Natura Impact Statement

Parkway Valley Residential Development

Prepared by: Moore Group – Environmental Services

26 May 2026

On behalf of Kirkland Investments

Project Proponent	Kirkland Investments
Project	Parkway Valley LRD
Title	Natura Impact Statement Parkway Valley LRD

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Moore Archaeological and Environmental Services Limited				

Abbreviations

AA	Appropriate Assessment
ACP	An Coimisiún Pleanála
EMP	Environmental Management Plan
EEC	European Economic Community
EPA	Environmental Protection Agency
EU	European Union
FWPM	Freshwater Pearl Mussel
GIS	Geographical Information System
LAP	Local Area Plan
NHA	Natural Heritage Area
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
OSI	Ordnance Survey Ireland
pNHA	proposed Natural Heritage Area
SAC	Special Area of Conservation
SPA	Special Protection Area
SuDS	Sustainable Drainage System
UÉ	Uisce Éireann
WFD	Water Framework Directive

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1. Introduction

1.1. General Introduction

This Natura Impact Statement (NIS) has been prepared by Moore Group – Environmental Services on behalf of Kirkland Investments. This NIS report contains information to assist the competent authority in carrying out an Appropriate Assessment (AA) for the purposes of Article 6(3) of the Habitats Directive in respect of the construction and operation of a large residential development (LRD) at Parkway Valley, located at Singland, Dublin Road (R445), Limerick, Co. Limerick (hereafter referred to as the Project).

This NIS informs the Appropriate Assessment process in the determination of the significance of potential impacts on the conservation objectives of European sites. It is necessary that the Project has regard to Article 6 of the Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (as amended) (referred to as the Habitats Directive).

The focus of the assessment is on objectively assessing by reference to the evidence as to whether the Project will adversely affect the integrity of the European sites in light of their conservation objectives.

1.2. Legislative Background

The Habitats Directive (Council Directive 92/43/EEC of 21 May 1992) on the conservation of natural habitats and of wild fauna and flora) is the main legislative instrument for the protection and conservation of biodiversity in the European Union (EU). Under Article 3 of the Habitats Directive, Member States are obliged to designate Special Areas of Conservation (SACs) which contain habitats or species considered important for protection and conservation in an EU context.

The Birds Directive (Council Directive 2009/147/EC) on the conservation of wild birds), transposed into Irish law by the European Communities (Birds and Habitats Directive) Regulations 2011, as amended, and the Wildlife Act 1976, as amended, is concerned with the long-term protection and management of all wild bird species and their habitats in the EU. Among other things, the Birds Directive requires that Special Protection Areas (SPAs) be established to protect migratory species and species which are rare, vulnerable, in danger of extinction, or otherwise require special attention.

SACs designated under the Habitats Directive and SPAs, designated under the Birds Directive, form a pan-European network of protected sites known as Natura 2000. The Habitats Directive sets out a unified system for the protection and management of SACs and SPAs. These sites are also referred to in Irish legislation as ‘European sites’.

Articles 6(3) and 6(4) of the Habitats Directive set out the requirement for an assessment of proposed plans and projects likely to have a significant effect on Natura 2000 sites.

Article 6(3) establishes the requirement to screen all plans and projects and to carry out an appropriate assessment if required (Appropriate Assessment (AA)).

> ***Article 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 subjected to an appropriate assessment of its implications for the site in view of the site's conservation objectives. In 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."*

Article 6(4) establishes requirements in cases of imperative reasons of overriding public interest.

These obligations in relation to Appropriate Assessment have been implemented in Ireland under Part XAB of the Planning and Development Act 2000, as amended, and in particular Section 177T thereof.

Part 1, section 2(1) of the European Communities (Birds and Habitats Directive) Regulations 2011 states as follows with regard to a Natura Impact Statement:

> *"Natura impact statement means a report comprising the scientific examination of a plan or project and the relevant European Site or European Sites, to identify and characterise any possible implications of the plan or project individually or in combination with other plans or projects in view of the conservation objectives of the site or sites, and any further information including, but not limited to, any plans, maps or drawings, scientific information or data required to enable the carrying out of an Appropriate Assessment."*

The EU Water Framework Directive[1] (WFD) is an important piece of environmental legislation which aims to improve our water quality. It applies to rivers, lakes, groundwater, estuaries and coastal waters. The Water Framework Directive was agreed by all individual EU member states in 2000, and its first cycle ran from 2009 – 2015. The Directive runs in 6-year cycles, so the second cycle runs from 2016 – 2021 and the third cycle runs form 2022-2027. It focuses on protection of surface water and groundwater and the consideration of the WFD has been addressed in the Hydrological & Hydrogeological Risk Assessment and WFD Assessment, prepared by AWN Consulting, submitted with

[1] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

the LRD Application. The key conclusions set out in those reports are incorporated into this NIS where the assessment of potential effects on the River Groody and River Shannon were considered along with the effect on surface waters and groundwaters which are potentially linked to the European sites considered in this AA process.

1.3. Methodology

The Commission's methodological guidance (EC, 2002, 2018, 2021 see Section 1.4 below) promotes a four-stage process to complete the AA and outlines the 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.

Stages 1 and 2 deal with the main requirements for assessment under Article 6(3). Stage 3 may be part of Article 6(3) or may be a necessary precursor to Stage 4. Stage 4 is the main derogation step of Article 6(4).

Stage 1 Screening: This stage examines the likely effects of a project either alone or in combination with other projects upon a Natura 2000 site and considers whether it can be objectively concluded that these effects will not be significant. In order to screen out a project, it must be excluded, on the basis of objective information, that the Project, individually or in combination with other plans or projects, will have a significant effect on a European site.

Stage 2 Appropriate Assessment: This stage considers whether the plan or project, alone or in combination with other projects or plans, will have adverse effects on the integrity of a Natura 2000 site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects. The proponent of the plan or project will be required to submit a Natura Impact Statement, i.e. the report of a targeted professional scientific examination of the plan or project and the relevant Natura 2000 sites, to identify and characterise any possible implications for the site in view of the site's conservation objectives, taking account of in combination effects.

Stage 3 Assessment of Alternative Solutions: This stage examines alternative ways of implementing the project that, where possible, avoid any adverse impacts on the integrity of the Natura 2000 site.

Stage 4 Assessment where no alternative solutions exist and where adverse impacts remain: Where imperative reasons of overriding public interest (IROPI) exist, an assessment to consider whether compensatory measures will or will not effectively offset the damage to the sites will be necessary.

1.4. Guidance

The NIS has been compiled in accordance with guidance contained in the following documents:

- Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities. (Department of Environment, Heritage and Local Government, 2010 rev.) (soon to be superseded by EC Guidance in prep.).
- Appropriate Assessment under Article 6 of the Habitats Directive: Guidance for Planning Authorities. Circular NPWS 1/10 & PSSP 2/10.
- Managing Natura 2000 Sites: The Provisions of Article 6 of the Habitat's Directive 92/43/EEC (EC, 2018).
- Guidance document on the strict protection of animal species of Community interest under the Habitats Directive (EC, 2021).
- 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 (EC, 2021).
- Office of the Planning Regulator (OPR) Practice Note PN01 Appropriate Assessment Screening for Development Management (OPR, 2021).

1.5. Data Sources

Sources of information that were used to collect data on the Natura 2000 network of sites, and the environment within which they are located, are listed below:

- The following mapping and Geographical Information Systems (GIS) data sources, as required:
  - National Parks & Wildlife (NPWS) protected site boundary data;
  - Ordnance Survey of Ireland (OSI) mapping and aerial photography;
  - OSI/Environmental Protection Agency (EPA) rivers and streams, and catchments;
  - Digital Elevation Model over Europe (EU-DEM);
  - Google Earth and Bing aerial photography 1995-2026;
- Online data available on Natura 2000 sites as held by the National Parks and Wildlife Service (NPWS) from www.npws.ie including:
  - Natura 2000 - Standard Data Form;
  - Conservation Objectives;
  - Site Synopses;
- National Biodiversity Data Centre records;
  - Online database of rare, threatened and protected species;
  - Publicly accessible biodiversity datasets.
- Status of EU Protected Habitats in Ireland. (National Parks & Wildlife Service, 2019); and
- Relevant Development Plans;
  - Limerick Development Plan 2022-2028
- Relevant Reports;

- Éire Ecology Bird and Bat Report - appendix to the Project EIAR.

1.6. Statement of Authority

This report has been prepared by Moore Group - Environmental Services to enable the competent authority to carry out AA screening in relation to the Project. The report was compiled by Ger O'Donohoe B.Sc. Applied Aquatic Sciences (ATU Galway, 1993) & M.Sc. Environmental Sciences (TCD, 1999) who has over 30 years' experience in environmental impact assessment and has completed numerous Appropriate Assessment Screening Reports and Natura Impact Statements on terrestrial and aquatic habitats for various development types.

It includes specialist data and determinations by;

- Punch Consulting Engineers providing data on civil engineering, project management, civil structural engineering, and environmental engineering, in particular the Construction Environmental Method Statement (CEMP).
- AWN Consulting on Hydrology and Hydrogeological Impact Assessment and Water Framework Directive Assessment.
- Éire Ecology Environmental Consultants on Birds and Bats.

1.7. Description of the Project

The Proposed Development consists of the construction and operation of a large residential development comprising 403 no. residential units over 5 no. apartment blocks, a crèche and medical centre and all associated and ancillary development.

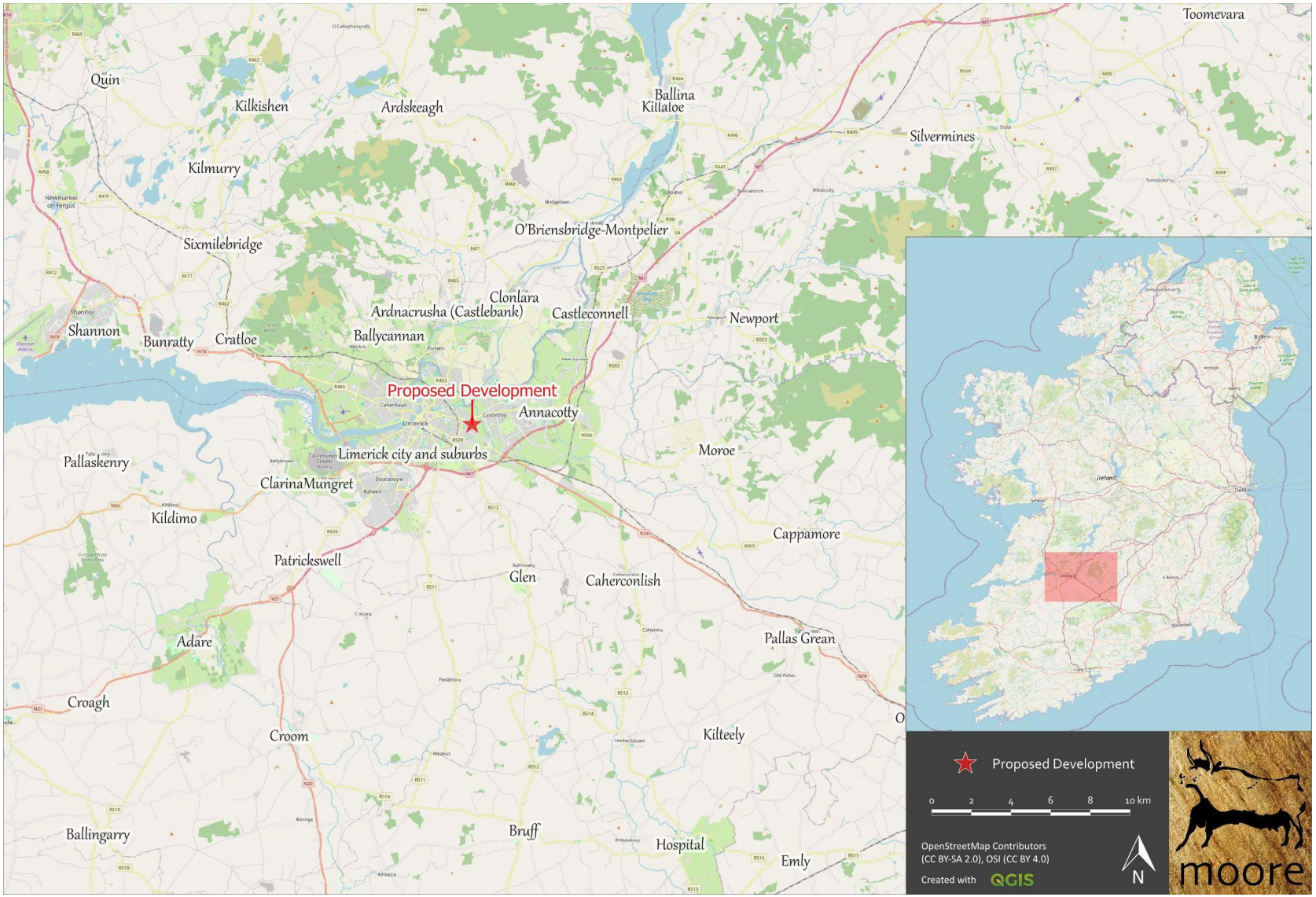

Figure 1. Showing the Project location in eastern Limerick City.

