CHAPTER SEVEN BIODIVERSITY

7.1 INTRODUCTION

This chapter assesses the likely significant effects (both alone and cumulatively with other projects) that the proposed development may have on biodiversity. Mitigation by design was applied to the finalised proposed development layout wherever possible to avoid impacts on biodiversity. This chapter first describes the baseline environment at the site. It then assesses the effects on biodiversity in the absence of mitigation. Following this, it sets out the mitigation measures proposed to avoid, reduce or offset any potential significant effects that are identified. The residual impacts on biodiversity are then assessed. Particular attention has been paid to species and habitats of ecological importance. These include species and habitats with national and international protection under the Wildlife Acts 1976 (as amended), EU Habitats Directive 92/43/EEC.

The proposed application site (Phase II) is part of a phased development proposal for a significant city centre, regeneration area or Masterplan Site (MS). This MS is divided into four different phases of delivery as detailed in Section 1.6.3 in Chapter 1.0 Introduction. The overall MS layout which illustrates the indicative layout of the subject site and adjoining lands in the ownership of the applicant is displayed in Chapter 1.0, Figure 1.4 and full details of the proposed development phases are provided in Chapter 2.0, Section 2.2.4. In addition to an in-depth assessment of the Proposed Development, this assessment takes a holistic approach and examines the wider MS area, taking into account the proposed future phases of development based on the available information.

There are six distinct, but yet permeable areas identified within the overall Cleeves Masterplan site, these are detailed in Figure 2.1 of Chapter 2.0 Project Description and are described as follows:

- ‘Flaxmill Site’ (1.6 hectares) comprises the Flaxmill, perimeter walls, Chimney, Engine House, Water Tank and Steeping Galleries.

- Shipyard Site’ (0.7 hectares) gently sloping towards the river, is located between the North Circular Road and Condell Road, adjoining Fernhill residential development to the north west and St, Michael’s Rowing club to the south east, is currently used for storage and car parking and includes a warehouse.

- ‘Riverfront’ (0.22 hectares) including St Michael’s Rowing Club premises and club facilities, is defined by O’Callaghan Strand to the north and the River Shannon to the south extending from a point defined by the Condell Road and Shannon Bridge to the west.

- ‘Stonetown Terrace Site’ (0.43 hectares) is accessed via the Stonetown Terrace Road and is defined by the Landsdowne Hall apartment block to the east, existing housing in Clanmaurice Gardens to the north, Clanmaurice Avenue to the west and the Quarry Site to the south. The site comprises an Upper Reservoir structure.

- ‘Quarry Site’ (0.61 hectares) is dominated by a cliff face which adjoins the long rear gardens of housing in Clanmaurice Avenue to the north. Part of the southern boundary touches the North Circular Road and extends to include 2 no. Victorian Houses.

- 'Salesians Site' (0.9 hectares) is separate to the Cleeves Complex, located to the west of the Quarry site, with the long rear gardens of housing in Clanmaurice Avenue defining the northern boundary, Salesians primary school defining the western boundary and North Circular Road defining the southern boundary. The site comprises a complex of buildings including a former secondary school, currently used for the temporary accommodation of Ukranian refugees and Fernbank House, a former private dwelling which has been much altered and extended to meet the needs of the school.

For the purposes of this EIAR:

- Where the 'proposed development' is referred to, this encompasses the entirety of the Phase II development
- Where 'the Application site', or 'the site', is referred to, this relates to the primary red line boundary of the proposed development
- Where 'the Masterplan site' is referred to, this relates to the wider MS area which has been considered as part of the assessment.
- 'Key Ecological Receptor" (KER) is defined as a species or habitat occurring within the zone of influence of the proposed development upon which likely significant effects are anticipated.
- Zones of Influence" (ZoI) for individual ecological receptors refers to the zone within which potential effects are anticipated. ZoIs differ depending on the sensitivities of particular habitats and species and were assigned in accordance with best available guidance and through adoption of a precautionary approach.

7.1.1 Requirements for Ecological Impact Assessment

National Legislation

The Wildlife Act, 1976 (as amended), is the principal piece of legislation governing protection of wildlife in Ireland. The Wildlife Act provides strict protection for species of conservation value. The Wildlife Act conserves wildlife (including game) and protects certain wild animals and flora. These species are therefore considered in this report as ecological receptors.

Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs) are heritage sites that are designated for the protection of flora, fauna, habitats and geological sites. Only NHAs are designated under the Wildlife Act. NHAs are legally protected from damage from the date they are formally proposed for designation[1]. A list of pNHAs were published on a non-statutory basis in 1995 but have not since been statutorily proposed or designated. However, these sites are considered to be of significance for wildlife and habitats as they may form statutory designated sites in the future.

The Flora (Protection) Order 2022 (S.I. No. 235) lists the species, hybrids and/or subspecies of flora protected under Section 21 of the Wildlife Act. It provides protection to a wide variety of protected plant species in Ireland including vascular plants, mosses, liverworts, lichens and stoneworts. Under the Flora Protection Order it is illegal to cut, pick, collect, uproot or damage, injure or destroy species listed or their flowers, fruits, seeds or spores or wilfully damage, alter, destroy or interfere with their habitat (unless under licence).

[1] *https://www.npws.ie/protected-sites/nha*

National Policy

Irelands 4th National Biodiversity Action Plan 2023-2030 (Department of Housing, Local Government and Heritage, 2024) (the "**NBAP**"). The NBAP strives for a "whole of government, whole of society" approach to the governance and conservation of biodiversity. It demonstrates Ireland's continuing commitment to meeting and acting on its obligations to protect Ireland's biodiversity for the benefit of future generations and will implement this through a number of key targets, actions and objectives.

The Wildlife Act, 1976 (as amended) provides that every public body, as listed in the Act, is obliged to have regard to the objectives and targets in the NBAP. The NBAP sets out five key objectives as follows:

- **Objective 1: Adopt a Whole-of Government, Whole of-Society Approach to Biodiversity.** Proposed actions include capacity and resource reviews across Government; determining responsibilities for the expanding biodiversity agenda providing support for communities, citizen scientists and business; and mechanisms for the governance and review of this National Biodiversity Action Plan.
- **Objective 2: Meet Urgent Conservation and Restoration Needs.** Supporting actions will build on existing conservation measures. Efforts to tackle Invasive Alien Species will be elevated. The protected area network will be expanded to include the Marine Protected Areas. The ambition of the EU Biodiversity Strategy will be considered as part of an evolving work programme across Government.
- **Objective 3: Secure Nature's Contribution to People.** Actions highlight the relationship between nature and people in Ireland. These include recognising the tangible and intangible values of biodiversity, promoting nature's importance to our culture and heritage and recognising how biodiversity supports our society and our economy.
- **Objective 4: Enhance the Evidence Base for Action on Biodiversity.** This objective focuses on biodiversity research needs, as well as the development and strengthening of long-term monitoring programmes that will underpin and strengthen future decision-making. Action will also focus on collaboration to advance ecosystem accounting that will contribute towards natural capital accounts.
- **Objective 5: Strengthen Ireland's Contribution to International Biodiversity Initiatives.** Collaboration with other countries and across the island of Ireland will play a key role in the realisation of this Objective. Ireland will strengthen its contribution to international biodiversity initiatives and international governance processes, such as the United Nations Convention on Biological Diversity.

European Legislation

Habitats and species of European importance are provided legal protection under the EU Habitats Directive 92/43/EEC (the Habitats Directive) and the EU Birds Directive 2009/147/EC (the Birds Directive) this legislation forms the cornerstone of Europe's nature conservation within the EU. It is built around two pillars: the Natura 2000 network of protected sites (hereafter referred to as European sites[2]) and the strict system of species protection. The European Communities (Birds and Natural Habitats

[2] *The term Natura 2000 network was replaced by 'European site' under the EU (Environmental Impact Assessment and Habitats) Regulations 2011 S.I. No. 473 of 2011.*

Regulations 2011 (S. I. No. 477 of 2011), as amended, and the Planning and Development Act 2000, as amended, transpose the Habitats Directive and the Birds Directive into Irish law.

Annex I of the Habitats Directive lists habitat types whose conservation requires the designation of Special Areas of Conservation (SAC). Priority habitats, such as Turloughs, which are in danger of disappearing within the EU territory are also listed in Annex I. Annex II of the Directive lists animal and plant species (e.g. marsh fritillary, Atlantic salmon, and Killarney fern) whose conservation also requires the designation of SAC. Annex IV lists animal and plant species in need of strict protection such as lesser horseshoe bat and otter, and Annex V lists animal and plant species whose taking in the wild and exploitation may be subject to management measures. In Ireland, species listed under Annex V include Irish hare, common frog and pine marten. Species can be listed in more than one Annex, as is the case with otter and lesser horseshoe bat which are listed on both Annex II and Annex IV. The disturbance of species under Article 12 of the Habitats Directive (and in particular avoidance of deliberate disturbance of Annex IV species, particularly during the period of breeding, rearing, hibernation and migration and avoidance of deterioration or destruction of breeding sites or resting places) has been specifically assessed in this EIAR.

The Birds Directive instructs Member States to take measures to maintain populations of all bird species naturally occurring in the wild state in the EU (Article 2). According to Recital 1 of the Birds Directive, Council Directive 79/409/EEC on the conservation of wild birds was substantially amended several times and in the interests of clarity and rationality, the Birds Directive codifies Council Directive 79/409/EEC. Such measures may include the maintenance and/or re-establishment of habitats in order to sustain these bird populations (Article 3). A subset of bird species has been identified in the Directive and are listed in Annex I as requiring special conservation measures in relation to their habitats. These species have been listed on account of inter alia: their risk of extinction; vulnerability to specific changes in their habitat; and/or due to their relatively small population size or restricted distribution. Special Protection Areas (SPAs) are to be identified and classified for these Annex I listed species and for regularly occurring migratory species, paying particular attention to the protection of wetlands (Article 4).

In summary, the species and habitats provided National and International protection under these legislative and policy documents have been considered in this EIAR. A detailed assessment of the likelihood of the proposed development having either a significant effect or an adverse impact on any relevant European Sites (i.e. SACs, cSACs[3], SPAs or cSPAs) has been carried out in the Appropriate Assessment (AA) Screening Report and Natura Impact Statement. A separate assessment has not been carried out in this chapter, to avoid duplication of assessments. However, the relevant conclusions have been cross-referenced and incorporated.

In addition to the above, the following legislation applies with respect to habitats, fauna, invasive species and water quality in Ireland and has been considered in the preparation of this chapter:

- The International Convention on Wetlands of International Importance especially Waterfowl Habitat (Concluded at Ramsar, Iran on 2 February 1971)

[3] *Candidate SAC (cSAC) are afforded the same protection as SACs. The process of making cSAC into SACs by means of Statutory instrument has begun and while the process if ongoing the term SAC will be used to conform with nomenclature used in the National Parks and Wildlife Services (NPWS) databased. The name applies to candidate SPAs.*

- S.I. No. 272 of 2009: European Communities Environmental Objectives (Surface Waters) Regulations 2009, as amended, and S.I. No. 722 of 2003 European Communities (Water Policy) Regulations 2003 which give further effect to EU Water Framework Directive (2000/60/EC), as amended.
- Regulation 49 and 50 of European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011).

7.1.2 Review of Relevant Guidance and Sources of Consultation

Chapter 1.0 lists the Guidelines that have been complied with in the preparation of the EIAR. In this chapter, the assessment methodology also complies with the National Road Authority (NRA)'s *Guidelines for Assessment of Ecological Impacts of National Road Schemes Rev 2* (NRA, 2009a) and the survey methodology is complies with the NRA Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes (NRA, 2009b). Although these survey methodologies relate to road schemes, these standard guidelines are recognised survey methodologies that ensure good practice regardless of the development type.

In addition, the following guidelines were adhered with in the preparation of this document to provide the scope, structure and content of the assessment:

- Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater and Coastal (CIEEM, 2018).

This assessment has been carried out in accordance with the Environmental Impact Assessment guidance as outlined in Chapter 1.0 of the EIAR.

This assessment has been prepared with respect to the various planning policies and strategy guidance documents listed below:

- Limerick County Development Plan 2022-2028
- Limerick City Development Plan 2021-2027
- 4th National Biodiversity Action Plan 2023-2027
- Limerick City Council Biodiversity Plan
- Lesser Horseshoe Bat Species Action Plan 2022-2026
- All-Ireland Pollinator Plan 2021-2025
- Regional Spatial and Economic Strategy for the Southern Region (2020-2032)
- National Planning Framework. Ireland 2040 Our Plan
- National Development Plan 2021-2030

7.1.3 Statement of Authority

This chapter was prepared by Pat Roberts and Sara Fissolo, their qualifications and experience are provided in Section 1.10 of this EIAR. The baseline ecological surveys undertaken at the site were conducted by a number of MKO Ecologists. All surveyors have relevant academic qualifications and are competent in undertaking habitat and ecological assessments (**Error! Reference source not found.**). Preliminary ecological site visits in 2021 were carried out by Kevin McElduff and overseen by Colin Murphy. Further habitat ecological surveys were carried out by Rachel Minogue, Tom Peters,

Sara Fissolo and David Mesarcik. Bird surveys were carried out by Kevin McElduff, Colin Murphy, Katy Beckett, Bronagh Boylan, Cora Twomey, Nora Szijarto and Sara Fissolo.

Bat survey scope development and project management was overseen by Pat Roberts and lead by Aoife Joyce and Sara Fissolo. All other bat surveyors are listed in Appendix 7-1.

Table 7.1.3-1 MKO Surveyors

Surveyor	Academic Qualifications
Pat Roberts	B.Sc. (Environmental Science),BTEC N. Dip (Countryside Management), (MCIEEM).
Aoife Joyce	B.Sc. (Environmental Science), M.Sc. (Agribioscience).
Sara Fissolo	B.Sc. (Hons.) (Ecology and Environmental Biology), B.Sc. (Intercultural Communication)
Colin Murphy	B.Sc. (Hons.) (Ecology and Environmental Biology), M.Sc. (Ecosystem Science and Policy)
Rachel Minogue	B.Sc. (Hons.) (Environmental Science)
David Mesarcik	B.Sc. (Ecology and Evolutionary Biology), Hons. (Ecology)
Kevin McElduff	B.Sc. (Environmental Science)
Tom Peters	B.Sc. (Hons.) (Environmental and Geographical Sciences), M.Sc. (Hons.) (Applied Environmental Sciences)
Katy Beckett	B.A. (Environmental Science), M.Sc. (Biodiversity and Conservation)
Bronagh Boylan	B.Sc. (Environmental Science)
Cora Twomey	B.Sc. (Ecology and Environmental Biology)
Nora Szijarto	B.Sc. (Biology), M.Sc. (Behaviour, Evolution and Conservation)

7.2 ASSESSMENT METHODOLOGY

The following sections describe the methodologies followed to establish the baseline ecological condition of the site and surrounding area. Assessing the impacts of any project and associated activities requires an understanding of the ecological baseline conditions prior to and at the time of the project proceeding. Ecological Baseline conditions are those existing in the absence of proposed activities (CIEEM, 2018).

7.2.1 Desk Study

The desk study undertaken for this assessment included a thorough review of available ecological data comprising the sources below, last reviewed on 2nd July 2025:

- Review of NPWS Article 17 maps 2019, 2013 and 2007.
- Review of online web-mappers: National Parks and Wildlife Service (NPWS)[4], EPA maps[5], Water Framework Directive (WFD) and Inland Fisheries Ireland (IFI)[6].
- Inland Fisheries Ireland (IFI) Reports.

[4] *https://dahg.maps.arcgis.com/apps/webappviewer/inde7.html?id=8f7060450de3485fa1c1085536d477ba*
[5] *https://gis.epa.ie/EPAMaps/*
[6] *https://ifigis.maps.arcgis.com/apps/webappviewer/inde7.html?id=9a31fedb077c4fb2991184842b7ef025*

- Data on potential occurrence of rare plant and bryophytes – as per NPWS online map viewers; Flora Protection Order 2022 Map Viewer[7].
- Review of the Bat Conservation Ireland (BCI) Private Database.
- Review of the publicly available National Biodiversity Data Centre (NBDC) web-mapper.
- Review of specially requested records from the NPWS Rare and Protected Species Database for the hectads in which the Proposed development is located.
- Potential for cumulative effects have been considered in Chapter 21.0 of this EIAR and Section 7.6 of this Chapter. This was informed by a review of the EIARs/NISs prepared for other plans and projects occurring in the wider area.

A review of the Irish Reports for Article 17 of the Habitats Directive (92/42/EEC), as well as the Heath, Bogs and Mires, Irish Semi-Natural Grassland Survey datasets, National Survey of Native Woodlands and Ancient and Long-Established Woodland datasets was carried out as part of this assessment.

The following methodology was used to establish which sites that are designated for nature conservation have the potential to be impacted by the proposed development:

- The presence of a complete source- pathway receptor chain between the proposed development and both European and Nationally designated sites was considered. Where any such connection was identified, the sites were subject of further assessment.
- The designation features of these sites, as per the NPWS website (www.npws.ie), were consulted and reviewed at the time of preparing this report.
- Where potential pathways for Significant Effect are identified, the site is included within the Likely Zone of Influence (ZoI) and further assessment is undertaken.

7.2.2 Field Study

A comprehensive survey of the biodiversity within the Application and Masterplan Sites was undertaken to inform this Biodiversity Chapter of the EIAR and associated reporting. The following sections fully describe the ecological surveys that have been undertaken and provide details of the methodologies and guidance followed.

Surveys were carried out between November 2021 and June 2025 and are summarised in Table 7.2-1 below.

Table 7.2-1 Surveys Undertaken

Survey Type	Dates	Relevant Appendix
Multi-disciplinary walkovers (incl. habitats and mammal surveys)	• 15th December 2021 • 12th January 2022 • 14th March 2022 • 7th July 2022 • 5th November 2024 • 15th February 2024 • 5th November 2024 • 4th December 2024	

[7] *https://heritagedata.maps.arcgis.com/apps/webappviewer/inde7.html?id=a41ef4e10227499d8de17a8abe42bd1e*

	• 27th March 2025 • 5th June 2025	
Bat Surveys	• 22nd February 2022 • July 2022 • May 2023 • July 2023 • September 2023 • 6th October 2024 • 5th June 2025	Bat Baseline Report - Appendix 7.1
Wintering Bird Surveys	• 15th December 2021 • 12th January 2022 • 15th February 2022 • 14th March 2022 • 15th February 2024 • 5th November 2024 • 4th December 2024	Wintering Bird Report – Appendix 7.2
Invasive Species Surveys	• A series of walk-through inspections and surveys of the MS were carried out by Invasive Plant Solutions between February 2021 and May 2021, informing required treatments undertaken until 2024. • 5th June 2025	ISMP – Appendix 7.3

7.2.2.1 Multi-disciplinary Walkover Surveys (as per NRA Guidelines, 2009)

Multidisciplinary walkover surveys were undertaken within the Masterplan site. Surveys were undertaken within the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith et al., 2011). All habitats recorded on site and described in this Biodiversity chapter have been classified in accordance with Fossitt (2000). Plant nomenclature for vascular plants follows 'New Flora of the British Isles' (Stace, 2010).

A comprehensive walkover of the entire Masterplan site was completed with incidental records also incorporated from other dedicated species/habitat specific surveys. During the multidisciplinary surveys, a search for Invasive Alien Species (IAS) listed under the First Schedule list of the European Union (Invasive Alien Species) Regulations 2024 [S.I.374/2024] was conducted.

The walkover surveys were also designed to detect the presence, or likely presence, of species protected in Ireland. The survey included a search for mammal signs and areas of suitable habitat to support these species, potential features likely to be of significance to bats and additional habitat features for the full range of other protected species that are likely to occur in the vicinity of the proposed development. Surveys for badger and otter were carried out during multidisciplinary walkovers to determine the presence or absence these species within the Masterplan Site. This involved a search for all potential badger signs (latrines, badger prints, mammal tracks and setts) across the site, and a search for all otter signs (e.g. spraints, scat, prints, slides, trails, couches and holts), particularly around the Reservoir located within the Quarry Site and along the shore of the Shannon.

Bird species observed during the multi-disciplinary surveys were also recorded.

The multi-disciplinary walkover surveys comprehensively covered the entire Masterplan site and based on the survey findings, further detailed targeted surveys were carried out for features and locations of ecological significance. The targeted surveys undertaken within the proposed development site are described in the following subsections.

7.2.2.2 Bat Surveys

An extensive suite of bat surveys was undertaken within the Masterplan Site. Preliminary roost inspections were first carried out in 2021 and 2022, with the first activity surveys carried out in summer 2022. The bulk of the assessment was undertaken in 2023, as seasonal surveys were carried out to establish the nature of the activity recorded on site. Particular focus was given to lesser horseshoe bat (LHB) activity identified onsite. Additional top-up inspection surveys were carried out in 2024 and 2025 to ensure no changes in the baseline had occurred since the bulk of the surveys were completed. These updated surveys included a revisit of all accessible interiors within the site to find evidence of recent use (i.e. droppings, feeding remains) in areas previously identified as resting sites.

The updated site visits in October 2024 were carried out by Sara Fissolo, Colin Murphy and Nora Szijarto, accompanied by LCCC Ecologist Sean Doyle. These primarily focused on the Flaxmill building to facilitate Phase 1 Heritage works on this protected structure. A derogation licence from NPWS has been obtained for the heritage works (DER-BAT-2025-169). Bat monitoring is ongoing at the site as part of Phase 1 Heritage works in line with conditions from the derogation licence.

The entire Application site was reinspected in June 2025 by Sara Fissolo and David Mesarcik. A thermal camera (Pixfra ARC Thermal Monocular) and an endoscope were used to aid these assessments.

Detailed description of the survey methodologies undertaken in relation to bats is provided in the Bat Report included in Appendix 7-1 of this EIAR, together with full details of the survey times and the surveyors who carried out the bat survey and assessment work.

Survey design and effort was created in accordance with the best practice guidelines available, ‘Bat Surveys: Good Practice Guidelines’ prepared by the Bat Conservation Trust (Collins 2023). This is in line with standard best practice industry guidelines.

7.2.2.3 Wintering Bird Surveys

Wintering bird surveys were undertaken to assess the presence and use of the Masterplan site by birds associated with the nearby SPA. The surveys were carried out within the Masterplan site, near the reservoir (Vantage Point ITM: anyway X556880, Y657253), and along the area of shoreline within River Shannon and River Fergus Estuaries SPA which is adjacent to the Masterplan site, located at St Micheals Rowing Club (Vantage Point ITM: X557086, Y657070). The surveys were undertaken by appropriately qualified ornithologists. All observations were recorded, with all bird species denoted using standard British Trust for Ornithology (BTO) codes and with the number of each species recorded next to each registration. The target species for these surveys were those covered by Irish Wetlands Bird Survey (I-WeBS) counts, i.e. all divers, grebes, cormorant, shag, herons, swans, geese, ducks, rails, crakes, waders, gulls and kingfisher.

The surveys were undertaken at high and low tide times to ensure information was gathered on how bird species may utilise the different habitats (i.e. mudflats and tidal river).

A 2021/2022 wintering bird surveys report is presented in Appendix 7.2.

