



**Screening for Appropriate Assessment
Report and Natura Impact Statement
Proposed Large-scale Residential Development (LRD) at
Killowen, Kenmare, Co. Kerry**

KPH Construction Ltd

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Appendix 3 Bat Report (Greenleaf Ecology)

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MWP, Engineering and Environmental Consultants

Address: Reen Point, Blennerville, Tralee, Co. Kerry, V92 X2TK

www.mwp.ie



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Summary of Findings

Appropriate Assessment

Project Title	Proposed Large-scale Residential Development (LRD) at Killowen, Kenmare, County Kerry
Project Proponent	KPH Construction Ltd.
Project Location	The proposed development site is located in County Kerry within the townland of Killowen, on the eastern outskirts of Kenmare town
Screening for Appropriate Assessment (Stage 1)	The screening for Appropriate Assessment (AA) report is undertaken to determine the potential for likely significant effects of the proposed construction and operation of a residential development in the townland of Killowen, County Kerry, either individually or in combination with other plans or projects, in view of the conservation objectives of certain European sites identified within this report.
Stage 1 Conclusion	It has been objectively concluded during the screening process that likely significant effects on the following European sites will not occur as a result of the Proposed Development: • Mucksna Wood SAC (001371) • Killarney National Park SPA (004038) • Maulagowna Bog SAC (001881) • Kilgarvan Ice House SAC (000364) • Blackwater River (Kerry) SAC (002173) • Old Domestic Building, Dromore Wood SAC (000353) • Eirk Bog SPA (004108) • Glanlough Woods SAC (002315) • Caha Mountains SAC (000093) • Cloonee and Inchiquin Loughs, Uragh Wood SAC (001342) • Derryclogher (Knockboy) Bog SAC (001873) • Glengarriff Harbour and Woodland SAC (000090) • Old Domestic Building, Curraglass Wood SAC (002041) However, it cannot be objectively concluded, at this stage, that the Proposed Development will not result in likely significant effects on the following European sites: • Kenmare River SAC (002158) • Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (000365) Therefore, an Appropriate Assessment is required, and a Natura Impact Statement (NIS) is necessary to assess the implications of the Proposed Development, alone and in combination with other plans or projects, for the integrity of these European sites in view of their conservation objectives.
Natura Impact Statement (Stage 2)	In cases where AA is required, an NIS is prepared and includes a report of a scientific examination of evidence and data carried out by competent persons to identify and classify any adverse impacts a project may have, either individually or in combination with other plans or projects, on the integrity of European site(s) in view of the sites' conservation objectives. This has been undertaken in Section 4 of this report.
Stage 2 Conclusion	The NIS set out in Section 4 of this report has considered all aspects of the Proposed Development, both alone and in combination with other plans or projects. Based on best scientific knowledge, it is objectively concluded that the Proposed Development will not, either

alone or in combination with other plans or projects, adversely affect, directly or indirectly, the integrity of the two identified European sites, namely Kenmare River SAC (002158) and Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC (000365), in view of the specific conservation objectives of each site.

The NIS contains information that the competent authority may consider in making its own complete, precise and definitive findings and conclusions, and upon which it can determine that all reasonable scientific doubt has been removed as to the effects of the Proposed Development on the integrity of the relevant European sites.

Provided that the mitigation measures set out in **Section 5** are implemented in full, it is considered that the Proposed Development, either individually or in combination with other plans or projects, will not adversely affect the integrity of the following European sites, or any other European site:

- Kenmare River SAC (002158)
- Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC (000365)

1. Introduction

A planning application is being lodged with Kerry County Council (KCC) by KPH Construction Ltd. (the 'Applicant') for a Large-scale Residential Development (LRD) on lands at Killowen, Kenmare, County Kerry (hereafter referred to as the 'Proposed Development site').

1.1 Overview of Proposed Development

The Proposed Development site is located off Pat Scarteen Road in the townland of Killowen, approximately 500m northeast of Kenmare town centre, County Kerry. The Proposed Development will occupy an area of approximately 2.63 ha and includes the demolition of two existing single-storey sheds and the construction of 100 no. residential units, comprising:

- 30 no. one-bedroom units;
- 30 no. two-bedroom units; and
- 40 no. three-bedroom houses.

The Proposed Development comprises 40 no. two-storey houses, consisting of 36 no. semi-detached three-bedroom units and four no. three-bedroom mid-terrace units, together with 60 no. own-door maisonette/apartment units arranged over two storeys.

Vehicular access will be provided via an upgraded and relocated entrance from Pat Scarteen Road. Separate pedestrian and cycle entrances will be provided from Clash Road, together with dedicated pedestrian and cycle routes through the Proposed Development site.

The Proposed Development also includes car parking, public open spaces, landscaping, internal roads and footpaths, wastewater infrastructure, a pumping station, surface-water drainage and attenuation infrastructure, water-supply infrastructure, public lighting, bin and bicycle stores, ESB substations, boundary treatments and all associated and ancillary site-development works.

1.2 Purpose of Assessment

This Appropriate Assessment report has been prepared by Malachy Walsh and Partners Engineering and Environmental Consultants (MWP).

Section 3 of this report comprises a Stage 1 Screening for Appropriate Assessment (AA), which aims to establish whether the construction and operation of the Proposed Development at Killowen, Kenmare, County Kerry, either alone or in combination with other plans or projects, is likely to result in significant effects on European sites¹ in view of their conservation objectives. The purpose of the Screening for AA is to provide sufficient information to the competent authority, in this case Kerry County Council, upon which it may undertake its own Screening for AA of the Proposed Development.

This assessment is based on a preliminary examination of publicly available information, project-specific technical information and data collected during ecological surveys undertaken at and in the vicinity of the Proposed Development site. It includes a description of the Proposed Development in **Section 3.2**, particularly those aspects that could interact with the receiving environment; identification of other plans and projects in **Section 3.4**; identification of relevant European sites in **Section 3.5**; identification of potential effects in **Section 3.6**; and an

¹ European sites' are defined in Section 177R of Part XAB of the Planning and Development Act 2000 and include Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) at all stages of designation

assessment of whether those effects, either alone or in combination with other plans or projects, are likely to result in significant effects on European sites in view of their conservation objectives.

The need to apply the precautionary principle when making key decisions in relation to the tests of Appropriate Assessment has been confirmed by the case law of the Court of Justice of the European Union. Therefore, where significant effects are likely, possible or uncertain at the screening stage, an Appropriate Assessment is required. In this case, a Stage 2 Natura Impact Statement has been prepared and is presented in **Section 4** of this report.

1.3 Statement of Competency

This report has been prepared by Rob Beer (MCIEEM, BSc. MRSB) Senior Ecologist at MWP. Rob is a Senior Ecologist with eight years full-time experience, since graduating in 2017. Before joining MWP in March 2024, Rob had previously been working in the UK. Rob is experienced in a range of standard and complex ecological surveys in accordance with British standards, including, but not limited to, UK habitat classification surveys and JNCC Phase 1 surveys, Biodiversity Net Gain (BNG) metric and reporting, bat surveys (stages 1 & 2), reptile surveys, badger surveys, & great crested newt (GCN) surveys. Rob has also authored ecological reports within an Irish setting including, but not limited to, Screenings for Appropriate Assessment Reports, Natura Impacts Statements and Ecological Impact Assessments. Rob is a holder of a Natural England bat license level 2, a holder of a Natural England GCN license level 1 and has a FISC level 2 certificate. Rob is also a holder of a National Parks and Wildlife Service (NPWS) bat survey license (License Number: DER-BAT-2026-174). Rob also has extensive experience with ecological clerk of works (ECoW) for a range of species across diverse project types, from small household projects to large infrastructure projects such as rail and road schemes. This includes conducting supervisions and overseeing licenced works in relation to bat, badger and GCN.

This report was reviewed by Úna Williams (BSc., MSc.), a Senior Ecologist and Environmental Consultant at MWP for almost seven years. Having worked on research teams both in Ireland and abroad, she is an experienced field ecologist familiar with various ecological survey methodologies and has undertaken assessments for a wide variety of projects including renewable energy developments, and infrastructural and coastal developments. Úna has designed and carried out several Avian Collision Risk Models for proposed wind farms and has authored many ecological reports including Screening for AA reports, Natura Impact Statements (NIS), Ecological Impact Assessments (EclA), and Environmental Impact Assessments (EIA). She graduated from Queen's University Belfast in 2018 with an MSc in Animal Behaviour and Welfare, and from Trinity College Dublin in 2008 with an Environmental Science degree.

1.4 Legislative Context for Appropriate Assessment

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats and wild fauna and flora through the designation of Special Areas of Conservation (SACs), while the Birds Directive (2009/147/EC) seeks to protect wild birds, including through the designation of Special Protection Areas (SPAs). SACs and SPAs form part of the Natura 2000 network of protected sites throughout the European Union.

The European Communities (Birds and Natural Habitats) Regulations 2011–2021 transpose the Habitats Directive and Birds Directive into Irish law. The requirement for Appropriate Assessment of the implications of plans and projects for European sites arises from Article 6(3) of the Habitats Directive.

The current assessment has been undertaken within this legislative framework and with regard to the following guidance:

- European Commission (2021), Assessment of plans and projects in relation to Natura 2000 sites – Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC;

- European Commission (2019), Managing Natura 2000 sites: The provisions of Article 6 of the Habitats Directive 92/43/EEC;
- Department of the Environment, Heritage and Local Government (2010), Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities; and
- Office of the Planning Regulator (2021), Appropriate Assessment Screening for Development Management, OPR Practice Note PN01.

Where it is determined that Appropriate Assessment is required in respect of a proposed development, a Natura Impact Statement must be prepared. Avoidance and mitigation measures may be considered at Stage 2 of the Appropriate Assessment process.

1.5 Stages of Appropriate Assessment

The Appropriate Assessment process comprises four stages, with specific issues and tests considered at each stage. The purpose of the screening assessment is to record, in a transparent and reasoned manner, the likely effects of a proposed development on European sites. The outcome of each successive stage determines whether progression to the next stage is required.

The four stages of the Appropriate Assessment process are set out in **Appendix 1** of this report.

2. Assessment Methodology

2.1 Appropriate Assessment Guidance

A plan or project may only be authorised by a competent authority where it has ascertained that the plan or project will not adversely affect the integrity of relevant European sites in view of their conservation objectives, either alone or in combination with other plans or projects. This can only be the case where no reasonable scientific doubt remains as to the absence of such effects.²

As set out in the National Parks and Wildlife Service guidance, establishing whether a plan or project is likely to affect a European site is based on a preliminary examination using available information and data, including the desktop information described in **Section 2.2** and relevant environmental information, supplemented where necessary by local information and ecological surveys. This is followed by a determination of whether the identified effects could be significant. The precautionary principle is applied throughout the assessment.

The assessment applies the source–pathway–receptor model. This model identifies:

- a source, comprising an activity or element of the Proposed Development capable of giving rise to an effect;
- a pathway through which that effect could reach an ecological receptor; and
- a receptor, comprising a qualifying-interest habitat or species, special conservation interest or supporting habitat associated with a European site.

Where a complete source–pathway–receptor linkage is absent, there is no mechanism through which an effect on a European site could occur. Where a complete or potentially complete linkage is identified, the potential for likely significant effects is examined further.

² European Court of Justice Case C-127/02 Landelijke Vereniging tot Behoud van de Waddenzee

Once the potential effects that may arise from the Proposed Development have been identified, their significance is assessed using the following key indicators:

- water quality and resources;
- habitat loss or alteration;
- disturbance and/or displacement of species; and
- habitat or species fragmentation.

2.2 Desktop Study

A desktop study was undertaken to collate available information concerning the natural environment of the Proposed Development site and its surroundings. This comprised a review of the following publications, information sources and datasets:

- Ordnance Survey Ireland aerial photography and 1:50,000-scale mapping;
- Geohive and other available aerial and satellite imagery;
- National Parks and Wildlife Service (NPWS) designated-site information, site synopses, conservation objectives and spatial datasets, available from <https://www.npws.ie/maps-and-data>;
- National Biodiversity Data Centre (NBDC) online database and map viewer, available at <https://maps.biodiversityireland.ie/>;
- BirdWatch Ireland's Irish Wetland Bird Survey (I-WeBS), available from <https://birdwatchireland.ie/our-work/surveys-research/research-surveys/irish-wetland-bird-survey/>;
- Environmental Protection Agency mapping and datasets, including surface-water features, catchments, sub-catchments, Water Framework Directive waterbodies and water-quality information, available from <https://gis.epa.ie/EPAMaps/Water>;
- Geological Survey Ireland bedrock, subsoil, groundwater and aquifer mapping, available from <https://gsi.geodata.gov.ie/portal/home/>;
- Teagasc soil mapping, available from <https://teagasc.ie/environment/soil/irish-soil-types-and-maps/irish-soil-information-system>;
- Inland Fisheries Ireland information on freshwater fish species and fisheries resources, available from <https://www.fisheriesireland.ie/fish-species>;
- Kerry County Development Plan 2022–2028, available at <https://www.kerrycoco.ie/kerry-county-development-plan-2022-2028/>;
- Available planning applications and permitted developments within the surrounding area;
- Aquatic Ecology and Fish Report (Document No. 25631-ZZ-ZZZ-RP-EC-6007);
- Bat Survey: Residential Development, Kenmare, County Kerry, prepared by Green Leaf Ecology Consultants;
- Ecological Impact Assessment for the Proposed Development;
- Drainage Impact Report;
- Civil Utilities Report;
- Water Framework Directive Compliance Assessment;
- Flood Risk Assessment;
- Construction Environmental Management Plan;
- Resource and Waste Management Plan; and
- Operational Waste Management Plan.

Other information sources and publications referenced during the assessment are listed in the References section and in footnotes throughout this report.

2.3 Field Survey

2.3.1 Study Area and Zone of Influence of the Proposed Development

The Zone of Influence is the geographical area over which the Proposed Development has the potential to affect the receiving environment in a manner that could result in significant effects on the qualifying-interest habitats or species or special conservation interests of a European site.

The area over which ecological features may be affected by biophysical changes resulting from the Proposed Development and associated activities may extend beyond the application boundary where ecological or hydrological connections occur. Consequently, the study area included the Proposed Development site, adjoining habitats, the Lissaniska 21 River, the downstream Finnihy River and other habitats or ecological features with potential connections to European sites.

The Zone of Influence was defined by the nature, scale and location of the Proposed Development and the potential source–pathway–receptor relationships identified, rather than through the application of an arbitrary fixed-distance buffer.

2.3.2 Ecological Survey

The desktop study described in **Section 2.2** was supplemented by a multidisciplinary ecological walkover survey of the Proposed Development site undertaken by an MWP ecologist on 26 March 2026. The survey provided project-specific baseline information concerning habitats and flora, fauna and invasive alien plant species.

The methodologies employed during the ecological surveys are summarised in the following subsections.

2.3.2.1 Habitats and Flora

Habitats within the study area were recorded, mapped and classified to Level 3, where possible, in accordance with A Guide to Habitats in Ireland (Fossitt, 2000) and with regard to Best Practice Guidance for Habitat Survey and Mapping (Smith et al., 2011).

Plant species characteristic of each habitat was recorded, and habitats were assessed for potential correspondence with habitats listed in Annex I of the Habitats Directive. Particular attention was given to retained woodland, treelines, watercourses and other habitats capable of supporting protected species or providing ecological connectivity within the surrounding landscape.

2.3.2.2 Fauna

The Proposed Development site and accessible adjoining habitats were inspected for terrestrial mammals and evidence of mammal activity, including footprints, droppings, burrows, dens or setts, feeding remains, activity trails and disturbed vegetation. The survey was informed by recognised guidance, including Animal Tracks and Signs (Bang and Dahlström, 2006) and Surveying for Badgers: Good Practice Guidelines (Scottish Badgers, 2018).

The Lissaniska 21 River, Finnihy River and associated riparian habitats were inspected for evidence of otter activity and potential breeding or resting sites, including holts, couches, spraints, footprints, feeding remains and slides, with regard to the methodology described in Chanin (2003).

Bird species observed or heard during the walkover survey were recorded, and habitats were assessed for their suitability for breeding, foraging and roosting birds. Habitats were also evaluated for their potential to support amphibians and reptiles.

2.3.2.3 Invasive Alien Plant Species

During the multidisciplinary ecological walkover survey, the study area was searched for terrestrial and aquatic invasive alien plant species, with particular attention given to species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended.

Where invasive species were encountered, the species, location and approximate extent of the infestation were recorded, and a photographic record was made.

2.3.3 Aquatic Surveys

Detailed aquatic ecological surveys were undertaken within the Finnihy catchment on 6 June and 13 July 2026. Four survey sites were examined, comprising two sites on the Lissaniska 21 River and two sites on the Finnihy River. The survey area included watercourses upstream and downstream of the Proposed Development and representative locations within the downstream receiving environment.

The aquatic survey programme comprised:

- River Hydromorphology Assessment Technique assessment and supplementary spot checks;
- aquatic habitat assessment;
- macroinvertebrate habitat evaluation;
- fish-habitat assessment;
- semi-quantitative benthic macroinvertebrate kick-sampling;
- biological water-quality assessment using the EPA Quality Rating System; and
- electrofishing surveys.

A River Hydromorphology Assessment Technique survey was undertaken on the Lissaniska 21 River on 6 June 2026. Supplementary spot checks were undertaken on the lower Finnihy River on 13 July 2026. These surveys assessed channel morphology, flow types, substrate composition, channel vegetation, barriers to continuity, bank condition, riparian vegetation and floodplain interaction.

Aquatic habitat assessments were undertaken at all four survey sites. The assessments recorded channel width and depth, substrate composition, flow characteristics, instream and bankside vegetation, shading and evidence of anthropogenic pressures. Habitat suitability for salmonids and lamprey was also evaluated.

Semi-quantitative sampling of benthic macroinvertebrates was undertaken at all four survey sites using multi-habitat kick-sampling. The macroinvertebrate assemblages were used to assess biological water quality through application of the EPA Quality Rating System.

Electrofishing surveys were undertaken under authorisation at Site 2 on the Lissaniska 21 River and Site 3 on the Finnihy River. The surveys followed the methodology set out in Methods for the Water Framework Directive – Electric Fishing in Wadable Reaches and were undertaken to identify the fish species present and assess fish populations within the receiving watercourses. Captured fish were identified, measured, allowed to recover and released alive within the surveyed reach.

Biosecurity procedures followed Inland Fisheries Ireland's Biosecurity Protocol for Field Survey Work.

Spot-check and River Hydromorphology Assessment Technique survey locations are shown in **Figure 1**, while the electrofishing survey locations are shown in **Figure 15**. Full survey methodologies and results are provided in the accompanying Aquatic Ecology and Fish Report (**Appendix 2**).