Figure 2. Showing Proposed Development boundary on recent aerial photography.

Figure 3. Layout of Proposed Development.

1.8. Description of the Receiving Environment

1.8.1. Habitats

The site comprises the footprint of a now demolished structure, with some remaining concrete surfaces (BL3) within a large area of Scrub (WS1), bare and recolonising ground (ED2/ED3), with smaller areas of Dry grassland (GS2) and Reed swamp (FS1). Habitats are presented on Figure 4. The following is a description of the flora and fauna of the existing environment in the study area.

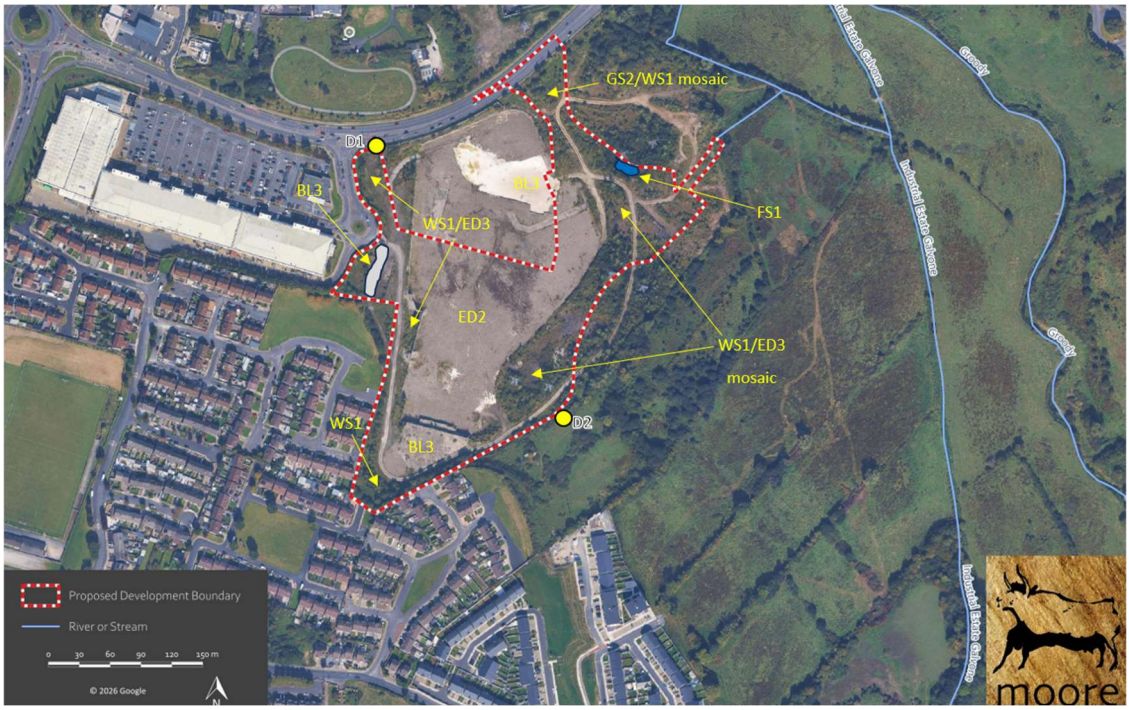

Figure 4 Proposed Development Site Habitat Types

Dry meadows and grassy verges (GS2)

This habitat occurs principally in the northeastern section of the site, adjacent to the Dublin Road (R445), as well as small, scattered patches along tracks. It generally occurs intermixed with scattered Scrub (WS1). Species present includes Cock's Foot (*Dactylis glomerata*), Red Fescue (*Festuca rubra*), Oxeye Daisy (*Leucanthemum vulgare*), Ribwort Plantain (*Plantago lanceolata*) and Bird's foot Trefoil (*Lotus corniculatus*).

Scrub (WS1)

Scrub occurs around the margins of the entire site, both as large stands and scattered patches among other transitional habitats. Where it is longest established, for example along the southwestern boundary, it comprises stands of fast-growing trees and shrubs, including Downy Birch (*Betula pubescens*), Grey Willow (*Salix cinerea*), Goat Willow (*Salix caprea*), Gorse (*Ulex europaeus*), Rowan (*Sorbus aucuparia*), Swedish Whitebeam (*Sorbus intermedia*), and *Buddleia*.

Spoil and bare ground (ED2)

This habitat occurs throughout the site, often in an intimate mosaic with WS1 and ED3 habitats. The substrate is largely crushed stone, with smaller areas of barish earth and spoil heaps. A broad range of species occur on this habitat across the site, including Red Valerian (*Centranthus ruber*), Fox and Cubs (*Pilosella aurantiaca*), Bilbao's Fleabane (*Erigeron floribundus*), Grey Willow saplings and Charlock (*Sinapis arvensis*).

Recolonising bare ground (ED3)

This category refers to habitats with greater vegetation cover than the previous category; however, both habitats are intermixed throughout the site. A large suite of ruderal species occupy this habitat, with Common Centaury (*Centaurium erythraea*), Yellowwort (*Blackstonia perfoliata*), Broad-leaved Willowherb (*Epilobium montanum*), Self Heal (*Prunella vulgaris*), Scarlet Pimpernel (*Lysimachia arvensis*), Cat's Ear (*Hypochaeris radicata*), Hawksbeards (*Crepis* sp.), Creeping Bent (*Agrostis stolonifera*) and Yorkshire Fog (*Holcus lanatus*).

Reed and large sedge swamps (FS1)

This category refers to a small hollow adjacent to a pylon in the northeastern section of the site. Bulrush (*Typha latifolia*) is the dominant species.

Buildings and artificial surfaces (BL3)

This category refers to hard surfaces on site. This includes the paved section of access road on the western side of the site, the concrete retaining walls, and the raised concrete surface at the southwestern section of the site.

1.8.2. Fauna

Badgers

The NBDC database was consulted for details on badger records held for the Proposed Development area. The database was consulted on the 22nd September 2025 for details on historical records from the site. There is a single record for a roadkill badger on the Dublin Road (R445) immediately north of the proposed development site (McLoughlin, 2012). There were no signs of badgers or setts within the proposed development area. The area is heavily disturbed brownfield, curtailed by intervening wire mesh fences and road development restricting badger movement into the site.

Otters

There were no signs of otters in the study area. The nearest NBDC records refer to records on the River Shannon 1km to the north downstream dated 13th December 2012.

Bats

Six species of bat were positively identified during the various bat surveys: Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Nathusius Pipistrelle (*Pipistrellus nathusii*), Brown Long-eared bat (*Plecotus auritus*), Leisler's bat (*Nyctalus leisleri*) and Lesser Horseshoe bat (*Rhinolophus hipposideros*). In addition, five unidentified Myotis bat species were recorded, these being either Whiskered, Natterers or Daubenton's bats. Finally, several Pipistrelle calls recorded from the static detectors had a peak frequency of 40kHz thus could be either Common or Nathusius Pipistrelle.

Surveys reveal the site is unsuitable for roosting bats but is used for feeding purposes.

Lesser Horseshoe bat recordings did not occur close to sunset thus suggesting records are not from bats roosting close to the site. At the D1 monitoring point (at the northern boundary of the site, adjacent to the Dublin Road) a recording was made on the 8th of May 2025 at 22:52 while at D2 monitoring point (at the southern boundary of the site), the recording was dated 17th May 2025 at 00:56. While surveys demonstrate the site has very low usage by this species it confirms a corridor for this species does exist in the city, with Lesser Horseshoe likely utilising the Groody River system as a navigational aid.

There are no European sites designated for Lesser Horseshoe bats in the zone of influence of the Proposed Development.

Birds

Bird surveys were conducted in both winter and the breeding season. Overall, low activity was recorded with gull species noted overfly generally not interacting with the site; Herring gull were noted resting on the ground on one occasion. Oystercatchers were recorded during a survey in February 2025. During the breeding season several passerines were recorded as probably breeding, however these were confined to scrub rather than open areas.

Overall, no large flocks of species of interest were noted in the surrounding wet grassland meadows. This is likely due to management and height of vegetation. Short, cropped grass is favoured by wintering waterbirds such as lapwing and golden plover while geese and swans favour improved grassland fields.

Lapwing was the primary species of interest noted in Wintering surveys at the Parkway Valley site. Lapwing was observed 10 times during VP surveys between October 2025 and January 2026. The largest flock observed was made up of 165 individuals was noted in January 2026.

This species was most noted perched on bare, built land south of ponding water located outside the boundary of the current planning proposal. The ponded area is screened from the road by a large fence effectively isolating the site from road traffic.

While this is not a Nationally important flock (c. 850), it can be considered of regional importance. The regionally important numbers were recorded only once and are likely to represent small flocks gathering in preparation to move north. Lapwing was not found to be present on site in February 2025 despite January 2026 showing highest levels of activity. This shows the current site is of highest value at mid-winter.

This Lapwing flock recorded east of Limerick City is unlikely to represent an *ex-situ* component of the River Shannon and River Fergus Estuaries SPA population. The SPA Supporting Document and associated distribution mapping indicate that SPA-linked Lapwing are concentrated west of the city, associated with estuarine margins and adjacent supratidal grasslands. The observed inland flock is therefore best interpreted as a discrete, non-SPA-dependent wintering group.

Loughmore Common Turlough, located 6.8km SW from the site is noted as having populations of Lapwing present. Given the Lapwing on site were seen entering from the North and East, and that Limerick City is located between the site and pNHA, it is highly unlikely that birds present on site represent an *ex-situ* population of Lapwing associated with the pNHA.

Aquatic Species

There are no water courses with flowing water on the site (See Figure 2). The site has large areas of pooled standing water which is ephemeral in nature depending on rainfall. Drainage is generally to ground or diffuse to distant drainage ditches to the east of the site. These drainage ditches were observed in September 2025 to be stagnant, but they have distant connectivity to the Groody River in that they link to the floodplain of the river and/or to more established water courses such as the EPA named Industrial Estate/Galvone Stream, which discharges the Groody c. 200m to the east of the site.

The ditches nearest the site were observed to have shallow stagnant stands of water with no instream flora and heavy/dense vegetation cover. They do not have fisheries value and have sub-optimal value to amphibians such as newts and frogs.

There are no plans to directly affect these drainage ditches. The proposed development does include surface water drainage design to link to one drainage ditch in the east to discharge treated surface water. Thus, the primary concern for aquatic species is upholding good water quality. Information from the Hydrological and Hydrogeological Risk Assessment, prepared by AWN and presented in the Project EIAR is included as follows with regard to groundwater. There would be a potential pathway to the underlying aquifer through the bedrock via vertical migration following the proposed localised excavation of bedrock. The bedrock will be temporarily unprotected by any overburden subsoil from any localised diesel/fuel oil spills during construction. The site is underlain by an aquifer which is 'moderately productive in local zones', with a combination of 'low', 'moderate' and 'high' vulnerability across the site. This aquifer is characterised by discrete local fracturing with little connectivity. As such, flow paths are generally local. The potential for offsite migration due to any construction discharges is low as there is no significant pathway in the aquifer.

2. Stage 1 – AA Screening

A Report for AA Screening was compiled and is presented as a stand-alone document in the LRD application. The following is a summary of the Screening process.