7.2.2.4 Other Fauna

During the multidisciplinary walkover surveys, where observed, incidental records of other fauna, including breeding birds and invertebrates, were recorded.

7.2.2.5 Invasive Species

A series of walk-through inspections and surveys of the development site were carried out by Invasive Plant Solutions between February 2021 and May 2021. The purpose of these surveys was to validate the presence, and extent, of the identified Japanese Knotweed location at the north-western boundary of the reservoir within the site, as well as identifying the presence of a further Himalayan Knotweed stand located adjacent to the southern / south-western boundary of the Shipyard site.

An Invasive Species Management Plan was developed in 2021, with subsequent treatments occurring from May 2021 to November 2024.

A site visit to assess the extent of the infestation following treatment was carried out in June 2025. An updated management plan was developed and is presented in Appendix 7-3.

7.2.3 Methodology for Assessment of Impacts and Effects

7.2.3.1 Identification of Target Receptors and Key Ecological Receptors

The criteria used to assess the ecological value and significance of the study area for habitats and species present follows Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA,2009a) and Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (CIEEM, 2018).

7.2.3.2 Valuing Ecological Receptors

Chapter 1.0 Introduction sets out a methodology for the EIAR, including a description of the significance of effects and a description of the duration of effects, as per EPA Guidelines (EPA, 2022).

The importance of the ecological features identified within the study area was also determined with reference to a defined geographical context. This was undertaken following a methodology that is set out in Chapter 3 of the NRA guidelines. These guidelines set out the context for the determination of value on a geographic basis with a hierarchy assigned in relation to the importance of any particular receptor. The guidelines provide a basis for determination of whether any particular receptor is of importance on the following scales:

- International
- National
- County

- Local Importance (Higher Value)
- Local Importance (Lower Value)

The Guidelines clearly set out the criteria by which each geographic level of importance can be assigned. Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and of any importance only in the local area. Internationally Important sites are either designated for conservation as part of the Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna. Specific criteria for assigning each of the other levels of importance are set out in the guidelines and have been followed in this assessment. Where appropriate, the geographic frame of reference set out above was adapted to suit local circumstances. In addition, and where appropriate, the conservation status of habitats and species is considered when determining the significance of ecological receptors. In accordance with these guidelines, a detailed impact assessment is only undertaken of Key Ecological Receptors (KERs). KERs are within the ZoI of the Proposed development and are 'both of sufficient value to be material in decision making and likely to be affected significantly'. To qualify as KERs, features must be of Local Ecological Importance (Higher Value) or higher. Features valued at Local Ecological Importance (Lower Value) are not considered to be KERs and therefore not subject to detailed impact assessment. This is not to say that they are of no biodiversity value, but that impacts on these habitat types in their local context are not likely to result in a significant effect on biodiversity. It should be noted that this relates to the impact on the habitat itself as distinct from considering the role these habitat types play in supporting KER fauna species.

7.2.3.3 Characterisation of Impacts and Effects

The proposed development will result in a number of impacts. The ecological effects of these impacts are characterised as per the CIEEM 'Guidelines for Ecological Impact Assessment in the UK and Ireland' (2018). The headings under which the impacts are characterised follow those listed in the guidance document and are applied where relevant. A summary of the impact characteristics considered in the assessment is provided below:

- **Positive or Negative.** Assessment of whether the proposed development results in a positive or negative effect on the ecological receptor.
- **Extent.** Description of the spatial area over which the effect has the potential to occur.
- **Magnitude** to size, amount, intensity and volume. It should be quantified if possible and expressed in absolute or relative terms e.g. the amount of habitat lost, percentage change to habitat area, percentage decline in a species population.
- **Duration** is defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species.
- **Frequency and Timing**. This relates to the number of times that an impact occurs and its frequency. A small-scale impact can have a significant effect if it is repeated on numerous occasions over a long period.
- **Reversibility**. This is a consideration of whether an effect is reversible within a 'reasonable' timescale. What is considered to be a reasonable timescale can vary between receptors and is justified where appropriate in the impact assessment section of this report.

7.2.3.4 Determining the Significance of Effects

The ecological significance of the effects of the proposed development are determined following the precautionary principle and in accordance with the methodology set out in Section 5 of CIEEM (2018). For the purpose of Ecological Impact Assessment (EcIA), 'significant effect' is an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local (CIEEM, 2018). When determining significance, consideration is given to whether:

- Any processes or key characteristics of key ecological receptors will be removed or changed.
- There will be an effect on the nature, extent, structure and function of important ecological features.
- There is an effect on the average population size and viability of ecologically important species.
- There is an effect on the conservation status of important ecological habitats and species.

7.2.3.5 Incorporation of Mitigation

Section 7.5 of this Biodiversity chapter assesses the potential effects of the proposed development to ensure that all effects on sensitive ecological receptors are adequately addressed. Where significant effects on sensitive ecological receptors are predicted, mitigation is incorporated into the project design or additional mitigation measures are proposed to address such effects. The implemented mitigation measures avoid or reduce potential significant residual effects, post mitigation.

7.2.4 Limitations

The information provided in this document accurately and comprehensively describes the baseline ecological environment; provides an accurate prediction of the likely ecological effects of the proposed development; prescribes mitigation as necessary; and describes the residual ecological impacts. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines. No limitations in the scope, scale or context of the assessment have been identified.

7.3 EXISTING RECEIVING ENVIRONMENT

7.3.1 Desk Study

The following sections describe the findings of the desk study. It provides a baseline of the ecology known to occur in the existing environment based on data sources reviewed to inform the ecological impact assessment as outlined in Section 7.2.1. While references are made to the application site, the results of the desktop study apply to the masterplan site also and this is not presented separately.

7.3.1.1 Designated Sites

A map of all the European Sites within the vicinity of the Application site is provided in Figure 7.3-1 with all Nationally Designated Sites shown in Figure 7.3-2.

Table 7.3-1 provides details of all relevant Nationally designated sites where a potential source-pathway receptor chain was identified. All European Designated Sites are fully described and assessed in the

Natura Impact Statement submitted with the EIAR. In summary, two European sites were identified to be within the ZoI of the proposed development, namely:

- Lower River Shannon SAC [002165]
- River Shannon and River Fergus Estuaries SPA [004077]

The Lower River Shannon SAC is located directly adjacent (0 m) to the Application Site, and the River Shannon and River Fergus Estuaries SPA is located 18.5 m to the Application Site. Potential for Likely Significant Effects was identified in relation to the deterioration on water quality (and associated indirect effects on QI and SCI species) during construction and operation in the absence of mitigation, as well as potential disturbance on SCI species of the SPA.

The following pNHAs were identified as being within the likely ZoI of the proposed development:

- Fergus Estuary and Inner Shannon, North Shore pNHA [002048]
- Inner Shannon Estuary - South Shore pNHA [000435]

Table 7.3-1 Identification of Nationally designated sites within the Likely ZoI

Designated Site	Distance from proposed development (km)	Zone of Likely Impact Determination
Proposed Natural Heritage Area (pNHA)		
Fergus Estuary and Inner Shannon, North Shore pNHA [002048]	0 km (Overlapping the Application Site)	A potential for direct effects was identified as the proposed development partially overlaps this pNHA. Potential indirect effects were also considered. **Habitat Degradation (Surface water):** The Fergus Estuary and Inner Shannon, North Shore pNHA is located directly adjacent to the application site boundary, partially overlapping it. Potential for Likely Significant Effects was identified in relation to the deterioration on water quality during construction and operation in the absence of mitigation. **Habitat Degradation (Groundwater):** The Fergus Estuary and Inner Shannon, North Shore pNHA is located within the same groundwater body as the proposed development (Limerick City Northwest: IE_SH_G_140). Taking a precautionary approach, there is potential for impacts on this pNHA through a deterioration in groundwater quality during construction and operation if groundwater was encountered during excavation works. **A pathway for effect on this pNHA was identified. The site is considered to be**

		within the ZoI of the proposed development and is therefore considered further in this assessment.
Inner Shannon Estuary - South Shore pNHA [000435]	0.63 km from the proposed development	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. **Habitat Degradation (Surface water):** The River Shannon provides a direct hydrological link between the Application site and this pNHA. Potential for Likely Significant Effects was identified in relation to the deterioration on water quality during construction and operation in the absence of mitigation. **Habitat Degradation (Groundwater):** The Inner Shannon Estuary - South Shore pNHA is located within a different groundwater body as the proposed development (Limerick City Northwest: IE_SH_G_141). No potential for impacts on this pNHA through a deterioration in groundwater quality was identified. **A pathway for effect on this pNHA was identified. The site is considered to be within the ZoI of the proposed development and is therefore considered further in this assessment.**
Knockalisheen Marsh pNHA [002001]	1.50 km from the proposed development	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. This pNHA is designated for marsh, and wetland habitats. The pNHA is located upstream from the proposed development. Given this, and due to the distance between the proposed development and the pNHA, there is no potential for indirect effects on the pNHA. **The pNHA is considered to be outside the ZoI for the proposed development and no further assessment is required.**
Cloonlara House pNHA [000028]	6.37 km from the proposed development	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. This site is located in a three-storey domestic dwelling house and hosts over l00 Leisler's Bats (*Nyctalus leisleri*) during the summer months. According to *Bat Conservation Trust – Bat Surveys for Professional Ecologists* (Collins 2023), Leisler's bats have a Core Sustenance Zone (CSZ) of 3 km from the

		roost. Due to the intervening distance of 6.37 km between the development site and the pNHA, the bat roost is unlikely to be affected by the proposed development. Due to the intervening distance between the pNHA and the development site, there is no potential for indirect effect. **The pNHA is considered to be outside the ZoI for the proposed development and no further assessment is required.**
Castleconnell (Domestic Dwelling, Occupied) pNHA [000433]	8.00 km from the proposed development	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. This Site hosts a Daubenton's bat (*Myotis daubentonii*) roost. According to *Bat Conservation Trust – Bat Surveys for Professional Ecologists* (Collins 2023), Irish bat species Core Substance Zone ranges between 1 and 4km from roost sites. Due to the intervening distance between the pNHA and the development site, there is no potential for indirect effect **The pNHA is considered to be outside the ZoI for the proposed development and no further assessment is required.**
Loughmore Common Turlough [000438]	4.72 km from the proposed development	There is no potential for direct effects as the proposed development is located entirely outside of this designated site. This pNHA is designated for aquatic plants and their supporting habitats. There is no identifiable surface water connectivity between the proposed development and this pNHA. This pNHA is located within a different groundwater body to the Application site, the 'Limerick City Southwest' WFD groundwater body. Therefore, there is no potential for effects via groundwater quality deterioration to the pNHA. **The pNHA is considered to be outside the ZoI for the proposed development and no further assessment is required.**

Map Legend

- Application Site
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- WFD Hydrological Catchments
- WFD Hydrological Subcatchments

Drawing Title
European Designated Sites within the Likely Zone of Influence

Project Title
Cleeves Riverside Quarter

Drawn By	Checked By
SF	PR
Project No.	Drawing No.
211052-a	Figure 7.3-1
Scale	Date
1:3,000	15.08.2025

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

Map Legend

- Application Site
- Natural Heritage Area (NHA)
- Proposed Natural Heritage Area (pNHA)

Drawing Title
Nationally Designated Sites within the Likely Zone of Influence

Project Title
Cleeves Riverside Quarter

Drawn By	Checked By
SF	PR
Project No.	Drawing No.
211052-a	Figure 7.3-2
Scale	Date
1:80,000	15.08.2025

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

7.3.1.2 NPWS Article 17 Reporting and other Databases

Available NPWS datasets were downloaded and overlain on the proposed development. No polygon or point data contained within datasets was identified within the Masterplan Site.

The section of the River Shannon located adjacent to the Masterplan site is mapped as Annex I habitat Estuaries (1130) and as Tidal mudflats and sandflats (1140). These habitats are QIs of the Lower River Shannon SAC.

No other significant mapped habitats from other databases listed in Section 7.2.1 were identified within or in proximity to the Masterplan site.

Vascular plants

A search was made in the New Atlas of the British and Irish Flora (Preston et al, 2002) to investigate whether any rare or unusual plant species listed under Annex II of the EU Habitats Directive, The Irish Red Data Book – 1 Vascular Plants (Curtis, 1988) or the Flora (Protection) Order 2022 had been recorded in the relevant 10km square in which the Application site is situated (R55). Each hectad contains 100 whole one-kilometre squares containing terrestrial habitats. Species of conservation concern are given in Table 7.3-2.

Table 7.3-2 Species listed designated under the Flora Protection Order or the Irish Red Data Book within Hectad R55.

Common Name	Scientific Name	Hectad	Status
Autumn crocus	*Colchicum autumnale*	R55	EN, FPO
Dittander	*Lepidium latifolium*	R55	VU
Green Figwort	*Scrophularia umbrosa*	R55	NT
Green-winged Orchid	*Orchis morio*	R55	VU
Large-flowered Hemp-nettle	*Galeopsis speciosa*	R55	NT
Marsh Mallow	*Althaea officinalis*	R55	NT
Meadow Barley	*Hordeum secalinum*	R55	VU, FPO
Meadow Brome	*Bromus commutatus*	R55	NT
Northern Dead-nettle	*Lamium confertum*	R55	NT
Opposite-leaved Pondweed	*Groenlandia densa*	R55	NT, FPO
Pale Flax	*Linum bienne*	R55	NT
Pennyroyal	*Mentha pulegium*	R55	EN, FPO
Slender Thistle	*Carduus tenuiflorus*	R55	NT
Slender Tufted-sedge	*Carex acuta*	R55	NT
Smooth Brome	*Bromus racemosus*	R55	NT
Spiked sedge	*Carex spicata*	R55	NT
Triangular Club-rush	*Schoenoplectus triqueter*	R55	NT, FPO
Tubular water-dropwort	*Oenanthe fistulosa*	R55	NT, FPO

Near Threatened (NT), Vulnerable (VU), Critically Endangered (CR), Regionally Extinct (RE), FPO (Flora Protection Order)

A record of the vascular plant maidenhair fern (*Adiantum capillus-veneris*) was also reported to have been found in close proximity (within a 100m grid) to the Application Site in 2022. The plant is red listed as Least Concern (LC) in Ireland.

Bryophytes

The desktop search (NPWS bryophyte mapper) indicated that no protected bryophytes have been recorded within or adjacent to the proposed development site.

Bats

The result of the desktop studies in relation to bats are detailed in the Bat Baseline Report, Appendix 7-1. Based on Article 17 reported species ranges, the Masterplan site is within the known distribution of seven bat species: soprano pipistrelle, common pipistrelle, Leisler's bat, Daubenton's bat, whiskered bat, brown long-eared bat and lesser horseshoe bat. The site is outside the known range of Nathusius' pipistrelle and Natterer's bat.

Birds

'Bird Atlas 2007-2011: The breeding and wintering birds of Britain and Ireland' (Balmer *et al*., 2013) is the most recent comprehensive work on wintering and breeding birds in Ireland. Previous bird atlases have been the primary source of information on the distribution and abundance of British and Irish birds prior to Bird Atlas 2007 – 2011. The three previously published atlases were:

- The atlas of breeding birds in Britain and Ireland (Sharrock, 1976)
- The atlas of breeding birds in Britain and Ireland (Lack, 1986)
- The new atlas of breeding birds in Britain and Ireland: 1988 -1991 (Gibbons *et al., 1993*)

The site lies within hectad R55 and Table 7.3-3 and

Table ***7.3-4*** present a list of species of conservation interest recorded from the relevant hectads, with regards to breeding and wintering respectively.

Table 7.3-3: Breeding bird atlas data for species on conservation interest for hectad R55.

Species Name	Breeding Atlas 2007-2011
Barn swallow *Hirundo rustica*	Confirmed
Blackbird *Turdus merula*	Confirmed
Blackcap *Sylvia atricapilla*	Possible
Blue tit *Cyanistes caeruleus*	Confirmed
Bullfinch *Pyrrhula pyrrhula*	Confirmed
Chaffinch *Fringilla coelebs*	Probable
Chiffchaff *Phylloscopus collybita*	Possible
Coal tit *Periparus ater*	Possible
Collared dove *Streptopelia decaocto*	Confirmed
Coot *Fulica atra*	Confirmed
Cormorant *Phalacrocorax carbo*	Confirmed
Cuckoo *Cuculus canorus*	Possible
Dunnock *Prunella modularis*	Confirmed

Gadwall *Anas strepera*	Probable
Goldcrest *Regulus regulus*	Probable
Goldfinch *Carduelis carduelis*	Probable
Grasshopper warbler *Locustella naevia*	Possible
Great crested grebe *Podiceps cristatus*	Confirmed
Great titi *Parus major*	Confirmed
Greenfinch *Carduelis chloris*	Confirmed
Grey heron *Ardea cinerea*	Confirmed
Grey wagtail *Motacilla cinerea*	Probable
Greylag goose *Anser anser*	Confirmed
Hooded crow *Corvus cornix*	Confirmed
House martin *Delichon urbicum*	Probable
House Sparrow *Passer domesticus*	Confirmed
Jackdaw *Corvus monedula*	Confirmed
Kestrel *Falco tinnunculus*	Confirmed
Kingfisher *Alcedo atthis*	Possible
Lapwing *Vanellus vanellus*	Probable
Linnet *Carduelis cannabina*	Confirmed
Little grebe *Tachybaptus ruficollis*	Confirmed
Long-eared owl *Asio otus*	Confirmed
Long-tailed tit *Aegithalos caudatus*	Probable
Magpie *Pica pica*	Probable
Mallard *Anas platyrhynchos*	Confirmed
Meadow pipit *Anthus pratensis*	Probable
Mistle thrush *Turdus viscivorus*	Confirmed
Moorhen *Gallinula chloropus*	Confirmed
Mute swan *Cygnus olor*	Confirmed
Pheasant *Phasianus colchicus*	Confirmed
Pochard *Aythya ferina*	Confirmed
Reed bunting *Emberiza schoeniclus*	Confirmed
Ringed plover *Charadrius hiaticula*	Confirmed
Robin *Erithacus rubecula*	Confirmed
Rock dove *Columba livia*	Probable
Rook *Corvus frugilegus*	Confirmed
Sand martin *Riparia riparia*	Confirmed
Sedge warbler *Acrocephalus schoenobaenus*	Confirmed
Shelduck *Tadorna tadorna*	Probable
Shoveler *Anas clypeata*	Probable
Skylark *Alauda arvensis*	Probable
Song thrush *Turdus philomelos*	Probable

Sparrowhawk *Accipiter nisus*	Possible
Spotted flycatcher *Muscicapa striata*	Possible
Starling *Sturnus vulgaris*	Confirmed
Stock dove *Columba oenas*	Probable
Stonechat *Saxicola torquata*	Probable
Swift *Apus apus*	Probable
Teal *Anas crecca*	Probable
Treecreeper *Certhia familiaris*	Possible
Tufted duck *Aythya fuligula*	Confirmed
Water rail *Rallus aquaticus*	Probable
White wagtail *Motacilla alba*	Probable
Whitethroat *Sylvia communis*	Probable
Willow warbler *Phylloscopus trochilus*	Probable
Woodpigeon *Columba palumbus*	Probable
Wren *Troglodytes troglodytes*	Probable

Table 7.3-4: Wintering bird Atlas data for species of conservation interest for hectad R55.

Species Name	Winter Atlas 1981-1984	Winter Atlas 2007-2011
Barn owl *Tyto alba*	Present	-
Bean goose *Anser fabalis*	Present	-
Bewick's swan *Cygnus columbianus*	Present	-
Black Redstart *Phoenicurus ochruros*	Present	Present
Black Swan *Cygnus atratus*	-	Present
Blackbird *Turdus merula*	Present	Present
Blackcap *Sylvia atricapilla*		Present
Black-headed gull *Larus ridibundus*	Present	Present
Black-tailed Godwit *Limosa limosa*	-	Present
Blue tit (*Cyanistes caeruleus)*	Present	Present
Brambling *Fringilla montifringilla*	Present	Present
Bullfinch *Pyrrhula pyrrhula*	Present	Present
Chaffinch *Fringilla coelebs*	Present	Present
Chiffchaff *Phylloscopus collybita*	Present	Present
Coal tit *Periparus ater*	Present	Present
Collared dove *Streptopelia decaocto*	Present	Present
Common gull *Larus canus*	Present	Present
Common sandpiper *Actitis hypoleucos*	-	Present
Coot *Fulica atra*	Present	Present
Cormorant *Phalacrocorax carbo*	Present	Present
Curlew *Numenius arquata*	Present	Present
Dipper *Cinclus cinclus*	-	Present

Dunlin *Calidris alpina*	Present	Present
Dunnock *Prunella modularis*	Present	Present
Fieldfare *Turdus pilaris*	Present	Present
Gadwall *Anas strepera*	Present	Present
Goldcrest *Regulus regulus*	Present	Present
Golden Plover *Pluvialis apricaria*	Present	Present
Goldeneye *Bucephala clangula*	Present	Present
Goldfinch *Carduelis carduelis*	Present	Present
Goosander *Mergus merganser*	-	Present
Great black-backed gull *Larus marinus*	Present	Present
Great crested grebe *Podiceps cristatus*	Present	Present
Great tit *Parus major*	Present	Present
Greenfinch *Carduelis chloris*	Present	Present
Greenshank *Tringa nebularia*	-	Present
Grey heron *Ardea cinerea*	Present	Present
Grey wagtail *Motacilla cinerea*	Present	Present
Greylag goose *Anser anser*	Present	Present
Hen harrier *Circus cyaneus*	Present	Present
Herring gull *Larus argentatus*	Present	Present
Hooded crow *Corvus cornix*	Present	Present
House Sparrow *Passer domesticus*	Present	Present
Iceland Gull	Present	-
Jack snipe *Lymnocryptes minimus*	Present	Present
Jackdaw *Corvus monedula*	Present	Present
Kestrel *Falco tinnunculus*	Present	Present
Kingfisher *Alcedo atthis*	Present	Present
Lapwing *Vanellus vanellus*	Present	Present
Lesser black-backed gull *Larus fuscus*	Present	Present
Lesser redpoll *Carduelis cabaret*	Present	Present
Linnet *Carduelis cannabina*	Present	Present
Little egret *Egretta garzetta*	-	Present
Little grebe *Tachybaptus ruficollis*	Present	Present
Long-tailed tit *Aegithalos caudatus*	Present	Present
Magpie *Pica pica*	Present	Present
Mallard *Anas platyrhynchos*	Present	Present
Meadow pipit *Anthus pratensis*	Present	Present
Mediterranean gull *Larus melanocephalus*	-	Present
Merlin *Falco columbarius*	Present	Present
Mistle thrush *Turdus viscivorus*	Present	Present
Moorhen *Gallinula chloropus*	Present	Present
Mute swan *Cygnus olor*	Present	Present

Oystercatcher *Haematopus ostralegus*	Present	Present
Peregrine falcon *Falco peregrinus*	Present	-
Pheasant *Phasianus colchicus*	Present	Present
Pintail *Anas acuta*	Present	Present
Pochard *Aythya ferina*	Present	Present
Raven *Corvus corax*	Present	Present
Rd-breasted merganster *Mergus serrator*	Present	-
Redshank *Tringa totanus*	Present	Present
Redwing *Turdus iliacus*	Present	Present
Reed bunting *Emberiza schoeniclus*	Present	Present
Ring-billed gull *Larus delawarensis*	Present	Present
Ringed plover *Charadrius hiaticula*	-	Present
Robin *Erithacus rubecula*	Present	Present
Rock dove *Columba livia*	Present	Present
Rook *Corvus frugilegus*	Present	Present
Scaup *Aythya marila*	Present	Present
Shelduck *Tadorna tadorna*	Present	Present
Short-eared owl *Asio flammeus*	-	Present
Shoveler *Anas clypeata*	Present	Present
Siskin *Carduelis spinus*	Present	Present
Skylark *Alauda arvensis*	Present	Present
Snipe *Gallinago gallinago*	Present	Present
Song thrush *Turdus philomelos*	Present	Present
Sparrowhawk *Accipiter nisus*	Present	Present
Starling *Sturnus vulgaris*	Present	Present
Stock dove *Columba oenas*	Present	Present
Stonechat *Saxicola torquata*	Present	Present
Teal *Anas crecca*	Present	Present
Treecreeper *Certhia familiaris*	Present	Present
Tufted duck *Aythya fuligula*	Present	Present
Turnstone *Arenaria interpres*	Present	Present
Water rail *Rallus aquaticus*	Present	Present
Waxwing *Bombycilla garrulus*	-	Present
White wagtail *Motacilla alba*	Present	Present
Whooper swan *Cygnus cygnus*	Present	Present
Wigeon *Anas penelope*	Present	Present
Woodpigeon *Columba palumbus*	Present	Present
Wren *Troglodytes troglodytes*	Present	Present
Yellowhammer *Emberiza citrinella*	Present	-
Yellow-legged gull *Larus michahellis*	-	Present

7.3.1.3 National Biodiversity Data Centre (NBDC) Records

Fauna

A search of the NBDC website was conducted. Records of protected fauna recorded from hectad R55 are provided in Table 7.3-5.