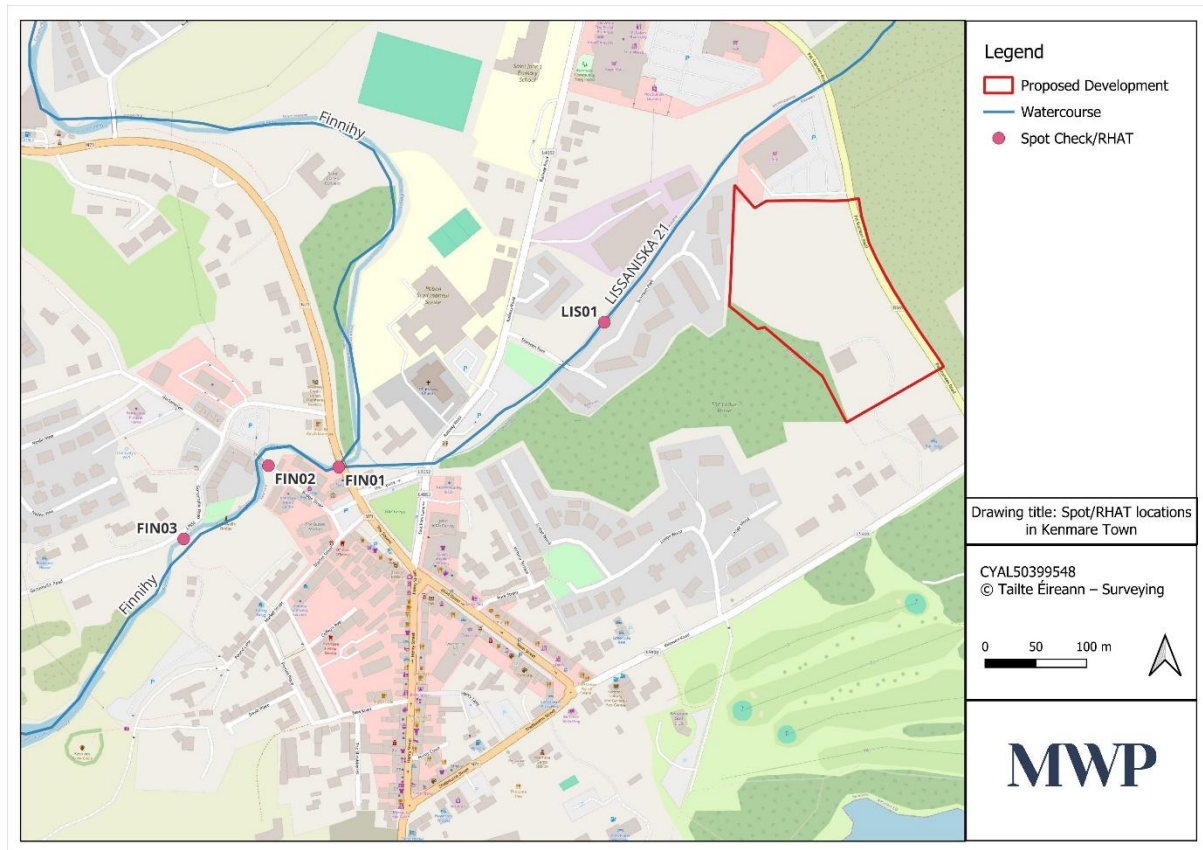


Figure 1: Spot-check and River Hydromorphology Assessment Technique survey locations within the Kenmare town environs.

2.3.4 Bat Surveys

Bat surveys were undertaken by Green Leaf Ecology Consultants during 2025 and 2026. The surveys comprised a desktop study, habitat suitability assessment, inspection of potential roost features, activity-transect surveys, passive static-detector monitoring and a dusk emergence survey.

A walkover survey of potential bat-roosting, commuting and foraging habitats was undertaken on 19 April 2025. Detailed external inspections of trees were undertaken on 14 April and 5 December 2025, and the derelict dwelling within the study area was inspected for potential bat-roost features on 14 April 2025.

Bat-activity transect surveys were undertaken on:

- 19 April 2025;
- 22 August 2025;
- 20 September 2025;
- 22 April 2026; and
- 7 July 2026.

Passive static-detector monitoring was undertaken at five locations associated with hedgerow and woodland habitats. Monitoring was completed monthly between April and September 2025 and during April and July 2026. Detectors were programmed to record from approximately 30 minutes before sunset until sunrise for seven nights during each deployment period.

A dusk emergence survey of the mature oak tree on the western boundary of the Proposed Development site was undertaken on 7 July 2026. The survey commenced approximately 15 minutes before sunset and continued until approximately 90 minutes after sunset. The survey was supported by a full-spectrum bat detector and thermal-imaging equipment.

Bat survey study area and passive-monitoring locations are shown in **Figure 2**. Potential tree-roost features recorded within the study area are shown in **Figure 3**. Full survey methodologies and results are provided in the Bat Survey Report (**Appendix 3**).



Figure 2: Locations of Passive Bat Detectors Deployed during the 2025 and 2026 Surveys (Greenleaf Ecology).



Figure 3: Potential Tree-Roost Features Recorded within the Bat Survey Study Area (Greenleaf Ecology)

2.4 Survey Limitations

The multidisciplinary ecological walkover survey was undertaken in March 2026. This period is generally suitable for detecting mammal field signs because reduced vegetation cover improves the visibility of features such as tracks, setts and feeding evidence. However, March falls outside the optimal period for detailed botanical surveys and the identification of some flowering plant species. Consequently, some seasonal or ephemeral plant species may have been under-recorded.

This limitation is not considered significant in the context of the Appropriate Assessment because the principal habitats within the Proposed Development site could be classified, retained woodland and watercourse habitats were identifiable, and the assessment was supplemented by desktop information and project-specific aquatic and bat surveys.

The aquatic surveys were undertaken during periods of high air temperature and low water levels. Reduced flows limited the availability and diversity of riffle habitat and may have influenced the composition and abundance of macroinvertebrate communities recorded. Survey constraints were greatest at Site 4 on the lower Finnihy River, where sampling was undertaken during low tide and extensive aquatic vegetation reduced the availability of exposed substrate. These limitations were taken into account when interpreting the aquatic survey results.

Brown long-eared bats and lesser horseshoe bats can be more difficult to detect than some other bat species because of their low-amplitude or highly directional echolocation calls. The bat-survey design addressed this limitation through the use of full-spectrum monitoring and the positioning of passive detectors along potential

commuting routes and suitable foraging habitats. Bat-activity transects were undertaken in suitable weather conditions, and the Bat Survey Report identified no significant constraints affecting the survey data obtained.

3. Stage 1 - Screening for Appropriate Assessment

The purpose of the screening assessment is to record in a transparent and reasoned manner the likely effects, on relevant Natura 2000 Sites, of the project, and whether these likely effects are significant.

Screening for Appropriate Assessment (Stage 1) determines the need for a full Appropriate Assessment (Stage 2) and consists of a number of steps, each of which is addressed in the following sections of this report:

- 3.1** Establish whether the project is necessary for the management of a Natura 2000 Site.
- 3.2** Description of the proposed LRD project.
- 3.3 3.6** Description of the Proposed Development, including site location and context, purpose of the project, description of the existing environment, and characteristics of the project
- 3.7** Identification of other plans, projects and activities with which the Proposed Development could interact to create in-combination effects.
- 3.8** Identification of Natura 2000 Sites potentially affected.
- 3.9** Identification and description of potential individual and cumulative impacts (in-combination effects) of the project.
- 3.10** Assessment of the significance of the potential impacts on Natura 2000 Sites.
- 3.11** Conclusion of screening stage.

3.1 Management of Natura 2000 Sites

The Proposed Development is not connected with or necessary to the conservation management of a Natura 2000 Site.

3.2 Description of Project

3.2.1 Site Location and Context

The Proposed Development site is located off Pat Scarteen Road in the townland of Killowen, approximately 500m northeast of Kenmare town centre, County Kerry. The site is situated within a semi-urban setting and is surrounded by existing residential and commercial development, open land, woodland and associated infrastructure.

The Proposed Development site was subject to vegetation clearance prior to the ecological assessment and is now predominantly characterised by disturbed and bare ground, together with areas of recolonising vegetation and a limited extent of semi-natural habitat. Woodland is present along the southwestern boundary and represents the principal ecological feature associated with the site.

The eastern boundary of the site is defined by Pat Scarteen Road, which connects with the R569 Kenmare–Kilgarvan regional road to the southeast. The Aldi commercial premises adjoin the site to the north, Scarteen Park

residential development is located to the northwest, and woodland borders the western and southwestern boundaries.

The Lissaniska 21 River flows close to the northern boundary of the Proposed Development site and continues downstream to the Finnihy River. These watercourses provide a hydrological connection between the Proposed Development site and the downstream receiving environment.

The location of the Proposed Development site is shown in **Figure 4**.



Figure 4: Location of Proposed Development Site

3.2.2 Brief Project Description of Proposed Development

The Proposed Development comprises a Large-scale Residential Development (LRD) on a site of approximately 2.7ha at Killowen, Kenmare, County Kerry. It includes the demolition of two existing single-storey sheds and the construction of 100 no. residential units. The proposed unit mix is summarised in **Table 1**.

Table 1: Proposed No. and types of units.

Unit	Unit type	No. Units
Houses		
HT-B1	Three-bedroom, two-storey house	17
Ht-B1S	Three-bedroom, two-storey house	3
HT-C1	Three-bedroom, two-storey house	4

Unit	Unit type	No. Units
HT-C1S	Three-bedroom, two-storey house	5
HT-C2	Three-bedroom, two-storey house	11
Apartments		
HT-M1	One-bedroom, own-door maisonette/apartment unit arranged over two storeys	30
HT-M2	Two-bedroom, own-door maisonette/apartment unit arranged over two storeys	30
Total Units		100 Units

The Proposed Development will include approximately 116 no. car-parking spaces. Vehicular access will be provided via an upgraded and relocated entrance from Pat Scarteen Road, including associated modifications to the existing shared pedestrian and cycle path and to road signage and lining. Separate pedestrian and cycle entrances will be provided from Clash Road, together with dedicated pedestrian and cycle routes through the site.

Associated works will include internal roads and footpaths, public open space, landscaping, boundary treatments, public lighting, bin and bicycle stores, ESB substations, water-supply infrastructure, wastewater infrastructure and a pumping station. Surface-water runoff will be managed through a drainage network incorporating Sustainable Drainage Systems, treatment and attenuation measures, with controlled discharge to the Lissaniska 21 River through a proposed headwall outfall located within the riverbank outside the application red-line boundary.

The Proposed Development layout is shown in **Figure 5**. Detailed construction and operational characteristics of the Proposed Development are provided in **Section 3.2.4**.



The purpose of the Proposed Development is to provide high-quality residential accommodation at Killowen, Kenmare, County Kerry, through the construction and operation of a Large-scale Residential Development (LRD), thereby contributing towards meeting the current demand for housing within Kenmare.

The proposal is described below in Table 2 and has been confirmed with the design team.

Size, scale, area, land-take

There is no spatial overlap between the Proposed Development and any Natura 2000 site; therefore, no land-take will occur within a Natura 2000 site. An indirect

hydrological connection exists between the Proposed Development and Kenmare River SAC (Site Code 002158) via the proposed surface-water drainage system, the Lissaniska 21 River and the Finnihy River.

There is also an indirect hydrological connection between the Proposed Development and Kenmare River SAC through the proposed foul-water connection. Foul wastewater will be conveyed to the existing public foul sewer and treated at Kenmare Wastewater Treatment Plant, which discharges treated effluent to the receiving waters associated with Kenmare River SAC under Waste Water Discharge Licence D0184-01.

Site set-up and clearance

The initial works will include the establishment of a temporary construction compound and welfare facilities, erection of hoarding and safety signage, implementation of traffic- and pedestrian-management measures and installation of temporary drainage and environmental controls.

The site was subject to vegetation clearance before the current ecological assessment. The remaining enabling works will include localised clearance of remaining vegetation, demolition and removal of two existing single-storey sheds, stripping and storage of topsoil, site grading and preparation of the development platform.

Construction phase

Construction will include earthworks and site levelling; excavation for foundations, roads and underground services; construction of the residential buildings; installation of surface-water, foul-water and utility infrastructure; construction of internal roads, footpaths and cycle infrastructure; installation of lighting; and completion of boundary treatments, public open spaces and landscaping.

Details of physical changes that will take place during the various stages of implementing the proposal.

Indicative construction sequence:

- Establishment of the temporary construction compound, welfare facilities, security measures and environmental controls.
- Demolition, site-clearance and enabling works.
- Stripping, storage and management of topsoil.
- Earthworks, site grading and excavation to foundation level.
- Construction of foundations, load-bearing walls, non-load-bearing elements and roof structures.
- Installation of foul-water, surface-water and utility infrastructure.
- Construction of internal roads, footpaths and cycleways.
- Installation of external finishes, internal services and mechanical and electrical infrastructure.
- Completion of hard and soft landscaping, public open space, lighting and boundary treatments.
- Testing, commissioning and phased completion of the development.

The precise construction methodology, programme and sequence will be determined by the appointed contractor.

Operational phase

During operation, the site will function as a residential development. Operational activities will include residential occupation, vehicle and pedestrian movements, operation of external lighting and drainage infrastructure, domestic waste collection

and routine maintenance of buildings, landscaped areas, public open spaces and associated infrastructure.

Construction-related materials (indicative)

- Hoarding and scaffolding.
- Aggregates and engineered fill.
- Concrete, reinforcement and formwork.
- Brickwork and blockwork.
- Structural and secondary steelwork.
- Timber and woodwork.
- Roofing, cladding, insulation and waterproofing materials.
- Internal and external finishes.
- Foul- and surface-water drainage pipes, chambers, gullies and associated fittings.
- Water-supply pipework.
- Electrical and telecommunications infrastructure.
- Road sub-base, surfacing materials, kerbs and paving
- Cellular attenuation units, petrol interceptors, catch pits and flow-control devices.
- Materials required for rain gardens, filter drains, dry swales and permeable paving.
- Boundary-treatment and landscaping materials.

Description of resource requirements for the construction/operation and decommissioning of the proposal (water resources, construction material, human presence etc).

Suitable excavated material will be retained and reused within the Proposed Development where practicable. The Resource and Waste Management Plan provides for the reuse of at least 90% of suitable excavated soil and subsoil on site.

Construction plant and machinery required (indicative)

- Hydraulic excavators and mini-excavators.
- Dump trucks and dumpers.
- Mobile cranes and lifting equipment.
- Telescopic handlers.
- Ready-mix concrete trucks and concrete pumps.
- Rollers and compactors.
- Road-surfacing plant.
- Delivery vehicles and heavy goods vehicles.
- Generators and bowsers.
- Access platforms and scissor lifts.
- Road sweeper.

Water requirement

Water will be required during construction for welfare facilities, dust suppression, cleaning and general construction activities. During the operational phase, potable water will be supplied from the public water-supply network via the proposed 110 mm-diameter watermain serving the development.

Human-resource requirement

The construction workforce will vary according to the stage of the works, with an anticipated peak workforce of approximately 30–50 personnel. The operational phase will involve permanent residential occupation of the 100 units, together with visitors, servicing and routine maintenance activities.

	No decommissioning phase is proposed as the development will constitute permanent residential infrastructure.
<i>Description of timescale for the various activities that will take place as a result of implementation (including likely start/finish date)</i>	Construction is anticipated to take approximately 24 months, including enabling works, main construction, landscaping, commissioning and completion. The commencement date will depend on the timing of the grant of planning permission and any other required statutory approvals. The anticipated normal construction hours are 07:00–19:00 Monday to Friday and 08:00–13:00 on Saturdays. Works will not normally take place on Sundays or public holidays. Any work required outside these hours will be subject to prior agreement with Kerry County Council. Certain activities, such as continuous concrete pours, may occasionally require extended working hours, subject to the necessary agreement.
<i>Description of wastes arising and other residues (including quantities) and their disposal.</i>	<u>Construction phase</u> General non-hazardous construction wastes may include: • Soil, subsoil and stones. • Concrete, bricks, blocks, tiles and ceramics. • Timber, glass, plastics and metals. • Paper, cardboard and other packaging. • Plasterboard and insulation materials. • Electrical and telecommunications waste. • Surplus building materials. • Vegetation and other biodegradable material arising from site clearance. • Dry mixed recyclables and mixed non-recyclable waste. • Waste arising from temporary welfare facilities. Suitable excavated soil and subsoil will be retained and reused within the Proposed Development where practicable. Surplus or unsuitable material will be removed by authorised waste collectors and transported to appropriately authorised facilities. Potentially hazardous wastes may include fuels, oils, lubricants, contaminated absorbents, paints, adhesives, batteries, construction chemicals and contaminated containers or residues. These materials will be segregated, securely stored and removed by authorised waste contractors in accordance with the Construction Environmental Management Plan and Resource and Waste Management Plan. Wastewater from temporary welfare facilities will be managed through a temporary foul connection where available. Otherwise, portable toilet facilities incorporating sealed holding tanks will be provided and serviced by a competent contractor, with the contents transported to an authorised wastewater-treatment facility. <u>Operational phase</u> Operational waste will principally comprise typical household waste, including dry mixed recyclables, organic waste, glass and mixed non-recyclable residual waste. Waste will be segregated and stored in designated waste-storage areas before collection by authorised waste contractors and transfer to appropriately authorised facilities.

	Foul wastewater will be collected separately from surface water and conveyed by gravity to the proposed on-site pumping station. It will then be pumped through a rising main to the existing public foul sewer and conveyed to Kenmare Wastewater Treatment Plant for treatment. Surface-water runoff will be managed using a treatment train comprising conventional drainage infrastructure and SuDS measures, including bioretention rain gardens or tree pits, filter drains, dry swales and permeable paving. Runoff will pass through petrol interceptors and catch pits before entering cellular attenuation storage. Attenuated runoff will be discharged at the calculated greenfield runoff rate through a Hydro-Brake flow-control device and proposed headwall to the Lissaniska 21 River.
<i>Identification of wastes arising and other residues (including quantities) that may be of particular concern in the context of the Natura 2000 network.</i>	The following materials and residues could be of particular concern if released to the receiving surface-water environment: • Sediment and sediment-laden surface-water runoff. • Fuels, oils and lubricants. • Concrete washout, wet cement, mortar and other cementitious materials. • Paints, solvents, adhesives and construction chemicals. • Contaminated water arising from excavations or construction activities. • Litter and general construction waste. • Effluent from temporary construction welfare facilities. • Foul wastewater generated during the operational phase. Uncontrolled releases of these materials could enter the Lissaniska 21 River and subsequently the Finnihy River and Kenmare River SAC. Their storage, handling, containment and disposal are therefore addressed through the construction and operational environmental controls described in this report.
<i>Description of any additional services required to implement the project or plan, their location and means of construction</i>	A temporary construction compound will be established within the Proposed Development site by the appointed contractor. The compound will be located at least 25 m from the Lissaniska 21 River and other surface-water drainage features, where practicable. It will include temporary site offices and welfare facilities, employee parking, secure material storage, designated waste-storage areas, delivery and unloading areas, spill-response equipment and appropriately controlled fuel and chemical storage. Temporary drainage and pollution-control measures will be installed during the enabling works and maintained throughout construction. Where a temporary foul connection is unavailable, portable toilets with sealed holding tanks will be provided and serviced by a competent contractor. Where a temporary water connection is unavailable, water required during construction will be supplied by tanker. Construction traffic will access the site from Pat Scarteen Road through the designated construction entrance. Traffic-management measures will include controlled delivery arrangements, safety signage, segregation of construction traffic and pedestrians where practicable, maintenance of the public road and use of a road sweeper when required. Permanent water-supply, foul-drainage, surface-water drainage, electrical and telecommunications infrastructure form part of the Proposed Development and will be installed during the construction phase. Underground services will generally be installed by trench excavation and connection to the relevant infrastructure within or adjacent to the Proposed Development site.

3.2.4.1 Site Set-up and Enabling Works

Before commencement of the principal construction works, the site will be secured and the necessary site-establishment and enabling works undertaken. These works will include the erection of hoarding and safety signage, establishment of controlled construction access, implementation of traffic- and pedestrian-management arrangements and installation of temporary drainage and environmental controls.