The Zone of Influence may be determined by considering the Proposed Development's potential connectivity with European sites, in terms of:

- Nature, scale, timing and duration of all aspects of the proposed works and possible impacts, including the nature and size of excavations, storage of materials, flat/sloping sites;
- Distance and nature of potential pathways (dilution and dispersion; intervening 'buffer' lands, roads etc.); and

- Location of ecological features and their sensitivity to the possible impacts.

The potential for source pathway receptor connectivity is firstly identified through GIS interrogation and detailed information is then provided on sites with connectivity. European sites that are located within a potential Zone of Influence (ZoI) of the Project are listed in Table 2 and presented in Figures 4 and 5, below. Spatial boundary data on the Natura 2000 network was extracted from the NPWS website (www.npws.ie) on 19 May 2026. This data was interrogated using GIS analysis to provide mapping, distances, locations and pathways to all sites of conservation concern including pNHAs, NHA and European sites.

Table 1 European Sites located within the potential Zone of Influence[2] of the Project.

Site Code	Site name	Distance (km)[3]
002165	Lower River Shannon SAC	0.705
004077	River Shannon and River Fergus Estuaries SPA	2.97

The Proposed Development Site is situated on a largely brownfield site in the eastern suburbs of Limerick City. The Groody River, which discharges to the River Shannon to the north, flows past the Proposed Development Site approximately 200m to the east.

The nearest European sites to the Proposed Development, and the only sites considered to lie within its potential Zone of Influence are the Lower River Shannon SAC (Site Code 002165), 705m to the north, and the River Shannon and River Fergus Estuaries SPA (Site Code 004077), 2.97km to the west.

There is no direct source pathway linkage between the Proposed Development site and any Natura 2000 sites. There is indirect source pathway linkage from the Proposed Development through the surface water drainage design which discharges to an open drain which flows into the OPW arterial drainage channel, ultimately discharging to the Groody River and eventually to the River Shannon.

There is an indirect hydrological connection to the River Shannon SAC. The Proposed Development would have a hydrological linkage through the drainage albeit via a long pathway with significant dilution and attenuation factors downstream in the river network. There will also be a hydrological connection via the wastewater drainage although, as mentioned above, the facility is required to operate under a licence which prevents water exceeding the SI threshold concentrations to be discharged.

[2] All European sites potentially connected irrespective of the nature or scale of the Proposed Development.
[3] Distances indicated are the closest geographical distance between the Proposed Development and the European site boundary, as made available by the NPWS.

The Proposed Development has an indirect hydrological linkage to the Upper Shannon Estuary and its associated Natura 2000 site (mentioned above), once operational via the wastewater network and surface water drainage, albeit the source pathway linkage is over a significant distance allowing for significant attenuation and large dilution factor within the river catchment and estuary.

In addition to the identified surface water pathways, a potential indirect hydrogeological linkage to the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA has been considered. During construction, excavation works, including foundation construction and localised bedrock excavation, could provide a pathway for contaminants to enter the underlying aquifer in the absence of control measures. Given the localised nature of groundwater flow, limited aquifer connectivity, attenuation within subsoils and dilution within the receiving river system, any such pathway would be indirect and limited; however, it is considered further on a precautionary basis.

The identification of relevant European sites compilation of information QIs and conservation objectives using Source-Pathway-Receptor model and determination of potential effects is presented in Table 2 below.

It cannot be excluded, on the basis of objective information, that the Proposed Development, individually or in combination with other plans or projects, will have a significant effect on the following European sites:

- Lower River Shannon SAC Site code 002165
- River Shannon and River Fergus Estuaries SPA Site code 004077

Thus, in line with Departmental Guidance and having regard to ECJ and Irish case law and the 'Precautionary Principle', Stage 2 Appropriate Assessment is required.

The Qualifying Interests (QIs) and Special Conservation Interests (SCIs) of the European sites in the Zone of influence of the Project are provided in Table 2 below.

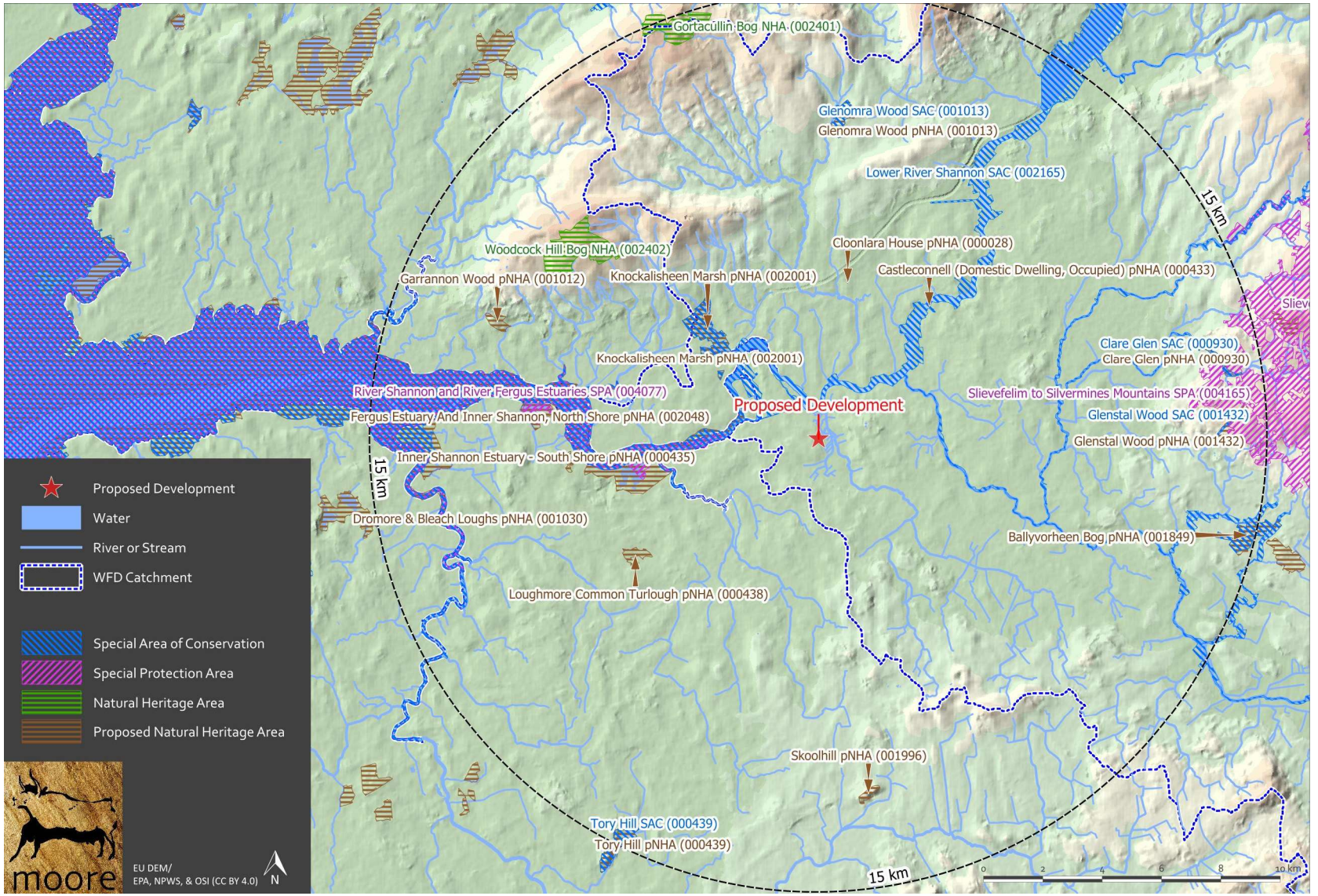

Figure 5. Showing European sites and NHAs/pNHAs within the wider Potential Zone of Influence of the Project.

Figure 6. Showing European sites within the nearer Potential Zone of Influence of the Project.

Table 2 Identification of relevant European sites using Source-Pathway-Receptor model and determination of potential effects.

Site Name	QI/SCI	Habitat Loss	Water Quality	Disturbance	Displacement	Rationale	Possibility of Significant Effects
Lower River Shannon SAC (002165)	1029 Freshwater pearl mussel *Margaritifera margaritifera*	None	Unlikely	None	Unlikely	This conservation objective applies to the freshwater pearl mussel population in the Cloon River, Co. Clare only. This species and supporting habitat is located outside the zone of influence of the Project.	None
	1095 Sea lamprey *Petromyzon marinus*	None	Unlikely	None	Unlikely	There will be no direct effects on this species located downstream in the Lower River Shannon. However, best practice construction management measures will be included in a CEMP.	Uncertain in the absence of environmental management.
	1096 Brook lamprey *Lampetra planeri*	None	Unlikely	None	Unlikely	There will be no direct effects on this species located downstream in the Lower River Shannon. However, best practice construction management measures will be included in a CEMP.	Uncertain in the absence of environmental management.
	1099 River lamprey *Lampetra fluviatilis*	None	Unlikely	None	Unlikely	There will be no direct effects on this species located downstream in the Lower River Shannon. However, best practice construction management measures will be included in a CEMP.	Uncertain in the absence of environmental management.
	1106 Atlantic salmon (*Salmo salar*) (only in fresh water)	None	Unlikely	None	Unlikely	There will be no direct effects on this species located downstream in the Lower River Shannon. However, best practice construction management measures will be included in a CEMP.	Uncertain in the absence of environmental management.
	1110 Sandbanks which are slightly covered by sea water all the time	None	Unlikely	None	Unlikely	This habitat is located outside the zone of influence of the Project in the outer Shannon Estuary.	None
	1130 Estuaries	None	Unlikely	None	Unlikely	This habitat is located outside the zone of influence of the Project in the outer Shannon Estuary.	None

	1140 Mudflats and sandflats not covered by seawater at low tide	None	Unlikely	None	Unlikely	This habitat is located outside the zone of influence of the Project in the outer Shannon Estuary.	None
	1150* Coastal lagoons	None	Unlikely	None	Unlikely	This habitat is located outside the zone of influence of the Project in the outer Shannon Estuary.	None
	1160 Large shallow inlets and bays	None	Unlikely	None	Unlikely	This habitat is located outside the zone of influence of the Project in the outer Shannon Estuary.	None
	1170 Reefs	None	Unlikely	None	Unlikely	This habitat is located outside the zone of influence of the Project in the outer Shannon Estuary.	None
	1220 Perennial vegetation of stony banks	None	Unlikely	None	Unlikely	This habitat is located outside the zone of influence of the Project in the outer Shannon Estuary.	None
	1230 Vegetated sea cliffs of the Atlantic and Baltic coasts	None	Unlikely	None	Unlikely	This habitat is located outside the zone of influence of the Project in the outer Shannon Estuary.	None
	1310 Salicornia and other annuals colonizing mud and sand	None	Unlikely	None	Unlikely	This habitat is located outside the zone of influence of the Project in the outer Shannon Estuary.	None
	1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	None	Unlikely	None	Unlikely	This habitat is located outside the zone of influence of the Project in the outer Shannon Estuary.	None
	1349 Bottlenose Dolphin *Tursiops truncatus*	None	Unlikely	None	Unlikely	This species is located outside the zone of influence of the Project in the outer Shannon Estuary	None
	1355 Otter *Lutra lutra*	None	Unlikely	Unlikely	Unlikely	There were no signs of otters in the study area. The nearest NBDC records refer to records on the River Shannon 1km to the north downstream	Uncertain in the absence of environmental management.