Table 7.3-5 NBDC records for protected species and species of conservation interest (excl. birds) in hectad R55

Common name	Scientific name	Designation	Hectad
Common Frog	*Rana temporaria*	Wildlife Act, Annex V	R55
Smooth Newt	*Lissotriton vulgaris*	Wildlife Act	R55
Common Lizard	*Zootoca vivipara*	Wildlife Act	R55
Marsh Fritillary	*Euphydryas aurinia*	Annex II,	R55
White-clawed crayfish	*Austropotamobius pallipes*	Wildlife Act, Annex II, Annex V	R55
Fallow Deer	*Dama dama*	Wildlife Act	R55
Hedgehog	*Erinaceus europaeus*	Wildlife Act,	R55
Otter	*Lutra lutra*	Wildlife Act, Annex II, Annex IV	R55
Pine Marten	*Martes martes*	Wildlife Act, Annex V	R55
Badger	*Meles meles*	Wildlife Act	R55
Irish Stoat	*Mustela erminea subsp. hibernica*	Wildlife Act	R55
Irish Hare	*Lepus timidus subsp. hibernicus*	Wildlife Act, Annex V	R55
Daubenton's Bat	*Myotis daubentonii*	Wildlife Act, Annex IV	R55
Whiskered Bat	*Myotis mystacinus*	Wildlife Act, Annex IV	R55
Natterer's Bat	*Myotis nattereri*	Wildlife Act, Annex IV	R55
Leisler's Bat	*Nyctalus leisleri*	Wildlife Act, Annex IV	R55
Nathusius' Pipistrelle	*Pipistrellus nathusii*	Wildlife Act, Annex IV	R55
Common Pipistrelle	*Pipistrellus pipistrellus*	Wildlife Act, Annex IV	R55
Soprano Pipistrelle	*Pipistrellus pygmaeus*	Wildlife Act, Annex IV	R55
Brown Long-eared Bat	*Plecotus auritus*	Wildlife Act, Annex IV	R55
Red Squirrel	*Sciurus vulgaris*	Wildlife Act	R55
Pygmy Shrew	*Sorex minutus*	Wildlife Act	R55

Annex II, Annex IV, Annex V – Of EU Habitats Directive, Annex I – Of EU Birds Directive, WA – Irish Wildlife Acts (1976 as amended)

Invasive Species

The NBDC database also contains records of invasive species identified within the relevant hectad. A number of species subject to restrictions under Regulations 17 and 18 and included in the First Schedule of the European Union (Invasive Alien Species) Regulations 2024 were found to be present in hectad R55 as shown in Table 7.3-6 below.

Table 7.3-6 NBDC records for invasive species (hectad R55)

Common Name	Scientific Name	Hectad
American Mink	*Mustela vison*	R55
American skunk-cabbage	*Lysichiton americanus*	R55
Brown Rat	*Rattus norvegicus*	R55
Canadian Waterweed	*Elodea canadensi*	R55
Giant hogweed	*Heracleum mantegazzianum*	R55
Giant-rhubarb	*Gunnera tinctoria*	R55
Himalayan balsam	*Impatiens glandulifera*	R55
Japanese knotweed	*Reynoutria japonica*[8]	R55
Three-cornered leek	*Allium triquetrum*	R55
Grey squirrel	*Sciurus carolinensis*	R55
Himalayan knotweed	*Persicaria wallichii*	R55
Nuttall's Waterweed	*Elodea nuttallii*	R55
Rhododendron	*Rhododendron ponticum*	R55
Greylag goose	*Anser anser*	R55
Fallow deer	*Dama dama*	R55
Water fern	*Azolla filiculoides*	R55

NPWS Protected Species Records

National Parks and Wildlife Service (NPWS) online records were searched to see if any rare or protected species of flora or fauna have been recorded from hectad R55. An information request was also sent to the NPWS scientific data unit requesting records from the Rare and Protected Species Database on the 20th January 2025. A response was received on the 19th June 2025. Table 7.3-7 lists rare and protected species records obtained from NPWS.

Table 7.3-7 NPWS records for rare and protected species

Common name	Scientific name	Designation	Hectad
Common Lizard	*Zootoca vivipara*	Wildlife Act,	R55
Common Frog	*Rana temporaria*	Wildlife Act, Annex V	R55
Eurasian Badger	*Meles meles*	Wildlife Act	R55
Eurasian Otter	*Lutra lutra*	Wildlife Act, Annex II, Annex IV	R55
Eurasian pygmy shrew	*Sorex minutus*	Wildlife Act	R55
Green figwort	*Scrophularia umbrosa*	NT	R55
Green-winged orchid	*Orchis morio*	VU	R55
Irish hare	*Lepus timidus subsp. hibernicus*	Wildlife Act, Annex V	R55
Lesser Horseshoe bat	*Rhinolophus hipposideros*	Wildlife Act, Annex II, Annex IV	R55
Meadow Barley	*Hordeum secalinum*	FPO	R55

[8] Named *Fallopia japonica* in the Regs.

Meadow saffron	*Colchicum autumnale*	FPO	R55
Northern dead-nettle	*Lamium confertum*	NT	R55
Opposite-leaved pondweed	*Groenlandia densa*	FPO, NT	R55
Pennyroyal	*Mentha pulegium*	FPO, EN	R55
River lamprey	*Lampetra fluviatilis*	Annex II, Annex V	R55
Sea lamprey	*Petromyzon marinus*	Annex II	R55
Smooth brome	*Bromus racemosus*	NT	R55
Smooth newt	*Lissotriton vulgaris*	WA	R55
Spiked sedge	*Carex spicata*	NT	R55
Triangular club-rush	*Schoenoplectus triqueter*	FPO, NT	R55
West European hedgehog	*Erinaceus europaeus*	Wildlife Act	R55

FPO = Flora Protection Order; EN + Endangered, VU = Vulnerable, NT-=Near Threatened, WA = Wildlife Act

Inland Fisheries Ireland Data

Inland Fisheries Ireland carried out fish stock surveys of the Limerick Dock, Shannon Upper, Shannon Lower, and Fergus Estuaries in 2017 (Ryan et al. 2018). The Shannon/Fergus Estuary complex has been split into two separate estuary systems which will be analysed separately. These will be named the Shannon Estuary (consisting of Limerick Docks, Shannon Estuary upper and lower) and the Fergus Estuary. The Limerick Docks sampling site is approx. 300 m upstream of the proposed development Site. The Shannon Estuary upper and lower and the Fergus Estuary are all downstream of the proposed development Site.

49 different fish species (40 in the Shannon, 18 in the Fergus) were encountered, including juvenile thornback ray and a three bearded rocking over the course of the sampling programme.

Although a wide range of fish species were encountered within the Shannon Estuary Complex during the survey, abundance was found to be low except for four species (sprat, common goby, sand goby and flounder) which made up 84% of the total catch. Combinations of the same species also dominated the catch during the previous two surveys (2008, 97%; 2014, 96%) (Ryan et al. 2018).

Four species, considered important for their conservation status (smelt, European eel) or angling value (dab, plaice), also made up a small but important proportion of the total catch within the Shannon Estuary Complex across all sampling years (2008, 0.4%; 2014, 1%; 2017, 2.8%) (Ryan et al. 2018).

Common goby were the most abundant species within the Fergus estuary in 2017, making up over 65% of the total catch. The other usually abundant species, flounder and sprat, made up 6.1 and 4.2 % of total catch respectively, whereas, in previous surveys, sprat dominated the catch (2008, 78.7%; 2010, 72.7%)

The only species of substantive angling interest within the Fergus Estuary is common sole, which made up 3.6% of the current catch.

The report concludes that flounder, sand goby, and smelt were among the most abundant and widespread species recorded between Shannon Estuary Complex and Fergus Estuary.

Regional and Local Hydrology and Hydrogeology

Hydrology maps are shown in Chapter 11.0 'Water and Hydrogeology' of this EIAR. The site is located within the Lower Shannon Catchment (hydrometric area number 27). The site of the proposed development is located within the Shannon [Lower]_SC_100 hydrological sub-catchment, the North Ballycannan_010 hydrological sub-basin and is also located in the Limerick City Northwest groundwater catchment (IE_SH_G_140). The groundwater waterbody risk is 'Not at risk' and the groundwater status of this catchment is assigned a status of 'Good' in the Water Framework Directive (WFD) groundwater monitoring programme.

No open watercourses were recorded within the confines of the proposed development site; however, the River Shannon is located directly adjacent to the proposed development boundary, and water connectivity with the River Shannon was determined through an existing drainage pipe which links the river to the Reservoir located within the site. The existing outfall is located on the River Shannon, and within the Lower River Shannon SAC. Through the River Shannon, it is connected to the River Fergus Estuaries SPA, located approximately 100m downstream from the outfall.

The River Shannon, considered under the Limerick Dock (IE_SH_060_0900) Transitional Waterbody WFD is classified as "At Risk" (EPA) and has a status of "Poor" (WFD Status 2016-2021).

Other connections through existing pipes, which were laid to serve the original Cleeves Factory operations, link the Reservoir to the Westfield Wetlands located west of the site. The wetland forms part of the Lower River Shannon SAC. It is conservatively assumed that there is an existing viable direct connection between the Wetlands and the proposed development (via. historic abstraction pipework). For more detail refer to Section 11.3.5 of Chapter 11.0.

Water Quality

Q-rating status data for EPA monitoring points on Shannon [Lower]_SC_100 River Subcatchment are shown on Table 6-10 below. The Q-Rating is a water quality rating system based on both the habitat and the invertebrate community assessment and is divided into status categories ranging from 0-1 (Poor) to 4-5 (Good/High). Q-values are assigned using a combination of habitat characteristics and structure of the macro-invertebrate community within the waterbody. Individual macro-invertebrate families are classified according to their sensitivity to organic pollution and the Q-value is assessed based primarily on their relative abundance within a sample.

Most recent data available (2002 to 2021) show that the Q-rating for the Shannon [Lower] upstream of the proposed development site at the Athlunkard Bridge was of Moderate (3-4) status (2002). Meanwhile, downstream of the proposed development site, the Limerick Dock Transitional Waterbody [IE_SH_060_0900] is reported to be of Poor status in the latest monitoring round (2016 - 2021).

Table 7.3-10: Water quality status of watercourses in proximity of the proposed development site

Waterbody	EPA Location Description	Year	Easting	Northing	EPA Q-Rating Status
Shannon [Lower]_SC_100	Castleconnell: World's End	2021	165869	163500	Moderate
Shannon [Lower]_SC_100	Athlunkard Br (d/s LHS)	2002	158792	159050	Moderate
Transitional Waterbody IE_SH_060_0900	Limerick Dock	2021	157388	157278	Poor

7.3.1.4 Conclusions of the Desktop Study

The desktop study has provided information about the existing environment in hectad R55, within which the proposed development is located. The Masterplan Site is located within the Shannon [Lower]_SC_100 hydrological sub-catchment.

There are no watercourse within the Masterplan Site, however the River Shannon flows adjacent to the site, and the existing reservoir on the site is connected to the river through existing drainage pipes in poor condition. These provide water connectivity to the Lower River Shannon SAC in two areas: on the River Shannon itself and at the Westfield Wetlands.

The close proximity and water connectivity brings four designated sites into the ZoI of the proposed development:

- Lower River Shannon SAC [002165]
- River Shannon and River Fergus Estuaries SPA [004077]
- Fergus Estuary and Inner Shannon, North Shore pNHA [002048]
- Inner Shannon Estuary - South Shore pNHA [000435]

The desk study identified that a variety of protected faunal species are known to occur within the wider study area, most being linked to the nearby protected sites. Additional species include bats, badger, red squirrel and amphibians. The mammal species recorded during the desk study informed the survey methodologies undertaken during the site visits. The mammal species recorded within the relevant hectad have widespread range and distributions in Ireland and are likely to be recorded frequently throughout Ireland (Marnell et al, 2009).

The desk study revealed that there are no known Annex I Article 17 habitats present within the site, however the site is adjacent to the Lower River Shannon SAC and the Annex I habitat Estuaries and Tidal mudflats and sandflats. No known records of rare or protected flora have been recorded within the site, with the exception of maidenhair fern on the exterior of a boundary wall.

The desk study provided useful information to inform the ecological surveys undertaken on site as well as the identification of pathways for potential impact on sensitive ecological receptors.

7.3.2 Field Study

The masterplan site was surveyed extensively between 2021 and 2025. The entire ecological baseline identified during habitat and faunal surveys is described below. All habitats identified within the masterplan site are described in Section 7.3.2.1, and the fauna recorded in Section 7.3.2.2. The Application site comprises most of the Masterplan site, save for the area of land including St. Michael's Rowing Club and extending to the river's edge. This area, which is classified as **Buildings and Artificial Surfaces (BL3)** is excluded from the Application Site, but has been included in the overall Masterplan for the site. Demolitions and public realm works, including the provision of underground services to serve the future masterplan development are proposed in this area. Section 7.3.3 identifies the key ecological receptors in relation to both the Masterplan Site and Application Site. A habitat map is provided in Figure 7.3-3.

7.3.2.1 Description of Habitats

The majority of the site comprises of paved surfaces and buildings, categorised as **Buildings and Artificial Surfaces (BL3)**. There are 16 buildings in total within the site boundary, including old industrial buildings in the centre of the site associated with the Flaxmill factory building (Plate 7.3-1); a school and convent in the Salesians Site (Plate 7.3-2); derelict warehouses and offices near O'Callaghan Strand; and two disused residential buildings and warehouses along North Circular Road (NCR) (**Error! Reference source not found.**). Carparks, roads, and other paved surfaces are also categorised as **BL3** (Plate 7.3-4).

A water reservoir built during the Cleeves Factory operations is located in the centre of site, in the Quarry Site, and is categorised as **Reservoir (FL8)** (Plate 7.3-5). Site investigation works described in the accompanying Chapter 11.0 'Water and Hydrogeology' have established that water from the reservoir within the Quarry Site discharges to the River Shannon, but that "the flow and volumes that are passing through the network into and out of the reservoir appear low". The reservoir is partially located underneath one the buildings lining NCR, and is exposed by nine archways supporting the buildings, which are also categorised as **BL3**. The reservoir is not considered a significant supporting habitat for aquatic species as through the years of surveys it was noted to vary in water levels, water clarity and algal vegetation, at times being significantly overgrown with algae and stagnant.

The reservoir is bordered on three sides by **Scrub (WS1)** habitat, with species recorded including Ivy (*Hedera hibernica*), Nettle (*Urtica dioica*), Ragwort (*Senecio jacobea*), Common marsh bedstraw (*Galium palustre*), Bramble (*Rubus fructicosus agg.*), and Cranesbill (*Geranium sanguineum)*. Various low and medium impact invasive species were recorded, including Winter heliotrope (*Petasites pyrenaicus*), Butterfly bush (*Buddleja davidii),* and Old man's beard (*Clematis vitalba)* (Plate 7.3-6). Japanese Knotweed was also recorded, as described in section 7.3.2.4. Scrub habitat is also found along NCR and in the disused back gardens of the two residential buildings in this area. Here, the scrub has overgrown and includes semi-mature trees including ash (*Fraxinus excelsior*) and sycamore (*Acer pseudoplatanus).* A single mature holm oak (*Quercus ilex*) is also present along NCR. Vegetation growing along the quarry walls, primarily ivy and old man's beard, contributes to this habitat but has been classified as **Hedgerows (WL1)** due to its linearity. The quarry walls are mostly overgrown, with limited exposed rock habitat remaining along the northern boundary (Plate 7.3-7). This is classified as **Exposed Calcareous Rock (ER2).**

Spoil and bare ground (ED2), including rubble heaps was recorded within the quarry (Plate 7.3-8). The area is actively used for storage of construction materials.

Areas of **Recolonising Bare Ground (ED3) / Dry Meadows and Grassy Verges (GS2)** were recorded in small patches throughout the site. Stonetown Terrace, to the north of the site, consists of imported materials, primarily from historical works within the Cleeves Factory site, which have recolonised into a low diversity meadow (Plate 7.3-9). Recolonising bare ground is found along existing paved tracks. These habitats were also encountered to the southeast of the site, in the Shipyard. Species recorded within these areas include Ivy, Nettle, Ragwort, Common marsh bedstraw, Cranesbill, Dandelion (*Taraxacum off. agg.*), Meadow Buttercup (*Ranunculus acris*), Common Vetch (*Vicia sativa ssp. Segetalis*), Common field Speedwell (*Veronica persica*), Red fescue (*Festuca rubra agg),* Coltsfoot (*Tussilago farfara*), Cinquefoil (*Potentilla reptans*), Alder (*Alnus glutinosa*), Goat willow (*Salix caprea*), Ash saplings (*Fraxinus excelsior*), Sorrel (*Rumex acetosa),* Ribwort plantain (*Plantago lanceolata*), and Figwort (*Scrophularia nodosa*) (Plate 7.3-9). Finally, small areas of dry meadows were recorded within the Salesians, in the school front and back yards. The front yard included a more diverse mix of grasses, including Yorkshire fog (*Holcus lanatus*), cock's foot (*Dactylis glomerata*), false oat grass (*Arrhenatherum elatius*), sweet meadow grass (*Anthoxanthum odoratum*), perennial ryegrass (*Lolium perrene*), red fescue (*Festuca rubra*), creeping bent (*Agrostis stolonifera*) and Italian ryegrass (*Lolium multiflorum*) (Plate 7.3-10). This patch of grassland was lined along the southern boundary by a short **Hedgerow (WL1)** consisting of an ornamental cypress and hawthorn (*Crataegus monogyna*).

The River Shannon flows adjacent to the site, to the south-east, along a short section of the development boundary and is categorised as a **Tidal River (CW2)** (Plate 7.3-11). This area of the Shannon is mapped as Annex I habitats Estuaries (1130) and Tidal mudflats and sandflats (1140) and is part of the Lower River Shannon SAC. The site does not include any habitats associated with the SAC and is confined to the public infrastructure along the riverfront.

Stone Walls and Other Stone works (BL1) form the boundary walls of the Flaxmill Site and the Shipyard (Plate 7.3-12). These were built in different phases and have been extensively altered, repointed and fixed through the years. The presence of maidenhair fern was confirmed throughout the southern and eastern boundary walls defining the Cleeves site, in multiple pockets.

Plate 7.3-1 Main Cleeves factory categorised as BL3

Plate 7.3-2 Salesians

Plate 7.3-3 Residential buildings on NCR

Plate 7.3-4 BL3 habitats seen from the Quarry site, used to store building materials

Plate 7.3-5: **Reservoir (FL8)** habitat within the site, including tunnels (BL3) and surrounding scrub (WS1)

Plate 7.3-6: **Scrub (WS1)** habitat bordering the reservoir

Plate 7.3-7 The Quarry Wall, which is overgrown by Ivy and Old man's Beard, is classified as **Hedgerow (WL1)** due to its linearity, to the western parcel of the site. Only patches of **Exposed Calcareous Rock (ER2)** are visible.

Plate 7.3-8: Spoil and bare ground (ED2), including rubble heaps recorded to the western parcel of the site, associated with construction activities on site. Overgrown quarry walls classified as **Hedgerow (WL1)**.

Plate 7.3-9: Area of **Recolonising Bare Ground (ED3) / Dry Meadows and Grassy Verges (GS2)** recorded in Stonetown Terrace.

Plate 7.3-10: Dry Meadows and Grassy Verges (GS2) recorded at the Salesians, with Hedgerow (WL1) to the south

Plate 7.3-11: The River Shannon flowing to the southeast section of the site, outside of the development boundary, categorised as a **Tidal River (CW2).**

Plate 7.3-12: Stone Walls and Other Stone works (BL1) were recorded on the site in the form of existing boundary stone walls, pictured along NCR.

Map Legend:

Site Boundary

Fossitt Habitats:

- Stone walls and other stonework
- Buildings and artificial surfaces
- Spoil and bare ground
- Recolonising bare ground
- Exposed calcareous rock
- Reservoirs
- Dry meadows and grassy verges
- Scrub
- Hedgerows
- Treelines

N

Drawing Title

Habitat Map

Project Title: Limerick Twenty Thirty Cleeves Riverside Quarter	
Drawn By: DM	Checked By: SF
Project No.: 211052	Drawing No.: Figure 7.3-3
Scale: 1:1,800	Date: 2025-10-09

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email: info@mkoireland.ie
Website: www.mkoireland.ie

7.3.2.2 Fauna

Badger Surveys

No signs of badger activity or suitable habitat for badger was recorded within the Application Site, or the Masterplan Site.

Otter Surveys

Otter is likely to use the River Shannon, which is located adjacent to the development and provides suitable habitat for the species. The reservoir, located in the centre of the site, provides suitable aquatic habitat for otter, including prey availability, however it is poorly connected to the River Shannon or other more suitable habitats, as it is fully surrounded by an urban network. No signs of otter activity were recorded within or adjacent to the Masterplan Site during the surveys undertaken.

Bat Surveys

Bat surveys were conducted at the site over a number of years, the primary conclusions of the surveys undertaken are detailed below. Appendix 7.1 Baseline Bat Report and associated appendices detail all bat surveys undertaken. No significant changes in the baseline were noted since the bulk of the activity surveys were completed in 2023. The results of the bat surveys are shown in Figure 7.3-4.