The Proposed Development site was subject to vegetation clearance before the current ecological assessment. This previous clearance has been acknowledged in the description of the existing environment and has been taken into account in the assessment of the Proposed Development. Any remaining vegetation requiring removal will be cleared in a controlled manner and in accordance with the ecological measures specified in this report and the Construction Environmental Management Plan (CEMP).

The enabling works will include:

- Establishment of the temporary construction compound and associated welfare facilities;
- Erection of hoarding, fencing, safety signage and site-security measures;
- Establishment of the construction access and internal construction routes;
- Implementation of traffic- and pedestrian-management measures;
- Demolition and removal of the two existing single-storey sheds. The existing concrete slab associated with the cleared structures will be broken out, with suitable concrete material retained and reused within the Proposed Development in accordance with the Resource and Waste Management Plan;
- Localised removal of remaining vegetation, where required;
- Stripping, segregation and temporary storage of topsoil;
- Site grading and preparation of the development platform;
- Installation of temporary surface-water drainage and sediment-control measures;
- Identification and protection of retained vegetation and ecologically sensitive features;
- Establishment of designated areas for the storage of construction materials, fuels, chemicals and waste; and
- Installation of temporary site services required during construction.

Suitable topsoil and other excavated materials will be segregated and retained for reuse within the Proposed Development where practicable. Materials that cannot be reused will be removed by authorised waste collectors and transferred to appropriately authorised facilities in accordance with the Resource and Waste Management Plan.

Temporary drainage and pollution-prevention measures will be installed before or concurrently with ground-disturbance works. These measures will be maintained throughout the construction phase to prevent sediment, hydrocarbons, cementitious materials or other construction-related pollutants from entering the Lissaniska 21 River or the wider surface-water network.

The precise sequencing and methodology for the enabling works will be finalised by the appointed contractor before construction commences. All works will be undertaken in accordance with the CEMP, Resource and Waste Management Plan and the mitigation measures specified in this NIS.

3.2.4.2 Temporary Construction Compound and Welfare Facilities

A temporary construction compound will be established within the Proposed Development site at an early stage of the construction programme. The compound will be located a minimum of 25 m from the Lissaniska 21 River and any other surface-water drain.

The compound will provide:

- Temporary site offices and staff welfare facilities;
- Secure storage areas for construction materials and excess spoil;
- Designated delivery and unloading areas;
- Storage containers and equipment-storage areas;
- Designated waste-storage and segregation areas;
- Construction-worker parking;
- Secure and appropriately controlled storage for fuels, oils and chemicals;
- Spill-response materials and equipment; and
- Temporary surface-water management measures.

The compound will typically comprise compacted layers of imported crushed-stone aggregate, spread and lightly compacted to provide a stable surface for the site offices, storage containers and other temporary facilities. Areas within the compound will also be used as temporary access routes, vehicle hardstanding, parking and delivery areas.

Surface-water and waste-management controls will be installed when the compound is established and maintained throughout the construction phase. Surface water arising within the compound will be managed to prevent sediment, hydrocarbons or other construction-related pollutants from entering the Lissaniska 21 River or any surface-water drainage feature.

Fuel, oil and chemical storage areas will be appropriately secured and contained. Refuelling and maintenance activities will be undertaken in designated areas with suitable spill-containment and response measures available. Construction waste will be segregated and stored in designated containers before removal by authorised waste collectors to appropriately authorised facilities.

Temporary welfare facilities will be provided for construction personnel. Where a temporary connection to the public foul-water network is available, welfare wastewater will be discharged through the agreed connection. Otherwise, portable sanitary facilities incorporating sealed holding tanks will be provided. These facilities will be located away from watercourses and surface-water drains and will be regularly serviced by a competent contractor, with the contents transferred to an authorised wastewater-treatment facility.

The temporary compound will remain in place for the duration of the construction phase. Following completion of the works, the site offices, storage containers, temporary services and hardstanding materials will be removed. The compound area will then be completed in accordance with the permitted development layout or reinstated and landscaped, as applicable.

3.2.4.3 Earthworks, Foundations and Building Construction

Construction of the Proposed Development will require bulk excavation and earthworks to facilitate the residential buildings, internal access roads, footpaths, drainage and utility trenches, public open spaces, landscaping and associated infrastructure.

Topsoil will be stripped separately and temporarily stored within the Proposed Development site for subsequent reuse in landscaping and reinstatement works. Topsoil and subsoil stockpiles will be appropriately located and managed to prevent erosion, excessive compaction and the release of sediment to the surface-water drainage network.

The existing concrete slab will be broken out during the enabling works. Suitable concrete arising from these works will be processed and reused within the Proposed Development where practicable. At least 90% of suitable topsoil and subsoil generated by the excavation works will be retained and reused within the development boundary, including within landscaped areas and in the reinstatement of the temporary construction compound.

Any surplus or unsuitable material will be removed by an authorised waste collector and transported to an appropriately authorised facility.

Excavations will be required for:

- Site grading and preparation of development platforms;
- Foundations and ground-floor construction;
- Internal roads, footpaths and parking areas;
- Foul- and surface-water drainage infrastructure;
- The proposed foul-water pumping station and associated rising main;
- Water-supply and other underground utility services;
- Attenuation storage and associated SuDS infrastructure;
- Public-lighting and telecommunications infrastructure; and
- Boundary treatments and landscaping works.

Following completion of the earthworks, the residential buildings will be constructed using conventional construction techniques. The indicative construction sequence will include:

- Excavation to the required foundation level;
- Construction of reinforced-concrete foundations and subsequent backfilling to the proposed ground-floor level;
- Construction of load-bearing walls, non-load-bearing vertical elements and upper floors;
- Installation of the roof structures, roof finishes and external cladding;
- Installation of windows, doors and external finishes;
- First-fix mechanical and electrical works;
- Internal partitions, insulation and internal finishes;
- Second-fix mechanical and electrical works and final connections;
- Installation and connection of permanent building services;
- Completion of internal and external finishes; and
- Testing and commissioning before occupation.

Construction plant will include excavators, dump trucks, compactors, concrete-delivery vehicles, concrete pumps, mobile lifting equipment, telescopic handlers and other conventional construction machinery.

Temporary construction-phase drainage and sediment-control measures will be implemented before and during ground-disturbance works. Excavated areas and exposed soils will be managed to minimise the generation of sediment-laden runoff. Stockpiles will be positioned away from the Lissaniska 21 River and surface-water drainage features and will be protected where necessary during prolonged periods of rainfall or inactivity.

Concrete and cementitious materials will be managed to prevent wet concrete, cement washwater or other alkaline material from entering the ground, temporary drainage system or receiving surface-water environment. Concrete washout will only be undertaken within a designated contained area.

The precise excavation depths, foundation design, earthworks balance and construction methodology will be determined through the detailed design and by the appointed contractor. All earthworks and building-construction activities will be undertaken in accordance with the CEMP, Resource and Waste Management Plan and the mitigation measures specified in this NIS.

3.2.4.4 Site Access, Internal Roads and Traffic

Construction access to the Proposed Development site will be provided from Pat Scarteen Road through the proposed vehicular entrance. This entrance will also serve the completed development during the operational phase.

The construction access will be established during the enabling works and maintained in a safe and serviceable condition throughout the construction programme. Appropriate signage, visibility arrangements and traffic-management measures will be provided at the entrance. Access to the construction site will be controlled to prevent unauthorised entry.

Construction traffic will principally comprise:

- Heavy goods vehicles delivering concrete, aggregates, road-construction materials, building materials, drainage and utility infrastructure, structural materials, cabling and boundary treatments;
- Heavy goods vehicles removing surplus excavated material, demolition material and construction waste;
- Vehicles delivering plant, machinery, cranes and fuel;
- Concrete-delivery vehicles and concrete pumps;
- Light commercial vehicles; and
- Private vehicles associated with construction personnel.

A road-safety and courtesy protocol will be implemented for the duration of the construction works. Contractors, subcontractors and suppliers making deliveries to the site will be required to comply with this protocol. Measures will include controlled delivery arrangements, restricted delivery periods where required, enforcement of appropriate speed limits and consideration of peak commuter and other sensitive traffic periods.

Construction vehicles will give way to existing traffic where appropriate and will slow down or stop for pedestrians and cyclists. Vehicle movements and deliveries will be coordinated to avoid unnecessary queuing or obstruction on Pat Scarteen Road. Parking for construction personnel and temporary delivery and turning areas will be provided within the construction site and temporary construction compound.

The condition of the public road adjoining the construction entrance will be monitored during the works. Any damage attributable to construction traffic will be repaired as required. Mud and debris deposited on the public road will be removed promptly, with a road sweeper employed where necessary.

The internal road network, parking areas, footpaths and pedestrian and cycle infrastructure will be constructed progressively as the development advances. Works will include excavation and preparation of the road formation, installation of drainage and underground services, construction of the sub-base and road base, installation of kerbing and paving, application of the final road surface and completion of road markings and signage.

During operation, vehicular access will be provided through the upgraded and relocated entrance from Pat Scarteen Road. The Proposed Development will also include separate pedestrian and cycle access from Pat Scarteen Road and dedicated pedestrian and cycle routes through the site.

The proposed vehicular access, internal road network and pedestrian and cycle connections are shown in **Figure 5**.

3.2.4.5 Utilities and Wastewater Infrastructure

The Proposed Development will require the installation of foul-water drainage, water-supply, electricity and telecommunications infrastructure. These services will be installed principally beneath the proposed internal roads and footpaths through conventional trench excavation and will be constructed progressively alongside the internal road network.

Foul-Water Drainage

The foul-water drainage system will be constructed as a separate system from the proposed surface-water drainage network. Foul wastewater generated by the residential units will be conveyed by gravity through the internal foul-sewer network to a proposed on-site pumping station.

The pumping station will be located within the Proposed Development and accessed from the internal road network. Its position has been selected to minimise the required depth of excavation and the length of the rising main, while maintaining a minimum separation of 15 m from adjacent residential properties. Vehicular access will be maintained to facilitate inspection, servicing and emergency tanker access in the event of pump failure.

Wastewater will be pumped from the pumping station through a rising main to the existing public foul-sewer network at Pat Scarteen Road. It will subsequently be conveyed through the public network to Kenmare Wastewater Treatment Plant for treatment. Treated effluent from the wastewater treatment plant is discharged to the receiving waters associated with Kenmare River SAC under Waste Water Discharge Licence D0184-01.

The foul-water infrastructure will include:

- Gravity foul sewers serving the residential units;
- Foul-water inspection chambers and manholes;
- The proposed on-site pumping station;
- Duty and standby pumping arrangements;
- Emergency storage and alarm provisions in accordance with the applicable Uisce Éireann requirements;
- A rising main connecting the pumping station to the existing public foul sewer; and
- Vehicular access for routine inspection, maintenance and emergency response.

Construction of the foul-water network will involve excavation of service trenches, installation and bedding of pipework, construction of manholes and the pumping station, connection of the rising main to the public sewer and subsequent backfilling and reinstatement. Excavated material will be reused where suitable, with surplus or unsuitable material managed in accordance with the Resource and Waste Management Plan.

The connection to the existing public foul sewer will be undertaken using standard construction methods and in accordance with the requirements of Uisce Éireann. Temporary measures will be employed during the connection works to prevent the uncontrolled release of wastewater or ingress of surface water.

Water Supply and Other Utilities

A permanent potable-water supply will be provided through a proposed 110 mm watermain connecting the Proposed Development to the existing public water-supply network. The watermain will be installed principally beneath the proposed internal road network and constructed in accordance with the applicable Uisce Éireann requirements.

Electricity and telecommunications services will be installed within the Proposed Development and connected to the relevant existing utility networks. Associated infrastructure will include underground ducts, chambers, service connections, public lighting and ESB substations.

Utility trenches will generally be excavated within the proposed internal road and footpath corridors. Following installation, the services will be surrounded with the specified bedding and protective materials before the trenches are backfilled, compacted and reinstated. Works affecting the public road will be subject to the relevant traffic-management and road-opening requirements.

Surface-water drainage is addressed separately in **Section 3.2.4.6**.

3.2.4.6 Sustainable Drainage Systems and Proposed Outfall

Surface-water runoff from the Proposed Development will be managed through a combination of conventional drainage infrastructure and Sustainable Drainage Systems (SuDS). The drainage strategy has been designed to manage surface-water quantity and quality while providing biodiversity and amenity benefits where practicable.

Surface-water runoff from roofs, roads, parking areas and other hardstanding will be collected through the proposed storm-sewer network. Road runoff will be collected through road gullies and conveyed through a SuDS management train before entering the principal attenuation system.

The proposed SuDS management train will include:

- Bioretention rain gardens and tree pits;
- Filter drains;
- Dry swales;
- Permeable paving;
- Road gullies and conventional storm sewers;
- Class 1 bypass petrol interceptors;
- Catch pits;
- Cellular attenuation storage; and
- Hydro-Brake flow-control devices.

All SuDS features will incorporate overflow connections to the storm-sewer network to ensure effective drainage during extreme rainfall events.

Bioretention Rain Gardens and Tree Pits

Bioretention rain gardens and tree pits will receive runoff from nearby roads, footpaths and other hardstanding areas. Surface water will pass through the planted surface layer and underlying engineered soil, providing filtration and removal of sediment and other pollutants.

Where ground conditions permit, a proportion of the treated water will infiltrate into the ground. Excess water will enter a surface overflow or perforated underdrain and be conveyed to the downstream storm-sewer network. Flow controls will be incorporated at outlets where required to maximise retention and infiltration.

A typical bioretention rain-garden arrangement is shown in **Figure 6**.

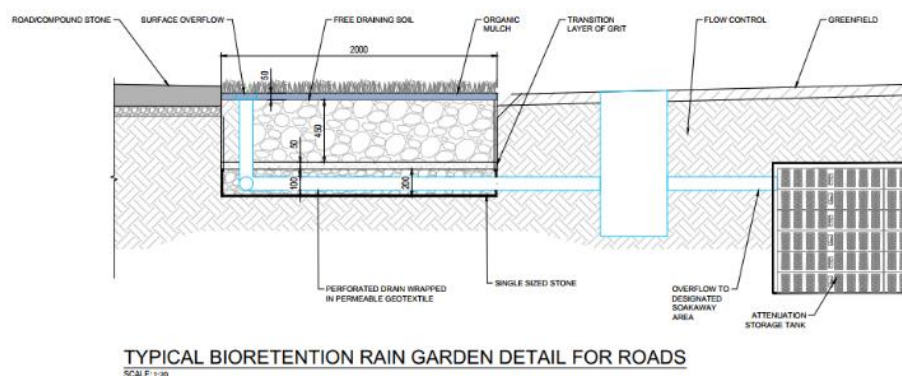


Figure 6: Typical Bioretention Rain-Garden Detail for Roads.

Filter Drains and Dry Swales

Filter drains will comprise shallow stone-filled trenches designed to provide temporary subsurface storage, filtration and conveyance of surface-water runoff. The stone-filled trenches will incorporate suitable geotextile, underdrainage and connections to the downstream drainage network, where required.

Dry swales will collect sheet flow from adjacent road and hardstanding surfaces. The swales will comprise shallow channels with flat bases and gently sloping sides, allowing runoff to be temporarily stored, filtered and conveyed at a controlled rate.

Stone check dams will be installed along the swales at intervals of approximately 10–20 m where required. These will reduce flow velocities and assist in the interception of sediment and pollutants. Filter drains beneath the swales will provide additional treatment, conveyance and attenuation capacity.

A typical filter-drain arrangement is shown in **Figure 7**, while a typical dry-swale arrangement is shown in **Figure 8**.

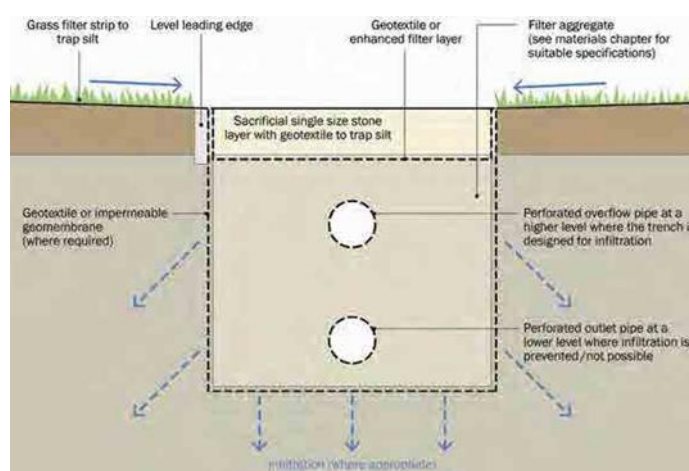


Figure 7: Typical Filter-Drain Detail.

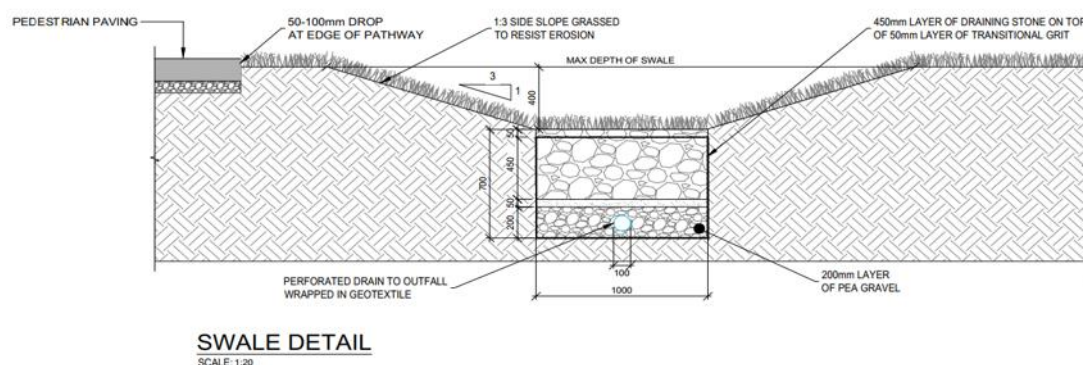


Figure 8: Typical Dry-Swale Detail.

Petrol Interceptors and Catch Pits

Class 1 bypass petrol interceptors will be installed within the principal stormwater drainage system to treat runoff collected from roads and parking areas. The interceptors will remove hydrocarbons and other pollutants potentially associated with vehicular traffic before runoff enters the attenuation system.

Manholes immediately upstream and downstream of the attenuation structures will incorporate catch pits. These will intercept sediment and reduce the potential for silt to accumulate within the attenuation tanks, flow-control devices and downstream drainage network.

Attenuation Storage and Flow Control

Surface-water runoff will be conveyed to underground cellular attenuation storage located within the Proposed Development. The attenuation system will comprise separate but hydraulically connected tanks, providing additional storage resilience if one element of the system is not performing at its intended capacity.

The attenuation tanks have been designed to accommodate the 1-in-100-year rainfall event, including a 20% allowance for climate change. The cellular storage system will be installed beneath landscaped areas with the required cover and structural protection.

Discharge from the attenuation system will be controlled to the calculated greenfield runoff rate through a Hydro-Brake flow-control device. This will limit the rate at which surface water is released from the Proposed Development.

A typical cellular attenuation-storage arrangement is shown in **Figure 9**.

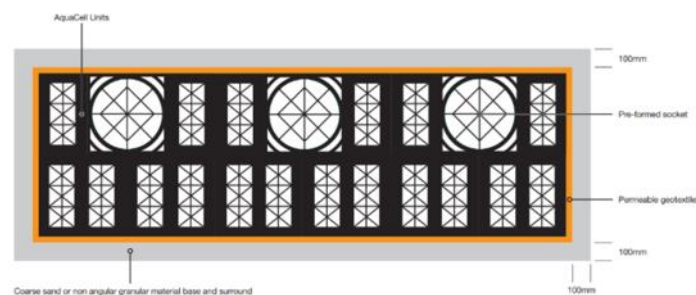


Figure 9: Typical Cellular Attenuation-Storage System.