						Potential negative effects on Water Quality status could affect the food sources for Otters and pose a threat to prey species. A CEMP will be required to ensure there are no impacts on this site.	
	1410 Mediterranean salt meadows (*Juncetalia maritimi*)	None	Unlikely	None	Unlikely	This habitat is located outside the zone of influence of the Project in the outer Shannon Estuary	None
	3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and Callitricho-Batrachion vegetation	None	Unlikely	None	Unlikely	This habitat is located outside the zone of influence of the Project in the upper River Shannon	None
	6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)	None	Unlikely	None	Unlikely	This habitat is located outside the zone of influence of the Project in the upper River Shannon	None
	91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, *Alnion incanae*, *Salicion albae*)	None	Unlikely	None	Unlikely	This habitat is located outside the zone of influence of the Project in the upper River Shannon.	None
River Shannon and River Fergus Estuaries SPA (004077)	A017 Cormorant *Phalacrocorax carbo* breeding + wintering A038 Whooper Swan *Cygnus cygnus* wintering A046 Light-bellied Brent Goose *Branta bernicla hrota* wintering A048 Shelduck *Tadorna tadorna* wintering A050 Wigeon *Anas penelope* wintering A052 Teal *Anas crecca* wintering A054 Pintail *Anas acuta* wintering A056 Shoveler *Anas clypeata* wintering A062 Scaup *Aythya marila* wintering A137 Ringed Plover *Charadrius hiaticula* wintering	None	Unlikely	None	Unlikely	These Annex 1 bird species are located in the lower River Shannon and Fergus Estuary and predominantly outside zone of influence of the Project. While the site is unsuitable for the listed annexed bird species, the consideration of potential effects on water quality is considered further A CEMP will be required to ensure there are no impacts on this site.	None

	A140 Golden Plover *Pluvialis apricaria* wintering A141 Grey Plover *Pluvialis squatarola* wintering A142 Lapwing *Vanellus vanellus* wintering A143 Knot *Calidris canutus* wintering A149 Dunlin *Calidris alpina* wintering A156 Black-tailed Godwit *Limosa limosa* wintering A157 Bar-tailed Godwit *Limosa lapponica* wintering A160 Curlew *Numenius arquata* wintering A162 Redshank *Tringa totanus* wintering A164 Greenshank *Tringa nebularia* wintering A179 Black-headed Gull *Chroicocephalus ridibundus* wintering						
	A999 Wetlands	None	Unlikely	None	Unlikely	While the site is unsuitable for the listed annexed bird species, the consideration of potential effects on water quality is considered further A CEMP will be required to ensure there are no impacts on this site.	Uncertain in the absence of environmental management.

3. Stage 2 – Appropriate Assessment

This stage considers whether the Project, alone or in combination with other projects or plans, will have adverse effects on the integrity of a European site, and includes any mitigation measures necessary to avoid, reduce or offset negative effects. The Stage 2 Appropriate Assessment comprises a scientific examination of the plan / project and the relevant European site; to identify and characterise any possible implications for the site in view of the site's conservation objectives, structure and function; taking account of in combination effects.

3.1. Description of European Sites Potentially Affected

Potential impacts on the following European sites have been identified**:**

Lower River Shannon SAC [002165]

The NPWS Site Synopsis in relation to the Lower River Shannon SAC (Version date: 16 December 2013) is presented in Appendix 1. The following excerpt is pertinent here.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (= priority; numbers in brackets are Natura 2000 codes):*

[1110] Sandbanks
[1130] Estuaries
[1140] Tidal Mudflats and Sandfiats
*[1150] Coastal Lagoons**
[1160] Large Shallow Inlets and Bays
[1170] Reefs
[1220] Perennial Vegetation of Stony Banks
[1230] Vegetated Sea Cliffs
[1310] Salicornia Mud
[1330] Atlantic Salt Meadows
[1410] Mediterranean Salt Meadows
[3260] Floating River Vegetation
[6410] Molinia Meadows
*[91E0] Alluvial Forests**
[1029] Freshwater Pearl Mussel (Margaritifera margaritifera)
[1095] Sea Lamprey (Petromyzon marinus)
[1096] Brook Lamprey (Lampetra planeri)
[1099] River Lamprey (Lampetra fluviatilis)
[1106] Atlantic Salmon (Salmo salar)
[1349] Bottle-nosed Dolphin (Tursiops truncatus)
[1355] Otter (Lutra lutra)

This site is of great ecological interest as it contains a high number of habitats and species listed on Annexes I and II of the E.U. Habitats Directive, including the priority habitats lagoon and alluvial woodland, the only known resident population of Bottle-nosed Dolphin in Ireland and all three Irish lamprey species. A good number of Red Data Book species are also present, perhaps most notably the thriving populations of Triangular Club-rush. A number of species listed on Annex I of the E.U. Birds Directive are also present, either wintering or breeding. Indeed, the Shannon and Fergus Estuaries form the largest estuarine complex in Ireland and support more wintering wildfowl and waders than any other site in the country. Most of the estuarine part of the site has been designated a Special Protection Area (SPA), under the E.U. Birds Directive, primarily to protect the large numbers of migratory birds present in winter.

River Shannon and River Fergus Estuaries SPA [004077]

The NPWS Site Synopsis in relation to the River Shannon and River Fergus Estuaries SPA (Version date: 30 May 2015) is presented in Appendix 1. The following excerpt is pertinent here.

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, Light-bellied 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 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.

3.2. Conservation Objectives of European Sites

3.2.1. Lower River Shannon SAC [002165]

Specific Conservation Objectives and Target Notes are set by the NPWS (Version 1. 7 August 2012) for the Lower River Shannon SAC (002165). Specific objectives are included for the aquatic species identified in the zone of influence of the Project as follows:

1095 Sea Lamprey *Petromyzon marinus*

To restore the favourable conservation condition of Sea Lamprey in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of river accessible	Greater than 75% of main stem length of rivers accessible from estuary	Artificial barriers can block or cause difficulties to lampreys' upstream migration, thereby limiting the species to lower stretches and restricting access to spawning areas. See Gargan et al. (2011). Specific barriers serve to constrain the up-river migration of sea lamprey. The upper extent of the SAC in the R. Fergus is delineated by a barrier to migration. Barriers are also present in the Mulkear and Feale
Population structure of juveniles	Number of age/size groups	At least three age/size groups present	Attribute and target based on data from Harvey and Cowx (2003) and O'Connor (2007)
Juvenile density in fine sediment	Juveniles/m^2	Juvenile density at least 1/m^2	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003)
Extent and distribution of spawning habitat	m^2 and occurrence	No decline in extent and distribution of spawning beds	Lampreys spawn in clean gravels. Surveys by Inland Fisheries ireland (IFI) commonly indicated accumulations of redds downstream of major weirs. (See also Gargan et al., 2011)
Availability of juvenile habitat	Number of positive sites in 3rd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Despite observed spawning activity, sampling for ammocoetes consistently fails to find these in many samplling stations and never in any great numbers

1096 Brook Lamprey *Lampetra planeri*

To maintain the favourable conservation condition of Brook Lamprey in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	% of river accessible	Access to all water courses down to first order streams	Artificial barriers can block or cause difficulties to brook lampreys' migration, both up- and downstream, thereby possibly limiting the species to specific stretches and creating genetically isolated populations (Espanhol et al., 2007)
Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present	Attribute and target based on data from Harvey and Cowx (2003). It is impossible to distinguish between brook and river lamprey juveniles in the field (Gardiner, 2003), hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m^2	Mean catchment juvenile density of brook/river lamprey at least 2/m^2	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003) who state 10/m^2 in optimal conditions and more than 2/m^2 on a catchment basis
Extent and distribution of spawning habitat	m^2 and occurrence	No decline in extent and distribution of spawning beds	Spawning site and redd attributes established by IFI (Rooney et al., in press)
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Many sites with suitable larval attributes i.e. fine sediment in low velocity habitat, are found not to contain larval lamprey. This may be a function of chance or probability, or may be a consequence of insufficient recruitment to fill all spatial niches. Occupancy in excess of 50% of sites would be 'reasonable' for the Irish catchments examined to date (King et al., unublished data)

1099 River Lamprey *Lampetra fluviatilis*

To maintain the favourable conservation condition of River Lamprey in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	% of river accessible	Access to all water courses down to first order streams	Artificial barriers can block or cause difficulties to river lampreys' migration, both up- and downstream, thereby possibly limiting species to specific stretches and creating genetically isolated populations (Espanhol et al., 2007)
Population structure of juveniles	Number of age/size groups	At least three age/size groups of river/brook lamprey present	Attribute and target based on data from Harvey and Cowx (2003). It is impossible to distinguish between river and brook lamprey juveniles in the field (Gardiner 2003), hence they are considered together in this target
Juvenile density in fine sediment	Juveniles/m^2	Mean catchment juvenile density of river/brook lamprey at least 2/m^2	Juveniles burrow in areas of fine sediment in still water. Attribute and target based on data from Harvey and Cowx (2003) who state 10/m^2 in optimal conditions and more than 2/m^2 on a catchment basis
Extent and distribution of spawning habitat	m^2 and occurrence	No decline in extent and distribution of spawning beds	
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive	Many sites with suitable larval attributes i.e. fine sediment in low velocity habitat, are found not to contain larval lamprey. This may be a function of chance or probability, or may be a consequence of insufficient recruitment to fill all spatial niches. Occupancy in excess of 50% of sites would be 'reasonable' for the Irish catchments examined to date (King et al., unpublished data)

1106 Atlantic Salmon *Salmo salar* (only in fresh water)

To restore the favourable conservation condition of Salmon in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution: extent of anadromy	% of river accessible	100% of river channels down to second order accessible from estuary	Artificial barriers block salmons' upstream migration, thereby limiting the species to lower stretches and restricting access to spawning areas. The large hyrdo-electric station at Ardnacrusha and the Parteen regulating weir present considerable obstructions to upstream passage of salmon on the Shannon main channel. While both have fish passes installed, upstream migration of salmon is still problematical. Further weirs upstream on the Shannon also restrict access to spawning habitat. No such obstacles, causing significant fish passage issues for salmon are present on the Feale and Mulkear rivers
Adult spawning fish	Number	Conservation Limit (CL) for each system consistently exceeded	A conservation limit is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "the spawning stock level that produces long-term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship". The target is based on the Standing Scientific Committee of the National Salmon Commission's annual model output of CL attainment levels. See SSC (2010). Stock estimates are either derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. The salmon stocks in the Shannon above the impoundments are significantly below their Conservation Limits. Salmon stocks in the Feale and Mulkear rivers are above CL
Salmon fry abundance	Number of fry/5 minutes electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5 min sampling	Target is threshold value for rivers currently exceeding their conservation limit (CL). The abundance of salmon fry at monitored sites on the Shannon main channel, above the hydro-electric station, is significantly below this target
Out-migrating smolt abundance	Number	No significant decline	Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and sea lice (*Lepeophtheirus salmonis*). On the Shannon main channel, salmon smolt abundance may be significantly affected by mortality passing through hydro-electric turbines
Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes	Salmon spawn in clean gravels. Artificial barriers are currently preventing salmon from accessing suitable spawning habitat on the Shannon main channel
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA	Q values based on triennial water quality surveys carried out by the Environmental Protection Agency (EPA)

1355 Otter *Lutra lutra*

To restore the favourable conservation condition of Otter in the Lower River Shannon SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Distribution	Percentage positive survey sites	No significant decline	Measure based on standard otter survey technique. FCS target, based on 1980/81 survey findings, is 88% in SACs. Current range in Shannon catchment estimated at 70.5% (Bailey and Rochford 2006)
Extent of terrestrial habitat	Hectares	No significant decline. Area mapped and calculated as 596.8ha above high water mark (HWM); 958.9ha along river banks/ around ponds	No field survey. Areas mapped to include 10m terrestrial buffer along shoreline (above HWM and along river banks) identified as critical for otters (NPWS, 2007)
Extent of marine habitat	Hectares	No significant decline. Area mapped and calculated as 4,461.6ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (HWM) (NPWS, 2007; Kruuk, 2006)
Extent of freshwater (river) habitat	Kilometers	No significant decline. Length mapped and calculated as 500.1km	No field survey. River length calculated on the basis that otters will utilise freshwater habitats from estuary to headwaters (Chapman and Chapman, 1982)
Extent of freshwater (lake/lagoon) habitat	Hectares	No significant decline. Area mapped and calculated as 125.6ha	No field survey. Area mapped based on evidence that otters tend to forage within 80m of the shoreline (NPWS, 2007)
Couching sites and holts	Number	No significant decline	Otters need lying up areas throughout their territory where they are secure from disturbance (Kruuk, 2006; Kruuk and Moorhouse, 1991)
Fish biomass available	Kilograms	No significant decline	Broad diet that varies locally and seasonally, but dominated by fish, in particular salmonids, eels and sticklebacks in freshwater (Bailey and Rochford, 2006) and wrasse and rockling in coastal waters (Kingston et al., 1999)
Barriers to connectivity	Number	No significant increase. For guidance, see map 17	Otters will regularly commute across stretches of open water up to 500m. e.g. between the mainland and an island; between two islands; across an estuary (De Jongh and O'Neill, 2010). It is important that such commuting routes are not obstructed

3.2.2. River Shannon and River Fergus Estuaries SPA [004077]

Generic Conservation Objectives and Target Notes are set by the NPWS (Version 1. 17th September 2012) for the River Shannon and River Fergus Estuaries SPA (004077). Specific objectives are included for the aquatic species identified in the zone of influence of the Project as follows:

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved 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 favourable conservation status of a species is achieved 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.
Objective: To maintain or restore the favourable conservation condition of the bird species listed and Wetlands as Special Conservation Interests for this SPA

Objective: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA:

Bird Code	Common Name	Scientific Name
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

Separately, a conservation objective for Wetlands and Waterbirds is also listed:

Conservation objectives for: River Shannon and River Fergus Estuaries SPA [004077]

A999 Wetlands

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. This is defined by the following attribute and target:

Attribute	Measure	Target	Notes
Wetland habitat area	hectares	The permanent area occupied by the wetland habitat should be stable and not significantly less than the area of 32,261ha, other than that occurring from natural patterns of variation	The wetland habitat area was estimated as 32,261ha using OSi data and relevant orthophotographs. For further information see part three of the conservation objectives supporting document

3.3. Consideration of Effects on Qualifying Interests

This section concentrates on the biology of Qualifying Interests and addresses the susceptibility of habitats first land then each species to potential effects from the Project.