The following points set out the conclusion of all surveys:

- Six bat species, as well as Myotis sp. were recorded commuting and foraging across the proposed works site during the bat surveys carried out, including Soprano pipistrelle, Common pipistrelle, Leisler's bat, Brown long-eared bat, Nathusius' pipistrelle and Lesser horseshoe bat (LHB).

- Most of the buildings located within the Masterplan site have the potential to support bat roosts. However, no dropping accumulations indicative of large regular roosts were found. The small accumulations of bat droppings and feeding remains recorded suggest that the structures on site are used with likely regularity by a small number of bats. Droppings were found in seven buildings within the proposed development site, either scattered or accumulated under likely LHB perches. One of these LHB perches were confirmed using DNA analysis. Despite multiple revisits, no LHBs were ever noted roosting at these locations during the daytime.

- Four active roosts were identified within the site:

    - One lesser horseshoe bat was observed entering the Coldstore building, west of the Flaxmill, from the ground floor during a dawn re-entry survey, however no confirmation of its day roosting location was possible: the entrance is well connected to the whole interior.

    - A small soprano pipistrelle roost counting approx. 6-8 bats was identified within the western rock face of the Quarry Site

    - Two lesser horseshoe bats were found to be roosting within a derelict classroom building at the back of the Salesians School.

- Another active roost was found within the Salesians, in the interior yard of the convent. Based on the evidence found in 2025 and the previous surveys undertaken in 2023, the location consistently hosts a small pipistrelle summer roost (*Pipistrellus sp.*).

- Baseline conditions present lighting disturbance around the Flaxmill site near O'Callaghan Strand, where security lighting operates all night, along the NCR and site boundaries, where road illumination spills onto the site, and in the Salesians, where the school currently operated as an accommodation centre. The central Quarry Site, with the Reservoir, present the darkest environments on the site, and the northern boundary, along the quarry walls between the Flaxmill and into the Salesians, was identified as a regular commuting corridor for LHB. This species is particularly sensitive to light pollution and represents the benchmark towards which all impacts on bats will be assessed.

- The commuting corridor for lesser horseshoe bats was confirmed during static and manual surveys to run between at least two identified roosting locations, one at the Salesians and one within the Flaxmill Site. The species utilises the site for foraging purposes and for roosting. No evidence of maternity roost or hibernating behaviour was identified for this species. It is unusual to find lesser horseshoe bats regularly utilising an urban environment. As such, due to the available roosting opportunities, the site is potentially a significant outpost for the species, despite the low numbers of individuals recorded.

- Soprano and common pipistrelles were observed commuting into the site by crossing NCR towards the Reservoir. This location and the westernmost section of the site, by the Salesians, are considered the most likely entry and exit points into the site. This is as a result of existing, but suboptimal, green infrastructure including treelines and private gardens located outside the MS in these areas.

- With regard to foraging and commuting bats, the reservoir and quarry areas are of Moderate suitability. Built and open areas, such as open yards and open grassland are considered of Low suitability. This assessment was confirmed by the surveys undertaken, which recorded small numbers of bats foraging continuously around the Reservoir and on occasion across the rest of the site. The Quarry Site was confirmed to be the focal point of bat activity around the Masterplan Site, with low activity levels recorded at all other sites. In particular, very little activity was recorded at the Riverfront and in the Salesians front yard.

In summary, the site is utilised by a small number of bats with approximately two lesser horseshoe bats roosting alternately at various locations throughout the derelict buildings on the site. Two small roosts of soprano pipistrelle were also recorded, neither of which were maternity roosts. Some evidence of bats travelling into the site from the south west was identified and the highest levels of foraging activity were around the quarry and reservoir, which are the sections of the site that are currently unlit and vegetated, thus providing the most optimal foraging habitat.

Map Legend

- Application Site
- Commuting Corridor (Site)
- Commuting Corridor (Ext)
- Foraging Areas
- Buildings Numbered

Bat Roosts

- Confirmed acitve (pipistrelle)
- Confirmed Active (LHB)
- Droppings (Perch)
- Scatter
- Roosts to be Retained

Drawing Title
Bat Survey Results

Project Title
Cleeves Riverside Quarter

Drawn By	Checked By
SF	PR
Project No.	Drawing No.
211052-a	Figure 7.3-4
Scale	Date
1:1,800	08.07.2025

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

Birds

Wintering Bird Surveys

A summary of all surveys undertaken is presented in Table 7.3-8. Results of the 2021/2022 wintering bird are presented in Appendix 7.2

Most of the bird species listed above were recorded outside the Masterplan site, either feeding on the River Shannon or roosting on the riverbank, on the nearby boat ramp and in the water. Non-target species recorded during the surveys along the River Shannon include feral pigeons, grey wagtail, hooded crow, rook, chaffinch, blackbird, goldfinch, magpie and wood pigeon.

No SCI species associated with the River Shannon and Fergus SPA were recorded within the site. Cormorants were the only species associated with the SPA which were observed flying east to west above the site. The site does not provide significant supporting habitat for any SCI species of the River Shannon and Fergus SPA.

Table 7.3-8 Bird Species Recorded within the Masterplan Site and the area of shoreline within River Shannon and River Fergus Estuaries SPA from 2021-2024.

Species	No.	Date Recorded
Target Species Recorded along the River Shannon ***species associated with the River Shannon and River Fergus Estuaries SPA**		
Mute Swan (*Cygnus olor)*	• 8	• 15/12/2021
	• 8	• 12/01/2022
	• 8	• 15/02/2022
	• 14	• 14/03/2022
	• 13	• 15/02/2024
	• 2	• 05/11/2024
	• 7	• 04/12/2024
Cormorant (*Phalacrocorax carbo*)*	• 4	• 15/12/2021
	• 15	• 12/01/2022
	• 110	• 15/02/2022
	• 9	• 14/03/2022
	• 6	• 15/02/2024
	• 2	• 05/11/2024
	• 4	• 04/12/2024
Mallard (*Anas platyrhynchos*)	• 6	• 15/12/2021
	• 6	• 12/01/2022
	• 5	• 15/02/2022
	• 11	• 14/03/2022
	• 5	• 15/02/2024
	• 7	• 05/11/2024

	• 15 (1 domestic/hybrid)	• 04/12/2024
Black-headed gull (*Larus ridibundus)* *	• 100	• 15/12/2021
	• 250	• 12/01/2022
	• ~1,250	• 15/02/2022
	• 200	• 14/03/2022
	• 50	• 15/02/2024
	• 50	• 05/11/2024
	• 127	• 04/12/2024
Lesser black-backed gull (*Larus fuscus)*	• 16	• 15/12/2021
	• 6	• 12/01/2022
	• 15	• 15/02/2022
	• 25	• 14/03/2022
Heron (*Ardea cinerea)*	• 4	• 12/01/2022
	• 1	• 05/11/2024
Redshank (*Tringa totanus*)	• 1	• 12/01/2022
Oystercatcher (*Haematopus ostralegus)*	• 19	• 12/01/2022
	• 75	• 15/02/2022
Common gull (*Larus Canus)*	• 2	• 05/11/2024
Herring gull (*Larus argentatus*)	• 3	• 05/11/2024
	• 2	• 04/12/2024
Target Species Recorded Within the Cleeves Masterplan Site		
Cormorant (*Phalacrocorax carbo*) *	• 4 (Flying East to West overhead)	• 15/02/2024
Herring gull (*Larus ridibundus)*	• 1 (Flying overhead)	• 04/12/2024
Black-headed gull (*Larus argentatus*) *	• 1 (Flying overhead)	• 04/12/2024

Other Birds

During the 2024 wintering bird surveys, the following non-target species were recorded within the Masterplan Site:

Table 7.3-9 Other bird species recorded within the site

Non-Target Species Noted within the Cleeves Masterplan Site		
Robin (*Erithacus rubecula*)	• 3	• 15/02/2024
	• 1	• 04/12/2024
Blackbird (*Turdus merula)*	• 2	• 15/02/2024
Starling (*Sturnus vulgaris)*	• 1	• 15/02/2024
Wood pigeon (*Columba palumbus*)	• 5	• 15/02/2024
Chaffinch (*Fringilla coelebs*).	• 1	• 15/02/2024
Pied wagtail (*Motacilla alba*)	• 1	• 04/12/2024

Dunnock (*Prunella modularis*)	• 1	• 04/12/2024
Hooded Crow (*Corvus cornix)*	• 1	• 04/12/2024
Great Tit (*Parus major*)	• 1	• 04/12/2024

Other bird species recorded within the site as incidentals include:

- Feral pigeon (*Columba livia f. domestica*)
- Blue tit (*Cyanistes caeruleus*)
- Wren (*Troglodytes troglodytes*)
- Swift (*Apus apus*)
- Rook (*Corvus frugilegus*)
- Coot (*Fulica atra*)
- Lesser black-backed gull (*Larus fuscus*)

Cormorants and black-headed gull were the only birds associated with the SPA noted flying above the masterplan site during walkover surveys, always in proximity of the River Shannon. Swifts were incidentally recorded flying above the site during a dusk bat survey undertaken on July 7th 2022. No nesting behaviour was observed and they were not recorded since. A lesser black backed gull was also observed on the Flaxmill building in July 2022. There is widespread pigeon nesting within the Cleeves factory buildings, as well as old signs of nesting by corvids. Common garden species such as robin, blue tit, great tit and wren are likely to nest within the overgrown vegetation on site, though no nests were recorded during the surveys undertaken.

7.3.2.3 Other Fauna

Mammals

Foxes (*Vulpes vulpes*) were encountered onsite during the bat activity surveys in the gardens of the Victorian Terrace and the Salesians. No dens were found within the Masterplan site.
Rat (*Rattus rattus*) droppings were observed in a storage area located in proximity of the reservoir.

Invertebrates

Invertebrate species recorded during the site visits include common pollinators such as common carder bee (*Bombus pascuorum*), buff-tailed bumblebee (*Bombus terrestris*) and white-tailed bumblebee (*Bombus lucorum agg.*), as well as honey bees (*Apis mellifera sp.*).

Fish

Common roach (*Rutilus rutilus)* fish were observed within the reservoir in June 2025, when the water level was low and relatively clear. No protected fisheries were observed.

7.3.2.4 Invasive Species

Various low and medium impact species, not listed on the *First Schedule* list of the *European Union (Invasive Alien Species) Regulations 2024 [S.I.374/2024]* were recorded, including winter heliotrope, butterfly bush, wall cotoneaster (*Cotoneaster horizontalis*), and Old man's beard.

Himalayan knotweed (Koenigia polystachya)

The Invasive Species Management Plan prepared for the site in 2022 described the extent of the Himalayan knotweed (*Koenigia polystachya*) previously identified within the Masterplan site. In 2021, a stand had been reported in proximity of the Shipyard.

During the site visit carried out in June 2025, no evidence of the species was recorded. An updated Invasive Species Management Plan has been developed and is presented in Appendix 7.3, along with the 2022 plan for reference.

Japanese Knotweed (*Reynoutria japonica*)

An invasive species survey was carried out on the site on the 5th June 2025 to assess the area to the west of the reservoir where Japanese knotweed was previously identified and treated.

While the extent of the knotweed seemed to have reduced significantly, live stands were found at three adjacent locations along the water edge (Plate 7.3-13 and Plate 7.3-14). The area was completely matted with old man's beard (*Clematis vitalba*) and it was difficult to establish the full extent of the knotweed without removing the surrounding vegetation and risking fragmenting potentially hidden canes.

An updated Invasive Species Management Plan has been developed and is presented in Appendix 7.3, along with the 2022 plan for reference. The knotweed will be removed from the site prior to work commencements, and the previously contaminated area will be monitored annually.

Plate 7.3-13 Knotweed strand almost hidden by surrounding vegetation.

Plate 7.3-14 Extent of Clematis overgrowth on previous Knotweed extent, which was marked by poles.

7.3.3 Identification of Key Ecological Receptors

7.3.3.1 Masterplan Site

Table 7.3-10 below provides the ecological evaluation of all receptors as described in Section 7.2.3.1. It provides the rationale for the determination and identifies the habitats and fauna that are considered to be KERs and therefore those receptors that are subject to impact assessment and considered in Section 7.5 of this report. Impact assessment mitigation measures are incorporated into the *proposed development* where required, to avoid potential significant impacts on these KERs. Section 7.3.3.2 describes these receptors in the context of the Application Site.

Table 7.3-10 Importance of Ecological Receptors

Ecological Feature or Species	KER Y/N	Rationale
Designated Sites	**Yes**	**European Designated Sites** The proposed development site is hydrologically linked to adjacent and downstream European sites, namely the: • Lower River Shannon SAC [002165] • River Shannon and River Fergus Estuaries SPA [004077] Potential for Likely Significant Effects (LSEs) on these European sites was identified within the AA screening for the proposed development. Potential impacts on these European sites are assessed fully in the NIS for the proposed development. In the context of this Biodiversity Chapter these sites have been assigned **International Importance** and included as a KER as there is potential for indirect effects on these European sites via water pollution, as well as disturbance of SCI and QI species. The potential collision of SCIs with newly built buildings was also considered.
	Yes	**Nationally Designated Sites** The following Nationally designated sites were identified as being within the ZoI of the proposed development: • Fergus Estuary and Inner Shannon, North Shore pNHA [002048] • Inner Shannon Estuary - South Shore pNHA [000435] These sites mostly overlap with the above European Sites. Fergus Estuary and Inner Shannon, North Shore pNHA partially overlaps with the Application site, along the Riverfront. A potential for direct effects was considered, however due to the artificial nature of the habitats within these overlapping areas, which consist of pedestrian walkways on O'Callaghan Strand, there is no potential for direct effects on any significant habitats of the Designated Site. A potential for direct effects on the pNHA was excluded. The sites are included as a KER as there is potential for indirect effects via water pollution and potential disturbance to associated species.
Aquatic Features		
Reservoir and associated aquatic species	**Yes**	The reservoir is the only aquatic habitat present within the Masterplan site. It has been assigned **Local importance (Higher Value)** as it supports biodiversity at the local scale, particularly within its urbanised context. The coarse fish species observed within the reservoir are not associated with the SAC and were also assigned **Local importance (Higher Value)**. The reservoir is not considered a significant supporting habitat for aquatic species in itself as it was noted to vary in water levels, algal vegetation, and likely oxygen content.

		The reservoir and the species it supports are considered for further assessment as a KER in relation to potential habitat modifications during construction and impacts on water quality during construction and operation.
River Shannon and associated habitats and species	**Yes**	The River Shannon, which is hydrologically linked and adjacent to the Masterplan Site, is known to support a number of aquatic habitats, including the Westfiled Wetlands which fringe the river, and aquatic species. The River Shannon (and the aquatic habitats and species it supports, including otter and avian fauna) is of **International Importance** due to its designation as an SAC or as QI's of the SAC (e.g. otter, salmon, lamprey,). The River also supports an SPA. The habitats located along the Riverfront are mapped as Annex I habitats and are associated with the SAC, therefore were assigned **International Importance.** Given the nature, scale and duration (phasing spanning a three-year period) of the proposed works, surface water and ground water have potential enter the River Shannon via hard surfaces adjacent to it or through the artificial pathways identified. A potential pathway for indirect effects was identified in the form of deterioration of water quality resulting from pollution, associated with the construction and operational phases of the proposed development. In addition, potential for disturbance on the QI Otter was also considered. The River Shannon, together with the aquatic habitats and species associated with it, are therefore included as a KER for further assessment.
Terrestrial Habitats		
Scrub/Hedgerow	**Yes**	The scrub/hedgerow surrounding the reservoir and covering the quarry walls has been assessed as being of **Local importance (Higher Value)**. Despite its low diversity composition and the presence of non-native species, these habitats were found to be important in maintaining links and ecological corridors between features of higher value, particularly in the local context. As the site will be cleared in order to facilitate construction of the proposed development, these habitats have been identified for further assessment as a KER in the context of their connectivity value.
Dry meadow and grassy verges	No	This habitat is primarily located to the north of the Masterplan Site, the Fernbank, in an area of spoil which has since regenerated. Other patches of habitat have been identified bordering buildings and artificial surfaces. Due to its low diversity and limited supporting function for local biodiversity, it was assigned Local Importance (Lower Value) and is not considered a KER.
Buildings and Artificial Surfaces **Spoil and Bare Ground** **Recolonising bare ground**	No	Artificial habitat types cover the vast majority of the site and are widely available in the surrounding urban environment. Small patches of exposed rock along the quarry walls will not be affected by the development. Stonewalls bounding the Flaxmill site provide habitat for maidenhair fern but have otherwise low

Stone walls and other stone works **Exposed Rock**		biodiversity value and will not be significantly affected by the proposed works. A small section of stonewalls along OCS is proposed for demolition and most will be retained, as such no significant impacts on the species supported is expected. These habitats are not identified as KERs.
Fauna		
Bats	**Yes**	Bats have been recorded roosting, commuting and foraging within the Application Site. The habitats within and surrounding the Masterplan Site are utilised by a small population of bats that are assigned **Local Importance (Higher Value)** due to their urban nature, relatively low suitability for bats and corresponding low activity levels. The soprano pipistrelles that are roosting on the site are assigned an importance of **Local Importance (Higher Value)** as the species is common and widespread in the local area and the number of roosting bats is small, with no breeding colony recorded. A population of approximately 2 LHB that was recorded roosting on the site was assigned **National Importance**, due to the high sensibility of the Limerick area in maintaining a valuable genetic link for populations in the Kerry and Clare counties. The Masterplan site is not located in proximity of any sites designated for the protection of bats and therefore the population is not considered in association with protected sites. The proposed development has the potential to result in direct and indirect effects on these receptors in the form of loss of roosting, commuting and foraging habitat, as well as potential death during site clearance and demolitions. Therefore, bats have been included as a KER for further assessment.
Birds	**Yes**	Common garden bird populations were recorded utilising the site for foraging and breeding. Flyovers were also recorded for species associated with the nearby SPA (Cormorant) and for red listed species (Swift). There is a potential for the site to result in direct effect such as disturbance of breeding birds. The bird population recorded within the Masterplan site was assigned **Local Importance (Higher Value)** and have been included as a KER for further assessment. The populations associated with the nearby SPA were assigned **International importance** and were also included as a KER, due to potential impacts as a result of disturbance and deterioration in water quality. The potential collision of these species with newly built buildings was also considered. The proposed development involves the micrositing of telecommunication antenna by approximately 3 meters on the rooftop of Block 2a of the PBSA. The minor relocation is not anticipated to incur in significant effects on local bird assemblages.
Other fauna (e.g. invertebrates, Fox, etc).	No	The recorded evidence suggests that the proposed development site is not utilised by populations of higher than Local Importance (Lower Value) and no potential for significantly effects have been identified at the population level. They are unlikely to be significantly affected by the proposed development. For this

		reason, other faunal species are not considered as KERs and as such are not considered further in this assessment.

7.3.3.2 Application Site

The Application Site was assessed for all Ecological Receptors identified above in Section 7.3.3.1. Likely receptors are described below for each zone of the Application Site.

Potential impacts on water quality, and therefore potential indirect impacts on the Lower River Shannon SAC and its QI's, and potential impacts on SCI birds of the nearby SPA as a result of disturbance during construction apply to every zone of the Application Site.

A site sequencing plan was developed and is described in in Chapter 2.0, Section 2.6.2.

Flaxmill Site

KERs identified for the Flaxmill are as follows:

- roosting bats (LHB)
- commuting bats (all bats recorded)
- breeding birds (pigeon, corvids, gulls)

The Flaxmill and associated buildings were found to be in use by a small population of LHBs for roosting and commuting. No other bat species was observed roosting within the building and its immediate surroundings, however as they are open and accessible to bats, it is likely that commuting by other species occurs.

The buildings surrounding the Flaxmill, and the Flaxmill itself to a lesser extent, provide nesting habitat for pigeons and other highly urbanised species like corvids.

Quarry Site

KERs identified within the Quarry Site are as follows:

- roosting bats (soprano pipistrelle)
- commuting bats (all bats recorded)
- foraging bats (all bats recorded)
- breeding birds (passerines)
- scrub habitat
- reservoir habitat and associated aquatic species

A soprano pipistrelle roost was found on the quarry walls. The quarry walls were identified as a commuting corridor for the LHB population on site and provide foraging and commuting habitat for all bat species recorded. The quarry grounds provided limited habitat suitability for fauna or flora, however the adjacent reservoir consists of the only aquatic habitat onsite and provides connectivity to designated sites.

A stand of Japanese Knotweed was identified in proximity to the reservoir and has been treated since 2021. An invasive species management plan has been prepared in support of the application. Section 7.7.2.4 presents site biosecurity measures proposed.

Stonetown Terrace Site

KERs identified within the Stonetown Terrace Site are as follows:

- commuting bats (all bats recorded)
- breeding birds (passerines)

Foraging and commuting bats were recorded utilising Stonetown Terrace during the surveys undertaken, however no roosting bats were recorded. The buildings in the area are accessible to nesting birds. No other KERs were recorded in this area.

Salesians Site

KERs identified within the Salesians are as follows:

- roosting bats (LHB, pipistrelles)
- commuting bats (all bats recorded)
- breeding birds (passerines)

A small pipistrelle roost was identified within the interior yard of the Salesians Convent, and a derelict classroom located to the north of the site was found to host a small LHB roost. The northern boundary of the Salesians Site is part of the LHB commuting corridor identified within the site.

Riverfront

KERs identified within the Riverfront are as follows:

- commuting bats (all bats recorded)
- otter
- breeding and wintering birds

No evidence of roosting bats was found in this area. This area of the Application Site does not provide suitable foraging habitat and has limited suitability for commuting bats due to the built environment and existing lighting. The zone is the closest to the River Shannon and the species it supports, and partially borders the Lower River Shannon SAC.

Shipyard Site

KERs identified within the Shipyard are as follows:

- commuting bats (all bats recorded)

Minimal activity was recorded in this area during previous surveys, and it is of very limited suitability for bats.

A stand of Himalayan Knotweed was identified in proximity to the Shipyard in 2021. An invasive species management plan has been prepared in support of the application. Section 7.5.2.3 presents site biosecurity measures proposed.

7.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

7.4.1 Masterplan Site

The Masterplan, published in 2023, was prepared in response to the requirements for a coordinated and holistic approach to development on the Cleeves Site (5.30 hectares) as detailed in the Limerick Development Plan 2022 – 2028. As part of this holistic approach, the masterplan was designed in collaboration with the project ecologists to avoid, limit, and compensate for impacts on biodiversity. Comments provided by NPWS staff during consultations, particularly in relation to landscaping, were also incorporated. These are detailed in Chapter 4.0.

With the central Quarry Site and its reservoir being the main ecologically sensitive aspects of the site, particularly in light of the bat surveys undertaken since 2021 to inform the masterplan, the following measures guided the design:

- Retention and enhancement of the existing reservoir
- Retention of bat commuting corridors within the site by:
    - Sensitive and organic lighting design across the masterplan and retention of identified dark corridor
    - Reinstatement of vegetation cover following construction
    - Provision of additional green habitats
    - Use of temporary landscape measures (i.e. movable planters) where future phases do not allow for permanent solutions at Phase I
- Use of native, diverse planting to increase biodiversity
- Maintaining distinction between public realm provisions and biodiversity measures
- Provision of bat roosting habitat to compensate for demolitions across the masterplan
- Use of coherent mitigation measures between phases to limit disturbance where possible

Phase I of the Masterplan has included for the provision of bat roosting habitat within the existing protected structures. As part of Phase I of the masterplan, cavities under the Flaxmill windowsills will be reopened to create safe roosting opportunities within the protected structure. The existing attic space above the Flaxmill stairwell will also be retained void and slate access will be included to create potential roosting habitat for crevice dwellers and other species like brown long-eared bats.These will be further developed as part of Phase III of the Masterplan. These measures are shown, in Section 7.7.1.