Proposed Surface-Water Outfall

Following treatment and attenuation, surface water will be discharged at the calculated greenfield runoff rate through a proposed headwall outfall located within the bank of the Lissaniska 21 River, outside the application red-line boundary. The outfall will form the downstream connection between the Proposed Development's surface-water drainage system and the receiving watercourse and will convey treated and attenuated surface water following flow control by the Hydro-Brake.

Construction of the outfall will require localised excavation of the riverbank, installation of the outfall pipe and headwall, connection to the surface-water drainage system, and reinstatement of the affected ground and watercourse margin. Appropriate temporary water-management, sediment-control and pollution-prevention measures will be implemented during these works. The drainage strategy is designed to mimic the existing hydrological regime by restricting discharge to the calculated greenfield runoff rate and to minimise effects on the receiving environment..

Consultation has been initiated with Inland Fisheries Ireland regarding the proposed stormwater outfall and associated aquatic considerations. This consultation remains ongoing, and any recommendations received from Inland Fisheries Ireland will be incorporated into the final design, construction methodology and mitigation measures, where applicable.

The SuDS features, petrol interceptors, catch pits, attenuation system, Hydro-Brake and outfall will be inspected and maintained throughout the operational phase in accordance with the maintenance requirements specified in the Drainage Impact Report.

3.2.4.7 Completion and Operational Phase

During the latter stages of construction, the internal roads, footpaths, cycle routes, parking areas, public open spaces and associated infrastructure will be completed. Temporary construction areas will be cleared, and the temporary construction compound, site offices, welfare facilities, storage containers and temporary services will be removed when they are no longer required.

Areas affected by the temporary construction works will be completed in accordance with the permitted development layout or reinstated and landscaped, as appropriate. Stored topsoil and other suitable excavated materials will be reused within landscaped areas and in the reinstatement of the temporary construction compound where practicable.

Completion works will include:

- Completion of internal roads, footpaths, cycle routes and parking areas;
- Installation of final road surfaces, kerbs, paving, road markings and signage;
- Completion and commissioning of the foul-water drainage system and pumping station;
- Completion and commissioning of the surface-water drainage system, SuDS features, attenuation storage, flow-control devices and outfall;
- Completion of permanent water, electricity, telecommunications and public-lighting infrastructure;
- Completion of boundary treatments;
- Implementation of hard and soft landscaping;
- Completion of public open spaces and amenity areas;
- Removal of temporary construction facilities and environmental controls where no longer required;
- Testing and commissioning of building services and utility infrastructure; and
- Phased completion and occupation of the residential units.

Following completion, the site will operate as a residential development comprising 100 residential units and associated roads, parking, open spaces, landscaping, lighting, drainage and utility infrastructure.

The principal operational activities will comprise residential occupation, vehicle and pedestrian movements, use of external lighting, domestic waste storage and collection, routine landscape management and inspection and maintenance of the drainage and utility infrastructure.

Foul wastewater will be conveyed through the internal foul-water network to the proposed pumping station and pumped to the existing public sewerage network for treatment at Kenmare Wastewater Treatment Plant. The pumping station will remain accessible from the internal road network for routine inspection and maintenance and for emergency tanker access in the event of pump failure.

Surface-water runoff will pass through the proposed SuDS treatment train before entering the cellular attenuation system. Discharge will be restricted to the calculated greenfield runoff rate by a Hydro-Brake flow-control device before release through the proposed headwall to the Lissaniska 21 River.

The rain gardens, tree pits, filter drains, dry swales, permeable paving, road gullies, petrol interceptors, catch pits, attenuation tanks, Hydro-Brake and associated pipework will be inspected and maintained in accordance with the maintenance requirements set out in the Drainage Impact Report. Maintenance will include removal of sediment, litter and vegetation where necessary; inspection and cleaning of inlets, outlets and flow-control devices; and repair or replacement of damaged components.

Operational waste will principally comprise typical domestic waste, including dry mixed recyclables, organic waste, glass and mixed non-recyclable residual waste. Waste will be segregated and stored within the designated waste-storage areas before collection by authorised waste contractors and transfer to appropriately authorised facilities.

Landscaped areas and public open spaces will be subject to routine maintenance. This will include management of planted vegetation, replacement of failed planting where required and maintenance of paths, boundary treatments and amenity areas. External lighting will operate in accordance with the final approved and ecologically reviewed lighting design, incorporating luminaires with a maximum correlated colour temperature of 2700 K, and will be maintained to avoid unnecessary light spill onto retained woodland, vegetation and other ecologically sensitive areas.

3.3 Description of Existing Site

3.3.1 General Site Description

The Proposed Development site is located at Killowen, approximately 0.5 km northeast of Kenmare town centre, County Kerry. It occupies an area of approximately 2.63 ha within a semi-urban setting characterised by residential development, commercial development, open land, woodland and associated infrastructure.

Pat Scarteen Road extends along the eastern boundary of the site in a northwest-to-southeast direction and connects the R569 regional road with Railway Road. The Scarteen Park residential development is located east of the site, beyond Pat Scarteen Road. Commercial development is present to the north, while mixed broadleaved woodland adjoins the southwestern boundary. The Lissaniska 21 River, also referred to locally as the Keelnagower Stream, flows close to the northern boundary of the site before continuing southwest towards the Finnihy River.

The site was subject to vegetation clearance before the current ecological assessment. Consequently, much of the site presently comprises recolonising bare ground and areas of exposed soil, compacted ground, spoil and coarse gravel. A small area of scrub is present in the southeastern part of the site, while a low and locally discontinuous stone wall extends along sections of the southwestern boundary adjoining the woodland.

The site is uneven, with elevated ground in the southern section and bedrock occurring close to the surface in places. There are no continuous internal hedgerows within the site.

Two small derelict sheds are present within the site boundary. These comprise metal-clad and timber structures, with a small area of concrete hardstanding adjoining the smaller shed. Pat Scarteen Road forms a linear artificial surface along the eastern boundary.

According to CORINE Land Cover 2018, the site and immediately adjoining lands are classified as “Sport and leisure facilities” (Code 142). Land within the wider surroundings is predominantly classified as “Discontinuous urban fabric” (Code 112), with areas of “Pastures” (Code 231) occurring farther east.

An overview of the existing site and its surroundings is presented in **Figure 10**. Representative photographs of the existing site conditions are provided in **Plates 1 and 2**.

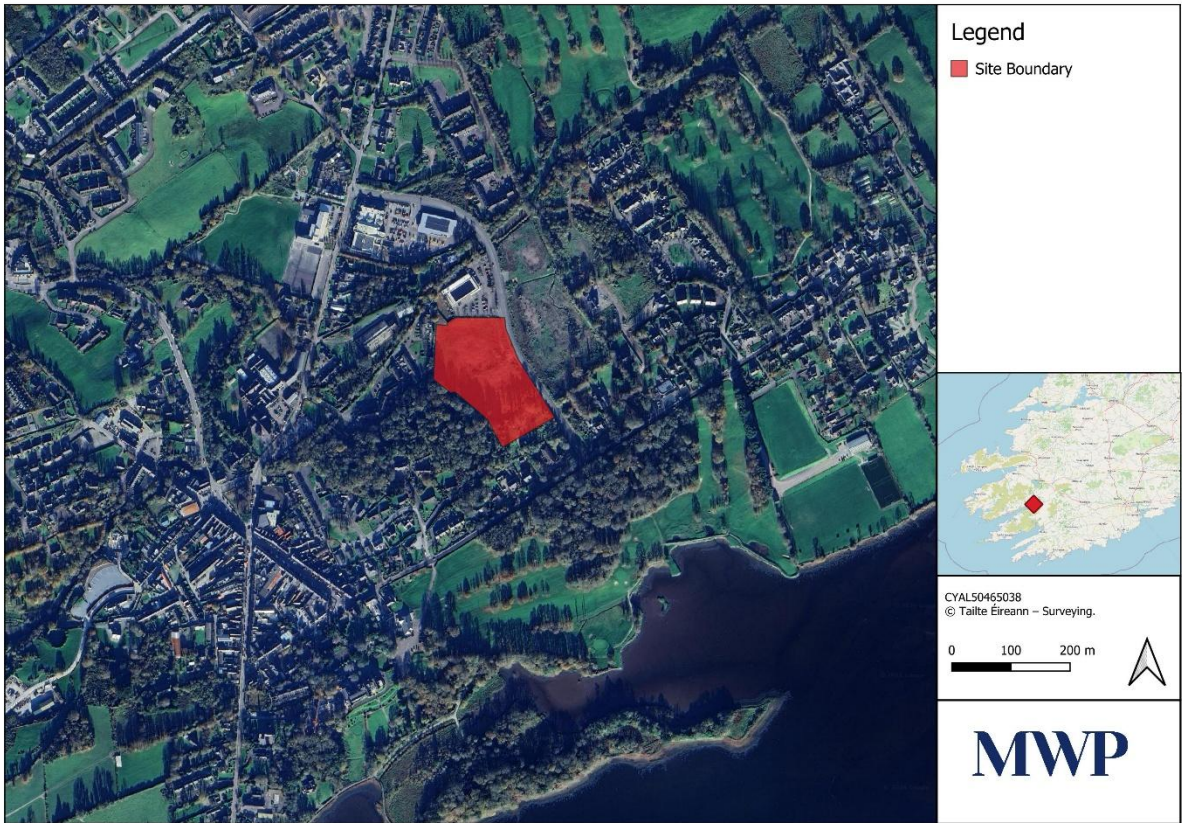


Figure 10: Overview of the Proposed Development Site and Surrounding Area.



Plate 1: Recolonising Bare Ground (ED3).



Plate 2: Spoil and Bare Ground within the Proposed Development Site.

3.3.2 Hydrology and Hydrogeology

3.3.2.1 Surface Water Environment

The Proposed Development site is located within Water Framework Directive (WFD) Catchment 21, the Dunmanus–Bantry–Kenmare Catchment, and within the Finnihy_SC_010 sub-catchment (Sub-catchment ID 21_13). The site lies within the Finnihy_020 river sub-basin.

The principal surface-water feature in the vicinity of the Proposed Development is the Lissaniska 21 River (EPA segment code 21L26), which flows close to the northern boundary of the site. This watercourse has previously been referred to locally and in some of the project documentation as the Keelnagower Stream; however, Lissaniska 21 River is the name used by the EPA and is therefore used throughout this assessment.

The Lissaniska 21 River flows in a southwesterly direction before joining the Finnihy River. The Finnihy River subsequently discharges to the Inner Kenmare River transitional waterbody, which forms part of Kenmare River SAC. The relevant WFD waterbody codes are:

- Lissaniska 21 River and Finnihy River: Finnihy_020 river waterbody (IE_SW_21F010510); and
- Inner Kenmare River transitional waterbody (IE_SW_190_0300).

The surface-water features and downstream hydrological connections associated with the Proposed Development site are shown in **Figure 11**.

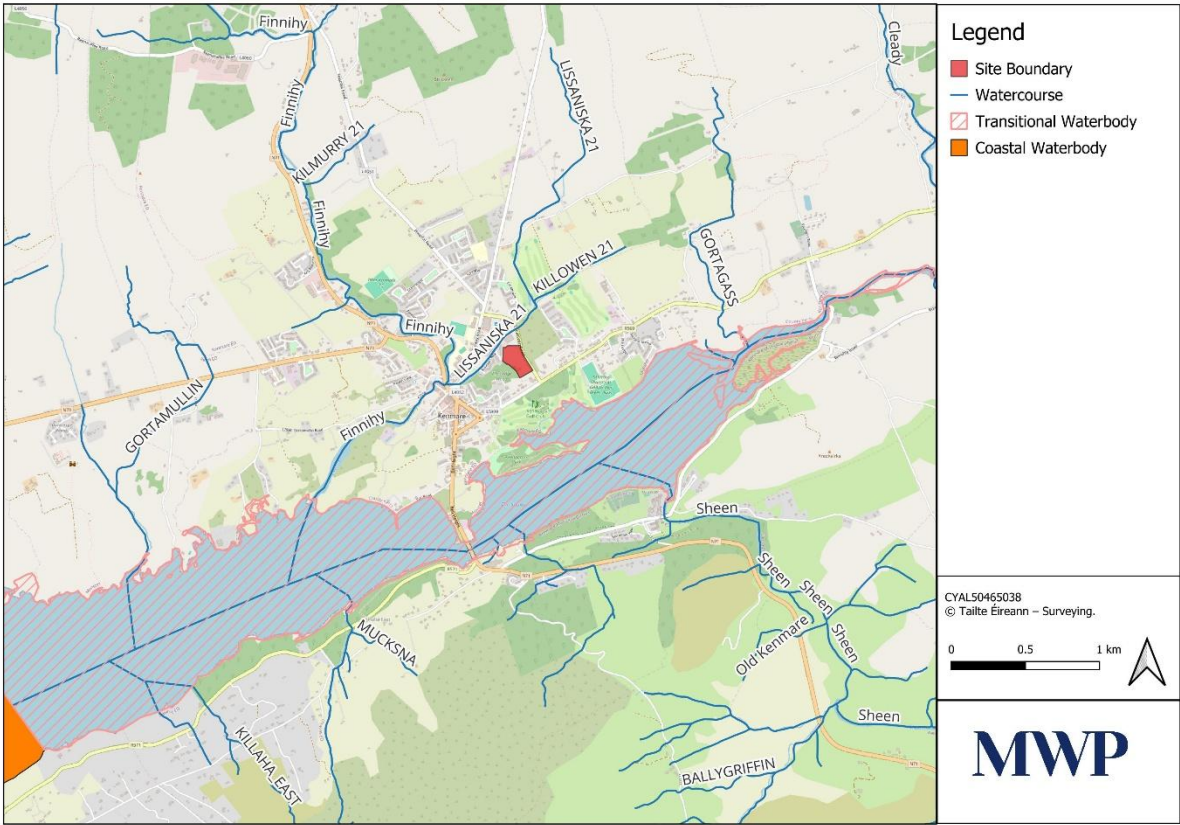


Figure 11: Surface-Water Bodies and Hydrological Connections in the Vicinity of the Proposed Development.

There is no watercourse within the application red-line boundary. However, a potential pathway for overland runoff exists because of the proximity of the Lissaniska 21 River and the topography of the site.

The operational surface-water drainage system will create a direct, controlled hydrological connection between the Proposed Development and the Lissaniska 21 River. Following treatment and attenuation through the proposed SuDS network, surface water will be discharged at the calculated greenfield runoff rate through a proposed headwall outfall to the Lissaniska 21 River. The receiving watercourse subsequently connects with the Finnihy River and Inner Kenmare River.

The WFD status and risk classifications of the relevant surface-water bodies are summarised below:

Table 3: WFD Status and Risk Classification of Surface-Water Bodies Relevant to the Proposed Development

Waterbody	WFD Code	Status 2019-2024	Risk Classification
Lissaniska 21 River/Finnihy_020	IE_SW_21F010510	Moderate	At Risk
Finnihy River/Finnihy_020	IE_SW_21F010510	Moderate	At Risk

Waterbody	WFD Code	Status 2019-2024	Risk Classification
Inner Kenmare River	IE_SW_190_0300	Good	Not at Risk

Two EPA biological monitoring stations are located on the Finnihy River downstream of the Proposed Development:

- FINNIHY – Kenmare – Finnihy Bridge (RHS) (Station Code RS21F010500); and
- Kenmare: Finnihy Bridge (LHS) (Station Code RS21F010510).

The available EPA monitoring information classifies the Finnihy_020 river waterbody as having Moderate ecological status. Aquatic surveys undertaken for the Proposed Development also assigned Q3–4, corresponding to Moderate Status, at each of the four surveyed locations on the Lissaniska 21 and Finnihy rivers. Further details of the aquatic surveys are provided in **Section 3.3.4 Fauna** and the accompanying Aquatic Ecology and Fish Report.

3.3.2.2 Groundwater Environment

The Proposed Development is underlain by the Kenmare Groundwater Body (EU Code IE_SW_G_040).

Geological Survey Ireland mapping identifies the underlying bedrock as predominantly Waulsortian Limestone, described as massive, unbedded lime-mudstone. The predominant Quaternary subsoil beneath the Proposed Development is mapped as undifferentiated alluvium.

The soils associated with the site comprise river alluvium and include:

- Boyne (0500BO) sandy river alluvium;
- Finisk (0570FI) fine loamy soils over non-calcareous gravels; and
- Aherlow (0570AH) sandy river alluvium.

The underlying aquifer is classified by Geological Survey Ireland as a Locally Important Aquifer – Karstified (diffuse). Groundwater vulnerability across the Proposed Development site is generally classified as Moderate.

The mapped groundwater vulnerability and aquifer classification are shown in **Figures 12** and **13**, respectively.

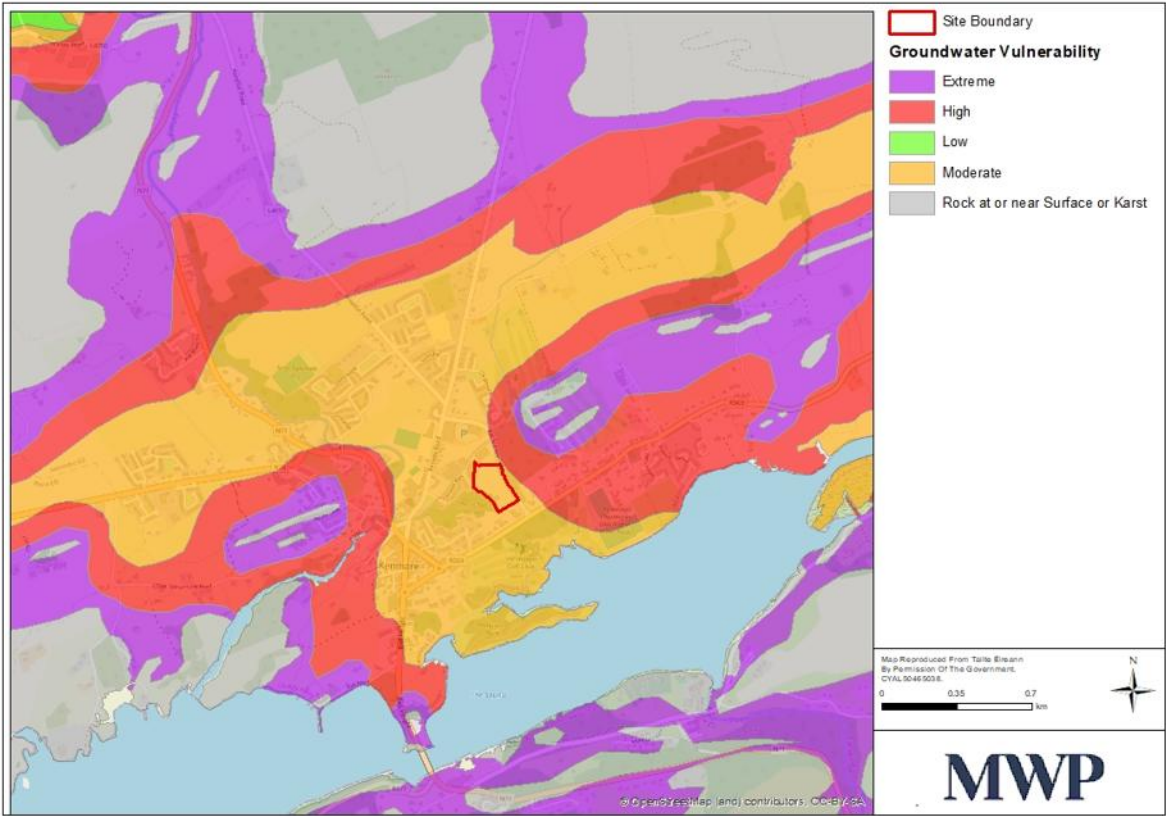


Figure 12: Groundwater Vulnerability at the Proposed Development Site.

