a "*small structure building of concrete block (externally plastered) with a natural slate roof and bitumous felt. It is designed according to VWT Day Roost recommendations and full details of the plans are provided in the appendices*" of the Bat Assessment Report accompanying this application.

"*The provision of such features within the 2.5km radius of Lesser Horseshoe Bat SACs is considered by The Vincent Wildlife Trust (VWT) as an important component to the support network for maternity and hibernation roosts.*

- *Dark free zone connected to Inch River no lighting permitted withing this area.*
- *Landscaping in vicinity of Day Roost and Inch River.*
- *Approximately 200m of hedge planting (Hawthorn).*
- *Approximately 10 small trees (e.g. Rowan, Birch and Crab Apple)."*

9 CONCLUSION

This Natura Impact Statement details the findings of the Stage 2 Appropriate Assessment conducted to further examine the potential direct and indirect effects of the Proposed Development at Ballymacaula, Circular Road, Ennis, Co. Clare on the following European Sites:

- Lower River Shannon SAC (002165)
- Newhall and Edenvale Complex SAC (002091)
- Pouladatig Cave SAC (000037)
- Ballyallia Lake SAC (000014)
- Dromore Woods And Loughs SAC (000032)
- Ballycullinan Lake SAC (000016)
- East Burren Complex SAC (001926)
- Poulnagordon Cave (Quin) SAC (000064)
- Lough Gash Turlough SAC (000051)
- Moyree River System SAC (000057)
- Ballyogan Lough SAC (000019)
- Ballyallia Lough SPA (004041)
- River Shannon and River Fergus Estuaries SPA (004077)
- Corofin Wetlands SPA (004220)

The above sites were identified by a screening exercise that assessed likely significant effects of a range of effects that may arise from the Proposed Development. The Appropriate Assessment investigated potential direct and indirect impacts of the Proposed Works, during both the Construction and Operational phases on the integrity and qualifying interests of the above European Sites alone and in combination with other plans and projects, taking into account the site's structure, function and conservation objectives.

Where the likelihood of potentially significant effects was identified, a range of mitigation and avoidance measures have been suggested to offset them. As a result of this Appropriate Assessment, it has been concluded that, ensuring the avoidance and mitigation measures are implemented in full as proposed, the Proposed Development will not have a significant adverse effect on the above European Sites.

As a result of the complete, precise and definitive findings in of this NIS, it has been concluded, beyond reasonable scientific doubt, that the Proposed Development will have no adverse effects on the qualifying interests, special conservation interests and on the integrity and extent of Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA. Accordingly, the Proposed Development will not adversely affect the integrity of any relevant European Site.

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