7.4.2 Application Site

A full description of the proposed development is provided in Chapter 2.0 Project Description, Section 2.5. The mitigation measures incorporated in the project design as part of Phase II of the development are described below.

The Proposed Development site is located in the Docklands of, Co. Limerick (Grid Ref: R 57051 57119) and is accessed via The North Circular Road. The Proposed Development site is located on the former Cleeves factory site on the northern bank of the River Shannon.

The proposed development comprises Phase II, of an overall Masterplan with four phases of development proposed. Phase II is subsequent to ongoing stabilisation and repair of the Flaxmill protected structure (Phase I). Phase III is intended to comprise an educational campus, inclusive of the

adaptive reuse of the Flaxmill Building as part of that development and will be subject to a future separate application. Phase IV comprising the Shipyard site will be the final phase of development.

Two structures within the site are designated protected structures: the Flaxmill Building (PS Ref no.264 & NIAH No. 21512053) and the octagonal brick chimney (PS Ref no.265 & NIAH No. 21512059), which are to be retained. Other structures on the site will be removed to facilitate the proposed redevelopment.

The proposed development includes:

A. Demolition of a number of structures to facilitate development including (i) Salesians Secondary School and Fernbank House; (ii) 2 no. houses on North Circular Road; (iii) Residual piers from the basin of the reservoir; (iv) Upper Reservoir on Stonetown Terrace comprising 2 no. concrete water tanks, pump house and liquid storage tank; (v) 1960's lean-to building structures adjoining the Cold Store (former Weaving Mill); (vi) remaining fabric of c20th rear lean-to of the Flaxmill Building; (vii) c.1960s office building adjoining the Packing Store and Cheese Plant on North Circular Road; (viii) Cluster of buildings including altered part of the Linen Store, the former Linen Store, Storage Building, and Office/Lab building at O'Callaghan Strand / Stonetown Terrace with partial retention of existing stone wall; (ix) warehouse on the Shipyard site; and (x) partial removal of stone boundary wall defining the Cleeves site adjoining O'Callaghan Strand / Stonetown Terrace and around the Shipyard site.
B. Construction and phased delivery of:
   i. Residential Development in 4 development 'zones' within the site ranging in height from 3 – 7 storeys (with screened service plant at roof level) comprising; (a) 234 no. residential units; (b) 270 no. student bedspaces with ancillary resident services at ground floor level; (c) 299sqm of commercial floorspace; and (d) a creche. The specific development details of each proposed development zone comprise the following:
      - Salesians Zone – 1 no. building with 2 no. blocks extending to 6 and 7 storeys comprising 146 no. apartments (76 no. 1 bed; and 70 no. 2 bed); a creche; semi basement car and bicycle parking; reception area, plant rooms, and refuse storage, with screened external plant and photovoltaic panels at roof level; 20 no. 3 storey 3 bed triplexe units with photovoltaic panels at roof level; and 30 no. car parking spaces for the dedicated use of the adjoining Salesians Primary School.
      - Quarry Zone – 1 no. Purpose Built Student Accommodation (PBSA) building with 3 no. blocks extending to 6 and 7 storeys comprising 270 no. bedspaces with study rooms, shared areas, exercise room, reception area, plant rooms, refuse storage and bicycle parking all at ground floor level and screened external plant and photovoltaic panels at roof level. Provision is made for telecommunication antennae on the roof top of one block. Consent is also sought for use of the PBSA accommodation, outside of student term time, for short-term letting purposes.
      - Stonetown Terrace Zone – 1 no. building extending to 4 - 5 storeys comprising 38 no. apartments (6 no. studios; 12 no. 1 beds; and 20 no. 2 beds) with plant rooms and refuse storage at ground level, ancillary infrastructure at basement level at northern end of the block, with screened external plant and photovoltaic panels at roof level; 9 no. 3 storey 3 bed townhouses with photovoltaic panels at roof level; and a dedicated secure bicycle storage facility.

- O'Callaghan Strand Zone – 1 no. building extending to 4 / 5 storeys comprising 21 no. apartments (9 no. 1 bed and 12 no. 2 bed) with an open roof structure accommodating communal open space, plant and photovoltaic panels; and 299qm of commercial ground floorspace intended to accommodate Class 1, Class 2 and / or Class 3 uses, with provision for car parking in the undercroft.

ii. Dedicated mobility hub with canopy and photovoltaic panels including double stacker bicycle parking; and EV Charging spaces, within the Shipyard Zone. A dedicated pedestrian/cycle link connects North Circular Road with Condell Road. The remaining area of the zone shall accommodate temporary car parking and a temporary external event space to be used on a periodic basis as the need arises, pending future redevelopment proposals as detailed in the Masterplan (Stage IV).

iii. Extensive provision of Public Realm including creation of the Reservoir/Quarry Park, the Flaxmill Square and the Riverside Corridor. Significant areas of civic and green spaces are provided, incorporating formal and informal play space; nature based SuDs, permeability and access; and a riverside canopy with photovoltaic panels functioning as an outdoor event space and incorporating heritage interpretative panels

iv. 3 no. dedicated bat houses;

v. Telecommunication antennae on roof of Block 2A of the PBSA, including (a) 9 no. Support poles to support 2 no. antennae each; (b) 6 no. microwave dishes affixed to the plant screen; and (c) associated telecommunications equipment and cabinets (effectively screened). To facilitate technologically acceptable locations at the time of delivery, a micro-siting allowance of 3m is proposed on the roof top of Block 2A of the PBSA for the infrastructure.

vi. Provision of vehicular access/egress points including (a) utilisation of existing access points to the Salesians Zone, to the Flaxmill and Quarry Zones and to the Mobility Hub on the Shipyard Site Zone; (ii) reopening an existing (currently blocked) access point off O'Callaghan Strand; (iii) new access points to the proposed undercroft carparking at Salesians from the North Circular Road and at the end of Stonetown Terrace road which provides access to the Stonetown Terrace Zone; and (iv) emergency access only from Stonetown Terrace to the Flaxmill Zone;

vii. Provision of 30 no. dedicated car parking spaces to serve the Salesians Primary School; and

viii. All ancillary site development works including (a) water services, foul and surface water drainage and associated connections across the site and serving each development zone; (b) attenuation proposals; (c) raising the level of North Circular Road between Fernhill and O'Callaghan Strand; (d) refuse collection store (e) car and bicycle parking to serve the development; (f) public lighting; (g) all landscaping works.; and (h) temporary construction measures including (i) construction access to the Quarry site including provision of a temporary access across the reservoir; and (ii) temporary use of onsite mobile crusher.

As the Application Site includes the majority of the Masterplan Site, detailed designs of the biodiversity measures described in the points above have been developed for Phase II. Namely, the proposed development includes:

- The retention and sustainable use of the existing reservoir
- The provision of alternative bat roosting habitat, with the creation of three LHB bat houses in particular

- A coherent landscape plan which maintains connectivity between zones, as detailed in Chapter 12.0
- A lighting plan that includes a combination of low colour temperatures, bollards and other fixtures limiting unnecessary light spilling, lighting control regimes, and avoidance of aesthetic lighting within the reservoir and along retained ecological features.
- The maintenance of a vegetated dark corridor for bats along the retained quarry walls, creating a link between NCR and the Salesians through the retained reservoir

7.5 LIKELIHOOD OF SIGNIFICANT EFFECTS

7.5.1 Construction Effects

7.5.1.1 Effects on Aquatic Features prior to Mitigation

The effects on water quality during construction are fully described in Chapter 11.0 'Water & Hydrogeology' of this EIAR and are described here in relation specifically to ecology. This section assesses the potential for likely significant effects on the aquatic habitats that have been identified as KERs and the faunal species associated with them, including, lamprey, salmonids, coarse fish, and other aquatic species identified during the desk study and multidisciplinary surveys and likely to occur within or downstream of the proposed development site.

The following potential effects during construction were identified and are discussed below:

- Direct and Indirect Impacts on the Reservoir and associated aquatic species
- Indirect Impacts on the River Shannon, its surrounding wetlands and associated aquatic species due to deterioration in surface and ground water quality

Direct and Indirect Impacts on the Reservoir and associated aquatic species

Description of Effect	The works proposed at the reservoir include elements which result in direct effects, including: • Construction of a temporary vehicular route via North Circular Road which will require partial infill of the reservoir • Removal of existing concrete piers from the drained reservoir • Construction of concrete piers into the reservoir to support proposed stairs and walkways • Repairs to the existing drainage infrastructure connecting the Reservoir to the River Shannon • Removal of debris from the water Works around the banks of the reservoir include scrub clearance and landscaping including the construction of boardwalks and seating areas. These works have the potential to result in indirect effects. The impacts on the reservoir include direct habitat loss and, whilst the reservoir was deemed not to have significant fisheries value, potentially direct mortality of fish (roach) that may be present at the time of the works. The construction works within and adjacent to the reservoir have the potential to result in a deterioration in water quality resulting from disturbance of the sediments within the waterbody, release of sediments and other pollutants as a result of works surrounding it. There is also the potential for the release of hydrocarbons and other construction related chemicals into the water via surface and groundwater pathways during construction.

Characterisation of Effect (EPA)	The potential effects on the reservoir as identified above are negative and short term, for the duration of the construction phase of the development and are reversible. They will cover a large percentage of the reservoir and will be of a moderate magnitude. Despite the low ecological quality of the reservoir habitat, the loss and deterioration of water quality constitutes a negative effect of slight magnitude.
Significance of Effect (CIEEM)	Given the low ecological quality of the reservoir habitat and that its significance is associated with its higher biodiversity value than the other sections of the MS site, the temporary effects on the habitat itself are not significant at any geographic scale. Direct effects on fish associated with this habitat are not considered significant.

Indirect Impacts on the River Shannon, its associated Westfield wetlands and aquatic species due to deterioration in surface and ground water quality

Description of Effect	No works are proposed within the River Shannon. However, the river flows adjacent to the Application site, along the Riverfront, and there is an existing hydrological **connection with the Reservoir via existing drainage infrastructure and groundwater.** There is also potential underground connectivity from the Reservoir into the Westfield Wetlands, which fringe the river south-west of the Site. The proposed works have the potential to result in run off of pollutants and sediment laden surface and groundwater run-off into the River Shannon via the above pathways. This could affect the aquatic habitats and species associated with it, including fish and aquatic mammals associated with the Lower River Shannon SAC and the bird assemblages associated with the River Shannon and River Fergus Estuaries SPA, as well as the corresponding Estuary and Inner Shannon, North Shore pNHA and Inner Shannon Estuary - South Shore pNHA. Potential sources of pollution to surface and ground waters as a result of the construction works were considered and include: • Mobilisation of particulate material during demolitions • Mobilisation of soil, sediment, and potentially hazardous (asbestos) material during excavations • Silt-laden surface run-off • Release of chemicals, including hydrocarbons, from onsite machinery, concrete and other cement-based products • Stockpiled excavated material providing a point source of exposed sediment • Groundwater ingress during excavation works
Characterisation of Effect (EPA)	The potential effects on the River Shannon and associated wetlands and species, including waterbirds, as identified above are short term, for the duration of the construction phase of the development and are reversible. Given the nature and scale of the works and the sensitivity of the receptors, they have the

	potential to result in an indirect negative effect of moderate magnitude.
Significance of Effect (CIEEM)	In the absence of mitigation and following the precautionary principle, there is potential for works associated with the proposed development to result in significant indirect effects on identified aquatic habitats and species. This would also result in impacts on identified aquatic receptors of Local (Higher Value), National (pNHAs), and International Importance (i.e. the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA, as well as associated QI and SCI species).

7.5.1.2 Effects on Terrestrial Habitats prior to Mitigation

The sections below provide details of the extent of the habitats that will be lost to facilitate the footprint of the proposed development.

Habitats of Local Importance (lower value) lost to the footprint of the proposed development consist of Buildings and Artificial Surfaces (BL3), Recolonising Bare Ground (ED3), Spoil and Bare Ground (ED2), and Dry meadow and grassy verges (WS2).

These habitats are common and widespread in the locality and have a low biodiversity value. Loss of these habitats to the footprint of the proposal is not considered to be significant at any geographic scale. Exposed Calcareous Rock (ER2) along the quarry will be retained, as well as the majority of boundary walls categorised as Stonewalls and other stonework (BL1). See Landscape booklet (LCLE001) for reference to retained boundary walls. The effects on vegetated habitats that are identified as KERs are described in the below tables.

Scrub and hedgerow were identified as KERs and the impacts thereon are assessed in the tables below.

Assessment of Potential Effects on Scrub/Hedgerow

Description of Effect	The proposed development will require the clearance of all scrub on site to allow for construction to be carried out. These enabling works are proposed as Stage 2 of site sequencing. The total area of scrub lost is approximately 0.7 ha and includes pockets found in proximity of the reservoir, as well as along the North Circular Road. They include invasive species including old Man's beard, winter heliotrope and butterfly bush. Vegetation clearance along the quarry walls will be limited to necessary removal of old Man's beard, ivy and butterfly bush, which overwhelm other existing vegetation and provide potential issues to the wall structure. Despite their low ecological significance, this loss will result in a decrease in biodiversity in the area and a loss of a foraging and commuting feature for birds and bats, in the context of a highly modified urban environment.

Characterisation of Effect (EPA)	This is a short term, reversible negative effect. Given the low ecological significance of the habitats in their wider context and the relatively small area affected, the effect is assessed to be of slight magnitude. The effect is short term, in the absence of any specific mitigation, as the development includes a detailed landscape plan that is provided Chapter 12.0.
Significance of Effect (CIEEM)	The unmitigated loss of scrub and low diversity hedgerow during construction is not considered a significant effect on these habitats at any geographic scale. The temporary loss of this habitat as a supporting habitat for faunal species is considered significant at a site level. Effects on supported fauna are assessed below.

7.5.1.3 Effects on Fauna prior to Mitigation

The proposed development has the potential to result in habitat loss and disturbance impacts on faunal species included as KERs. Therefore, these species were taken forward for further assessment. Although no breeding or rest sites for otter were recorded during the site visits, the River Shannon, which flows directly adjacent to the Site, provides suitable foraging and commuting habitat for faunal species. Taking a precautionary approach, there is potential for disturbance to otter during the construction phase of the Proposed Development.

The following species have been brought forward for further assessment:

- Bats
- Birds
- Otter

The potential for significant effects on aquatic species as a result of degradation in water quality, including otter, is assessed in relation to effects on the aquatic habitat in which they reside. This has been assessed in the preceding sections and is not repeated.

No potential for significant effects on any other species or taxa was recorded and none were assigned as KERs.

Effects on Bats during Construction

Small populations of foraging, commuting and roosting bats were recorded utilising the site on a regular basis. The proposed construction phase of the development has the potential to impact bats directly via:

- Loss of, or Damage to, Roosts
- Loss or Damage to Commuting and Foraging Habitat
- Mortality

And indirectly via:

- Disturbance

Each effect is described below.

Due to the proposed site sequencing, potential disturbance of roosting bats taking up newly built roost alternatives (described in remedial measures, Section 7.7 below) or using the identified roost within the Quarry Site during construction is also anticipated.

Direct loss of Roosting Habitat

Description of Effect	The proposed development will result in the permanent loss of a small roost of Pipistrelle (*Pipistrellus* sp.) bats (Approx.5) in the Salesians site and multiple roosting sites for the small number of LHB that were recorded on the site. These include known roosts in a derelict classroom in the Salesians site and a number of locations in buildings throughout the MS. Many of the buildings provide potential roosting habitat but no evidence of large regularly used roosts was recorded during the multiple surveys that were undertaken.
Characterisation of Effect (EPA)	The loss of the pipistrelle roost represents a permanent, irreversible, negative effect on a small number of bats. Given the small number of bats involved and the retention of another known pipistrelle roost on the site, within the quarry walls, the magnitude of this effect is slight. With regard to the LHB, despite the low numbers of bats involved (Approx.2), the population is of National importance and the loss of roosting habitat at this location has the potential to result in a reduction of the local range of the species in Limerick City. The loss of this habitat represents a permanent, irreversible, negative effect on a small number of bats. The magnitude is slight.
Significance of Effect (CIEEM)	Despite the slight magnitude of the effects on roosting bats, the loss of roosting habitat during construction, is considered Significant at a local level prior to the application of mitigation.

Direct loss of Commuting and Foraging Habitat

Description of Effect	The proposed development involves the partial removal of existing vegetation on site during construction. While the reservoir habitat will be retained, significant works will be undertaken in this area, temporarily affecting existing prey availability. **Commuting corridors will remain in place along the quarry walls** and retained buildings, however the quality of the corridor will be temporarily reduced by vegetation clearance and resultant loss of cover and prey availability.
Characterisation of Effect (EPA)	This is a short term, reversible negative effect. Given the way that the features are used for commuting and foraging, the effect is assessed to be of moderate magnitude. It is short term, in the absence of any specific mitigation, as the development includes a detailed landscape plan that is provided in Chapter 12.0
Significance of Effect (CIEEM)	The degradation of commuting and foraging habitat during construction, prior to mitigations, is considered Significant at a site level.

Direct Mortality

Description of Effect	The destruction of known bat roosts and roosting habitat during the demolition of the existing buildings on the site has the potential to result in direct mortality of any roosting bats if undertaken in the absence of any mitigation.
Characterisation of Effect (EPA)	This is a potential, permanent, irreversible impact on a small number of bats, in the absence of mitigation. The magnitude would be slight, given the small number of bats potentially affected.
Significance of Effect (CIEEM)	The potential killing of bats is considered significant. In particular, the potential killing of LHB within the Limerick area is considered Significant at a National level, as the population was assigned National importance due to the sensitivity of maintaining a viable population in this area.

Indirect Effects due to Disturbance

Description of Effect	The development has the potential to disturb local bat populations using the site to roost, commute and forage during the construction phase. There is potential for disturbance to the known roost of soprano pipistrelle in the quarry wall where vegetation clearance and construction operations are located in close proximity to the roost. In addition, construction activities have the potential to disturb the LHB that may be roosting throughout the site during the construction phase, as a result of rock crushing, use of machinery and construction-related noises and dust production. Disturbance in relation to site sequencing on bats is further discussed in Section 7.5.2 Phased construction Effects. Disturbance as a result of lighting is unlikely to occur as working hours on the site are restricted to between 07:00 and 18:00 and lighting (except potentially some security lighting) is unlikely to be required outside the winter months, when bats are less active (no hibernacula were recorded on the site).
Characterisation of Effect (EPA)	The impact of construction disturbance is a likely, short term, negative effect on a small number of bats. The magnitude of this impact is slight, given the small numbers of bats involved.
Significance of Effect (CIEEM)	In the absence of mitigation, the potential for disturbance as a result of lighting during construction is not considered significant as any effects would be limited to working hours during the winter months. Potential disturbance due to vegetation clearance on the existing soprano roost has the potential to be significant in the absence of appropriate mitigation. Potential disturbance on roosting bats using the site during construction activity, is also considered significant in the absence of mitigation.

Effects on Birds during Construction

An assemblage of common garden birds was found to utilise the MS. The MS is also adjacent to the River Shannon and the bird populations associated with it. However, the site was not found to be utilized by any sensitive species during the extensive surveys undertaken. In addition, the MS is located in the middle of Limerick City and the river and its banks are subject to existing high levels of disturbance from human activity and vehicular traffic.

The following potential effects on birds during construction were identified and are discussed below:

- Direct impacts due to loss of resting and breeding habitat for local assemblages and potential mortality from demolition activities

- Indirect impacts due to disturbance of birds, including SCIs of the nearby SPA birds found outside the Application Site, from construction-related noise.

Indirect effects on waterbirds as a result of water quality deterioration were also considered. The potential for significant effects as a result of water quality deterioration resulting from water pollution has been assessed in the preceding sections and is not repeated below.

Direct Loss of Resting and Breeding Habitat

Description of Effect	The loss of habitats within the MS will result in loss of and fragmentation of potential nesting habitat for a range of local common and widespread bird species. In addition, if site clearance is undertaken during the bird nesting season, it could potentially lead to the destruction or disturbance of nests and potentially to cause mortality to juvenile birds in the nest. No direct habitat loss or mortality is anticipated on bird assemblages associated with the River Shannon, including SCI species associated with the nearby SPA considered of international importance, **as no works are proposed within the River Shannon and no supporting habitat for these species was identified within the site**.
Characterisation of Effect (EPA)	The impact of habitat loss, disturbance and potential mortality is a likely, short term, negative effect on a small number of common bird species. The magnitude of this impact is slight, given the small numbers of individuals likely to be present and the common and widespread nature of the habitats to be lost.
Significance of Effect (CIEEM)	In the absence of mitigation, the potential for habitat loss and mortality during the construction phase to local bird populations using the site is considered significant at the local geographic scale only.

Indirect Effects due to Disturbance

Description of Effect	The construction phase also has the potential to result in disturbance to the local bird assemblages, potentially leading to avoidance of the MS. In addition, works on the Riverfront have the potential to disturb the bird assemblages associated with the River Shannon, including birds associated with the SPA. No works are proposed within the River or on supporting habitats to these birds. It was taken into account that the riverfront site is located in the middle of Limerick City and is already subject to high levels of human activity and vehicular traffic, and the Shannon Bridge separates the Application Site from the SPA boundary. The birds utilising the River Shannon in proximity to the Application Site are considered habituated to visual and noise disturbance, are

	therefore unlikely to be significantly affected by the proposed works. The majority of the aquatic species recorded during the surveys undertaken were limited to species usually associated with urban environments (e.g. mute swan, mallard, cormorant, black-headed gulls).
Characterisation of Effect (EPA)	The impact of disturbance on bird species is a short-term, negative impact. The magnitude of this impact is moderate, given the small amount of bird activity currently on the site and the existing high levels of disturbance surrounding the River Shannon and the nature of the bird populations recorded during the surveys undertaken.
Significance of Effect (CIEEM)	In the absence of mitigation, the potential for disturbance during the construction phase to local bird populations using the Application site is not considered significant at any geographic scale.

Effects on Otter during Construction

Indirect Effects due to Disturbance

Description of Effect	The construction phase, and in particular construction works proposed to raise North Circular Road, has the potential to result in disturbance to otter utilising the River Shannon. In relation to disturbance, Otter are predominantly crepuscular in nature and construction activity will be confined to daytime hours, thus minimizing potential disturbance related impacts to the species.
Characterisation of Effect (EPA)	The impact of disturbance on otter is a short-term, negative impact. On a precautionary basis, the magnitude of this impact is slight.
Significance of Effect (CIEEM)	In the absence of mitigation, the potential for disturbance during the construction phase to otters likely to use the River Shannon is not considered significant at any geographic scale.