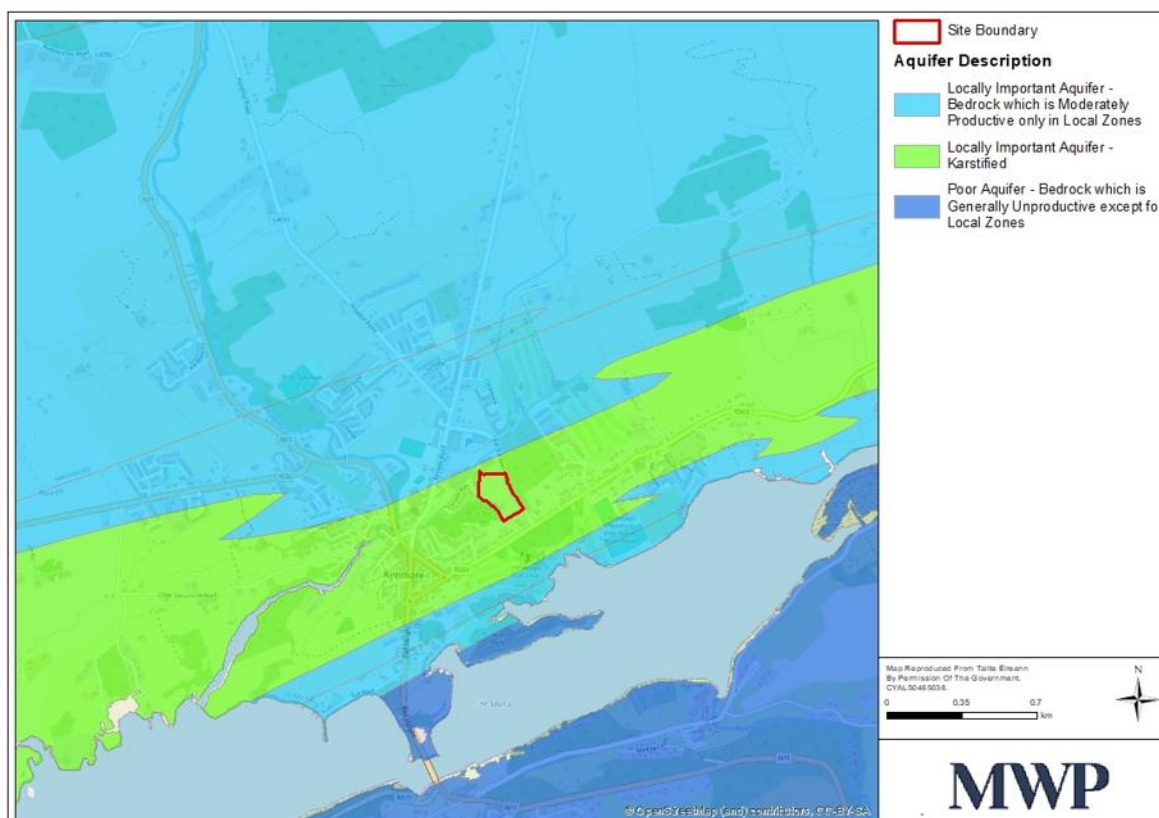


Figure 13: Groundwater Aquifer Classification at the Proposed Development Site.

The Kenmare Groundwater Body was classified as having Good overall status for the 2019–2024 assessment period and is identified as Not at Risk of failing to maintain its WFD environmental objectives.

Construction activities involving excavation, soil stripping, concrete, fuels, oils and other construction materials have the potential to interact with the underlying groundwater environment if not appropriately controlled. The construction-phase controls relevant to groundwater protection are described in the CEMP and the mitigation section of this NIS.

3.3.3 Habitats and Flora

Habitats within and immediately adjoining the Proposed Development site were classified in accordance with the Level 3 categories set out in A Guide to Habitats in Ireland (Fossitt, 2000).

The habitats recorded are summarised in **Table 4** and described individually in the following subsections. Representative examples are shown in **Plates 3-7**, and their distribution is presented on the habitat map in **Figure 14**.

Table 4: Habitats within and Immediately Adjoining the Proposed Development Site

Fossitt Habitat Category & Code ³	Extent and Description
Recolonising bare ground (ED3)	The predominant habitat within the application boundary, occurring across areas previously subject to vegetation clearance. Ruderal and early successional vegetation has subsequently recolonised parts of the disturbed ground.
Spoil and bare ground (ED2)	Widespread areas of exposed soil, compacted mud, spoil and coarse gravel associated with previous vegetation clearance and ground disturbance. These areas were largely unvegetated at the time of survey.
Scrub (WS1)	A small, localised area of early-successional scrub is present in the southeastern part of the site.
Buildings and artificial surfaces (BL3)	Two small derelict sheds and an adjoining area of concrete hardstanding are present within the application boundary. Pat Scarteen Road extends along the eastern site boundary.
Stone walls and other stonework (BL1)	A low and locally discontinuous stone wall extends along sections of the southwestern site boundary.
Mixed broadleaved woodland (WD2)	Mixed broadleaved woodland adjoins the southwestern boundary but is primarily located outside the application red-line boundary.
Depositing/lowland river (FW2)	The Lissaniska 21 River flows close to the northern boundary, outside the application red-line boundary. It forms the receiving watercourse for the proposed controlled surface-water outfall.

3.3.3.1 Recolonising Bare Ground (ED3)

The Proposed Development site was subject to vegetation clearance before the current ecological assessment. Consequently, recolonising bare ground is now the predominant habitat within the application boundary.

The habitat supports ruderal and early-successional plant species, including dandelion (*Taraxacum officinale* agg.), willowherb (*Epilobium* spp.), field speedwell (*Veronica persica*), clover (*Trifolium* spp.), wild angelica (*Angelica sylvestris*), ribwort plantain (*Plantago lanceolata*), wild strawberry (*Fragaria vesca*), perforate St John's-wort

³ Habitats are classified in accordance with the level 3 category of Fossitt 2000 (*A Guide to Habitats in Ireland*)

(*Hypericum perforatum*), common ragwort (*Jacobaea vulgaris*), gorse (*Ulex europaeus*), creeping buttercup (*Ranunculus repens*), dock (*Rumex* spp.), thistle (*Cirsium* spp.), field horsetail (*Equisetum arvense*), cleavers (*Galium aparine*) and small-flowered bittercress (*Cardamine parviflora*).

Along the boundary adjoining the woodland, species associated with shaded and damp conditions include wood club-rush (*Scirpus sylvaticus*), common nettle (*Urtica dioica*), common figwort (*Scrophularia nodosa*), lesser celandine (*Ficaria verna*), foxglove (*Digitalis purpurea*), ivy (*Hedera helix*) and lady fern (*Athyrium filix-femina*).

In the southern part of the site, where bedrock occurs close to the surface, hart's-tongue fern (*Asplenium scolopendrium*) and lady fern were also recorded.



Plate 3: Recolonising Bare Ground (ED3) within the Proposed Development Site.

3.3.3.2 Spoil and Bare Ground (ED2)

Areas of spoil and bare ground are widespread throughout the Proposed Development site. These areas comprise exposed soil, compacted mud and localised deposits of coarse gravel resulting from previous vegetation clearance and ground disturbance.

The habitat was largely devoid of vegetation at the time of the ecological walkover survey, although recolonising vegetation was becoming established along its margins and in less frequently disturbed areas.



Plate 4: Spoil and Bare Ground (ED2) within the Proposed Development Site.

3.3.3.3 Scrub (WS1)

A small, localised area of scrub occurs in the southeastern part of the Proposed Development site. This comprises early successional scrub dominated by sycamore (*Acer pseudoplatanus*) and willow (*Salix* spp.) saplings, interspersed with dense bramble (*Rubus fruticosus* agg.).

Ground flora recorded within the scrub includes ivy, ribwort plantain and clover. Scrub vegetation also occurs locally along sections of the site boundary.



Plate 5: Scrub (WS1) within the Southeastern Part of the Proposed Development Site.

3.3.3.4 Buildings and Artificial Surfaces (BL3)

Two small derelict sheds are present within the application boundary. These comprise metal-clad and timber structures. A small area of concrete hardstanding is located adjacent to the smaller shed and is understood to have previously been used for access or parking.

Additional artificial surfaces include areas of compacted ground within the site and Pat Scarteen Road, which forms a linear artificial surface along the eastern boundary.

The assessment of the sheds for potential use by bats is presented separately in **Section 3.3.4.4**.



Plate 6: Buildings and Artificial Surfaces (BL3) within the Proposed Development Site.

3.3.3.5 Stone Walls and Other Stonework (BL1)

A low stone wall extends along sections of the southwestern site boundary, forming a boundary feature between the Proposed Development site and the adjoining woodland.

The wall is discontinuous in places, with sections exhibiting collapse or disrepair. Parts of the wall are partially covered by ivy. The wall does not form a continuous feature around the application boundary.



Plate 7: Stone Wall and Other Stonework (BL1) along the Southwestern Boundary.

3.3.3.6 Adjacent Mixed Broadleaved Woodland (WD2)

Mixed broadleaved woodland adjoins the southwestern boundary of the Proposed Development site. The woodland is primarily located outside the application red-line boundary and provides a continuous area of mature woody vegetation along the southwestern side of the site.

The woodland edge and associated vegetation create structural connectivity with the wider landscape. Its potential use by bats and other fauna is considered separately in **Section 3.3.4**.

3.3.3.7 Lissaniska 21 River – Depositing/Lowland River (FW2)

The Lissaniska 21 River is located close to the northern boundary of the Proposed Development site and lies outside the application red-line boundary. It flows southwest before joining the Finnihy River, which subsequently discharges to the Inner Kenmare River.

The surveyed sections of the Lissaniska 21 River comprise a narrow, shallow and predominantly low-gradient watercourse. The channel was generally dominated by glide habitat, with more limited riffle and pool habitat. Gravel was the principal substrate, together with cobble and localised deposits of sand and silt.

The upstream survey location had a mean wetted width of approximately 2.5m and a mean depth of approximately 0.2m. The downstream survey location was approximately 3m wide and 0.15m deep at the time of survey. Riparian shading ranged from moderate to high, with bank vegetation providing substantial cover along the surveyed reaches.

Aquatic vegetation was locally present, together with filamentous algae. Fine sediment had accumulated within slower-flowing sections and along channel margins. Evidence of previous channel modification and limited flow diversity was also recorded.

The aquatic habitats, macroinvertebrate communities and fish populations associated with the Lissaniska 21 and Finnihy rivers are described in **Section 3.3.4.2** and in the accompanying Aquatic Ecology and Fish Report.

Habitat Mapping and Annex I Habitats

A review of the available NPWS Article 17 habitat mapping determined that the Proposed Development site is not mapped as supporting any Annex I habitat. None of the habitats recorded within the application boundary were considered to correspond with an Annex I habitat type.

The distribution of habitats within and immediately adjoining the Proposed Development site is shown in **Figure 14**.

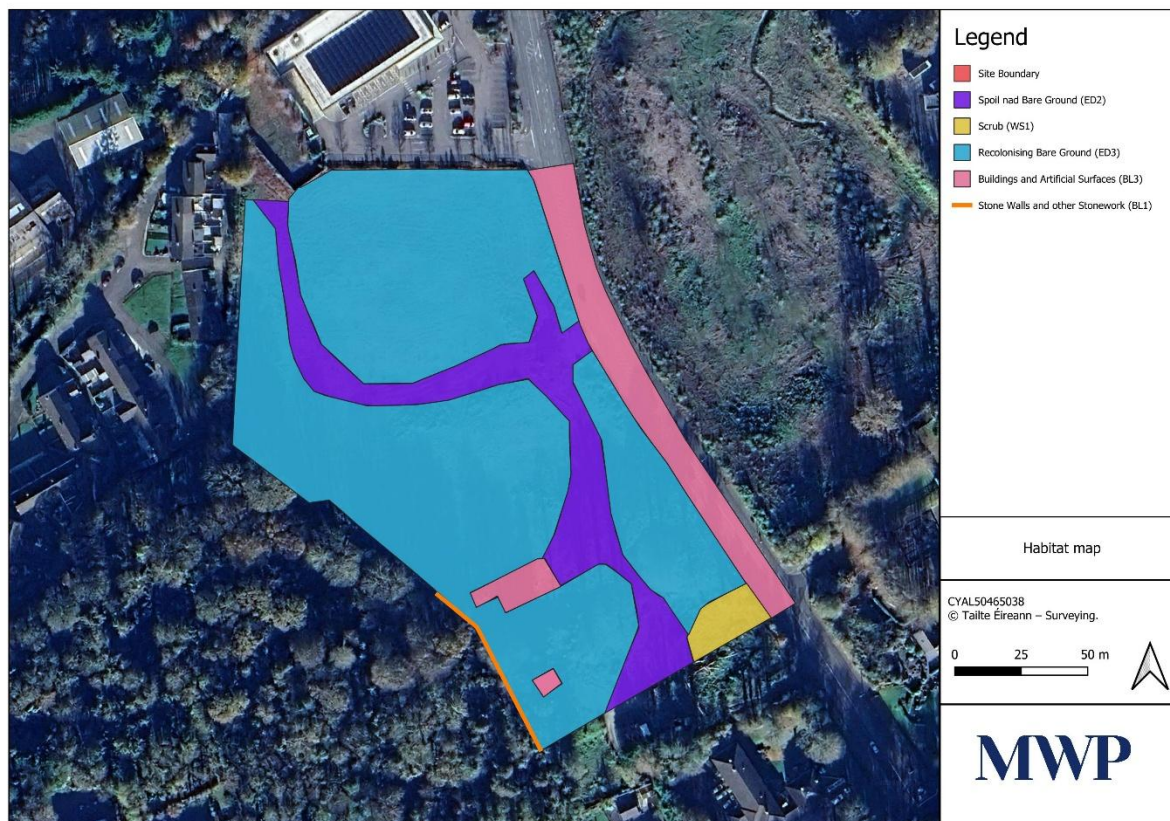


Figure 14: Habitat Map of the Proposed Development Site

3.3.4 Fauna

The desk study and field surveys considered the potential use of the Proposed Development site and surrounding habitats by protected and otherwise notable faunal species. Particular consideration was given to species associated with nearby Natura 2000 sites and to species that could use the Lissaniska 21 River, Finnihy River, adjoining woodland, buildings or other habitats within the study area.

The following subsections present the available baseline information for otter, aquatic macroinvertebrates, fish, birds and bats.

3.3.4.1 Otter

Otter (*Lutra lutra*) is listed on Annexes II and IV of the Habitats Directive and is protected in Ireland under the Wildlife Acts 1976–2022. Otter is also a qualifying interest of Kenmare River SAC (Site Code 002158).

The National Biodiversity Data Centre database contains a record of otter from the wider Kenmare area, approximately 480m west of the Proposed Development site within the Inner Kenmare River. This confirms the presence of the species within the wider receiving environment.

The Lissaniska 21 River and Finnihy River were examined for evidence of otter activity during the ecological and aquatic surveys. The surveys included searches of the watercourses and adjoining riparian habitats for:

- Holts and other potential breeding or resting sites;
- Couches and lying-up areas;
- Spraints;
- Footprints;
- Slides and regularly used access points;
- Feeding remains; and
- Other evidence of otter activity.

No holts, couches, spraints, footprints, feeding remains or other evidence of otter activity was recorded along the surveyed sections of the Lissaniska 21 or Finnihy rivers. No evidence was identified to indicate that the surveyed area supported an otter breeding or resting site at the time of survey.

The absence of field signs does not preclude occasional use of the watercourses by otter, as the species is highly mobile and may travel considerable distances through river catchments. The Lissaniska 21 River connects with the Finnihy River and Inner Kenmare River, providing aquatic connectivity with habitats used by otter within the wider Kenmare catchment.

The Proposed Development site itself does not contain a watercourse or other substantial aquatic habitat. Potential use by otter is therefore principally associated with the Lissaniska 21 River, the downstream Finnihy River and their adjoining riparian habitats.

3.3.4.2 Aquatic Habitats and Macroinvertebrates

Targeted aquatic surveys were undertaken within the Finnihy catchment on 6 June and 13 July 2026. Four survey locations were assessed, comprising two locations on the Lissaniska 21 River and two locations on the Finnihy River.

The survey locations were:

- Site 1: Lissaniska 21 River, approximately 0.15 river kilometres upstream of the Proposed Development site;
- Site 2: Lissaniska 21 River, approximately 0.23 river kilometres downstream of the Proposed Development site;
- Site 3: Finnihy River, approximately 0.59 river kilometres downstream of the Proposed Development site; and
- Site 4: Lower Finnihy River, approximately 0.89 river kilometres downstream of the Proposed Development site, within the tidally influenced reach adjoining the Kenmare Wastewater Treatment Plant outfall.

The locations surveyed by electrofishing are shown in **Figure 15**. Spot-check and River Hydromorphology Assessment Technique survey locations are shown previously in **Figure 1**.

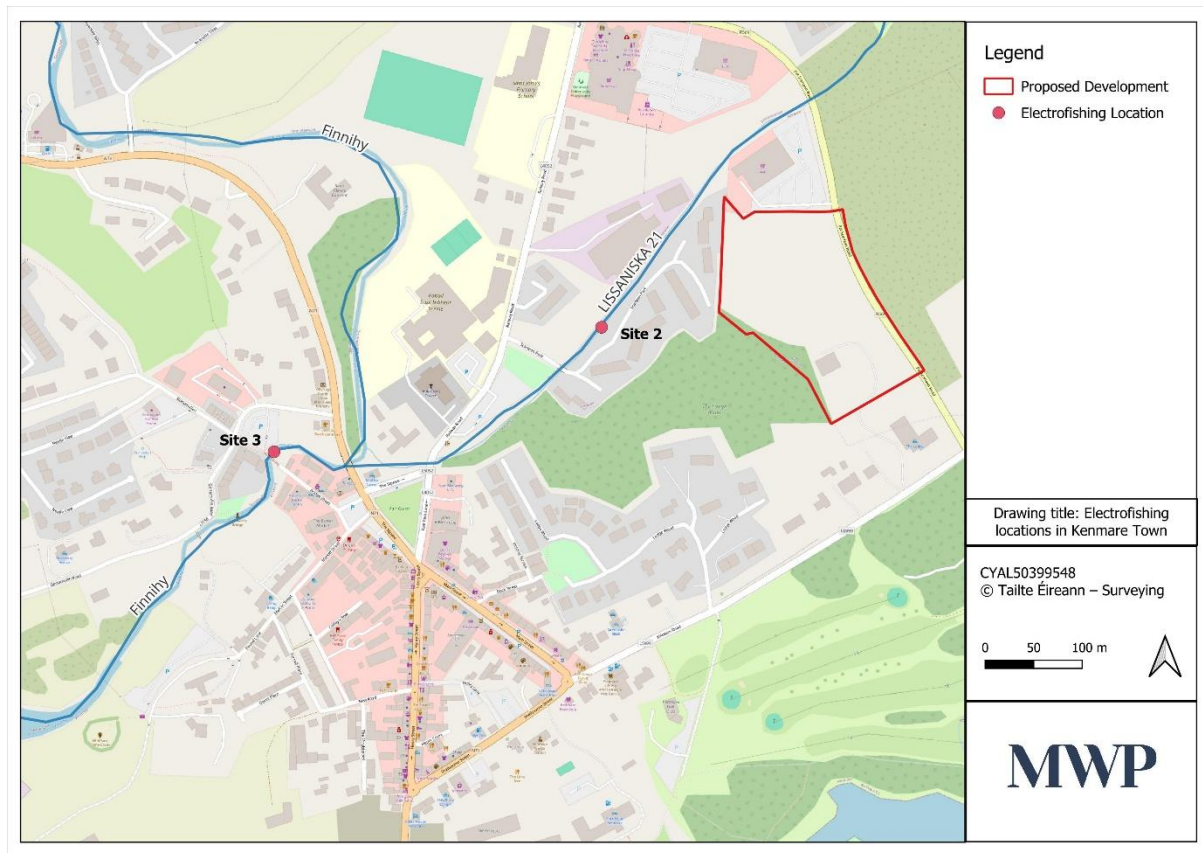


Figure 15: Electrofishing survey locations on the Lissaniska 21 and Finnihy rivers.