3.3.1. Annex I Habitats Directive Habitats

The nearest European sites to the Project are the Lower River Shannon SAC (Site Code 002165), which is located c. 705m to the north.

There would be no direct impacts on the Lower River Shannon SAC and there would be no habitat loss or fragmentation as a result of the Project. Having considered direct impacts and ruling them out, indirect impacts are then considered in terms of source pathway vectors.

A worst-case scenario may be considered whereby the Project would be the source of a significant detrimental change in water quality in the watercourses connecting the site to the River Shannon, either alone or in combination with other projects or plans as a result of indirect pollution. The effect would have to be considered in terms of changes in water quality which would negatively affect the aquatic species or food sources for those species for which the Lower River Shannon SAC is designated.

3.3.2. Annex I Birds Directive Birds

The Proposed Development site contains a mix of brownfield, rank grassland and scrub, and is generally unsuitable for the species listed as conservation objectives of the Shannon and River Fergus Estuaries, principally waterfowl, gulls and waders.

There will be no direct impacts on any bird species listed as conservation objectives of the River Shannon and River Fergus Estuaries SPA and so the main concern is with regard to water quality and indirect impacts on water quality and prey species.

3.3.3. E.U. Habitats Directive Annex II Species

The following Annex II Habitats Directive species listed in the Lower River Shannon SAC are considered as sensitive receptors having been brought forward from Stage 1 screening for further consideration.

Lamprey Species

All three species of Lamprey Sea Lamprey (*Petromyzon marinus*), River Lamprey (*Lampetra fluviatilis*) and Brook Lamprey (*Lampetra planeri*) have potential to occur in the River Shannon downstream of the Project site.

A worst-case scenario may be considered whereby the Project would be the source of a significant detrimental change in water quality in the Groody River and River Shannon. The effect would have to be considered in terms of changes in water quality which would affect Lamprey species.

Salmon (Salmo salar)

The Lower River Shannon SAC is designated for Atlantic Salmon. A conservation limit is defined by the North Atlantic Salmon Conservation Organisation (NASCO) as "*the spawning stock level that produces long term average maximum sustainable yield as derived from the adult to adult stock and recruitment relationship*". The target is based on the Standing Scientific Committee of the National Salmon Commission's annual model output of CL attainment levels. Stock estimates are either derived from direct counts of adults (rod catch, fish counter) or indirectly by fry abundance counts. The River Shannon is currently below its CL. Smolt abundance can be negatively affected by a number of impacts such as estuarine pollution, predation and Sea lice (*Lepeophtheirus salmonis*). The conservation Limit (CL) for each system in regard to spawning fish should be consistently exceeded. The mean catchment-

wide abundance threshold value should maintain or exceed 0+ fry (currently set at 17 salmon fry /5min sampling). There should be no significant decline in out-migrating smolt. There should be no decline in number and distribution of spawning redds due to anthropogenic causes and a value of at least Q4 at all sites sampled by EPA should persist.

While direct impacts may be ruled out, impacts on water quality and indirect impacts on salmonids are a consideration.

Otter (Lutra lutra)

The otter is listed under Annex II of the EU Habitats Directive and under Annex II of the Berne Convention; it is also a legally protected species under the Wildlife Act, 1976 (and Wildlife (Amendment) Act, 2000). Otters are found throughout Ireland and tend to occupy linear territories along watercourses and are rarely found far away from water.

There were no signs of otters in the study area. The nearest NBDC records refer to records on the River Shannon c. 1km to the north downstream dated 12th December 2012.

A worst-case scenario may be considered whereby the Project may result in a significant detrimental change in water quality in the Groody River and River Shannon, either alone or in combination with other projects or plans as a result of indirect pollution. The effect would have to be considered in terms of changes in water quality which would affect the habitats or food sources for otters.

3.3.4. Ecological Network Supporting Natura 2000 Sites

An analysis of the proposed Natural Heritage Areas and designated Natural Heritage Areas in terms of their role in supporting the species using Natura 2000 sites was undertaken. These supporting roles mainly relate to mobile fauna such as mammals and birds which may use pNHAs and NHAs as "stepping stones" between Natura 2000 sites.

Article 10 of the Habitats Directive and the Habitats Regulations 2011 place a high degree of importance on such non-Natura 2000 areas as features that connect the Natura 2000 network. Features such as ponds, woodlands and important hedgerows were taken into account during the AA process.

The NHAs and pNHAs identified in Figure 4 are located outside the Zone of Influence, with the exception of the Fergus Estuary and Inner Shannon, North Shore pNHA, which overlaps with the two European sites considered above, and is assessed under its higher conservation status as European sites.

Loughmore Common Turlough, located 6.8km SW from the site is noted as having populations of Lapwing present. Given the Lapwing on site were seen entering from the North and East, and that Limerick City is located between the site and pNHA, it is highly unlikely that birds present on site represent an *ex-situ* population of Lapwing associated with the pNHA.

3.4. Potential Impacts on European Sites

The Project is not directly connected with or necessary to the management of the European sites considered in the assessment and therefore potential downstream impacts must be identified and considered.

There will be no direct impacts on the Lower River Shannon SAC or the River Shannon and River Fergus Estuaries SPA as a result of the Project. Direct impact refers to physical impacts defined in the Departmental Guidance as 'Loss of habitat area' and/or 'Habitat Fragmentation'. Having established this, the assessment emphasis is placed on potential indirect and cumulative impacts.

The potential for impact is considered whereby the Project would result in a significant detrimental change in water quality either alone or in combination with other projects or plans as a result of indirect pollution of surface water. The effect would have to be considered in terms of changes in water quality which would affect the habitats or species for which Lower River Shannon SAC or the River Shannon and River Fergus Estuaries SPA are designated.

3.4.1. Direct Impacts

There will be no direct impacts on the Lower River Shannon SAC (Site Code 002165) or the River Shannon and River Fergus Estuaries SPA (Site Code 004077) as a result of the implementation of the Project. Direct impact refers to physical impacts defined in the Departmental Guidance as 'Loss of habitat area' and/or 'Habitat Fragmentation'. The Project will have **no direct impacts** upon the integrity or the site structure of the Lower River Shannon SAC or the River Shannon and River Fergus Estuaries SPA.

3.4.2. Indirect Impacts

Construction

Consideration of impacts on Surface Water

The potential for impact is considered whereby the Project would result in a significant detrimental change in water quality either alone or in combination with other projects or plans as a result of indirect pollution of surface water. The effect would have to be considered in terms of changes in water quality which would affect the species for which the Lower River Shannon SAC (Site Code 002165), is designated; Otter, Salmon, Sea Lamprey, River Lamprey and Brook Lamprey.

Consideration of impacts on Groundwater

Fuels or any hazardous chemicals will be stored in specific bunded areas. Refuelling of plant and machinery will also be carried out in bunded areas to minimise risk of any potential being discharged from the site. As a worst-case scenario, a rupture of a 1,000-litre tank to ground is considered in this analysis which disregards the effect of bunding. This would be a single short-term event.

A leakage may occur from site equipment and/or machinery during the construction phase. As a worst-case scenario an unmitigated leak of 300 litres. It should be noted that Hydrotreated Vegetable Oil (HVO) will be used to fuel vehicles and plant including generators and cranes. The use of HVO, rather than diesel, means that there will be minimal potential for impact for contamination of surface water or groundwater bodies in the event of a spill / leak. HVO is considered less harmful than traditional fossil oils when it spills on the ground due to its renewable nature and biodegradability. When HVO spills, it tends to degrade rapidly through natural processes involving microorganisms, which can metabolize it into less harmful substances. This quick degradation helps minimize its impact on the hydrological environment, reducing the risk of contamination in water sources and soil. Additionally, HVO has a lower toxicity profile compared to fossil oils, making it less harmful to aquatic life and groundwater systems.

Use of wet cement is a requirement during construction. Run-off water from recent cemented areas will result in highly alkaline water with high pH. As this would only occur during particular phases of work, this is again considered as a single short-term event rather than an ongoing event.

With regard to the construction of foundations, the CEMP submitted with the planning application states that the piles will be bored displacement (CFA methodology) which will have an average depth of 5 m below ground level. This foundation construction method extracts a core of soil and replaces it with concrete cast in-situ; a continuous helical auger drills into the subsoil/rock to the required depth; concrete is then pumped steadily through the hollow stem, forming a continuous cast-in-place concrete pile. Since the core is never left open, CFA piling effectively prevents soil collapse and groundwater ingress. Reinforcement cages are installed immediately after concreting while the concrete remains workable, since the in-situ casting creates a water-tight seal against the geology over the length of the pile. This methodology ensures that the contact time between the concrete and any potential groundwater is minimal and, given the low connectivity of the underlying bedrock aquifer, this contact is limited to the duration of the concrete seal and spatially, only to the potential groundwater in contact with the hollow stem during this brief period. Any interaction between fresh concrete and groundwater would be highly localised and short-lived during placement. The surrounding soils and bedrock provide buffering and dilution, and the low permeability means migration beyond the immediate pile location is considered highly unlikely. On this basis, impacts to groundwater quality from piling are considered negligible, and consequently there would be no likely impact on the River Shannon SAC.

In the event of a leak or spill, hydrogeological connections may exist through lateral migration with the River Shannon. However, the potential for impacts is low given the distance of removal, allowing for significant attenuation and large dilution factor within the river catchment and estuary, should an accidental release occur. Also, the use of HVO for vehicles and plant means reduces the risk of contamination of receiving waters, as it degrades rapidly when spilled and is less harmful to aquatic life and groundwater systems, than fossil fuels.

Operation

Consideration of impacts on Surface Water

The design has taken account of the potential impacts of the development on surface water and groundwater quality; measures have been incorporated in the design to mitigate these potential impacts.

The proposed surface water management design establishes a hydrological connection to the Groody River, where discharge from the site will be controlled via a hydrobrake located upstream of the stormwater outfall, conveying flows by gravity to the Industrial Estate/Galvone Stream, which discharges to the Groody River, c. 200 m to the east of the site.

To mitigate potential contamination from surface water runoff, which may originate from roads, car parks, and hardstanding areas, a sustainable drainage system (SuDS) will be implemented. This system is designed to minimize the risk of contaminants, such as hydrocarbons, entering the stormwater drainage network and subsequently impacting the hydrological and hydrogeological environment.

The proposed drainage system has been designed using Causeway Flow software, in line with Recommendations for Site Development Works for Housing Areas (DoEHLG), the GDSDS, CIRIA guidance (C644 and C753), and Limerick City & County Council requirements.

A new fully separated surface water sewer network is proposed for the development. In accordance with the Limerick Development Plan 2022–2028 and the Greater Dublin Strategic Drainage Study (GDSDS), surface water discharge will be restricted to the greater of 2 l/s/ha or Qbar. The system has been designed to manage the 1% AEP (1:100-year) storm event, with an additional 30% climate change allowance and 10% urban creep allowance, providing robust long-term resilience under future climate scenarios.