7.5.2 Phased Construction Effects

The proposed development will be delivered in phases, as described in the site sequencing plan presented in Chapter 2.0, Section 2.6.2. The anticipated sequence of stages is outlined below:

- Stage 1: Construction of Bat Houses - A 3-month period is allocated exclusively to this stage to allow bats on-site to adjust to their new accommodation. No other construction activity will overlap with this stage.

- Stage 2: Site Demolition and Enabling Works - This stage involves demolishing identified buildings and structures to facilitate development and installing enabling drainage infrastructure across the Flaxmill area. Temporary surface treatments will be applied to support access to the upper-level sites (Salesians and Stonetown). This stage is expected to take 12–15 months.

- Stage 3: Flood Protection Works - Raising the North Circular Road and implementing other flood protection measures will occur concurrently with Stage 2 and is expected to take 15 months.

- Stage 4: Salesians Zone Development - Construction of apartments and townhouses, along with local public realm and communal open spaces, will begin midway through Stage 2. This stage is expected to take 18–24 months.

- Stage 5: Stonetown Terrace Zone Development - This stage will likely begin alongside Stage 4 and take 15–18 months. Given its timeline, Stonetown Terrace is expected to be the first zone ready for occupation.

- Stage 6: O'Callaghan Strand Zone Development - Construction of apartments in this zone will begin midway through the Stonetown Terrace works and is expected to take 15 months, likely completing before the Salesians Zone.

- Stage 7: Quarry Zone PBSA and Public Realm - This stage includes the construction of Purpose-Built Student Accommodation (PBSA) and associated amenities, as well as public realm improvements around the reservoir. It is expected to take 24 months.

- Stage 8: Flaxmill Plaza and Riverside Public Realm - Delivery of Flaxmill Plaza and riverside canopy works is anticipated to take 15 months. This stage will begin after the completion of Stonetown Terrace but before the Salesians Zone is finished. Completion is expected to align with the PBSA.

- Stage 9: Shipyard Mobility Hub - The final stage involves constructing the Mobility Hub on the Shipyard site, along with associated site works. This will commence once all other stages are complete and is expected to take 6 months

The primary effect considered as a result of sequencing is the prolonged disturbance expected on bat species utilising the site as a result of the delivery of mitigation measures proposed and discussed in Section 7.7. Chapter 13.0 Noise details noise impacts anticipated as a result of the development.

7.5.2.1 Phased Construction Disturbance on Roosting Bats

During demolitions, the site will retain some existing roosting habitat, particularly along the quarry wall, however other suitable locations (i.e. existing buildings) will eventually be removed. Alternative bat roosting habitat will be reinstated within the site throughout the construction phase of the development, which is expected to take approximately three years for the delivery of all phases, and for the subsequent phases of the masterplan. This decision to allow the site to remain available to bats was considered more favourable than short-term displacement until operation. Temporary Cathedine roosts for LHB will be in place in and permanent bat houses and bat boxes will be erected as soon as development allows. Section 7.7 details mitigations.

There is little information on the tolerance levels of different bat species to noise, but as the site is currently in use for material stockpiling and events (i.e. scare factory, army drills), the current baseline includes for some noise levels, which bats utilising the site are likely accustomed to. However, due to the nature and scale of the works, including material stockpiling within the quarry, rock blasting, and the use of heavy machinery, on a precautionary basis disturbance on roosting bats is considered likely, particularly in the form of momentary and brief effects where noise will exceed background noise levels.

Following site clearance and demolitions, the Salesians will be the first area to be completed where a bat house for LHB and alternative roosting crevice dwelling bats will be in place and distanced from potential disturbance (Stage 2-4). Following construction in this area, no significant noise disturbance impacts are anticipated on these roosts. This is expected to provide safe roosting habitat from the Quarry site where bat houses are proposed, if disturbance levels still occurring in this area (i.e. during Stage 7 and 8) exceed their tolerance levels. This solution will maintain roosting availability within the site while allowing for bats to use all three bat houses when noise levels are tolerable.

The construction of bat houses along the quarry wall is expected to also briefly disturb the existing soprano pipistrelle roost located in this area and retained. Construction of the houses will occur as soon as possible following site clearance (Stage 2).

Phased construction mitigations are presented in tandem with construction mitigations.

7.5.3 Operational Effects

The operation of the proposed development will not result in any additional land take or loss of habitats and as such there is no potential for any significant effects in this regard.

Potential effects on water quality are considered below with regards to the aquatic Reservoir habitat located within the Site, and with regards to identified connectivity to the River Shannon.

7.5.3.1 Effects on Aquatic Features prior to Mitigation

The effects on water quality during operation are fully described in Chapter 11.0 ‘Water & Hydrogeology’ of this EIAR and are described here in relation specifically to ecology. This section assesses the potential for likely significant effects the aquatic habitats that have been identified as KERs and the faunal species associated with them, including, lamprey, salmonids, coarse fish, and other aquatic species identified during the desk study and multidisciplinary surveys and likely to occur within or downstream of the proposed development site.

The following potential effects during operation were identified and are discussed below:

- Impacts on the Reservoir and associated aquatic species
- Impacts on the River Shannon, its surrounding wetlands and associated aquatic species due to deterioration in surface water quality

Impacts on the Reservoir

Description of Effect	During operation of the proposed development, surface water drainage from the Salesians and Quarry Sites will be directed into the reservoir. In the absence of mitigation, this has the potential to result in pollution of the waterbody as a result of the inflow of untreated waters from the site which could potentially include hydrocarbons from trafficked areas, silt, litter and other pollutants.
Characterisation of Effect (EPA)	The potential effects on the reservoir as identified above are negative and permanent. They are reversible. They have the potential to be of a moderate magnitude, given that they would affect the only aquatic habitat on the site.
Significance of Effect (CIEEM)	The ongoing pollution of a waterbody that otherwise has the potential to be a clean and unpolluted ecological resource within the MS is a significant effect at the local scale.

Impacts on the River Shannon, its surrounding wetlands and associated aquatic species due to deterioration in surface water quality

Description of Effect	During operation of the proposed development, surface water drainage from the MS will be directed into the reservoir as described above. There is a direct connection between the reservoir and the River Shannon. In the absence of mitigation, this has the potential to result in pollution of the waterbody and the designated sites associated with it as a result of the inflow of untreated waters from the site which could potentially include hydrocarbons from trafficked areas, silt, litter and other pollutants. In addition, the proposed development will result in the production of foul waste.
Characterisation of Effect (EPA)	The potential effects on the River Shannon and associated wetlands and species as identified above are long term but are reversible. Despite the relatively small area of run off and foul water in comparison to the size of the river, the sensitivity of the receptor has been taken into account in finding that the development has the potential to result in an indirect negative effect of moderate magnitude.
Significance of Effect (CIEEM)	The impact of the proposed development on water quality in the River Shannon has the potential to be Significant in the absence of mitigation. This would also

	result in impacts on aquatic receptors of Local (Higher Value), National (pNHAs), and International Importance (i.e. the Lower River Shannon SAC and the River Shannon and River Fergus Estuaries SPA, as well as associated QI and SCI species).

7.5.3.2 Effects on Fauna prior to Mitigation

The operational phase of the proposed development will not result in any loss of supporting habitat for protected fauna. As described previously in this EIAR, there will be no additional loss of habitat to the construction phase losses assessed in Section 7.5.1.3.

Potential for indirect effects on aquatic species such as otter, salmonids, lamprey and aquatic receptors due to run off of pollutants from hardstanding areas and from storm water and foul water if not treated adequately during the operational phase has been addressed above. The following faunal species have been identified as KERs for further assessment in the following subsections:

- Bats
- Birds

Effects on Bats during Operation

Small populations of foraging, commuting and roosting bats were recorded utilising the site on a regular basis. The proposed development was designed to encourage usage by bats during operation, as described in section 7.4. However, in the absence of mitigation, the proposed operation phase of the development has the potential to impact bats indirectly via:

- Disturbance of roosting, foraging and commuting bats

Effects due to Disturbance

Description of Effect	The operational phase of the proposed development will result in increased human activity and noise within the proposed Application site. In addition, the proposed development will lead to an increase in artificial lighting throughout the site. Lighting has the potential to affect bats by fragmenting their commuting and foraging habitats and disturbing roosting locations, causing abandonment of suitable habitats that are unusable due to increased risks of predation and inability to adapt to artificial lighting levels. However, the proposed lighting plan was specifically limited to the provision of lighting that was justified and incorporated mitigation to reduce impacts on wildlife and maintain a dark corridor along the quarry walls. These mitigations are detailed in Section 7.7.1.3.
Characterisation of Effect (EPA)	Increased illumination within the site is considered is a likely permanent negative effect. Given the low numbers of bats potentially affected and the incorporated mitigation, the effect is of slight magnitude.

Significance of Effect (CIEEM)	Considering the incorporated mitigation, disturbance from lighting during operation to local bat populations is not considered Significant at any scale.

Effects on Birds during Operation

The MS is adjacent to the River Shannon and the bird populations associated with it. However, the site was not found to be utilized by any sensitive species during the extensive surveys undertaken. In addition the MS is located in the middle of Limerick City and the river and its banks are subject to existing high levels of human activity and disturbance and the proposed development is unlikely to be significantly different to the existing baseline.

Collision risk resulting from the proposed development was also considered. However, no significant impacts in this regard were identified: very few birds associated with the adjacent River Shannon or associated wetlands were recorded flying over the site, and the proposed development consists of a number of prominent, large, stationary objects (unlike suspension bridges or powerlines) that are not located on a significant flyway for birds (e.g. the River Shannon).

The following potential effects on birds during operation were identified and are discussed below:

- Indirect impacts due to disturbance of birds

Indirect effects on birds as a result of water quality deterioration were also considered. The potential for significant effects as a result of water quality deterioration resulting from water pollution has been assessed in the preceding sections and is not repeated below.

Indirect Effects due to Disturbance

Description of Effect	The operational phase of the proposed development will result in increased human activity and noise within the Application site, when compared to the current, disused condition, particularly around the reservoir. In addition, the proposed development will lead to an increase in artificial lighting throughout the site. These effects have been mitigated by design. Any increased levels of activity in the Riverfront area are likely to be negligible in the context of disturbance to bird species in the SPA, which is located in an existing busy urban environment.
Characterisation of Effect (EPA)	This is a permanent negative effect. The magnitude of this impact is not significant, given the small amount of bird activity currently on the site, the existing levels of disturbance surrounding the River Shannon, and the nature of the bird populations recorded during the surveys undertaken.

Significance of Effect (CIEEM)	Disturbance during operation to local bird populations utilising the site is not considered significant at any geographic scale.

7.5.4 Do Nothing Scenario

If the proposed development was not to go ahead, the habitats within the site will likely be retained in the short term and remain in their brown-field state. Due to its prominent location within Limerick City, the Application site is likely to be eventually used for a different development in line with local and national planning policies.

In the short-term, scrub, hedgerows, recolonising bare ground and dry meadows and grassy verges will continue to mature into scrub. The Japanese knotweed onsite will continue to be treated. The site will likely continue to be used for material storage and other occasional uses, such as one-off events, and firefighter and army drills. The school building would continue to be used as temporary accommodation. The majority of buildings onsite will continue to deteriorate, with maintenance likely occurring where necessary.

Phase I of the masterplan will be completed to remediate the structural conditions of the Flaxmill and the Flaxmill building may be put to other use or will remain in place as a shell.

7.5.5 Effects on Designated Sites

7.5.5.1 Impacts on European Sites

As per the EPA Guidance (2022), "*A biodiversity section of an EIAR, for example, should not repeat the detailed assessment of potential effects on European sites contained in documentation prepared as part of the Appropriate Assessment process, but it should refer to the findings of that separate assessment in the context of likely significant effects on the environment, as required by the EIA Directive*". This section provides a summary of the key assessment findings with regard to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs).

The potential for impact on European sites has been fully assessed in the Appropriate Assessment Screening Report NIS that has been prepared in support of the current application. The NIS 'Screens In' the potential for the proposed development to result in Likely Significant Effects on both the Lower River Shannon SAC or the River Shannon and River Fergus Estuaries SPA both alone and in combination with other plans and projects as a result of deterioration in water quality and disturbance to relevant species during construction and operation.

No potential for direct effects was identified as, whilst the red line boundary of the site overlaps with the Lower River Shannon SAC, no works are proposed in this urban area. Potential indirect effects were identified in the form of:

Deterioration of water quality

A potential indirect adverse effects on the relevant European Sites and relevant aquatic Qualifying Interests was identified in the form of deterioration of water quality during both construction and operation.

The potential pathways by which this effect may occur include:

- Direct overland run off to river
- Overland run off to reservoir – which has a connection to the river and potentially to the Westland Wetlands
- Discharge to groundwater
- Inundation with flood waters

Potential sources of pollution to surface and ground waters as a result of the construction works were considered and include:

- Run off of soil, sediment and other particulate material either overland or into the reservoir
- Release of chemicals, including hydrocarbons, from onsite machinery, concrete and other cement-based products either overland, into the reservoir or to groundwater within the site.
- Release of hazardous material such as asbestos to the reservoir, surface or groundwater during demolition and construction.
- Discharge of untreated surface waters to the River Shannon via the surface water drainage system during operation of the proposed development. These may contain silt and hydrocarbons from the trafficked areas and run off of pollutants associated with emergency fire response.

Disturbance to SCI Birds

The construction phase of the proposed development will involve the use of machinery with the potential to generate high levels of noise. As construction works are proposed directly adjacent to the River Shannon, there is potential for disturbance to wetland birds recorded in proximity to the Application site during the construction phase of the Proposed Development.

Disturbance to QI Otter

Although no breeding or resting sites for otter were recorded during the site visits, the River Shannon which flows directly adjacent to the Proposed Application Site, provides suitable foraging and commuting habitat for otter, (a QI species of Lower River Shannon SAC). As construction works are proposed directly adjacent to the River Shannon, taking an extremely precautionary approach, there is potential for disturbance to otter during the construction phase of the Proposed Development.

Conclusion of NIS

Mitigation is prescribed in the NIS to prevent any adverse effects on water quality. In addition, best practice measures, including those set out in Chapter 13 Noise and Vibrations, will be adhered to and will mitigate the potential for disturbance to otter and waterbirds. It is confirmed that the potential for any adverse effect on the integrity of any European Site is avoided and the NIS concludes as follows:

This NIS has provided an assessment of all potential direct or indirect adverse effects on European Sites. It has also assessed the potential for in-combination effects on European site with other plans and projects.

Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report. The measures ensure that the construction of the Proposed Development does not adversely affect the integrity of the Lower River Shannon SAC or the River Shannon and River Fergus Estuaries SPA or any other European Sites, in view of their Conservation Objectives.

Therefore, it can be objectively concluded that the Proposed Development, individually or in-combination with other plans or projects, will not adversely affect the integrity of the Lower River Shannon SAC or the River Shannon and River Fergus Estuaries SPA or any other European Sites.

7.5.5.2 Impacts on Nationally Designated Sites

Potential for significant effects on the following Nationally Designated Sites was identified:

- Fergus Estuary and Inner Shannon, North Shore pNHA [002048]
- Inner Shannon Estuary - South Shore pNHA [000435]

These sites mostly overlap with the above European Sites. Fergus Estuary and Inner Shannon, North Shore pNHA partially overlaps with the Application site, along the Riverfront. A potential for direct effects was considered, however due to the artificial nature of the habitats within these overlapping areas, which consist of pedestrian walkways on O'Callaghan Strand, there is no potential for direct effects on any significant habitats or species associated with the Designated Site. A potential for direct effects on the pNHA was excluded.

The potential for significant indirect effects via water pollution and potential disturbance to associated species was identified. The mitigation to avoid any significant impacts via the identified pathways is provided in Section 7.6 below. With consideration of the mitigations proposed, no significant effects on the Nationally Designated Sites are anticipated.

7.6 CUMULATIVE ASSESSMENT

The proposed development was considered in combination with other plans and projects in the area that could result in cumulative impacts on the Key Ecological Receptors (KERs) identified in Section 7.3.3 of this report, including European Sites and Nationally designated sites. This included a review of online Planning Registers and served to identify past, present and future plans and projects, their activities and their predicted environmental effects. The projects considered, with a particular emphasis on substantial developments, are listed in Appendix 1.1 of this EIAR, together with the methodology for assessment. Relevant projects are addressed in Section 7.6.3. Potential cumulative impacts as a result of the Masterplan were also considered.

7.6.1 Masterplan

The masterplan development has been reviewed, based on available information. It is noted that the proposed development has been designed to ensure future proofing of the overall masterplan development strategy, particularly when considering the demolition strategy, construction phasing, landscape design, lighting designs and drainage. The ecological surveys and all incorporated mitigations for this Phase II development have considered the previous and future phases of the masterplan, and no significant cumulative or in-combination adverse effects are anticipated on the

conservation objectives of any European Site, when considered in combination with the previous or remaining phases of the masterplan.

7.6.2 Assessment of Plans

The following development plans have been reviewed and taken into consideration:

- Limerick County Development Plan 2022-2028
- Regional Spatial and Economic Strategy for the Southern Region
- 4th National Biodiversity Action Plan 2023-2027
- Lesser Horseshoe Bat Species Action Plan 2022-2026
- All Ireland Pollinator Plan 2021-2025

The review focused on policies and objectives that relate to designated sites for nature conservation, biodiversity and protected species. Policies and objectives relating to the conservation of Annex I habitats were also reviewed. The plans were also searched for references to the protection of bats, in particular the lesser horseshoe bat. This species is present in the county but is considered of particular concern due to risk of isolation and the fragmentation of corridors between Cork and Clare populations. An overview of the search results with regard to plans is provided in Table 7-1 below.

Table 7.6.2-1: Plans

Key Policies/Issues/Objectives Directly Related To European Sites, Biodiversity and Sustainable Development In The Zone of Influence	Assessment of development compliance with policy
4th National Biodiversity Action Plan 2023-2027	
Objective 2: Meet Urgent Conservation and Restoration Needs Outcome 2A: The protection of existing designated areas and species is strengthened and conservation and restoration within the existing protected are network are enhanced 29 Outcome 2B: Biodiversity and ecosystem services in the wider countryside are conserved 32 18 27 Navigation Outcome 2C: All freshwater bodies are of at least 'Good Ecological Status' as defined under the EU Water Framework Directive 36	Mitigation measures as outlined in this EIAR for the proposed development also aim to protect biodiversity and ensure no significant effects occur. As such no potential for cumulative impacts were identified upon review of the Plan in conjunction with the proposed development. The proposed development does not contravene the plan and there is no potential for cumulative effects.
Limerick Development Plan 2022-2028	
In this plan, Limerick City Council recognizes the importance of 'undesignated areas' for local wildlife and biodiversity and the importance of maintaining a mosaic of natural habitats and wildlife corridors across the city. Important biodiversity areas in the city include parks, wildflower meadows, green spaces, private gardens, hedgerows, trees, vacant and derelict sites and graveyards. Policy EH P1: Protection of Natural heritage and Biodiversity It is a policy of the Council to: a) Protect and conserve Limerick's natural heritage and biodiversity, in particular, areas designated as part of the European Sites Natura 2000 network, such as Special Protection Areas (SPAs) and Special Areas of Conservations (SACs), in accordance with relevant EU Directives and national legislation and guidelines. b) Maintain the conservation value of all Natural Heritage Areas and proposed Natural Heritage Areas (pNHAs) for the benefit of existing and future generations. Policy EH P2: Sustainable Management and Conservation	The Development plan was comprehensively reviewed, with particular reference to Policies and Objectives that relate to the biodiversity and other natural heritage interests. The proposed development has been designed in order to avoid likely significant effect on areas of ecological importance. Where the potential for adverse effect on areas of ecological importance has been identified, mitigation will be implemented. The proposed project has been designed to avoid any effect on the wider environment including preventing the spread of invasive species, disturbance to protected species and loss/fragmentation of habitat.

It is a policy of the Council to ensure the sustainable management and conservation of areas of natural environmental and geological value within Limerick and to protect, enhance, create and connect, where ecologically suitable, natural heritage, green spaces and high-quality amenity areas for the benefit of biodiversity. Policy EH 01: Designated Sites and Habitats Directive It is an objective of the Council to ensure that projects/plans likely to have significant effects on European Sites (either individually or in combination with other plans or projects) are subject to an appropriate assessment and will not be permitted under the Plan unless they comply with Article 6 of the Habitats Directive. The Council, will through the planning enforcement process where applicable, seek to restore the ecological functions of designated sites, where they have been damaged through inappropriate development. The following Objective was found in relation to the conservation of the lesser horseshoe bat: Objective EH O2: It is an objective of the Council to require all developments in areas where there may be Lesser Horseshoe Bats, to submit an ecological assessment of the effects of the development on the species. The assessment shall include mitigation measures to ensure that feeding, roosting or hibernation sites for the species are maintained. The assessment shall also include measures to ensure that landscape features are retained and that the development itself will not cause a barrier or deterrent effect on the species. The following Objective was found in relation to the conservation of other Irish bat species: Objective EH O3: It is an objective of the Council to require all developments where there are species of conservation concern, to submit an ecological assessment of the effects of the development on the site and nearby designated sites, suggesting appropriate mitigation measures and establishing, in particular, the presence or absence of the following species: Otter, badger, bats, lamprey and protected plant species such as the Triangular Club Rush, Opposite Leaved Pond Weed and Flora Protection Order Species generally. Objective EH O4: Creation of new habitats It is an objective of the Council to: a) Seek the creation of new habitats by encouraging wild green areas and new water features such as, pools and ponds in new developments.	The proposed development does not contravene the plan and there is no potential for cumulative effects

b) Encourage management plans for green areas to use the minimum of pesticides and herbicides. c) The creation of areas that are not subject to public access in order to promote wildlife use is strongly encouraged. Objective EHO5: New Infrastructure Projects It is an objective of the Council to require new infrastructure and linear developments in particular, to demonstrate at design stage sufficient measures to assist in the conservation of and dispersal of species and to demonstrate a high degree of permeability for wildlife, to allow the movement of species and to prevent the creation of barriers to wildlife and aquatic life in the wider countryside. Objective EH O8: Roosting Habitats It is an objective of the Council to require the provision of alternative roosting or settlement facilities for species, such as bird or bat boxes, swift boxes, artificial holts (for otters), or other artificially created habitats in proposed developments, where considered appropriate. Objective EH 01: Invasive Species It is an objective of the Council to: a) Work with and facilitate the work of agencies addressing the issue of terrestrial and aquatic invasive alien species (IAS), by implementing biosecurity measures, selected control measures and surveys, where appropriate. b) Address the presence of invasive alien species on derelict sites under the provisions of the Derelict Sites Act through the preparation of a management and eradication plan for these species. c) Require the submission of a control and management program for the particular invasive species as part of the planning process, if developments are proposed on sites where invasive species are present. d) Employ biosecurity measures to prevent the spread of invasive alien species and disease and to insist that all such measures are employed on all development sites.	
Lesser Horseshoe Bat Species Action Plan 2022-2026	
4.1.2 Roost Recording: 4.1b Undertake a review of the roost network across the species' range to identify those areas without adequate roosting opportunities, for example, winter hibernation sites, night roosts and maternity roosts. 4.1.4 Roost Monitoring: 4.1h Continue monitoring winter and summer roosts annually and keep the national database up to date.	The overall aim of the objectives set out in the Lesser Horseshoe Bat Species Action Plan aim to guide, inform and provide structure for the conservation management of lesser horseshoe bats. The proposed development site is not in

4.1j Continue to survey for new roosts, particularly in those areas that border the current known range for the species 4.1.4 Lighting: 4.1e Evaluate current lighting regimes in the vicinity of key lesser horseshoe bat roosts and their foraging areas and implement site-specific mitigation measures where required.	proximity of key lesser horseshoe roosts and as such the development is not considered to be in contradiction with the plan. However, impacts on LHB were assessed as part of this EIAR as the species has been recorded on site. With the implementation of mitigation measures outlined within this chapter for the proposed development no potential for significant in-combination effects are predicted. The proposed development does not contravene the plan and there is no potential for cumulative effects.
Regional Spatial and Economic Strategy for the Southern Region	
RPO 1. b. The RSES seeks to protect, manage, and through enhanced ecological connectivity, improve the coherence of the Natura 2000 Network in the Southern Region. RPO 117 Flood Risk Management and Biodiversity It is an objective to avail of opportunities to enhance biodiversity and amenity and to ensure the protection of environmentally sensitive sites and habitats, including where flood risk management measures are planned. Plans and projects that have the potential to negatively impact on Natura 2000 sites are subject to the requirements of the Habitats Directive. RPO 124 Green Infrastructure a. It is an objective to promote the concept of connecting corridors for the movement of wildlife and encourage the retention and creation of features of biodiversity value, ecological corridors and networks that connect areas of high conservation value such as woodlands, hedgerows, earth banks, watercourses and wetlands. The RSES recognises the necessity of protecting such corridors and the necessity to encourage the management of features of the landscape that support the Natura 2000 network; b. Green infrastructure will be integrated into the preparation of statutory land-use plans in the Region, which will include identifying Green infrastructure and strengthening this network;	The strategy was reviewed, with particular reference to Policies and Objectives that relate to biodiversity. No potential for cumulative impacts when considered in conjunction with the current proposal were identified. There will be no significant impacts on designated sites or biodiversity as a result of the proposed development. The proposed development will not impact on connectivity within the wider area. The proposed development does not contravene the strategy and there is no potential for cumulative effects.

c. All Development Plans and Local Area Plans shall protect, enhance, provide and manage Green infrastructure in an integrated and coherent manner addressing the themes of biodiversity protection, water management and climate action; and should also have regard to the required targets in relation to the conservation of European sites, other nature conservation sites, ecological networks, and protected species; d. Any future development of greenways, blueways, peatways, cycleways or walkways will include an assessment by the relevant authorities of any impacts that may arise from increased visitor pressures, in particular, on sensitive European sites and the design of the network will consider the provision of protective measures on sites sensitive to disturbance/visitor pressure.	