The aquatic survey programme included:

- River Hydromorphology Assessment Technique assessment of the Lissaniska 21 River;
- Hydromorphological spot checks of the lower Finnihy River;
- Physical aquatic-habitat assessment;
- Assessment of habitat suitability for fish and aquatic macroinvertebrates;
- Macroinvertebrate kick sampling and biological water-quality assessment; and
- Electrofishing at selected survey locations.

Lissaniska 21 River

The Lissaniska 21 River survey locations comprised a narrow, shallow and predominantly low-gradient watercourse.

Site 1 had a mean wetted width of approximately 2.5 m and a mean depth of approximately 0.2 m at the time of survey. The channel was strongly dominated by glide habitat, with limited riffle and pool habitat. Gravel formed the principal substrate, together with smaller proportions of cobble, sand and silt. Moderate deposits of fine sediment were present within the channel and along its margins. Riparian shading was approximately 40–50%, and the banks supported continuous vegetative cover.

Site 2 was approximately 3 m wide and had a mean depth of approximately 0.15 m. It was also predominantly glide-dominated, although a greater proportion of riffle habitat was present. The substrate comprised principally

gravel and cobble, with sand and silt present along the channel margins. Riparian shading was high, at approximately 90%, and the banks supported continuous vegetation.

The surveyed reaches exhibited evidence of historical channel modification and limited hydraulic diversity. Instream vegetation was locally present, together with filamentous algae. Fine sediment accumulation was recorded within slower-flowing sections and along channel margins.

Finnihey River

The Finnihey River survey locations were wider than those on the Lissaniska 21 River and generally supported greater flow and substrate diversity.

Site 3 was located within a partially tidally influenced reach in Kenmare town. It had a mean wetted width of approximately 5 m and a mean depth of approximately 0.15 m at the time of survey. The channel supported predominantly riffle habitat, together with glide habitat. Substrates were dominated by cobble and gravel, with localised boulder and fine-sediment deposits. The reach was periodically subject to saline intrusion during higher tides and periods of low freshwater flow.

Site 4 was situated within the lower, strongly tidally influenced reach of the Finnihey River. It had a mean wetted width of approximately 7 m and a mean depth of approximately 0.2 m at the time of survey. The channel was predominantly glide-dominated, with areas of riffle and pool habitat. Substrates comprised gravel, cobble, bedrock, boulder, sand and silt. The presence of marine and estuarine organisms confirmed the brackish character of this reach.

Macroinvertebrate Communities and Biological Water Quality

Macroinvertebrate kick sampling and biological water-quality assessments were completed at all four survey sites.

The recorded macroinvertebrate communities included mayflies, stoneflies, true flies, aquatic beetles, molluscs, crustaceans, annelids and other aquatic invertebrates. Community composition varied between survey locations in response to differences in flow, substrate, sediment deposition, shading and tidal influence.

The Lissaniska 21 River sites supported generally lower macroinvertebrate diversity and a greater proportion of pollution-tolerant taxa. The recorded assemblage reflected the predominance of slow-flowing glide habitat, fine-sediment deposition, limited hydraulic diversity and extensive algal growth.

Taxa recorded within the Lissaniska 21 River included:

- *Baetis rhodani*;
- *Leuctra* spp.;
- *Simulium* spp.;
- *Halplidae*;
- *Gammarus duebeni*;
- *Potamopyrgus antipodarum*; and
- *Erpobdella* sp.

The Finnihey River generally supported a more diverse macroinvertebrate community, particularly at Site 3, where cleaner coarse substrates and riffle habitat were present. Caddisfly families recorded at Site 3 included Limnephilidae, Glossosomatidae and Sericostomatidae.

Macroinvertebrate diversity declined within the lower tidally influenced reach at Site 4. Freshwater taxa were less abundant, while estuarine organisms, including Nereididae, reflected the regular influence of saline water.

Biological water-quality assessment assigned a rating of Q3–4, corresponding to Moderate Status, to each of the four surveyed locations. These results are consistent with the EPA’s 2024 biological monitoring results for the Finnihy River, which also recorded Q3–4 at the downstream monitoring stations.

The principal factors influencing aquatic habitat and macroinvertebrate communities within the surveyed watercourses were:

- Fine-sediment deposition;
- Nutrient enrichment;
- Extensive macrophyte and filamentous-algal growth;
- Limited flow diversity and historical channel modification within parts of the Lissaniska 21 River; and
- Tidal influence and saline intrusion within the lower Finnihy River.

3.3.4.3 Fish

Fish-habitat assessments were undertaken at all four aquatic survey locations on the Lissaniska 21 and Finnihy rivers. Electrofishing surveys were completed at Site 2 on the Lissaniska 21 River and Site 3 on the Finnihy River on 13 July 2026.

The electrofishing surveys were undertaken under the relevant authorisation issued pursuant to Section 14 of the Fisheries (Consolidation) Act 1959, as amended, and followed the methodology set out in Methods for the Water Framework Directive – Electric Fishing in Wadable Reaches (Central Fisheries Board, 2008).

A total of 28 fish representing three species were recorded:

- 20 brown trout (*Salmo trutta*);
- Six European eel (*Anguilla anguilla*); and
- Two three-spined stickleback (*Gasterosteus aculeatus*).

The fish recorded at each electrofishing location are summarised in **Table 5**.

Table 5: Fish Recorded during Electrofishing Surveys

Site location	Watercourse	Brown Trout	European eel	Three-spined stickleback	Total
Site 2	Lissaniska 21 River	12	1	2	15
Site 3	Finnihy River	8	5	0	13
Total	-	20	6	2	28

Brown Trout

Brown trout was the most frequently recorded fish species and was present at both electrofishing locations. Twelve individuals were recorded at Site 2 on the Lissaniska 21 River, while eight individuals were recorded at Site 3 on the Finnihy River.

Multiple size classes were recorded, with most individuals comprising juvenile fish. This indicates that both watercourses provide habitat used by juvenile brown trout.

The Lissaniska 21 River contained localised areas of gravel substrate with potential suitability for salmonid spawning. However, the predominance of slow-flowing glide habitat, fine-sediment deposition, channel

modification and algal growth reduced the overall quality of spawning and nursery habitat. Site 1 was assessed as unsuitable for salmonid spawning and nursery habitat, while Site 2 was assessed as marginal.

The Finnihy River at Site 3 supported cleaner gravel and cobble substrates and a greater proportion of riffle habitat. These physical characteristics provide potentially suitable salmonid spawning and nursery habitat. However, periodic tidal influence and saline intrusion within the lower river may reduce the suitability of this reach during certain conditions.

Atlantic Salmon

No Atlantic salmon (*Salmo salar*) were recorded during the electrofishing surveys. The Finnihy River and its tributaries nevertheless contain habitat that may be used by salmonids, including Atlantic salmon, particularly where clean gravel, cobble and riffle habitat occur.

The absence of Atlantic salmon from the survey catches does not confirm their absence from the wider Finnihy catchment because fish distribution can vary seasonally and in response to flow, water temperature and tidal conditions.

European Eel

European eel was recorded at both electrofishing locations. One individual was recorded at Site 2 on the Lissaniska 21 River, while five individuals were captured at Site 3 on the Finnihy River.

Additional eels were observed escaping capture between cobbles and boulders at Site 3. Consequently, eel abundance at this location is likely to have been underestimated.

Suitable eel habitat occurs throughout the Finnihy system, particularly where cobble and boulder substrates provide refuge. The lower Finnihy River is likely to be of particular importance because of its proximity and connectivity to the estuary and associated migratory routes.

Three-Spined Stickleback

Two three-spined sticklebacks were recorded at Site 2 on the Lissaniska 21 River. No three-spined sticklebacks were captured at Site 3.

Lamprey

No lamprey species were recorded during the targeted electrofishing surveys.

The Lissaniska 21 River contained localised deposits of fine sediment along the channel margins. However, these deposits were generally limited in extent and depth and were considered suboptimal for juvenile lamprey.

Parts of the Finnihy River may provide potentially suitable spawning habitat where clean gravel substrates occur. Suitable nursery habitat for ammocoetes was limited by the relative scarcity of stable deposits of fine sand and silt and by tidal influence within the lower reaches.

Representative fish recorded during the electrofishing survey are shown in **Plate 8**.



Plate 8: Juvenile Brown Trout and Three-Spined Stickleback Recorded at Site 2 on the Lissaniska 21 River.

3.3.4.4 Birds

A review of bird records available from the National Biodiversity Data Centre was undertaken for the 2km grid square V97A, within which the Proposed Development site is located. Records for 63 protected bird species were returned, including Annex I species and species classified as Red- or Amber-listed under the Birds of Conservation Concern in Ireland 2020–2026 (Gilbert et al., 2021).

The desk-study records relate to the wider 2km grid square and do not necessarily indicate that the recorded species use the Proposed Development site. The site does not contain extensive wetland, agricultural grassland or other habitat likely to support significant populations of waterbirds or specialised bird species.

All birds observed or heard during the ecological walkover survey were recorded. A total of ten species was recorded within the Proposed Development site or its immediate surroundings. These are listed in **Table 6**.

Table 6: Bird Species Recorded during the Ecological Walkover Survey.

Species	Scientific name	BoCCI
Blackbird	<i>Turdus merula</i>	Green-listed
Blue tit	<i>Cyanistes caeruleus</i>	Green-listed
Chaffinch	<i>Fringilla coelebs</i>	Green-listed
Great tit	<i>Parus major</i>	Green-listed
Hooded crow	<i>Corvus cornix</i>	Green-listed
Jackdaw	<i>Coloeus monedula</i>	Green-listed
Lesser black-backed gull	<i>Larus fuscus</i>	Amber-listed
Rook	<i>Corvus frugilegus</i>	Green-listed
Robin	<i>Erithacus rubecula</i>	Green-listed
Wren	<i>Troglodytes troglodytes</i>	Green-listed

Nine of the recorded species are Green listed under the Birds of Conservation Concern in Ireland. Lesser black-backed gull was the only, Amber-listed species recorded during the walkover survey.

Most bird activity was associated with the woodland and boundary vegetation adjoining the Proposed Development site or involved birds commuting across the site. Jackdaw, juvenile lesser black-backed gulls and hooded crow were observed foraging on disturbed ground within the site.

Previous vegetation clearance has substantially reduced the extent of potential nesting habitat within the application boundary. The recolonising bare ground and spoil habitats provide limited nesting opportunities but may be used opportunistically for foraging by common and widespread species.

The localised scrub in the southeastern part of the site and vegetation along the site boundaries provide some potential nesting habitat for common passerine birds. The adjoining mixed broadleaved woodland provides more extensive nesting, sheltering and foraging habitat for birds within the wider study area.

No evidence was recorded to indicate that the Proposed Development site supports a significant population of any Annex I, Red-listed or other specialised bird species. However, common nesting birds may use the remaining scrub, boundary vegetation and adjoining woodland during the breeding season.

3.3.4.5 Bats

A dedicated bat survey was undertaken by Green Leaf Ecology during the 2025 and 2026 bat survey seasons. The assessment included a review of existing bat records, habitat-suitability assessment, inspection of structures and trees for potential roost features, activity transects, passive detector monitoring and an emergence survey of a mature oak tree.

The bat survey study area extended beyond the application red-line boundary to include adjoining woodland, treelines, the Lissaniska 21 River corridor and other habitats potentially used by commuting and foraging bats.

Existing Bat Records

A review of National Biodiversity Data Centre records identified eight of the ten bat species known to occur in Ireland within 4km of the study area:

- Common pipistrelle (*Pipistrellus pipistrellus*);
- Soprano pipistrelle (*Pipistrellus pygmaeus*);
- Nathusius' pipistrelle (*Pipistrellus nathusii*);
- Leisler's bat (*Nyctalus leisleri*);
- Brown long-eared bat (*Plecotus auritus*);
- Daubenton's bat (*Myotis daubentonii*);
- Natterer's bat (*Myotis nattereri*); and
- Lesser horseshoe bat (*Rhinolophus hipposideros*).

Records of roosting soprano pipistrelle, brown long-eared bat and lesser horseshoe bat were identified within 4km of the study area.

Lesser horseshoe bat has previously been recorded roosting within the townlands of Kilmurry and Killowen. Consultation undertaken during preparation of the Bat Survey Report also identified two lesser horseshoe bat winter roosts within 1km of the study area. One of these supported more than 120 individuals during winter 2025/2026.

The bat landscape-association model indicates that the surrounding landscape has moderate-to-high suitability for most of the bat species considered, including lesser horseshoe bat.

Buildings and Other Potential Roost Features

Structures within the wider bat survey study area were inspected for features potentially suitable for roosting bats and for evidence of current or previous bat use.

A low concrete-slab bridge crosses the Lissaniska 21 River north of the Proposed Development site. The bridge has pointed parapets, and no potential bat-roost features were recorded within the structure.

A ruinous stone structure is located in the southeastern part of the wider bat survey study area. Its roof has collapsed, and its windows and doors are absent. Gaps within the stonework provide potential opportunities for individual bats or small numbers of bats to roost opportunistically. However, because the structure is open to the elements, it does not provide suitable conditions for a maternity or hibernation roost.

Gaps within a stone wall along the southern part of the bat survey study area also provide potential opportunities for individual bats or small numbers of bats to roost opportunistically.

No evidence confirming use of any inspected structure by roosting bats was recorded.

Trees and Potential Roost Features

Detailed ground-level inspections of trees were undertaken on 14 April and 5 December 2025. Trees were examined for potential roost features including cavities, knot holes, lifting bark, splits, hazard limbs, deadwood, rot holes and dense ivy cover.

Three trees supporting potential roost features were identified. These are summarised in **Table 7**.

Table 7: Trees Supporting Potential Bat-Roost Features

Tree reference	Species	PRF category	Potential roost features
PTR1	Oak	PRF-I	Lifting bark, hazard limb, deadwood and knot hole
PTR2	Ash	PRF-M	Heart rot
PTR3	Oak	PRF-I	Knot hole

PRF-I denotes a tree with potential roost features considered suitable for individual bats or small numbers of bats. PRF-M denotes a tree with potential roost features potentially suitable for multiple bats.

Several other trees along the study-area boundary supported ivy cover that could conceal potential roost features and may provide opportunities for individual bats to roost during warmer months.

No tree was confirmed as supporting a bat roost during the surveys.

The locations of the three trees are shown in **Figure 16**.



Figure 16: Potential Tree-Roost Features within the Bat Survey Study Area.

A dusk emergence survey of PTR1, the mature oak on the western boundary, was undertaken on 7 July 2026. The survey used a handheld bat detector and thermal-imaging equipment and commenced approximately 15 minutes before sunset, continuing until approximately 90 minutes after sunset.

No bats were recorded emerging from the oak during the survey.

Bat Activity Surveys

Five dusk activity transect surveys were undertaken:

- 19 April 2025;
- 22 August 2025;
- 20 September 2025;
- 22 April 2026; and
- 7 July 2026.

The surveys were undertaken using a handheld full-spectrum bat detector in suitable weather conditions. The transects sought to identify the species present, approximate levels of activity, foraging areas and commuting routes within the study area.

Common pipistrelle, soprano pipistrelle and Leisler's bat were regularly recorded during the transect surveys. Common and soprano pipistrelles were observed foraging along treelines and woodland-edge habitats, while Leisler's bats were recorded foraging and commuting above the site.

Lesser horseshoe bat was recorded during one transect along the western boundary of the study area.

During the April and August 2025 transects, common and soprano pipistrelles were recorded approximately 8–14 minutes after sunset, flying from a southerly direction along the woodland edge west of the site. The early timing and direction of these observations suggest the likely presence of a spring and summer pipistrelle roost within the surrounding area but outside the bat survey study-area boundary.

The Bat Survey Report does not provide a mapped activity-transect route. Accordingly, no separate transect map is included in this report.

Passive Monitoring

Passive monitoring was undertaken monthly between April and September 2025 and during April and July 2026. Anabat Swift detectors were deployed at five monitoring locations within or adjacent to woodland, treelines and other linear habitats.

Detectors recorded from approximately 30 minutes before sunset until sunrise for seven nights during each deployment. The passive-monitoring locations are shown in the figure previously included in the Assessment Methodology section.

Eight bat species were identified during passive monitoring:

- Common pipistrelle;
- Soprano pipistrelle;
- Leisler's bat;
- Brown long-eared bat;
- Natterer's bat;
- Whiskered bat;
- Daubenton's bat; and
- Lesser horseshoe bat.

Additional calls attributable to the *Myotis* genus and unidentified pipistrelle species were also recorded.

In 2025, a total of 100,733 bat passes was recorded. Common pipistrelle accounted for approximately 49% of recorded activity, soprano pipistrelle approximately 33%, Leisler's bat approximately 13% and lesser horseshoe bat approximately 4%.

During the April and July 2026 monitoring periods, a total of 10,589 bat passes was recorded. Common pipistrelle accounted for approximately 54% of activity, soprano pipistrelle approximately 29%, Leisler's bat approximately 10% and lesser horseshoe bat approximately 4%.

Common pipistrelle was the most frequently recorded species, followed by soprano pipistrelle and Leisler's bat. Brown long-eared bat was recorded across most of the study area, with its highest activity at PM1 in the southeastern part of the site.

Natterer's, whiskered and Daubenton's bats were recorded at comparatively low levels. Lesser horseshoe bat was recorded across the study area, with particularly high activity at PM2 and PM4 during July 2025.

Overall, the passive-monitoring surveys recorded a high level of bat activity and a diverse bat assemblage across the study area. Treelines, woodland edges and the woodland adjoining the western and southwestern boundaries were the principal habitats associated with commuting and foraging activity.

Lesser Horseshoe Bat

Lesser horseshoe bat is listed on Annexes II and IV of the Habitats Directive and is a qualifying interest of Kenmare River SAC and Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC.

The Proposed Development site is located approximately 0.55km east of Kenmare River SAC at its nearest point. NPWS site-specific conservation-objective mapping places the site outside the mapped potential foraging ranges associated with the lesser horseshoe bat winter colony at Dunkerron Souterrain and the summer roost at Foley's Cottage.

Notwithstanding this, passive monitoring confirmed use of the study area by lesser horseshoe bat throughout the 2025 and 2026 survey periods. Lesser horseshoe bat activity was recorded at each passive-monitoring location, with particularly high activity recorded at PM2 and PM4 during July 2025. The species was also recorded during one activity transect along the western boundary.