Refer to the Engineering Report, prepared by Punch Consulting Engineers (May 2026) submitted as part of the planning application for further information on the proposed surface water management and design.

Consideration of impacts on Groundwater

During the operational phase, the introduction of additional hardstanding has the potential to marginally reduce local groundwater recharge and increase surface water runoff if not appropriately controlled. However, the majority of the site is already capped with existing hardstanding and made ground, meaning that the Proposed Development will not significantly alter current infiltration patterns. As a result, any further reduction in recharge to the underlying Locally Important Aquifer (Limerick City East GWB) will be very minor and not hydrologically significant.

In the absence of mitigation, increased surface water runoff could potentially contribute to downstream hydraulic pressures or localised flooding. However, the site is predominantly located within Flood Zone C, where the probability of fluvial flooding is low. All elements of the Proposed Development have been positioned outside areas identified as susceptible to localised flooding, other than the outfall pipe from the nature-based attenuation pond, effectively eliminating residual flood risk to the development itself.

To ensure runoff is properly managed and does not exceed pre-development conditions, the proposed drainage system incorporates a suite of Sustainable Drainage Systems (SuDS) and attenuation features. These measures regulate, treat, and attenuate flows before discharge, ensuring that:

- Runoff rates remain restricted to greenfield-equivalent conditions;
- Peak flows are contained on-site;
- Downstream drainage networks are not hydraulically overloaded; and
- Groundwater recharge patterns remain broadly unchanged.

No surface water or groundwater abstractions are proposed during the operational phase. Therefore, no impacts on the quantity of local water resources are anticipated.

Overall, with the proposed SuDS measures, attenuation systems, and the fact that the site is already predominantly hardstanding / made ground, no significant operational impacts on surface water or groundwater flow or quantity are expected.

3.5. Mitigation

The following mitigation measures for the control of surface water and prevention of pollution of downstream surface waters is presented in the Project CEMP by Punch Consulting Engineers. The contractor will be required to implement and adhere to the CEMP and update the CEMP to include any further provisions required by the grant of permission.

3.5.1. Surface Water Management

Run-off into excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts. All run-off will be prevented from directly entering any water courses.

During the construction phase as part of standard practice, appropriate measures to prevent water pollution to any watercourses near the site will be implemented during the construction phases and will include referral to:

a) Control of Water Pollution from construction Sites, Guidance for consultants and contractors (C532).

b) Environmental Good Practice on site guide (5th edition) (C811).

c) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016).

Pollution Control

Reduction and Prevention of Suspended Solids

Prior to the commencement of earthworks operations, the following site-specific surface water management measures will be put in place:

a) Silt fencing will be installed around the perimeter of the site. The purpose of the silt fencing is to prevent silt laden water leaving the site with the potential to impact nearby watercourses. A typical silt fence detail is shown below in Figure 5. It will consist of a double layer of geotextile membrane fixed to wooden stakes approximately 600mm high. The membrane will be anchored into the ground to form a continuous barrier to silt laden water from the works site. Silt fences will be monitored via a silt inspection log to be maintained by the construction manager and periodically maintained during the construction period. Typical maintenance will consist of repairs to damaged sections of membrane and removal of a build-up of silt on the upslope side of the fence. Daily silt fence inspections are recommended as part of their operation ensuring that any necessary repairs can be expedited.

b) Drainage ditches will be installed to intercept surface water where there is a risk of significant water flow into excavations or on to adjoining lands. All collected surface water will have to be treated prior to discharge. The run-off will be directed through appropriately sized settlement ponds to remove suspended solids.

Figure 7. Example of Silt fencing.

c) The settlement ponds will be designed/constructed in accordance with Ciria Document C532 "Control of water pollution from Construction Sites" (Ciria 2001) and Ciria Document C648 "Control of water pollution from linear construction projects" (Ciria 2006).

d) Each pond will contain a forebay equivalent to 10% of the overall plan area of the pond. The forebay receives incoming surface water into the pond and provides settlement of the larger sediment material from the runoff. The forebay prevents these larger sediment materials progressing further in the pond. The ponds will contain a permanent water level below the outfall location allowing sediment to settle to the bottom while allowing the clean water at the top of the pond to discharge to the existing surface water sewer. Settlement tanks by Siltbuster or similar may be utilised.

e) Work involving moving of soil during heavy rainfall will be avoided to minimise potential for entrainment of silt. Where forecasts indicate heavy rainfall events, works should be rescheduled accordingly.

f) Where stockpiling is required, temporary stockpiles will be located a minimum of 20m from any temporary or permanent surface water drainage features. Three sides will be surrounded with silt fencing with access from the fourth (uphill) side. Sides will be smoothened, and runoff directed toward drainage ditches. Stockpiles shall be stored on level terrain and be covered during heavy rainfall periods. To prevent run off from stripped ground, banks are to be placed on the downstream side of stockpiles.

g) Emergency contact numbers for the Local Authority Environmental Section, Inland Fisheries Ireland, the Environmental Protection Agency and the National Parks and Wildlife Service will be displayed in a prominent position within the site compound. These agencies will be notified immediately in the event of a pollution incident.

h) Site personnel will be trained in the importance of preventing pollution and the mitigation measures described here to ensure same.

i) The construction manager will be responsible for the implementation of these measures. They will be inspected on at least a daily basis for the duration of the works, and a record of these inspections will be maintained.

j) Emergency contact numbers for the Local Authority Environmental Section, Inland Fisheries Ireland, the Environmental Protection Agency and the National Parks and Wildlife Service will be displayed in a prominent position within the site compound. These agencies will be notified immediately in the event of a pollution incident.

k) Site personnel will be trained in the importance of preventing pollution and the mitigation measures described here to ensure same.

l) The construction manager will be responsible for the implementation of these measures. They will be inspected on at least a daily basis for the duration of the works, and a record of these inspections will be maintained.

Flooding

The site is at low risk of flooding during the 0.1%AEP or 1 in 1000-year return period fluvial event. Therefore, the statistical likelihood of flooding during the construction period is very low. It is impractical to provide silt management measures that could remain operational during such a flood event, protection of life and critical infrastructure will be the overriding concerns. The following measures will be required:

a) An Emergency Response plan shall be developed for the site and shall consider the following:

i. Flood warning shall be used to determine the probability of the site being flooded.

ii. Met Éireann weather warnings alert service which is available on the Met Éireann app or through its website.

iii. Tidal levels around the coast of Ireland are currently monitored by OPW who issue high tide advisories, which are then widely broadcast on mainstream and social media. Warnings are usually given several days in advance with updates regularly provided in the media as the weather event approaches. This ensures there will be sufficient warning of any extreme tidal events likely to impact on the proposed development.

iv. Emergency evacuation routes will be included in the plan to ensure that flooding does not threaten the safety of construction personnel and/or residents.

v. In the event of a forecasted flood event, all fuels, material stockpiles and construction equipment and materials that may be a cause for pollutants will be stored in areas above a level of 9.5mAOD (MRFS 0.5%AEP flood level with 300mm freeboard.

vi. No construction works will take place during orange or red rain weather warnings issued by Met Eireann.

b) Silt fences shall be inspected as part of the daily inspection regime. Trapped silt shall be removed from silt fencing at regular intervals.

c) Earthworks shall be left exposed for the minimum time possible. Earthworks formations shall be protected by a layer of imported granular fill.

d) Landscaping and seeding in accordance with the Landscaping Plan shall be carried out as early as possible

e) Compound shall not be located within Flood Zone A or B.

Ground Water Vulnerability

There is a high water table within the site and the site is partially located in an area where the groundwater vulnerability varies from low to moderate to high.

Control measures are to be implemented on site to minimise the risk of contamination from fuels, chemicals and hazardous materials to prevent accidental spills and leaks.

Control of cement run-off

As stated in Section 3.4.2, the piles will be bored displacement (CFA methodology) The methodology (CFA) forms a sealed, in-situ concrete pile that limits groundwater interaction to a very short, localised period, meaning any potential effects on groundwater (and therefore downstream Natura 2000 sites) are negligible.

Works with concrete shall be done during dry conditions for a period sufficient to cure the concrete (at least 48 hours). Concrete pours shall occur in contained areas.

The washing out of concrete delivery vehicles is a potential source of pollution and shall be carried out in designated wash out areas only.

Wash-out areas on site will be located greater than 50m from any natural watercourse and properly designed with an impermeable liner to contain all cement laden water. No wash-out of ready-mix concrete vehicles shall be located within 20 metres of any temporary or permanent drainage features. Signage shall be erected to clearly identify the wash-out areas. Sufficient wash-out areas shall be

provided to cater for all vehicles at peak delivery times. Wash water shall be disposed of appropriately off site.

Accidental Spills and Leaks

No bulk chemicals will be stored within the active construction areas. Temporary oil and fuel storage tanks may be kept in the material storage area (within site compound) in suitable containers and will be stored on appropriately bunded spill pallets as required. HVO will be used to fuel vehicles and plant on site. Any fuel and oil stored onsite shall be stored on bunded spill pallets approved under BS EN 1992-3:2006. All bunds will be impermeable and capable of retaining a volume of equal to or greater than 1.1 times (>110%) capacity of the containers stored on them. In the event of a spillage, excess oil or fuel will be collected in the bund.

Refuelling of vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in the compound, away from watercourses. Emergency procedures and spill protection equipment such as oil booms, oil soakage pads, socks and sand will be available in clearly marked bins/silos and in construction vehicles to be used in the event of an accidental release during refuelling. This equipment will be checked weekly to ensure there is sufficient supply for the site. Any spillage of fuels, lubricants or hydraulic oils will be immediately contained, and the contaminated soil removed from the site and disposed of in accordance with all relevant waste management legislation. Training will be given to site workers in how to manage a spill event.

Prior to any work commencing on site, all construction equipment will be checked to ensure that it is mechanically sound, to avoid leaks of oil, hydraulic fluids and grease.

The following measures will be put in place to prevent any spillages to ground of fuels during machinery activities and prevent any resulting soil and/or groundwater quality impacts:

a) Where mobile fuel bowsers are used the following measures will be taken:

i. Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use.

ii. Any pump or valve will be fitted with a lock and will be secured when not in use.

iii. All bowsers to carry a spill kit and operatives must have spill response training; and Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

iv. Weekly checks of spill kits will be carried out to ensure they are sufficiently stocked.

Monitoring

Daily checks will be carried out and recorded in a Surface Water Management Log to ensure pollution control measures are being adhered to. A daily log of inspections will be maintained, and any significant

blockage or spill incidents will be recorded for root cause investigation purposes and updating procedures to ensure incidents do not reoccur.

Contingency Plan

a)The measures will be implemented prior to the relevant works being carried out.

b)During the construction stage the following procedures will be undertaken in response to any pollution incident at the site:

i. The source and/or activities relating to the incident will be stopped immediately.

ii. Adequate steps will be taken to filter and/or slow down the rate of discharge/slippage.

iii. The relevant authorities will be contacted immediately.

The Construction Environmental Management Plan sets out the overall management strategy for construction works for the proposed site works. It includes the mitigation measures set out in the EIAR and will be updated to include additional measures required by the planning conditions, subject to grant of permission for the Proposed Development. The CEMP aims to ensure the management of construction activity is carried out in a planned, structured, and considerate manner which minimises the impacts of the works on the local environment, residents and commercial activities in the vicinity of the site. The project team are committed to ensuring that the construction activities to be carried out are pro-actively managed to minimise potential impacts.

3.6. Assessment of Cumulative & In-Combination Effects

Cumulative effects are described by the EPA as *the addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects*. In combination effects are considered in the appropriate assessment process as an assessment of the potential adverse effects of a plan or project in combination with other plans or projects. The underlying intention of the in-combination provision is to take account of cumulative effects.

As part of the Screening for an Appropriate Assessment, in addition to the Proposed Development, other relevant plans and projects in the area must also be considered at this stage. This step aims to identify at this early stage any possible significant in-combination effects of the Proposed Development with other such plans and projects on European sites.

A review of the National Planning Application Database was undertaken. The database was then queried for developments granted planning permission within 500m of the Proposed Development within the last three years, these are presented in Table 3 below.

Table 3. Planning applications granted permission in the vicinity of the Proposed Development.