7.6.3 Assessment of Projects

A search of relevant online Planning Registers, reviews of relevant documents, planning application details and planning drawings was undertaken, and served to identify past and future projects, their activities, and their environmental impacts. All relevant projects were considered in relation to the potential for cumulative effects. All relevant data was reviewed (e.g., individual EISs/EIARs, layouts, drawings etc.) for all relevant projects where available. The majority of projects considered include extensions to houses, retention permissions, change of use and small alterations, and did not have any potential to result in significant cumulative effects. The following projects have been subject to further assessment as having potential for cumulative impacts on the basis of their nature and scale, or their close proximity to the site:

- **Planning Ref: 21855:** Revisions to development permitted under planning register reference number 17/550(the parent permission) comprising a minor revision to the position of the new footprint of Kilmoyle House on the site, revisions to the design of the extensions to the house consisting of a single storey extension to the rear(west) elevation and a part single storey, part two storey courtyard extension to the rear(west) and side(north) elevations with two storey glazed link to the main dwelling, omission of courtyard outbuildings as permitted and construction of a new single storey outbuilding in lieu, revised internal driveways, new landscape design, revised storm water drainage system, revised foul drainage network and connection to existing services & all ancillary site development works and excavation works above and below ground. Kilmoyle House is on the National Inventory of Architectural Heritage (NIAH Schedule Reference No. 21511009). The development was considered due to the proximity to the Application Site, and its nature and scale. No ecological assessment was carried out, particularly in relation to bats. The development was granted on conditions that water supply and drainage were compliant, and all treeline and hedgerows were retained in addition to proposed landscape plans. In the absence of significant impacts on any KERs being identified for this project (and its parent application), it was determined that the proposed development combined with this project, once carried out in line with planning conditions, would not have the potential to result in any significant cumulative effects on any KER.
- **Planning Ref: 22756:** the construction of a detached house with associated site works. The development was considered due to the proximity to the Application Site: 500m. No ecological assessment was highlighted as necessary within the reviewed Inspector's report. It was determined that the proposed development combined with this project would not have the potential to result in any significant cumulative effects on any KER, due to the nature and scale of the project being carried out in line with planning regulations.
- **Planning Ref: 221172:** The change of use to Student Residences, adaptive re-use and refurbishment of the former Railway Hotel (Protected Structure - RPS Ref. 6035, NIAH Ref: 21518017), demolition of McEnerys Shop, erection of a 3 storey building to Parnell Street and a 7 storey building to Davis Street/Davis Lane, to provide 111 no bed spaces (6no studios and 19no apartments), a ground floor Café to Parnell Street/Davis Street, a Laundry accessed via courtyard, Bicycle and Bin Stores, accessed via courtyard and Davis Lane and all associated site works. No ecological assessment was available for review, however the development was granted on conditions that water supply and drainage were compliant, a resource waste management plan (RWMP) and a lighting plan submitted and agreed by the planning authority. it was determined that the proposed development combined with this project, once carried out

in line with planning conditions, would not have the potential to result in any significant cumulative effects on any KER.

- **Planning Ref: 221186:** The redevelopment of the existing school and its grounds at Sexton Street, Limerick (Eircode V94 NF25). It is noted that the development is proposed to be undertaken within the demesne of protected structure. Approximate distance from proposed development: ~950 m. No ecological assessment was available for review. In the absence of significant impacts on any KERs being identified for this project, it was determined that the proposed development combined with this project would not have the potential to result in any significant cumulative effects on any KER, due to the nature and scale of the project being carried out in line with planning regulations.
- **Planning Ref: 221189:** (a) Demolition of existing derelict building and associated works, (b) the construction of a residential development comprising of 28 No. Apartments which will be located within 4 separate blocks, construction of new access and internal roads, the installation of all required services to include pumping stations, connection to all public utility services, hard and soft landscaping with all associated site works. No ecological assessment was available for review. The development was granted on conditions that bat surveys were undertaken at the site and any impacts mitigated, that disposal of surface water is compliant, that a RWMP is prepared, and compliant public lighting plans submitted. In the absence of significant impacts on any KERs being identified for this project, it was determined that the proposed development combined with this project, once carried out in line with planning conditions, would not have the potential to result in any significant cumulative effects on any KER.
- **Planning Ref: 228014:** Permission for development works from TUS Moylish Campus to the City. Segregated cycle lanes and footpath upgrades along Cratloe Road, Sexton Street North and High Road with a number of dedicated pedestrian and cycle crossing facilities. Upgrade of the traffic signals and junction layout at Hassett's Cross, Cross Road and Belfield Court Junctions to provide a protected junction arrangement for cyclists & bus priority measures of public transport. An inbound bus lane extending along Cratloe Road from Moylish Roundabout to Hassett's Cross. Traffic calming measures on Belfield Court and Belfield Gardens such as raised table junctions and build out with cycle by-pass. Upgrade works to bus stops, side road junctions and new road surfacing. Installation of LED public lighting. Surface water drain works. Landscaping works including tree removal & tree planting and all associated site works. Application was granted on the 12/12/2022. A bat report was consulted and no significant effects on the KER was expected. Approximate distance from proposed development: ~286 m. In the absence of significant impacts on any KERs being identified for this project, it was determined that the proposed development combined with this project would not have the potential to result in any significant in-combination effects on any KER.
- **Planning Ref: 2360485:** the addition of a single and two-storey extension to the rear of the existing dwelling, conversion of the attic space with an extension to the roof at the rear to facilitate a second floor level, insertion of heritage rooflights in the front roof, modifications to the existing dwelling, and all ancillary site works. No ecological assessment was available for review, however the development was granted on conditions that water supply and drainage were compliant. It was determined that the proposed development combined with this project would not have the potential to result in any significant in-combination effects on any KER.
- **Planning Ref: 23557:** Permission for a Large-Scale Residential Development (LRD) at this site: Ardhu House, Ennis Road, Roses Avenue and North Circular Road, Limerick. Ardhu House is a Protected Structure, RPS Reg. No. 3281 (Former Limerick Ryan Hotel, Ennis Road,

Roses Avenue). The application site includes an area of public road/footpaths to facilitate a watermain diversion via North Circular Road, Roses Avenue and Ennis Road. The development site area and watermain diversion works provide a total planning application site area of 2.19 hectares approx. Application was granted on the 19/04/2024. The Ecological Impact Assessment was consulted, and it was determined that the proposed development combined with this project would not have the potential to result in any significant in-combination effects on any KER. Approximate distance from proposed development: 667m.

- **Planning Ref: 2360345:** Permission for (i) The demolition of an existing two-storey residential dwelling located on James' Street (58 sq.m), (ii) Development of an eight-storey building, over basement level, comprising of 21 no. residential units, communal areas and commercial space, including: (a) Basement level communal area (73.5 sq.m) and ground level communal area (68.5 sq. m), (b) Ground floor commercial space (87.25 sq.m), (c) 3 no. Studio apartments, 15 no. 1-bed apartments and 3 no. 2-bed apartments from first to eight storeys, (iii) The provision of internal cycle storage, bin storage, plant room, and lighting and heating system, (iv) The provision of external visitor cycle parking, (v) The provision of foul and surface water drainage, attenuation, and blue roof, (vi) All other associated and ancillary works, as required. Application was granted on the 17/07/2023. The Ecological report was consulted, and it was determined that the proposed development combined with this project would not have the potential to result in any significant in-combination effects on any KER. Approximate distance from proposed development: 650m
- **Planning Ref: 316523:** Permission for the demolition of existing single storey extension and shed to the rear of existing dwelling. The construction of an extension to the rear of existing dwelling and all associated works. Permission is also being sought for the construction of a single storey garage and store room within the private open space to the rear of the existing dwelling. Application refused permission on the 17/05/2023. Approximate distance from proposed development: less than 50m. The relevant application documents were consulted, and It was determined that the proposed development combined with this project would not have the potential to result in any significant cumulative effects on any KER, due to the nature and scale of the project being carried out in line with planning regulations.

7.6.4 Conclusion of Cumulative Assessment

Following the assessments of plans and projects undertaken, no potential for any significant cumulative effects was identified.

In the review of the projects that was undertaken, no connection that could potentially result in additional or cumulative impacts was identified. Neither was any potential for different (new) impacts resulting from the combination of the various projects and plans in association with the proposed development.

Taking into consideration the reported residual impacts from other plans and projects in the area and the predicted impacts with the current proposal, no residual cumulative impacts have been identified with regard to the biodiversity, flora, and fauna of the existing environment.

7.7 REMEDIAL & MITIGATION MEASURES

7.7.1 Incorporated Design Mitigation

The proposed development has been designed in collaboration with project ecologists to avoid and limit potential impacts on key ecological receptors by design where feasible. A detailed description of the proposed development is presented in Chapter 2.0 Project Description. Chapter 11.0 Water & Hydrogeology, presents all embedded mitigations in relation to impacts on water quality, and Chapter 12.0 Landscape presents the proposed landscape plan, including the provision of resting, commuting and foraging habitats for local fauna.

Incorporated mitigation in relation to the KERs identified in Section 7.3.3 is provided in full below.

7.7.1.1 Incorporated Mitigation related to Aquatic Features

The proposed development includes features that minimize the potential for negative effects on the identified aquatic KERs.

- The reservoir is included as a central feature in the design of the development and will be retained and enhanced accordingly. Given the poor state of existing water quality within the reservoir and proliferation of invasive, non-native species that currently surround the reservoir, the measures set out in the landscaping plan will ensure that the ecological status of the feature is improved.
- The proposed development is designed to connect directly with the Limerick public wastewater treatment infrastructure, which has adequate capacity to accommodate and treat any arisings from the proposed development. This is fully assessed in Chapter 8 of the EIAR.

Potential for effects on water quality associated with the production of foul sewage and surface water runoff from the site has been fully mitigated through appropriate design as fully described in Chapter 11 Water and Hydrogeology, the assessment concludes that with the implementation of mitigation, 'no significant effects on downstream surface water quality will occur' during the operational phase.

7.7.1.2 Incorporated Mitigation related to Terrestrial Habitats

The landscaping plan provides for the provision of greenspace throughout the MS and increases vegetative cover and connectivity throughout the site as part of the overall design. 2841m^2 of perennial planting, 87m^2 of wetland planting, 1611m2 of swale and 4527m^2 of grassland are proposed across the site, and will mitigate for the removal of the existing low-diversity scrub, grassland and recolonising bare ground. The epimural vegetation along the quarry walls will be allowed to revegetate following any removal of existing invasive species and ivy (If any) that may be required. All proposed tree species to be replanted are pollinator friendly varieties. The landscape plan also contains measures to enhance the reservoir both in terms of vegetation and water quality and has a strong focus on native and pollinator friendly species. No invasive species are proposed as part of the plan and a management plan has been included to treat the invasive species identified on site (Appendix 7-3).

7.7.1.3 Incorporated Mitigation related to Fauna

The design of the development and the associated landscaping plan provide for an overall increase in vegetation and greenspace throughout the site. This will enhance the amount of cover and habitat connectivity throughout the site.

Bat Roosting Habitat

Crevice Dwelling Bat Species

The landscape design includes for the retention of the roost identified within the quarry walls. The reservoir arches will also be retained and not illuminated. While no evidence of roosting was found in the latter, the existing tunnels provide suitable resting habitat for bats and birds. All compensatory habitats proposed are shown in Figure 7.7-1, which includes measures included in Phase I of the Masterplan, for context.

Lesser Horseshoe Bats

LHB were recorded utilising the site for roosting and as such it was an important part of the design to ensure roosting availability remained within Cleeves Riverside Quarter for this species. Three bat houses were included in the design to provide choice availability in various weather, season, and life-cycle conditions (***Plate 7.7-1***). The locations of the bat houses were selected to provide safe and undisturbed roosting habitat along identified and recreated commuting corridors and will be positioned away from potential tampering and light disturbance. The bat house design was inspired by Vincent Wildlife Trust's designs (, however a pitched roof was included instead of a sloped roof. The bat houses will be installed as soon as possible after site clearance takes place, and will replace the smaller Cathedine roosts (***Plate 7.7-2***) put in place prior to demolitions.

- One bat house is proposed to be located against the western quarry wall, under the proposed boardwalk above the reservoir from the Salesians into the Quarry. This location, in proximity to water and partially shaded by the boardwalk, will provide cooler climatic conditions. The entrance into the house, suitable for LHB (30x20cm), will be located on the floor of the suspended house to limit potential bird access.
- One bat house is proposed along the same quarry wall, at the corner with the northern boundary. This house will be also suspended on the quarry to limit potential tampering. The house will not obstruct the existing soprano pipistrelle roost.
- One bat house is proposed along the northern boundary of the Salesians, where a roost was previously identified. This house will be on stilts to prevent tampering.

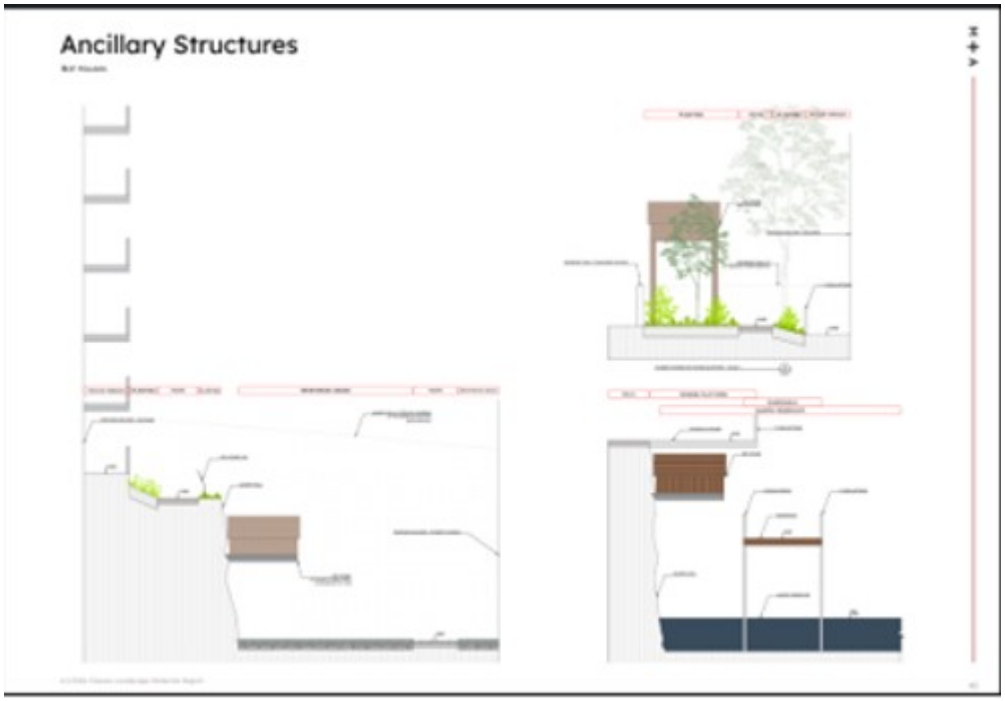

Plate 7.7-1 Extract from LCLE001 Landscape Plan showing proposed bat houses

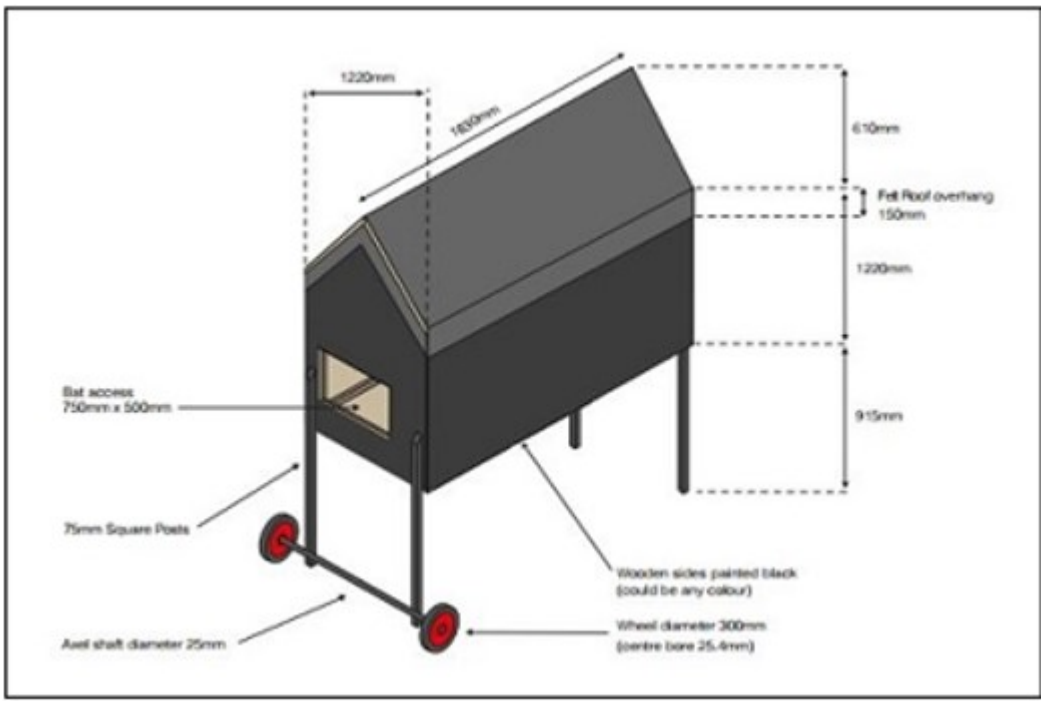

Plate 7.7-2 Cathedine Roost Example

Bat Foraging and Commuting Habitat

The design of the proposed development was informed by the findings of bat surveys undertaken at the site, which found the quarry area to be the focus of commuting and foraging bat activity, with the reservoir providing suitable prey availability. This is where the majority of bat activity recorded was

concentrated. LHBs were found to be moving across the site along its northern boundary, using the quarry walls and neighbouring private gardens to navigate.

In collaboration with the project ecologists, the landscape and lighting plans underwent a series of iterations to ensure these habitats remained available and were improved and enhanced as much as possible.

The proposed landscape plan includes for the provision of native planting and aquatic habitats throughout the Application and Masterplan Sites, which will help provide foraging opportunity for local wildlife:

- As the focus of the proposed development's landscape, the reservoir will see biodiverse planting mix replacing the existing the existing low diversity scrub and recolonising bare ground which will maintain connectivity along the identified commuting corridors.
- Phytoremediation islands will also be introduced to help purify surface water and will be planted with native flowering mixes to attract invertebrates and boost biodiversity. The planting mixes around the reservoir will promote prey availability for bats.
- A tree canopy will be re-established along the proposed steps into the quarry, which will replace the existing semi-mature gardens of the Victorian terrace. It was not possible to retain the existing trees as their roots extend below derelict buildings to be demolished.
- The quarry walls will be revegetated with climbing mixes where removal of existing vegetation during construction was necessary, to maintain prey availability and commuting features in this area.
- In front of the Flaxmill, trees will be introduced within movable wooden planters to increase greenery in this zone while allowing for future phases of the masterplan to be implemented.
- Communal gardens and amenity spaces will be created in the Salesians and Stonetown terrace.
- Tree canopy will be added to existing treelines adjacent to the Shipyard to strengthen potential commuting and foraging route, and increase prey availability in this area.

The proposed lighting plan was specifically limited to the provision of lighting that was justified and navigated Limerick City and County Council Public Lighting and Product Specification 2022 Guidance, amongst others:

- The LCCC guidance on outdoor lighting colour temperature request the use of 4000K luminaires in public areas. Following studies carried out on ecological impact on the site, and the identification of foraging bats in the area, the IDT have agreed to the reduced temperature of 2700K luminaires to accommodate the local wildlife requirements. This colour temperature allows for better visual comfort for wildlife.
- The use low-level bollards has also been incorporated into many areas to suit the design team vision for the site. There is a mixture of symmetrical and asymmetrical bollard being used in the proposed scheme. This is to limit artificial illumination along the vertical space utilised by bats.
- Bollards have been used in the trafficked area to the rear of the Quarry building to suit the IDT requirements.

- Handrail lights are used in areas with steps. This lighting type will maximise the lighting on the steps for safety and minimise up light spill and impact on the ecology. Lighting in handrails will be fit with dimming control to achieve appropriate lux levels.
- Surface mounted downlight luminaires are proposed in some areas, primarily the canopy areas on the main site, and in the shipyard. These luminaires were selected to reduce upwards light spill on the site while providing sufficient light fittings for pedestrians within the scheme constraints
- All luminaires will have an LED light source.
- No lighting is directed at the reservoir area or along linear features created or retained. Low intensity handrail lights will be utilised at the reservoir for public safety.
- Lighting control regimes were implemented across the site:
    - Walkways and amenity areas will be programmed with dusk to midnight switching, and roadways with dusk to dawn switching, as per LCCC specification.
    - The Quarry Roadway being the primary route for the foraging wildlife will incorporate presence detection, the lighting will be off unless there is movement detected that will activate the lights in this area via movement sensors. The purpose of this is to always ensure minimum light in the area to allow maintenance of the foraging route.