The adjoining woodland, woodland edges, treelines and river corridor provide sheltered linear features used by lesser horseshoe bats for commuting and foraging. Lesser horseshoe bats characteristically commute close to continuous vegetation and generally avoid exposed or brightly illuminated areas.

Two lesser horseshoe bat winter roosts are located within 1km of the study area, including one roost supporting more than 120 individuals during winter 2025/2026. Consequently, the lesser horseshoe bats recorded within the study area may be associated with a roost of international importance.

The existing Conservation Objectives mapping for lesser horseshoe bat in relation to Kenmare River SAC is presented in **Figure 17**.



Figure 17: Lesser Horseshoe Bat Potential Foraging Grounds and Mapped Foraging Range in Relation to the Proposed Development.

3.3.5 Invasive Alien Plant Species

3.3.5.1 Desk Study

The desk study included a review of available National Biodiversity Data Centre records for invasive and non-native plant species within hectad V97. Particular consideration was given to species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011, as amended).

Desk-study records relate to the wider hectad and do not necessarily indicate the presence of the recorded species within the Proposed Development site.

3.3.5.2 Field Survey Results

Two invasive or non-native plant species were recorded within the Proposed Development site during the ecological walkover survey:

- Butterfly-bush (*Buddleja davidii*); and
- Traveller's joy, also known as old man's beard (*Clematis vitalba*).

Both species are classified as Medium Risk invasive species by the National Biodiversity Data Centre. Their distribution within the study area is summarised in **Table 8**.

Table 8: Invasive and Non-native Plant Species Recorded within the Proposed Development Site.

Species	Scientific name	Risk classification	Distribution
Butterfly bush	<i>Buddleja davidii</i>	Medium Risk	The most widespread invasive plant recorded, occurring across disturbed areas and particularly along the site boundaries.
Traveller's joy/old man's beard	<i>Clematis vitalba</i>	Medium Risk	Recorded primarily along site boundaries, with notable concentrations along the northwestern boundary.

Neither butterfly-bush nor traveller's joy is listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended.

No invasive alien plant species listed on the Third Schedule were recorded within the Proposed Development site.

3.3.5.3 Butterfly bush

Butterfly-bush was the most widespread invasive plant recorded during the ecological walkover survey. It occurred within areas of previously disturbed ground and along several sections of the site boundary.

The species readily colonises disturbed, unvegetated and artificial substrates and may spread through the production and dispersal of numerous wind-borne seeds. Ground disturbance, vegetation clearance and the movement of soil or construction materials could facilitate its dispersal within or beyond the Proposed Development site if not appropriately managed.

3.3.5.4 Traveller's Joy/Old Man's Beard

Traveller's joy, also known as old man's beard, was recorded primarily along the boundaries of the Proposed Development site, with notable concentrations along the northwestern boundary.

The species is a vigorous climbing plant that can spread across shrubs, fencing and other boundary vegetation. Disturbance or movement of soil and vegetation containing viable plant material could facilitate its spread during construction.

Representative examples of butterfly-bush and traveller's joy are shown in **Plate 9**.



Plate 9: Butterfly-Bush along the Stone Wall and Traveller's Joy along Boundary Fencing.

3.3.5.5 Rhododendron outside the Proposed Development Site

Rhododendron (*Rhododendron ponticum*) was recorded on a landscaped earth bank within the Scarteen Park residential estate, northwest of and outside the Proposed Development site and study-area boundary.

Rhododendron is listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. However, it was not recorded within the application red-line boundary during the ecological walkover survey.

Identification of Other Projects or Plans or Activities

3.4 Identification of Other Projects or Plans or Activities

3.4.1 Introduction

An in-combination effect may arise where the effects of a project interact with those of other plans, projects or ongoing activities. A review was undertaken to identify relevant plans, permitted or proposed developments, licensed facilities and existing activities within the surrounding area.

The plans, projects, facilities and activities identified are presented in the following subsections. Their potential to act in combination with the Proposed Development is considered in **Section 3.4.6** and, where relevant, within the Stage 2 assessment.

3.4.2 Plans

Plans considered relevant to the Proposed Development and surrounding area include:

- Kerry County Development Plan 2022–2028;

- Kerry County Biodiversity Action Plan 2022–2028;
- Kenmare Municipal District Local Area Plan 2024–2030;
- Kerry County Council Local Authority Climate Action Plan 2024–2029;
- River Basin Management Plan for Ireland 2022–2027; and
- Ireland’s 4th National Biodiversity Action Plan 2023–2030.

3.4.3 Permitted and Proposed Developments

A search of Kerry County Council’s online planning records and publicly available records from An Coimisiún Pleanála was undertaken to identify relevant permitted and proposed developments within the vicinity of the Proposed Development site.

The identified developments are presented in **Table 9**. Their potential to act in combination with the Proposed Development is considered separately in Section 3.4.6 and, where relevant, within the Stage 2 assessment.

Table 9: Permitted and Proposed Developments within the Vicinity of the Proposed Development Site.

Application reference	Applicant	Location	Proposed development
PL08.320798 / 23/60456	Martin Arthur	Reenagappul, Kenmare, County Kerry	Construction of a motorhome park comprising individual pitches, boundary fencing and all associated site works.
PL08.313364 / 22/55	Uisce Éireann	Kenmare Wastewater Treatment Plant, Kenmare, County Kerry	Upgrade and increase in capacity of the wastewater treatment plant and all associated site-development works. A Natura Impact Statement accompanied the application.
23/212	Micheal and Kerry Healy	Killowen, Kenmare, County Kerry	Construction of a dwelling house and garage, together with a private pumping station discharging to the public sewer and all associated services and site works.

3.4.4 EPA Licenced/Registered Facilities

A review of the Environmental Protection Agency’s online licensing register was undertaken to identify EPA-licensed or registered facilities within 5 km of the Proposed Development site. One waste-licensed facility was identified, as presented in **Table 10**.

Table 10: EPA-Licensed/Registered Facility within 5km of the Proposed Development Site.

Name	Active licence type	Active license number	Location relative to the Proposed Development site
Kenmare Transfer Station	Waste	W0086-01	Approximately 3.6 km northwest

The closest urban wastewater treatment plant with an active Wastewater Discharge Authorisation is presented in **Table 11**.

Table 11: Closest Urban Wastewater Treatment Plant with an Active Waste Water Discharge Authorisation.

Name	Active license number	Plant equivalent (P.E.)	population	Location relative to the Proposed Development site
Kenmare Wastewater Treatment Plant	D0184-01	5,176		Approximately 900 m southwest

3.4.5 Existing Land Uses and Ongoing Activities

The Proposed Development site is not currently subject to an active agricultural, residential, industrial or commercial use.

Pat Scarteen Road extends along the eastern boundary of the site and is subject to ongoing vehicular, pedestrian and cycle movements. The Scarteen Park residential development and other established residential areas are present east of the site. Commercial development is located to the north.

Mixed broadleaved woodland adjoins the southwestern boundary, while recreational land associated with Kenmare Golf Club is present to the south and southeast. The Lissaniska 21 River flows close to the northern boundary and continues southwest towards its confluence with the Finnihy River.

Existing land uses and ongoing activities within the wider surrounding area include:

- Residential occupation and associated domestic activity;
- Commercial activity within Kenmare town;
- Vehicular, pedestrian and cycle movements on the surrounding road network;
- Recreational activity associated with Kenmare Golf Club and other amenity areas;
- Woodland, vegetation and landscape management;
- Operation and maintenance of public water, foul-water, surface-water, electricity and telecommunications infrastructure;
- Operation of Kenmare Wastewater Treatment Plant;
- Waste handling at Kenmare Transfer Station; and
- Agricultural activity within the wider Finnihy catchment.

3.4.6 Potential for Significant In-combination Effects

Having regard to the nature, scale and location of the Proposed Development and applying the precautionary principle, the potential for significant effects arising in combination with other plans, projects and ongoing activities cannot be excluded at this stage.

Potential in-combination pathways include:

- Construction-related surface-water runoff or accidental pollution entering the Lissaniska 21 River, Finnihy River and downstream Inner Kenmare River;
- Incremental foul-water loading associated with developments connecting to Kenmare Wastewater Treatment Plant;
- Operational surface-water discharges to the Lissaniska 21 River;
- Increased artificial lighting, noise and human activity within the wider area; and
- Incremental alteration or disturbance of habitats used by commuting and foraging bats, including lesser horseshoe bat.

The potential for significant in-combination effects is considered further within the subsequent Stage 1 screening assessment and, where relevant, within the Stage 2 Natura Impact Statement.

3.5 Identification of European Sites Located Within the Zone of Potential Impact

3.5.1 Zone of Influence

European sites comprise Special Areas of Conservation (SACs) designated under the Habitats Directive and Special Protection Areas (SPAs) designated under the Birds Directive. Collectively, these sites form the Natura 2000 network.

The Zone of Influence (ZOI) for the Proposed Development is the geographical area over which biophysical changes arising from its construction or operation could affect the qualifying interests (QIs) or special conservation interests (SCIs) of a European site.

To establish which European sites are located within the ZOI, the Source–Pathway–Receptor (SPR) model was applied during Stage 1 screening. According to the Office of the Planning Regulator guidance, a European site will only be at risk of likely significant effects where an SPR linkage exists between the Proposed Development and the European site (OPR, 2021).

The SPR model considers:

- The nature, scale and location of the Proposed Development and the activities capable of acting as a source of direct or indirect ecological effects;
- The presence of a pathway, such as a watercourse, drainage network or habitat corridor used by a mobile qualifying-interest species, through which an effect could reach a European site or its qualifying interests; and
- The location, nature and sensitivity of the receptor, comprising the European site and its QI habitats or species or SCIs, having regard to the site's conservation objectives.

Where no complete SPR linkage exists, the European site is considered to lie outside the ZOI and is not considered further. Where a credible pathway exists or uncertainty remains, the European site is considered to lie within the ZOI and is carried forward for further assessment.

The European sites considered in establishing the ZOI are shown in **Figure 18**. Their QIs or SCIs, approximate distances from the Proposed Development and the findings of the SPR assessment are presented in **Table 12**

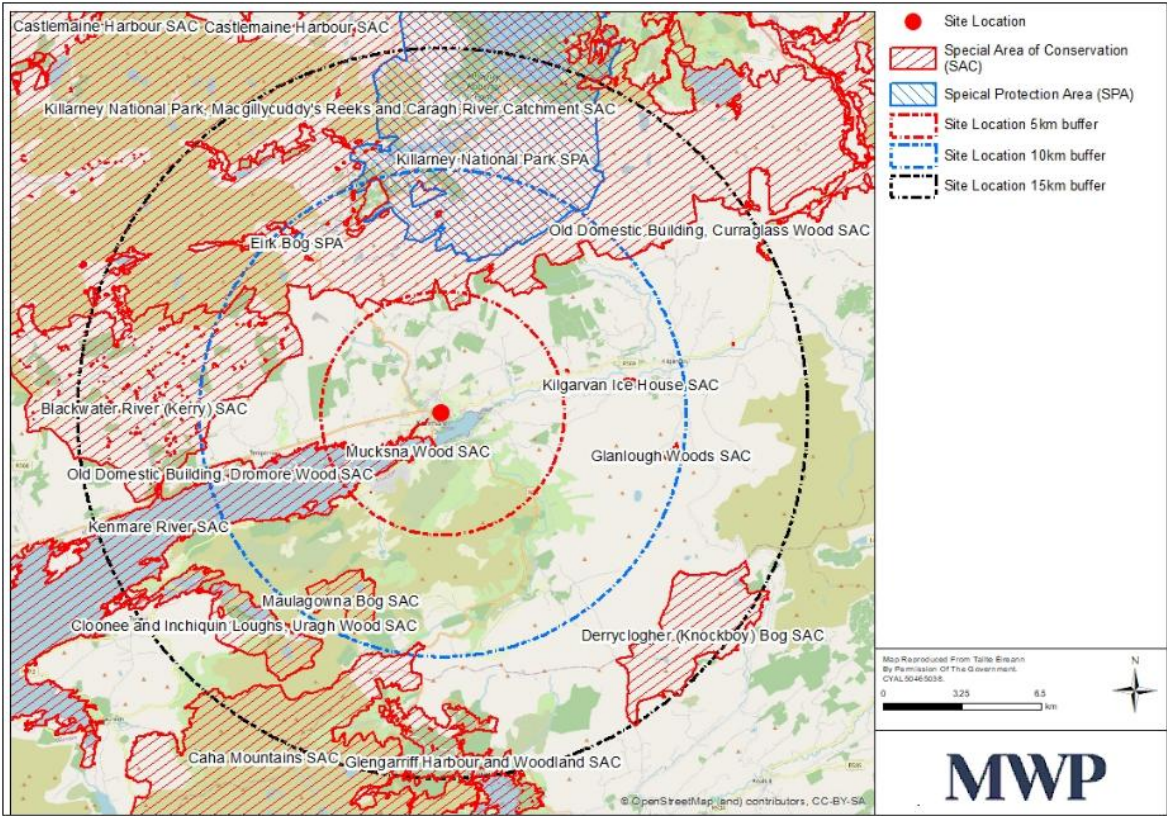


Figure 18: European Sites Considered in Establishing the Zone of Influence.

Table 12: European sites potentially located within the ZOI of the Proposed Development, details of their qualifying-interest species and/or habitats, distance from the Proposed Development site and, using the SPR framework, identification of the European sites located within the ZOI

Designated site	Qualifying features of conservation interest	Approximate distance from the Proposed Development site	Located within the ZOI?
Kenmare River SAC (002158)	- Large shallow inlets and bays [1160] - Reefs [1170] - Perennial vegetation of stony banks [1220] - Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] - Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330] - Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410] - Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120] - Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130] - European dry heaths [4030] <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] - Calaminarian grasslands of the <i>Violetalia calaminariae</i> [6130] - Submerged or partially submerged sea caves [8330] <i>Vertigo angustior</i> (Narrow-mouthed Whorl Snail) [1014] <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] <i>Phocoena phocoena</i> (Harbour Porpoise) [1351] <i>Lutra lutra</i> (Otter) [1355] <i>Phoca vitulina</i> (Harbour Seal) [1365]	Approximately 0.5km southwest	Yes – there is no spatial overlap between the Proposed Development and the SAC and, therefore, no direct land-take within the SAC will occur. However, a viable hydrological connection exists through the proposed surface-water drainage system and headwall outfall to the Lissaniska 21 River. The Lissaniska 21 River joins the Finnihy River, which subsequently discharges to the Inner Kenmare River within the SAC. An additional indirect hydrological connection exists through the proposed connection to the public foul-water network. Foul wastewater will be conveyed to Kenmare Wastewater Treatment Plant for treatment before discharge to the Finnihy and Inner Kenmare River receiving environment. Lesser horseshoe bat was also recorded commuting and foraging within the bat survey study area. Woodland, woodland-edge and treeline habitats adjoining the Proposed Development provide habitat used by the species. Accordingly, complete hydrological and ecological SPR linkages cannot be excluded and the SAC is located within the ZOI.

Designated site	Qualifying features of conservation interest	Approximate distance from the Proposed Development site	Located within the ZOI?
Mucksna Wood SAC (001371)	Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> [91A0]	Approximately 1.4km southwest	No – there is no spatial overlap between the Proposed Development and the SAC, and no hydrological or other ecological connection has been identified between the Proposed Development and the qualifying woodland habitat. The effects associated with the construction and operation of the Proposed Development will be localised and will not extend to the SAC. No complete SPR linkage exists, and the SAC is outside the ZOI.
Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (000365)	- Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110] - Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or <i>Isoeto-Nanojuncetea</i> [3130] - Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation [3260] - Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] - European dry heaths [4030] - Alpine and Boreal heaths [4060] <i>Juniperus communis</i> formations on heaths or calcareous grasslands [5130] - Calaminarian grasslands of the <i>Violetalia calaminariae</i> [6130] - Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410] - Blanket bogs (* if active bog) [7130] - Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	Approximately 4.7km north	Yes, in respect of lesser horseshoe bat – there is no spatial or hydrological connection between the Proposed Development and the SAC habitats or aquatic QIs. However, lesser horseshoe bat was recorded commuting and foraging within the bat survey study area, including along woodland-edge and treeline habitats adjoining the Proposed Development. Applying the precautionary principle, a potential ecological connection associated with this mobile QI species cannot be excluded at this stage. The SAC is therefore considered to lie within the ZOI in respect of lesser horseshoe bat only. No viable pathway has been identified in respect of the remaining QIs.

Designated site	Qualifying features of conservation interest	Approximate distance from the Proposed Development site	Located within the ZOI?
	• Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0] • Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] • <i>Taxus baccata</i> woods of the British Isles [91J0] • <i>Geomalacus maculosus</i> (Kerry Slug) [1024] • <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] • <i>Euphydryas aurinia</i> (Marsh Fritillary) [1065] • <i>Petromyzon marinus</i> (Sea Lamprey) [1095] • <i>Lampetra planeri</i> (Brook Lamprey) [1096] • <i>Lampetra fluviatilis</i> (River Lamprey) [1099] • <i>Salmo salar</i> (Salmon) [1106] • <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] • <i>Lutra lutra</i> (Otter) [1355] • <i>Najas flexilis</i> (Slender Naiad) [1833] • <i>Alosa fallax killarnensis</i> (Killarney Shad) [5046] • <i>Vandenboschia speciosa</i> (Killarney Fern) [6985]		
Killarney National Park SPA (004038)	• Merlin (<i>Falco columbarius</i>) [A098] • Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]	Approximately 6.8km north	No – the Proposed Development site does not provide suitable supporting habitat for Greenland white-fronted goose or important breeding or foraging habitat for merlin. No hydrological or functional ecological connection between the Proposed Development and the SPA or its SCIs has been identified. No complete SPR linkage exists and the SPA is outside the ZOI.

Designated site	Qualifying features of conservation interest	Approximate distance from the Proposed Development site	Located within the ZOI?
Blackwater River (Kerry) SAC (002173)	- European dry heaths [4030] <i>Geomalacus maculosus</i> (Kerry Slug) [1024] <i>Margaritifera margaritifera</i> (Freshwater Pearl Mussel) [1029] <i>Salmo salar</i> (Salmon) [1106] <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] <i>Lutra lutra</i> (Otter) [1355]	Approximately 6.2km northwest	No – the SAC is situated within a separate surface-water catchment, and no hydrological connection exists between the Proposed Development and the SAC. No evidence has been identified to indicate that habitats within or adjoining the Proposed Development are functionally linked to the QI populations of this SAC. No complete SPR linkage exists and the SAC is outside the ZOI.
Maulagowna Bog SAC (001881)	Blanket bogs (* if active bog) [7130]	Approximately 7.2km southwest	No – there is no spatial, hydrological or ecological connection between the Proposed Development and the qualifying blanket-bog habitat. No complete SPR linkage exists and the SAC is outside the ZOI.
Kilgarvan Ice House SAC (000364)	<i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]	Approximately 7.4km east	No – the Proposed Development is beyond the relevant core foraging range of the designated lesser horseshoe bat roost. No functional habitat or commuting connection between the Proposed Development and the designated roost has been identified. No complete SPR linkage exists and the SAC is outside the ZOI.
Old Domestic Building, Dromore Wood SAC (000353)	<i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]	Approximately 7.9km west	No – the Proposed Development is beyond the relevant core foraging range of the designated lesser horseshoe bat roost. No functional habitat or commuting connection between the Proposed Development and the designated roost has been identified. No complete SPR linkage exists and the SAC is outside the ZOI.
Eirk Bog SPA (004108)	Greenland White-fronted Goose (<i>Anser albifrons flavirostris</i>) [A395]	Approximately 9km north	No – the Proposed Development site does not contain suitable supporting habitat for Greenland white-fronted goose. No hydrological or functional ecological connection with the SPA has been identified. No complete SPR linkage exists and the SPA is outside the ZOI.