Planning Ref.	Description of development	Comments
2560113	Large-Scale Residential Development (LRD) - development of a Purpose-Built Student Accommodation (PBSA) scheme on land fronting the Groody Road and Dublin Road, Castletroy, in the townland of Newcastle, Limerick for a period of seven years. Vehicular access to the site will be from the Groody Road with pedestrian access to the Dublin Road. Extensive landscaping proposals, including (a) landscaped courtyards; (b) pedestrian and cycle connections from the Groody Road to the Groody Green Wedge; (c) natural landscaping and public walkways within the Groody Green Wedge; and (d) a Wetland area adjacent to the Groody River are also proposed. Planning permission is also sought for use of the accommodation, outside of student term time, for short-term letting purposes. The planning application is accompanied by a Natura Impact Statement.	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
211501	modifications of the existing KFC restaurant located in the southern part of the car park, including the installation of 2no. leader boards c.1.805m high x c.0.34m wide, a free standing menu board c. 2.250m high x 2.400m wide, a banner sign c.2.200m high x 5.000m wide, a speaker post outside of the KFC unit c.1.200m high x c.0.600m wide, 4 entry/exit signs c. 1.805m high x 0.4m wide, and 1no. vehicle height restrictor c.3.000m high x c.3.900m wide, the installation of 6 cycle spaces outside of the KFC unit, and modifications to the existing hard standing outside of the KFC unit to facilitate drive through use of the restaurant(resulting in the loss of 2no. car parking spaces). Minor enhancements to the main internal site access road in the central area of the car park to enhance the priority afforded to traffic entering the Limerick One Shopping Park from the Childers Road and ancillary development to include all works above and below ground to facilitate the development	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
221208	the construction of a new detached dwelling house with connection to existing services and all ancillary site works	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
221216	Large-Scale Residential Development (LRD) on lands (0.53 Ha) at Old Dublin Road, Rhebogue, Limerick City. The proposed development comprises of the construction of a Purpose-Built Student Accommodation (PBSA) scheme consisting of 26 no. apartments with a total of 202 no. student bedspaces distributed across 3 No. multi storey blocks with a gross development area of 5,771 sq. m. 'Block C' located at the southern end of the site	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.

	addressing the Old Dublin Road provides 7 No. Student apartments and 52 No. Bedspaces and is 4 storeys with the uppermost floor setback. 'Block C' steps down to 2 storeys to the rear providing ancillary space (342 sq. m.) inclusive of a communal lounge, meeting room, reception area and laundry. Two additional Blocks proposed are located to the rear, namely 'Block B', a 5-storey block with 10 No. apartments and 79 No. Bedspaces and 'Block A', a 4/5 storey block with 9 No. Apartments and 71 No. Bedspaces located at the northern end of the site. A total of 1,519 sq. m. of landscaped public open space is provided across the scheme. The site will be accessed via a 4.8m shared surface and dedicated footpath from the old Dublin Road. The proposed development also includes parking for 16 No. cars and 142 No. bicycles, boundary treatments, bin storage, public lighting, EV charging Bays, electrical infrastructure including 1 no. electrical supply sub-station, water supply and foul and surface water drainage infrastructure and all associated and ancillary site and development works. The planning application may be inspected online at the following website URL setup by the applicant www.olddublinroadstudentvillage.ie	
221231	the raising of the end gable wall and the hip roof to facilitate an attic conversion and all ancillary site works	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
221278	the change of use of part of existing dwelling house to a Personal Training Studio and associated development works	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
2223	the installation of an all-weather training pitch with a 3.0 metre high surrounding fence and floodlighting on masts with ancillary site works	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
22369	'Change of Use' from existing Pub & Restaurant to co-working offices with an internal area of 965m2, external building signage of 7m2, hard & soft landscaping to the front of the building, installation of an EV charging pylon, bicycle shelter & all ancillary site works	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
22683	the construction of a new extension to the side and front of the existing dwelling, alterations to the fenestration of the existing dwelling and all associated site works	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
22718	the installation of solar photovoltaic panels and mounting system (c.2, 528 sqm) on Dunnes Stores roof, including all other associated site works/services	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
22814	the installation of solar photovoltaic panels and mounting system (C.2,794 sq.m) on Dunnes Stores roof, including all other associated site works/services	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.

22907	the development of proposed revisions to the previously permitted development granted under planning permission Reg. Ref. 21/1272 to include proposed modifications to the testing and display area including a new outdoor covered canopy structure, proposed revisions to 4 no. internally illuminated signage, proposed additional external signage, and all ancillary site works	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
23205	The development will consist of the construction of a single store Deposit Return Scheme(DRS) Kiosk (Gross Floor Area: 17 sq. m), including 2 no. signage panel areas for branding on the side elevation of the DRS Kiosk (1.0m x 2.0m), and all associated site development works. The development will result in the removal of 3 no. existing car parking spaces in the car park that serves the existing Aldi store	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
23216	the change from permitted office use to student accommodation on floors 6,7, 8 and 9 together with ancillary foyer on ground floor level	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
23240	the renovation of the protected structure No. 1628, known as the 'Groody' Toll House and the construction of a new extension. Connect to public services and carry out all ancillary site works at the above address. Previous permission granted under Planning Ref. No.18/774	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
2360242	the construction of a first floor extension to side of dwelling. I will also be seeking permission to convert the attic space to habitable area over existing two storey house, add three velux windows on the front elevation of the existing roof, a dormer window on the rear elevation of the existing roof and change the profile of the existing roof and carry out all other ancillary site works	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
23605	7no. two storey, 3 bedroom, terraced dwelling houses, all with off street car parking, connection to main sewer, public lighting and associated site works	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
2360797	the construction of a garage and all ancillary site works	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
2360934	a single storey extension to the side and rear of dwelling and construct a domestic store at the rear and all associated site works	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
2360940	the development that will consist of a proposed mezzanine level to provide for additional trading floorspace, proposed internal alterations to facilitate the development, proposed new signages to the front elevation, and all associated site works necessary to facilitate the development	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
24232	the installation of a cold store to the south side of the petrol station and all ancillary site works	No potential for in-combination effects given that with proposed construction management, the

		Proposed Development will have no effect on any European site.
2438	the demolition & removal of front wall, associated groundworks, internal surface water system and creation of off-road parking	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
2460978	the amalgamation of 4no. existing Ground Floor Retail Units no.s 30, 31/32, 33 & 34 accessed off the existing shopping centre Mall with existing Mall shopfronts and external escape doors on the South side elevation to create one larger Retail Unit with internal and external modifications to widen the escape doors on the South side elevation, new Mall shopfront signage and all associated works necessary to facilitate the development	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.
2560123	the change of use of an existing garage structure to a living space, including minor alterations to the front facade of the garage	No potential for in-combination effects given that with proposed construction management, the Proposed Development will have no effect on any European site.

The Limerick County Development Plan in complying with the requirements of the Habitats Directive requires that all Projects and Plans that could affect the Natura 2000 sites in the same potential Zone of Influence of the Proposed Development site would be initially screened for Appropriate Assessment and if requiring Stage 2 AA, that appropriate employable mitigation measures would be put in place to avoid, reduce or ameliorate negative impacts. In this way any, in-combination impacts with Plans or Projects for the proposed development area and surrounding townlands in which the proposed development site is located, would be avoided.

The listed developments have been granted permission in most cases with conditions relating to sustainable development by the consenting authority in compliance with the relevant Local Authority Development Plan and in compliance with the Local Authority requirement with regard to the Habitats Directive. The development cannot have received planning permission without having met the consenting authority requirement in this regard.

Any new applications for the Proposed Development area will be assessed on a case-by-case basis *initially* by Limerick City and County Council which will determine the requirement for AA Screening as per the requirements of Article 6(3) of the Habitats Directive.

4. Natura Impact Statement & Conclusion

This NIS has reviewed the predicted impacts arising from the Project and found that with the implementation of appropriate measures during the Construction Phase implemented through a

Construction Environment Management Plan, there will be no adverse effects on the integrity of the Lower River Shannon SAC or the River Shannon and River Fergus Estuaries SPA.

It is the conclusion of this NIS, on the basis of the best scientific knowledge available, and with the implementation of the mitigation and restriction measures set out under Section 3.5, that the possibility of any adverse effects on the integrity of the European Sites considered in this NIS (having regard to their conservation objectives), arising from the Project, either alone or in combination with other plans or projects, can be excluded beyond reasonable scientific doubt.

A final determination will be made by the competent authority in this regard.

5. References

Department of the Environment, Heritage and Local Government (2010) Guidance on Appropriate Assessment of plans and projects in Ireland (as amended February 2010).

European Commission (2007) Guidance document on Article 6(4) of the 'Habitats Directive '92/43/EEC: Clarification of the concepts of: alternative solutions, imperative reasons of overriding public interests, compensatory measures, overall coherence and opinion of the Commission. European Commission, Brussels.

European Commission (2018) Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC.

European Commission (2021) 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, Brussels 28.9.21.

European Commission (2021) Guidance document on the strict protection of animal species of Community interest under the Habitats Directive, Brussels 12.10.21.

NPWS (2019) The Status of EU Protected Habitats and Species in Ireland. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.

NPWS (2012) Conservation Objectives: Lower River Shannon SAC [002156]. Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

NPWS (2012) Conservation Objectives: River Shannon and River Fergus Estuaries SPA 004077 . Version 1. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

NPWS (2026) National Parks and Wildlife Service Metadata available online at https://www.npws.ie/maps-and-data

Office-of-the-Planning-Regulator (2021) Appropriate Assessment Screening for Development Management OPR Practice Note PN01. March 2021.

Appendix 1

NPWS Site Synopses

Lower River Shannon SAC [002165]

The NPWS provides the following Site Synopsis in relation to the Lower River Shannon SAC (Version date: 16 December 2013):

This very large site stretches along the Shannon valley from Killaloe in Co. Clare to Loop Head/ Kerry Head, a distance of some 120 km. The site thus encompasses the Shannon, Feale, Mulkear and Fergus estuaries, the freshwater lower reaches of the River Shannon (between Killaloe and Limerick), the freshwater stretches of much of the Feale and Mulkear catchments and the marine area between Loop Head and Kerry Head. Rivers within the sub-catchment of the Feale include the Galey, Smearlagh, Oolagh, Allaughaun, Owveg, Clydagh, Caher, Breanagh and Glenacarney. Rivers within the sub-catchment of the Mulkear include the Killeenagarriff, Annagh, Newport, the Dead River, the Bilboa, Glashacloonaraveela, Gortnageragh and Cahernahallia.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (= priority; numbers in brackets are Natura 2000 codes):*

[1110] Sandbanks
[1130] Estuaries
[1140] Tidal Mudflats and Sandfiats
*[1150] Coastal Lagoons**
[1160] Large Shallow Inlets and Bays
[1170] Reefs
[1220] Perennial Vegetation of Stony Banks
[1230] Vegetated Sea Cliffs
[1310] Salicornia Mud
[1330] Atlantic Salt Meadows
[1410] Mediterranean Salt Meadows
[3260] Floating River Vegetation
[6410] Molinia Meadows
*[91E0] Alluvial Forests**
[1029] Freshwater Pearl Mussel (Margaritifera margaritifera)
[1095] Sea Lamprey (Petromyzon marinus)
[1096] Brook Lamprey (Lampetra planeri)
[1099] River Lamprey (Lampetra fluviatilis)
[1106] Atlantic Salmon (Salmo salar)
[1349] Bottle-nosed Dolphin (Tursiops truncatus)
[1355] Otter (Lutra lutra)

The Shannon and Fergus Rivers flow through Carboniferous limestone as far as Foynes, but west of Foynes Namurian shales and flagstones predominate (except at Kerry Head, which is formed from Old Red Sandstone). The eastern sections of the Feale catchment flow through Namurian rocks and the western stretches through Carboniferous limestone. The Mulkear flows through Lower Palaeozoic rocks in the upper reaches before passing through Namurian rocks, followed by Lower Carboniferous shales and Carboniferous limestone. The Mulkear River itself, immediately north of Pallas Green, passes through an area of Rhyolites, Tuffs and Agglomerates.

The Shannon and Fergus Estuaries form the largest estuarine complex in Ireland. They form a unit stretching from the upper tidal limits of the Shannon and Fergus Rivers to the mouth of the Shannon Estuary (considered to be a line across the narrow strait between Kilcredaun Point and Kilconly Point). Within this main unit there are several tributaries with their own 'sub-estuaries' e.g. the Deel River, Mulkear River, and Maigue River. To the west of Foynes, a number of small estuaries form indentations in the predominantly hard coastline, namely Poulnasherry Bay, Ballylongford Bay, Clonderalaw Bay and the Feale or Cashen River estuary.