7.7.2 Construction Phase Mitigation

7.7.2.1 Construction Mitigation related to Aquatic Features

Potential significant effects on water quality are predicted as a result of the construction and demolition activities associated with the proposed development. A suite of mitigation and best practice measures are in place to block potential pathways for any significant impacts on water quality. To avoid repetition, these measures are not listed in full here but are included in Chapter 11.0 of this EIAR and associated appendices.

To protect aquatic fauna from direct impacts during construction, particularly during works around and within the Reservoir habitat, the following mitigation measures will apply:

- Prior to proposed works within the reservoir, fish will be caught using electrofishing and all fish collected will be released into the River Shannon.

7.7.2.2 Construction Mitigation related to Terrestrial Habitats

Vegetation clearance along the quarry walls will be limited to necessary removal of clematis, ivy and buddleia species which overwhelm other existing vegetation and provide potential issues to the wall structure. Whilst much of the existing vegetation on the Application site will be lost, the landscape plan for the development includes specific measures to enhance the areas where the existing vegetation is located with diverse native species mixes. This includes the quarry wall and the area surrounding the reservoir, where the majority of existing vegetation on the site is found.

7.7.2.3 Construction Mitigation related to Fauna

Loss of Bat Roosting Habitat and Mortality

A derogation licence (DER-BAT-2025-169) is in place for Phase I works relating to the remediation works on the Flaxmill building, where LHB roosts were identified. The following mitigations apply to this

phase and are relevant to the continued monitoring of the bat activity within the site prior to and during the construction of the Application Site (Phase II):

- A pre-commencement survey will be carried out to assess the buildings where roosting was identified prior to any works. The function of this survey will be to assess any changes in baseline environment since the time of last undertaking surveys in 2024, and to prevent direct harm on bats.
- Prior to commencement, a toolbox talk will be carried out by the project ecologist to inform working crews of the potential effects of the works on resident bats, and known roosting locations will be clearly pointed out. Roosting locations will be avoided where possible.
- While it is recommended to avoid works during the bat activity season (April – September), it is understood that this cannot be avoided due to the structural integrity of the building being at risk. The work programme currently is anticipated to commence in Q2 2025 and run for a period of 12 months.
- Based on the work programme, regular site visits will be undertaken by a licenced bat ecologist at different stages of the works to assess progress and use of known roosts by bats, as well as checking access to known locations is maintained. Inspections will make use of scaffolding equipment where possible to expand bat searches to previously unreachable areas.
- Bat access to the first floor will be maintained throughout the works by ensuring access points are kept free from obstruction. The roost locations on the first floor will not be used to store materials and will be kept free from human traffic.
- Interior lighting will be restricted to the areas where works are being undertaken and any exterior lighting will be turned off when not in use.

In addition to these, it has been proposed to also limit lighting during works in adjacent buildings so as to provide alternative dark environments in buildings adjacent to the Flaxmill during Phase I.

A derogation licence application has been submitted to NPWS (Appendix 7.4) and will need to be in place for the project. The derogation licence is issued by NPWS on a yearly basis, and therefore it is expected that multiple licences will be necessary. Each licence will be informed by monitoring undertaken at the site and will be specific to the works to be undertaken during the calendar year. NPWS will be informed of any progress made during construction with regular updates.

The following mitigations in relation to the construction works for Phase II will apply:

- Prior to commencement, confirmatory inspections and bat activity surveys will be carried out to ensure no bats are present within the buildings. These will be catered to each specific building. If these cannot rule out the presence of bats, precautions will be taken during the demolitions (manual removal of materials such as slates, delayed use of machinery to allow escape) and these will be undertaken under the supervision of an ecologist.
- Demolition works will not be carried out during the bat activity season (April-September) within buildings where active day roosts are found. Where pre-commencement confirmatory surveys identify any alternative roosts, demolition works will not be carried out in respect of these alternative roosts during bat activity season.
- A toolbox talk will be carried out prior to works commencing by the project ecologist to inform working crews of the potential effects of the works on resident bats, and known roosting locations will be clearly pointed out.
- Prior to demolitions being carried out, alternative roosting resources will be set up to retain roosting availability on site. These will be in the form of three cathedine bat houses, suitable for LHB. Their

proposed locations are shown in Figure 7.7-1. Whilst two of the Cathedine night roosts will be located in areas relatively buffered from continuous construction activities, in the Victorian terrace garden and along an existing terrace looking over the reservoir, the third roost will be in the north-western corner of the Quarry Site. A 5m buffer will be created around it to avoid stockpiling and machinery in its immediate vicinity. This is primarily to avoid damage to the roost.

- Other available roosting spaces will be retained along the quarry wall, under the reservoir tunnels and in buildings not proposed for demolition. The permanent bat houses included in the design will also be set up prior to demolition or as soon as possible following site clearance.
- The use of the site by LHB will be monitored during construction using passive static detectors left on site and tuned to the specific frequency calls of the species, to reduce battery and storage usage. A minimum of three detectors at the proposed bat house locations, or nearby, are proposed.

The provision of alternative roosting habitat following construction has been incorporated into the design of the project and will include the use of bat boxes. Permanent roosting habitat available within the site is listed in the following sections.

Salesians Site bat pole roost

A bat pole will be erected along the northern boundary of the Salesians, in the proposed public gardens, to be of use to pipistrelle species currently utilising the convent's yard. This will be in addition to alternative roosting habitat for LHB placed in this area prior to demolitions.

Flaxmill staircase roost

As part of Phase 1 works on the Flaxmill, following remediation of the building, an unused attic space above the buildings' exterior staircase will be retained and isolated from the building. Access via bat slates will be provided into the space.

Flaxmill bat slates

The provision of bat slates on the Flaxmill has also been included in the design to allow space for crevice dwellers to roost on the roof. These will not provide access to the interior.

Bat houses

Three bat houses have been included in the design. The location of the bat houses within the site was considered in connection with the retention of the dark corridor along the quarry walls and to provide access to the Reservoir, while providing options to bats depending on preferred roosting conditions. These are described in section 7.7.1.3.

Tunnels

Two bat boxes suitable for bridges will be erected under one of the tunnel arches to increase roosting suitability in this area. Access into the tunnels will be restricted to prevent disturbance and tampering.

Bat Boxes

A minimum of three woodcrete bat boxes will be installed within the site, with final locations to be determined by an ecologist following construction. Provisional locations include on or in proximity to the bat houses along the quarry walls.

Map Legend

- Application Site

Bat Corridor

- Dark Corridor
- Road Crossing

Bespoke Roosting Habitat

- Proposed Bat Boxes
- LHB Bat House
- Bat Pole
- Retained Roof Space
- Bat Slates
- Windowsill Crevices
- Temporary Cathedine Roosts

Drawing Title
Bat Mitigations and Compensations

Project Title
Cleeves Riverside Quarter

Drawn By	Checked By
SF	PR
Project No.	Drawing No.
211052-a	Figure 7.7-1
Scale	Date
1:1,200	08.07.2025

MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

Bat Disturbance

A derogation licence from the NPWS has been applied for the project. The derogation licence is issued by NPWS on a yearly basis, and therefore it is expected that multiple licences will be necessary. Each licence will be informed by monitoring undertaken at the site and will be specific to the works to be undertaken during the calendar year. NPWS will be informed of any progress made during construction with regular updates.

During the construction phase, plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001). Where construction is required in close proximity to installed temporary or permanent LHB roosts, these will be monitored by the appointed ecological clerk of works to assess whether they are occupied. If occupied, works will be avoided if possible until the roost is vacant.

Vegetation clearance of non-native species and ivy in proximity of the soprano pipistrelle roost identified within the quarry walls will be avoided, where unjustified. If vegetation clearance is required in this area, it will be carried out outside the bat activity season (April-October) and all clearance works supervised by an appropriately qualified ecologist to ensure that:

- All vegetation removal is justified
- The removal does not damage the existing roost crevice

If lighting is required (likely only in early evening and morning during winter months), directional lighting will be used to prevent overspill on to sensitive areas, namely the reservoir and quarry areas. Exterior lighting during construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the Proposed Project, and consequently on bats i.e. Lighting will be directed away from sensitive areas around the periphery of the site boundary to minimize disturbance to bats. Directional accessories will be used to direct light away from these features, e.g. through the use of light shields (Stone, 2013). The luminaries will be of the type that prevent upward spillage of light and minimize horizontal spillage away from the intended lands.

In addition, the applicant commits to the use of lights during construction (such that they are necessary) in line with the following guidance that is provided in the Dark Sky Ireland Lighting Recommendations:

- Every light needs to be justifiable,
- Limit the use of light to when it is needed,
- Direct the light to where it is needed,
- Reduce the light intensity to the minimum needed,
- Use light spectra adapted to the environment,
- When using white light, use sources with a “warm” colour temperature (less than 3000K, ideally 2700K).

Bird Habitat

The incorporated landscape measures described in Section 7.7.1 above will reinstate suitable resting and breeding spaces for the common garden birds recorded at the site. Swift boxes will also be provided. Cement or woodcrete materials will be utilised to ensure durability of these nesting habitats.

Locations for the swift boxes have been included into the northern elevations of Block 2B – Central Wing and Block 2A – West Wing, within the Quarry Site (Plate 7.4-1). As no eaves are proposed on these buildings, these will be installed to the exterior along the walls. A minimum of two triple entry boxes per building are proposed (Plate 7.7-4).

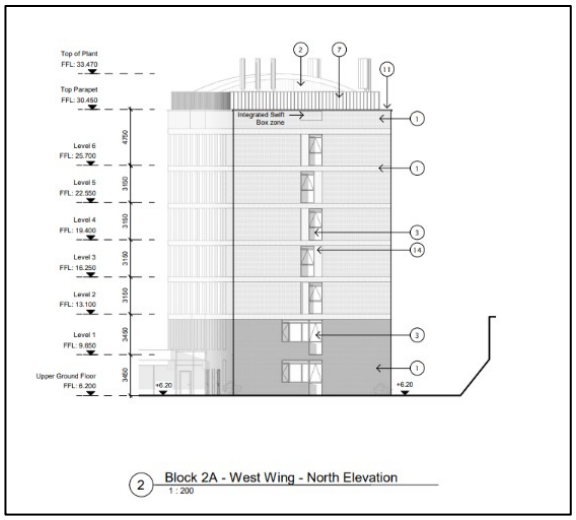

Plate 7.7-7.7-3 Example of swift box location from ARCH Drawing CRQMP-BMEA-2X-ZZ-DR-AA-2862

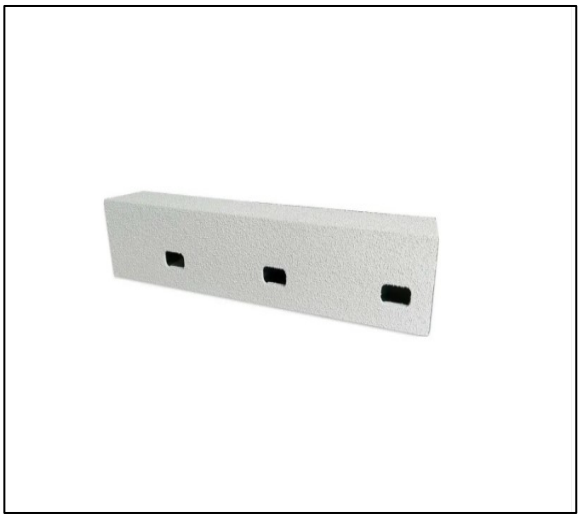

Plate 7.7-4 Example of durable swift box. Birdwatch Ireland.

Bird Mortality

Site clearance to facilitate the construction phase of the proposed development will be undertaken outside of the nesting bird season (1st March – 31st August) to ensure compliance with the Wildlife Act. If vegetation clearance is required during the nesting bird season, this will be preceded by a confirmatory nesting bird survey to ensure no nesting birds are present and all clearance works supervised by an appropriately qualified ecologist.

Numerous feral pigeon nests are located throughout the buildings on the Application site. Access to nesting areas will be prevented prior to demolition to ensure that no birds with young that have not fledged are present at the time of demolition.

Otter Disturbance

In relation to disturbance, Otter are predominantly crepuscular in nature, and it is anticipated that construction activity will mostly be confined to daytime hours, thus minimising potential disturbance related impacts to the species.

Best practice noise mitigations are presented in Chapter 13 Noise and Vibration. The following measures will also be implemented to limit disturbance to otter:

- All plant and equipment for use will comply with S.I. No. 632/2001 - European Communities (Noise Emission by Equipment For Use Outdoors) Regulations, 2001
- Operating machinery will be restricted to the proposed works site area.

- The use of artificial lighting will be avoided during construction works. Any unavoidable artificial lighting used to facilitate works will be blocked from spilling onto the River Shannon, using directional accessories or physical barriers.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.
- Compressors will be of the "sound reduced" models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.
- Machines which are used intermittently will be shut down or throttled back to a minimum during those periods when they are not in use.
- Any plant such as generators or pumps which are required to work outside of normal working hours will be surrounded by an acoustic enclosure.

7.7.2.4 Biosecurity

An invasive species management plan has been prepared to remove the Japanese knotweed recorded within in proximity of the reservoir prior to construction.

All of the identified Japanese knotweed within the proposed development site will continue to be treated and any remaining contaminated soil will be removed from site to a licenced waste facility prior to construction works commencing. In the same way, any contaminated soil in proximity of the Shipyard found to be contaminated with Himalayan knotweed will be removed prior to any earthworks in this area.

The proposed methodologies for treatment and eradication of the First Schedule invasive plant species are presented in Appendix 7.3, as well as all site hygiene and biosecurity measures.

7.7.3 Operation Phase Mitigation

7.7.3.1 Operation Phase Mitigation Relating to Aquatic Features

Potential significant effects on water quality are predicted as a result of the operation of the proposed development. A suite of mitigation and best practice measures are in place to block potential pathways for any significant impacts on water quality. To avoid repetition, these measures are not listed in full here but are included in Chapter 11.0 of this EIAR and associated appendices. In addition, the landscaping plan includes specific measures including nature based SUDs to protect water quality on the site. The plan also includes specific measures such as floating islands, which will be installed in the reservoir and will not only improve water quality but will also enhance biodiversity.

The production of foul sewage was also considered and it is noted that Uisce Eireann have issued a confirmation of feasibility in respect of the project and as such it is considered that the public treatment system has adequate capacity and capability to accommodate any arisings from the proposed development. Therefore, there is no potential for the foul sewage arising from the proposed development to result in any adverse effect on water quality in this regard. The wastewater network will be gravity operated. In order to reduce pressure on the public sewage network water saving technologies will be included in the design, for example, low flow fixtures and dual flush toilets. Combining these technologies with smart metering and continued education of the water users, it is possible to achieve up to a 30% reduction in potable water consumption and wastewater discharge.

7.7.3.2 Operation Phase Mitigation Relating to Fauna

Mitigation measures to limit disturbance on fauna as a result of lighting have been incorporated in the operational design and have been described in section 7.7.1. No further mitigation is considered necessary.

7.8 RESIDUAL IMPACTS

7.8.1 Construction Phase

7.8.1.1 Residual Effects on Aquatic Features

Following the informed design of the project and the implementation of the prescribed mitigation measures, no significant residual effects are predicted and the potential for improvements in water quality and biodiversity in the aquatic environment are anticipated.

7.8.1.2 Residual Effects on Terrestrial Habitats

With the implementation of the prescribed mitigation measures, no significant residual effects are predicted. The removal of terrestrial habitats will be temporary, during construction, with short-term negative effects anticipated during the settlement and maturing process of the vegetation reinstated. Ultimately, there will be a net gain in the vegetation cover and ecological quality throughout the site.

7.8.1.3 Residual Effects on Fauna

Bats

Roosting Bats

Following the incorporation of mitigation measures for roosting bats as described above, and the provision of alternative roosting resource, there will be no significant residual effect on roosting bats at any geographic scale as a result of this development. As a result of the development phased approach and the provision of temporary bat houses, roosting availability will be retained onsite during construction until the proposed bat houses and bat boxes are erected.

Commuting and Foraging Bats

Following the clearance of the buildings and vegetation on site, there will be a temporary residual loss of commuting and foraging habitat availability for bat species. However, the most significant features on site, namely quarry walls and the reservoir, have been retained by design, and the landscape plan is designed to enhance the amount of green space on site, and provide new significant landscape features. The landscaping plan also includes the planting of tall vegetation leading into the site from the west, thus potentially improving a commuting route into the site adjacent to the reservoir. As such, with the implementation of mitigation measures outlined above, there will be no significant residual effect on bats at any geographic scale as a result of this development and once the vegetation matures, there will be a likely enhancement of bat foraging habitat.

Mortality

Following the incorporation of mitigation measures described above, no mortality of bats is expected.

Disturbance

The provided mitigations have been proposed to limit significant effects of the construction on bats, however the scale of development will not allow for residual effects to be completely eliminated. Residual temporary negative effects of slight magnitude are anticipated during construction.

Birds

Loss of Resting and Breeding Habitat

Following the incorporation of mitigation measures described above, no significant residual effects on breeding birds utilising the site are anticipated.

Disturbance

Following the proposed best practice and mitigation measures as described above, and considering the urban location of the site and the likely habituation of birds using the local area to noise disturbance, no effect greater than Slight, as per the EPA Guidelines, was identified. No significant residual effects on birds are anticipated.

7.8.2 Operational Phase

7.8..2.1 Residual Effects on Aquatic Features

Following the informed design of the project and the implementation of the prescribed mitigation measures, no significant residual effects are predicted and the potential for improvements in water quality and biodiversity in the aquatic environment provided by the reservoir are anticipated.

7.8.2.2 Residual Effects on Terrestrial Habitats

With the implementation of the prescribed mitigation measures, no significant residual effects are predicted. Ultimately, there will be a net gain in the vegetation cover and ecological quality throughout the site.

7.8.2.3 Residual Effects on Fauna

Bats

Whilst residual effects are expected as a result of the increased light pollution on site, particularly on lesser horseshoe bats, the mitigation proposed in the form of bat roosting habitat and the provision of a darker corridor around the quarry and to the western boundary of the site was put in place so that no significant residual effects are anticipated at any geographic scale. Anticipated residual effects as a result of disturbance, particularly light disturbance, are slight.

Birds

No significant effects on birds utilising the Application site as a result of disturbance were anticipated. As such, no significant residual effects are expected.

7.11 WORST CASE SCENARIO

Potential worst-case scenarios were considered during the impact assessment. Potential worst-case scenarios for biodiversity included, for example, a catastrophic water pollution event where no mitigation was employed, or the direct mortality of bats and birds on the site due to unrestricted and unregulated demolition and construction activities.

The impacts were characterised on that basis and measures were put in place to mitigate against such an event. Chapter 20, Risk Management describes the Proposed Development in respect of its potential vulnerability to major accidents / disasters, and its potential to give rise to the same.

7.12 MONITORING

7.12.1 Construction Phase

The construction works will be monitored at several levels of seniority as described below to ensure that the environmental best practice prescribed in this document is fully adhered to and is effective. The following system will be put in place to ensure compliance.

Contractors Environmental Representative

An Ecological Clerk of Works (ECoW) will be appointed by the Contractor to ensure that the ecological plan is effectively implemented. The representative will be a suitably qualified ecologist or environmental scientist. All operatives working on the site will be made fully aware of the environmental responsibilities, conditions and requirements along with a full description of the methods to be employed. This information will be imparted at a dedicated site induction prior to commencing work on the site. The induction of any new staff will include an environmental induction. A checklist will be filled in on a weekly basis to show how the measures above have been complied with. Any environmental incidents or non-compliance issues will immediately be reported to the project team and that the project team will take corrective action if necessary. The construction management team will be regularly monitoring the works and will be fully briefed and aware of the environmental constraints and protection measures to be employed. The contractor's environmental representative will work closely with the Employers Environmental Representative as described below.
The ECoW will be responsible for:

- Monitoring the construction works and identifying any additional or refined mitigation measures (i.e. 'adaptive management measures required), in relation to any ecology;
- Reporting the findings of monitoring, including any adaptive management measures recommended and the effectiveness of same;
- Delivering site induction and training on ecological aspects to all construction personnel prior to commencement of construction activities;
- The implementation of ecological mitigation measures
- Updating, renewing and returning the derogation licence in place throughout construction

Employers Environmental Representative

In addition to the above, the employer (Limerick Twenty Thirty), will also provide an employer's environmental representative. This officer will be a suitably qualified ecologist or environmental scientist and will work closely with the contractor's representative to ensure that all environmental/ecological requirements are adhered to and fully monitored. The employer's representative will visit the site on a

weekly basis (at a minimum) during the construction phase. An audit of the works will be undertaken during these weekly visits, and it will be ensured that the prescribed methods are employed. Any potential impacts additional to those predicted will be highlighted and if necessary, additional measures put in place to prevent them. Any deviance from the agreed methodology will be highlighted and if necessary rectified.

7.12.2 Operational Phase

7.10.2.1 Fauna

Operational monitoring for biodiversity will include annual surveys for bats to monitor the success of the constructed bat roosts and to ensure that the proposed landscaping and lighting measures are in place and are established and maintained as planned. Monitoring of the bat populations on the site will continue for 5 years following construction and will include activity surveys as well as inspections of the erected bat houses and boxes and other alternative roosting places. The results of the monitoring will be communicated to NPWS in standard reporting format as part of the conditions of the derogation licencing required.

Swift boxes do not usually require maintenance. However, as boxes will be installed onto the buildings and not integrated within the structure, these will be regularly checked as part of the building's regular maintenance programme to ensure they are firmly in place.

7.10.2.2 Invasive Species

Ongoing monitoring will be implemented for all First Schedule Invasive Species and non-native Invasive Species of potential concern recorded, with suitable follow-up management in order to control new growth or re-establishment within the infested areas.

Following the initial treatment and removal, at operation of the development the treated areas will be re-surveyed annually to ensure no invasive species re-stablish. If necessary, the areas will be re-treated until no growth is recorded for two consecutive years.

7.14.3 Conclusion

Following consideration of the residual effects (post mitigation) it is concluded that the Proposed Development will not result in any significant effects on any of the identified KERs. No significant effects on receptors of International, National, County Importance or Local importance (higher value) were identified.

The potential for effects on the European Designated Sites is fully described in the Natura Impact Statement that accompanies this application. The NIS concludes that in view of best scientific knowledge and on the basis of objective information, the Proposed Development either individually or in combination with other plans or projects, is not likely to have adverse effects on the European Sites that were assessed as part Appropriate Assessment process. Similarly, with the prescribed mitigations in place, there is no potential for impact on any nationally designated site.

Provided that the Proposed Development is constructed and operated in accordance with the design, best practice and mitigation that is described within this application, significant individual or cumulative

effects on ecology are not anticipated at the international, national, county, or local scales or on any of the identified KERs.

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