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.

In the transition zone between mudflats and saltmarsh, specialised colonisers of mud predominate. For example, swards of Common Cord-grass (Spartina anglica) frequently occur in the upper parts of the estuaries. Less common are swards of Glasswort (Salicornia europaea agg.). In the innermost parts of the estuaries, the tidal channels or creeks are fringed with species such as Common Reed (Phragmites australis) and club-rushes (Scirpus maritimus, S. tabernaemontani and S. triquetrus). In addition to the nationally rare Triangular Club-rush (Scirpus triqueter), two scarce species are found in some of these creeks (e.g. Ballinacurra Creek): Lesser Bulrush (Typha angustifolia) and Summer Snowflake (Leucojum aestivum).

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).

Saltmarsh vegetation also occurs around a number of lagoons within the site, two of which have been surveyed as part of a National Inventory of Lagoons. Cloonconeen Pool (4-5 ha) is a natural sedimentary lagoon impounded by a low cobble barrier. Seawater enters by percolation through the barrier and by overwash. This lagoon represents a type which may be unique to Ireland since the substrate is composed almost entirely of peat. The adjacent shore features one of the best examples of a drowned forest in Ireland. Aquatic vegetation in the lagoon includes typical species such as Beaked Tasselweed (Ruppia maritima) and green algae (Cladophora sp.). The fauna is not diverse, but is typical of a high salinity lagoon and includes six lagoon specialists (Hydrobia ventrosa, Cerastoderma glaucum, Lekanesphaera hookeri, Palaemonetes varians, Sigara stagnalis and Enochrus bicolor). In contrast, Shannon Airport Lagoon (2 ha) is an artificial saline lake with an artificial barrier and sluiced outlet. However, it supports two Red Data Book species of stonewort (Chara canescens and Chara cf. connivens).

Most of the site west of Kilcredaun Point/Kilconly Point is bounded by high rocky sea cliffs. The cliffs in the outer part of the site are sparsely vegetated with lichens, Red Fescue, Sea Beet (Beta vulgaris subsp. maritima), Sea Campion (Silene vulgaris subsp. maritima), Thrift and plantains (Plantago spp.). A rare endemic type of sea- lavender, Limonium recurvum subsp. pseudotranswallianum, occurs on cliffs near Loop Head. Cliff-top vegetation usually consists of either grassland or maritime heath. The boulder clay cliffs further up the estuary tend to be more densely vegetated, with swards of Red Fescue and species such as Kidney Vetch (Anthyllis vulneraria) and Common Bird's-foot-trefoil (Lotus corniculatus).

The site supports an excellent example of a large shallow inlet and bay. Littoral sediment communities in the mouth of the Shannon Estuary occur in areas that are exposed to wave action and also in areas extremely sheltered from wave action. Characteristically, exposed sediment communities are composed of coarse sand and have a sparse fauna. Species richness increases as conditions become more sheltered. All shores in the site have a zone of sand hoppers at the top, and below this each of the shores has different characteristic species giving a range of different shore types.

The intertidal reefs in the Shannon Estuary are exposed or moderately exposed to wave action and subject to moderate tidal streams. Known sites are steeply sloping and show a good zonation down the shore. Well developed lichen zones and littoral reef communities offering a high species richness in the sublittoral fringe and strong populations of the Purple Sea Urchin Paracentrotus lividus are found. The communities found are tolerant to sand scour and tidal streams. The infralittoral reefs range from sloping platforms with some vertical steps, to ridged bedrock with gullies of sand between the ridges, to ridged bedrock with boulders or a mixture of cobbles, gravel and sand. Kelp is very common to about 18 m. Below this it becomes rare and the community is characterised by coralline crusts and red foliose algae.

Other coastal habitats that occur within the site include stony beaches and bedrock shores (these support a typical zonation of seaweeds such as Fucus spp., Ascophyllum nodosum and kelps), shingle beaches (with species such as Sea Beet, Sea Mayweed Matricaria maritima, Sea Campion and Curled Dock - Rumex crispus), sandbanks which are slightly covered by sea water at all times (e.g. in the area from Kerry Head to Beal Head) and sand dunes (a small area occurs at Beal Point, where Marram — Ammophila arenaria is the dominant species).

Freshwater rivers have been included in the site, most notably the Feale and Mulkear catchments, the Shannon from Killaloe to Limerick (along with some of its tributaries, including a short stretch of the Kilmastulla River), the Fergus up as far as Ennis, and the Cloon River. These systems are very different in character: the Shannon is broad, generally slow flowing and naturally eutrophic; the Fergus is smaller and alkaline; while the narrow, fast flowing Cloon is acid in nature. The Feale and Mulkear catchments exhibit all the aspects of a river from source to mouth. Semi-natural habitats, such as wet grassland, wet woodland and marsh occur by the rivers, but improved grassland is the most common habitat type. One grassland type of particular conservation significance, Molinia meadows, occurs in several parts of the site and the examples at Worldsend on the River Shannon are especially noteworthy. Here are found areas of wet meadow dominated by rushes (Juncus spp.) and sedges (Carex spp.), and supporting a diverse and species-rich vegetation, including such uncommon species as Blue-eyed Grass (Sisyrinchium bermudiana) and Pale Sedge (C. pallescens).

Floating river vegetation characterised by species of water-crowfoot (Ranunculus spp.), pondweeds (Potamogeton spp.) and the moss Fontinalius antipyretica are present throughout the major river systems within the site. The rivers contain an interesting bryoflora with Schistidium alpicola var. alpicola recorded from in-stream boulders on the Bilboa, new to Co. Limerick.

Alluvial woodland occurs on the banks of the Shannon and on islands in the vicinity of the University of Limerick. The woodland is up to 50 m wide on the banks and somewhat wider on the largest island. The most prominent woodland type is gallery woodland where White Willow (Salix alba) dominates the tree layer with occasional Alder (Alnus glutinosa). The shrub layer consists of various willow species with Rusty Willow (Salix cinerea ssp. oleifolia) and what appear to be hybrids of S. alba x S. viminalis. The herbaceous layer consists of tall perennial herbs. A fringe of bulrush (Typha sp.) occurs on the river side of the woodland. On slightly higher ground above the wet woodland and on the raised embankment remnants of mixed oak-ash- alder woodland occur. These are poorly developed and contain numerous exotic species but locally there are signs that it is invading open grassland. Alder is the principal tree species, with occasional Pedunculate Oak (Quercus robur), elm (Ulmus glabra and U. procera), Hazel (Corylus avellana), Hawthorn (Crataegus monogyna) and the shrubs Guelder-rose (Viburnum opulus) and willows. The ground flora is species-rich.

While woodland is infrequent within the site, however Cahiracon Wood contains a strip of old oak woodland. Sessile Oak (Q. petraea) forms the canopy, with an understorey of Hazel and Holly (Ilex aquifolium). Great Wood-rush (Luzula sylvatica) dominates the ground flora. Less common species present include Great Horsetail (Equisetum telmeteia) and Pendulous Sedge (Carex pendula).

In the low hills to the south of the Slievefelim Mountains, the Cahernahallia River cuts a valley through the Upper Silurian rocks. For approximately 2 km south of Cappagh Bridge at Knockanavar, the valley sides are wooded. The woodland consists of birch (Betula spp.), Hazel, oak, Rowan (Sorbus aucuparia), some Ash (Fraxinus excelsior) and willow (Salix spp.). Most of the valley is not grazed by stock, and as a result the trees are regenerating well. The ground flora features prominent Great wood-rush and Bilberry (Vaccinium myrtillus), along with a typical range of woodland herbs. Bracken (Pteridium aquilinum) is a feature in areas where there is more light available.

The valley sides of the Bilboa and Gortnageragh Rivers, on higher ground north-east of Cappamore, support patches of semi-natural broadleaf woodland dominated by Ash, Hazel, oak and birch. There is a good scrub layer with Hawthorn, willow, Holly and Blackthorn (Prunus spinosa) common. The herb layer in these woodlands is often open, with a typically rich mixture of woodland herbs and ferns. Moss species diversity is high. The woodlands are ungrazed. The Hazel is actively coppiced in places.

There is a small area of actively regenerating cut-away raised bog at Ballyrorheen. It is situated approximately 5 km north-west of Cappamore in Co. Limerick. The bog contains some wet areas with good cover of bog mosses (Sphagnum spp.). Species of particular interest include Cranberry (Vaccinium oxycoccos) and White Sedge (Carex curta), along with two regionally rare mosses, including the bog moss S. fimbriatum. The site is being invaded by Downy Birch (Betula pubescens) scrub woodland. Both commercial forestry and the spread of Rhododendron (Rhododendron ponticum) has greatly reduced the overall value of the site.

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 Bar- tailed Godwit (476; 1995/96). In the past, three separate flocks of Greenland White-fronted 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).

There is a resident population of Bottle-nosed Dolphin in the Shannon Estuary. This is the only known resident population of this E.U. Habitats Directive Annex II species in Ireland. The population is estimated (in 2006) to be 140 ± 12 individuals. Otter, a species also listed on Annex II of this Directive, is commonly found on the site.

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.

Two additional fish species of note, listed in the Irish Red Data Book, also occur, namely Smelt (Osmerus eperlanus) and Pollan (Coregonus autumnalis pollan). Only the former has been observed spawning in the Shannon.

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.

There is a wide range of land uses within the site. The most common use of the terrestrial parts is grazing by cattle, and some areas have been damaged through over-grazing and poaching. Much of the land adjacent to the rivers and estuaries has been improved or reclaimed and is protected by embankments (especially along the Fergus estuary). Further, reclamation continues to pose a threat, as do flood relief works (e.g. dredging of rivers). Gravel extraction poses a major threat on the Feale.

In the past, cord-grass (Spartina sp.) was planted to assist in land reclamation. This has spread widely, and may oust less vigorous colonisers of mud and may also reduce the area of mudflat available to feeding birds.

Domestic and industrial wastes are discharged into the Shannon, but water quality is generally satisfactory, except in the upper estuary where it reflects the sewage load from Limerick City. Analyses for trace metals suggest a relatively clean estuary with no influences of industrial discharges apparent. Further industrial development along the Shannon and water polluting operations are potential threats.

Fishing is a main tourist attraction on the Shannon and there are a large number of angler associations, some with a number of beats. Fishing stands and styles have been erected in places. The River Feale is a designated Salmonid Water under the E.U. Freshwater Fish Directive. Other uses of the site include commercial angling, oyster farming, boating (including dolphin-watching trips) and shooting. Some of these may pose threats to the birds and dolphins through disturbance. Specific threats to the dolphins include underwater acoustic disturbance, entanglement in fishing gear and collisions with fast moving craft.

This site is of great ecological interest as it contains a high number of habitats and species listed on Annexes I and II of the E.U. Habitats Directive, including the priority habitats lagoon and alluvial woodland, the only known resident population of Bottle-nosed Dolphin in Ireland and all three Irish lamprey species. A good number of Red Data Book species are also present, perhaps most notably the thriving populations of Triangular Club-rush. A number of species listed on Annex I of the E.U. Birds Directive are also present, either wintering or breeding. Indeed, the Shannon and Fergus Estuaries form the largest estuarine complex in Ireland and support more wintering wildfowl and waders than any other site in the country. Most of the estuarine part of the site has been designated a Special Protection Area (SPA), under the E.U. Birds Directive, primarily to protect the large numbers of migratory birds present in winter.

River Shannon and River Fergus Estuaries SPA [004077]

The NPWS provides the following Site Synopsis in relation to the River Shannon and River Fergus Estuaries SPA (Version date: 30 May 2015):

The estuaries of the River Shannon and River Fergus form the largest estuarine complex in Ireland. The site comprises the entire estuarine habitat from Limerick City westwards as far as Doonaha in Co. Clare and Dooneen Point in Co. Kerry.

The site has vast expanses of intertidal flats which contain a diverse macro-invertebrate 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, Light-bellied 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.

Apart from the wintering birds, large numbers of some species also pass through the site whilst on migration in spring and/or autumn.

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.