Designated site	Qualifying features of conservation interest	Approximate distance from the Proposed Development site	Located within the ZOI?
Glanlough Woods SAC (002315)	• <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]	Approximately 9km east	No – the Proposed Development is beyond the relevant core foraging range of the designated lesser horseshoe bat roost. No functional habitat or commuting connection between the Proposed Development and the designated roost has been identified. No complete SPR linkage exists and the SAC is outside the ZOI.
Caha Mountains SAC (000093)	• Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110] • Natural dystrophic lakes and ponds [3160] • Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] • European dry heaths [4030] • Alpine and Boreal heaths [4060] • Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] • Blanket bogs (* if active bog) [7130] • Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) [8110] • Calcareous rocky slopes with chasmophytic vegetation [8210] • Siliceous rocky slopes with chasmophytic vegetation [8220] • <i>Geomalacus maculosus</i> (Kerry Slug) [1024] • <i>Vandenboschia speciosa</i> (Killarney Fern) [6985]	Approximately 9.4km south	No – there is no spatial, hydrological or ecological connection between the Proposed Development and the SAC or its QIs. No complete SPR linkage exists and the SAC is outside the ZOI.
Cloonee and Inchiquin Loughs, Uragh Wood SAC (001342)	• Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110] • Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010] • European dry heaths [4030] • Siliceous rocky slopes with chasmophytic vegetation [8220]	Approximately 10.8km southwest	No – there is no hydrological connection between the Proposed Development and the SAC. The Proposed Development is beyond the relevant core foraging range of its lesser horseshoe bat population, and no functional ecological connection has been identified for that or any other QI. No complete SPR linkage exists and the SAC is outside the ZOI.

Designated site	Qualifying features of conservation interest	Approximate distance from the Proposed Development site	Located within the ZOI?
	• Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] • <i>Geomalacus maculosus</i> (Kerry Slug) [1024] • <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] • <i>Najas flexilis</i> (Slender Naiad) [1833] • <i>Vandenboschia speciosa</i> (Killarney Fern) [6985]		
Derryclogher (Knockboy) Bog SAC (001873)	• Blanket bogs (* if active bog) [7130]	Approximately 11.5km southeast	No – there is no spatial, hydrological or ecological connection between the Proposed Development and the qualifying blanket-bog habitat. No complete SPR linkage exists and the SAC is outside the ZOI.
Glengarriff Harbour and Woodland SAC (000090)	• Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] • Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (<i>Alno-Padion</i>, <i>Alnion incanae</i>, <i>Salicion albae</i>) [91E0] • <i>Geomalacus maculosus</i> (Kerry Slug) [1024] • <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303] • <i>Lutra lutra</i> (Otter) [1355] • <i>Phoca vitulina</i> (Harbour Seal) [1365]	Approximately 14km south	No – there is no hydrological connection between the Proposed Development and the SAC. The Proposed Development is beyond the relevant core foraging range of its lesser horseshoe bat population, and no functional ecological connection has been identified for that or any other QI. No complete SPR linkage exists and the SAC is outside the ZOI.
Old Domestic Building, Curraglass Wood SAC (002041)	• <i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]	Approximately 14.1km northeast	No – the Proposed Development is beyond the relevant core foraging range of the designated lesser horseshoe bat roost. No functional habitat or commuting connection between the Proposed Development and the designated roost has been identified. No complete SPR linkage exists and the SAC is outside the ZOI.

3.5.1.1 European Sites Located Outside the ZOI

Having regard to the information presented in **Table 12**, the following European sites are considered to lie outside the ZOI of the Proposed Development described in **Section 3.2** and will not be considered further in this Screening for Appropriate Assessment:

- Mucksna Wood SAC (001371);
- Killarney National Park SPA (004038);
- Blackwater River (Kerry) SAC (002173);
- Maulagowna Bog SAC (001881);
- Kilgarvan Ice House SAC (000364);
- Old Domestic Building, Dromore Wood SAC (000353);
- Eirk Bog SPA (004108);
- Glanlough Woods SAC (002315);
- Caha Mountains SAC (000093);
- Cloonee and Inchiquin Loughs, Uragh Wood SAC (001342);
- Derryclogher (Knockboy) Bog SAC (001873);
- Glengarriff Harbour and Woodland SAC (000090); and
Old Domestic Building, Curraglass Wood SAC (002041).

3.5.1.2 European Sites Located Within the ZOI

Having regard to the information presented in **Table 12**, the following European sites are considered to be located within the ZOI of the Proposed Development described in Section 3.2 and will be assessed further in this Screening for Appropriate Assessment:

- Kenmare River SAC (002158); and
- Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC (000365).

Further assessment of Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC is limited to the potential ecological pathway associated with lesser horseshoe bat (*Rhinolophus hipposideros*). No viable SPR linkage was identified in respect of the remaining QIs of that SAC.

3.5.2 Conservation Objectives

According to the Habitats Directive, the conservation status of a natural habitat will be taken as 'favourable' within its biogeographic range when:

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

According to the Habitats Directive, the conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations. The conservation status will be taken as 'favourable' within its biogeographical range when:

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

Individual conservation objectives for each site listed in Tables 2 and 3 above are available on www.npws.ie.

Site-specific conservation objectives were available for the following sites:

- Kenmare River SAC (Site Code IE0002158), NPWS Conservation Objectives, accessed [12/04/2026]
- Mucksna Wood SAC (Site Code IE0001371), NPWS Conservation Objectives, accessed [20/04/2026]
- Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC (Site Code IE0000365), NPWS Conservation Objectives, accessed [12/04/2026]
- Killarney National Park SPA (Site Code IE0004038), NPWS Conservation Objectives, accessed [12/04/2026]
- Eirk Bog SPA (Site Code IE0004108), NPWS Conservation Objectives, accessed [20/04/2026]
- Maulagowna Bog SAC (Site Code IE0001881), NPWS Conservation Objectives, accessed [12/04/2026]
- Kilgarvan Ice House SAC (Site Code IE0000364), NPWS Conservation Objectives, accessed [12/04/2026]
- Blackwater River (Kerry) SAC (Site Code IE0002173), NPWS Conservation Objectives, accessed [12/04/2026]
- Old Domestic Building, Dromore Wood SAC (Site Code IE0000353), NPWS Conservation Objectives, accessed [12/04/2026]
- Glanlough Woods SAC (Site Code IE0002315), NPWS Conservation Objectives, accessed [12/04/2026]
- Caha Mountains SAC (Site Code IE0000093), NPWS Conservation Objectives, accessed [12/04/2026]
- Cloonee and Inchiquin Loughs, Uragh Wood SAC (Site Code IE0001342), NPWS Conservation Objectives, accessed [20/04/2026]

- Derryclogher (Knockboy) Bog SAC (Site Code IE0001873), NPWS Conservation Objectives, accessed [20/04/2026]
- Glengarriff Harbour and Woodland SAC (Site Code IE0000090), NPWS Conservation Objectives, accessed [20/04/2026]
- Old Domestic Building, Curraglass Wood SAC (Site Code IE0002041), NPWS Conservation Objectives, accessed [20/04/2026]

The conservation objectives for these sites were used to inform the assessment of potential effects, with particular regard to the conservation of qualifying habitats and species, and the maintenance of the ecological integrity of each site.

3.6 Assessment of Significance of Potential Impacts

This section considers the European sites identified in **Section 3.5** as being located within the Zone of Influence (ZOI) of the Proposed Development, together with the potential ecological impacts identified above, and determines whether the Proposed Development is likely to have significant effects on those European sites.

The evaluation takes cognisance of the nature, size and scale of the Proposed Development, its location relative to the European sites, the potential impact pathways identified through the Source-Pathway-Receptor (SPR) model and the sensitivity of the relevant qualifying interests.

As outlined in **Section 2.1**, the likelihood of significant effects arising as a result of the Proposed Development is assessed under the following indicators:

- Water quality;
- Habitat loss/alteration;
- Disturbance and/or displacement of species; and
- Habitat or species fragmentation.

The potential for significant cumulative or in-combination effects is assessed in **Section 3.6.5**.

3.6.1 Water Quality

The Proposed Development site does not spatially overlap with any European site and no EPA-registered watercourse traverses the site. The Lissaniska 21 River is located approximately 22m north of the Proposed Development site and flows into the Finnihy River, which subsequently discharges to the Kenmare River. An indirect hydrological connection therefore exists between the Proposed Development and Kenmare River SAC (002158).

During construction, and in the absence of pollution-prevention controls, site clearance, earthworks, excavations, the handling and storage of materials and the operation of construction plant could generate sediment-laden runoff or result in the accidental release of hydrocarbons, concrete, cementitious materials or other potentially polluting substances. Such contaminants could enter the Lissaniska 21 River through overland flow or the site drainage network and subsequently reach the Finnihy River and Kenmare River SAC.

During operation, surface-water runoff from roads, parking areas and other hardstanding will be discharged at a controlled rate through the proposed surface-water drainage system to the Lissaniska 21 River. Foul wastewater generated by the Proposed Development will also be conveyed through the public sewerage network for treatment at Kenmare Wastewater Treatment Plant, from which treated effluent is discharged to the Kenmare

River receiving environment. These arrangements provide indirect pathways through which the Proposed Development could potentially affect water quality within Kenmare River SAC.

A deterioration in water quality could result in indirect effects upon water-dependent qualifying habitats and species of Kenmare River SAC. No corresponding hydrological pathway has been identified between the Proposed Development and Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (000365).

Consequently, in the absence of mitigation and applying the precautionary principle, it cannot be objectively concluded at the screening stage that the construction or operation of the Proposed Development will not result in likely significant effects on Kenmare River SAC through deterioration of water quality. Further assessment is therefore required.

3.6.2 Habitat loss/alteration

There is no spatial overlap between the Proposed Development site and either Kenmare River SAC (002158) or Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (000365). Consequently, the Proposed Development will not result in the direct loss or alteration of any qualifying habitat situated within either European site.

Habitat loss arising from the Proposed Development will be confined to the application site. The habitats affected predominantly comprise disturbed and modified habitats, including recolonising bare ground, dry meadows and grassy verges, scrub and buildings and artificial surfaces. Nevertheless, the site and its immediate surroundings contain woodland-edge habitat, mature trees and vegetated linear features that may provide foraging and commuting habitat for bats.

Lesser Horseshoe Bat (*Rhinolophus hipposideros*) is a qualifying interest of both Kenmare River SAC and Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC. The bat surveys recorded Lesser Horseshoe Bat activity within the study area and identified the use of habitats within and adjoining the Proposed Development site by the species. Accordingly, the removal, alteration or illumination of habitat features used for commuting or foraging could reduce their ecological function or disrupt connectivity within the wider landscape.

An indirect pathway for alteration of water-dependent habitats within Kenmare River SAC also exists through the Lissaniska 21 River and Finnihy River. As established in **Section 3.6.1**, a deterioration in water quality during either construction or operation could indirectly alter aquatic, estuarine or coastal habitats for which Kenmare River SAC is designated.

Consequently, in the absence of mitigation and applying the precautionary principle, it cannot be objectively concluded at the screening stage that the Proposed Development will not result in likely significant effects through the indirect loss or alteration of habitats supporting the qualifying interests of Kenmare River SAC or Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC. Further assessment is therefore required.

3.6.3 Disturbance and/or displacement of species

The Proposed Development site is located outside Kenmare River SAC (002158) and Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (000365). Consequently, construction activities will not result in direct disturbance or displacement of qualifying species within the boundaries of either European site.

An indirect hydrological pathway exists between the Proposed Development and Kenmare River SAC via the Lissaniska 21 River and Finnihy River. In the absence of pollution-prevention controls, the release of sediment or other contaminants during construction or operation could affect water quality and consequently disturb or displace aquatic qualifying species using downstream receiving waters.

Lesser Horseshoe Bat (*Rhinolophus hipposideros*) is a qualifying interest of both European sites carried forward for assessment. Lesser Horseshoe Bat activity was recorded within the study area during the bat surveys, demonstrating that the species uses habitats within the vicinity of the Proposed Development.

During construction, temporary lighting, noise, vibration, vegetation clearance, construction traffic and increased human activity could disturb Lesser Horseshoe Bats using the site and adjoining woodland-edge and linear habitats for commuting or foraging. These activities could result in the temporary avoidance of affected habitat or displacement onto alternative commuting and foraging routes.

During operation, artificial lighting, increased traffic and human activity could permanently alter the suitability of retained and adjoining habitats for this light-sensitive species. In particular, illumination of woodland edges, mature trees or other vegetated features could disrupt commuting behaviour and reduce the availability or effectiveness of foraging habitat.

Consequently, in the absence of mitigation and applying the precautionary principle, it cannot be objectively concluded at the screening stage that the Proposed Development will not result in likely significant effects through disturbance or displacement of qualifying species associated with Kenmare River SAC or Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC. Further assessment is therefore required.

3.6.4 Habitat or species fragmentation

Habitat fragmentation is the reduction and isolation of areas of habitat that were previously connected. Such fragmentation can disrupt the movement of species, reduce access to feeding or resting areas and increase the isolation of populations.

There is no spatial overlap between the Proposed Development site and either European site carried forward for assessment. Accordingly, the Proposed Development will not directly fragment any habitat located within Kenmare River SAC (002158) or Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC (000365).

However, Lesser Horseshoe Bat (*Rhinolophus hipposideros*) is dependent upon connected, sheltered and predominantly unlit landscape features for movement between roosting and foraging areas. The species was recorded within the study area, and woodland edges, mature trees and other vegetated features within and adjoining the Proposed Development may contribute to habitat connectivity through the wider landscape.

Removal or alteration of these features, or the introduction of artificial lighting across existing commuting routes, could create a functional break in habitat connectivity. This could restrict the movement of Lesser Horseshoe Bat, reduce access to foraging habitat or result in the displacement of individuals onto less suitable routes.

As identified in the preceding sections, potential indirect effects on aquatic habitats and species associated with Kenmare River SAC could also arise through deterioration in water quality within the Lissaniska 21 River, Finnihy River and downstream receiving environment.

Consequently, in the absence of mitigation and applying the precautionary principle, it cannot be objectively concluded at the screening stage that the Proposed Development will not result in likely significant effects through habitat or species fragmentation in relation to the qualifying interests of Kenmare River SAC or Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC. Further assessment is therefore required.

3.6.5 Cumulative/In-combination Impacts

In addition to the potential effects of the Proposed Development alone, the potential for likely significant effects in combination with other plans or projects must also be considered. An in-combination effect may arise where

the effects of the Proposed Development interact with those of other past, present or reasonably foreseeable plans or projects.

The Proposed Development has been considered in combination with the plans, permitted and proposed developments, EPA-licensed or registered facilities and existing land uses identified in **Section 3.4**.

Other residential, tourism and infrastructural developments within the Kenmare area may involve construction activities, vegetation clearance, additional artificial lighting, surface-water discharges and connections to the public wastewater network. If undertaken concurrently or sequentially, such developments could contribute to cumulative sediment or pollutant loading within the receiving surface-water network, increased hydraulic or organic loading at Kenmare Wastewater Treatment Plant, and additional pressure on water quality within the downstream Kenmare River receiving environment.

The permitted upgrade of Kenmare Wastewater Treatment Plant and other developments connecting to the public sewerage network are particularly relevant to the consideration of potential in-combination effects associated with wastewater collection, treatment capacity and discharge to the receiving environment.

Other development within the surrounding landscape could also result in the incremental loss, alteration or illumination of woodland edges, treelines and other vegetated features used by Lesser Horseshoe Bat (*Rhinolophus hipposideros*). The combined effect of habitat alteration, artificial lighting and increased human activity could reduce the availability or connectivity of suitable commuting and foraging habitat for the species.

Consequently, in the absence of mitigation and applying the precautionary principle, it cannot be objectively concluded at the screening stage that the Proposed Development, in combination with other plans or projects, will not result in likely significant effects on Kenmare River SAC (002158) or Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (000365). Further assessment is therefore required.

3.7 Conclusion of Screening Stage

In conclusion, to determine the potential effects of the construction and operation of the Proposed Development on European sites, a screening process for Appropriate Assessment was undertaken. A total of 15 European sites were considered when establishing the Zone of Influence of the Proposed Development.

It has been concluded, based on objective information, that the Proposed Development, either individually or in combination with other plans or projects, is not likely to have significant effects on the following 13 European sites:

- Mucksna Wood SAC (001371);
- Killarney National Park SPA (004038);
- Maulagowna Bog SAC (001881);
- Kilgarvan Ice House SAC (000364);
- Blackwater River (Kerry) SAC (002173);
- Old Domestic Building, Dromore Wood SAC (000353);
- Eirk Bog SPA (004108);
- Glanlough Woods SAC (002315);
- Caha Mountains SAC (000093);
- Cloonee and Inchiquin Loughs, Uragh Wood SAC (001342);
- Derryclogher (Knockboy) Bog SAC (001873);
- Glengarriff Harbour and Woodland SAC (000090); and
- Old Domestic Building, Curraglass Wood SAC (002041).

However, owing to the potential effects identified in **Sections 3.6.1 to 3.6.5**, it cannot be objectively concluded at this stage that the Proposed Development will not result in likely significant effects on the following two European sites:

- Kenmare River SAC (002158); and
- Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (000365).

Potential impact pathways have been identified in relation to water quality, habitat loss or alteration, disturbance and/or displacement of species, habitat or species fragmentation and cumulative or in-combination effects.

Therefore, it has been concluded that, in respect of these two European sites, the Proposed Development should proceed to Stage 2 of the Appropriate Assessment process and, as such, a Natura Impact Statement is required.

All other European sites have been screened out and excluded from further consideration based on objective information demonstrating that the Proposed Development, either individually or in combination with other plans or projects, will have no, or no appreciable, effects on those sites.

4. Stage 2 Natura Impact Statement (NIS)

4.1 Introduction

The Stage 1 screening for Appropriate Assessment undertaken in **Section 3** determined that an Appropriate Assessment of the Proposed Development is required, as it could not be excluded on the basis of objective information that the Proposed Development, individually or in combination with other plans or projects, would not have likely significant effects on European sites in view of their conservation objectives.

The conservation objectives of European sites are site-specific and based on the ecological requirements of the qualifying habitats and species present. They define the desired conservation condition of the relevant habitats and species and are expressed through attributes and targets relating to parameters such as area, range, population, structure and function. The conservation objectives may seek either to maintain or restore the favourable conservation condition of a qualifying habitat or species.

Article 6(3) of Council Directive 92/43/EEC provides that:

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

It was concluded in **Section 3** that likely significant effects arising from the construction and operation of the Proposed Development could not be excluded at the screening stage, in the absence of mitigation, in respect of the following two European sites:

- Kenmare River SAC (002158); and
- Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (000365).

An Appropriate Assessment of the Proposed Development is therefore required. Accordingly, this Natura Impact Statement has been prepared to provide a scientific examination of the evidence and data and to identify and

assess the implications of the Proposed Development for these European sites in view of their conservation objectives.

The purpose of the Natura Impact Statement is to provide sufficient information to enable the competent authority, Kerry County Council, to undertake its Appropriate Assessment and determine whether the Proposed Development, either individually or in combination with other plans or projects, will adversely affect the integrity of either European site.

Mitigation measures designed to avoid or reduce adverse effects are considered as part of the Stage 2 assessment. The Proposed Development is described in full in **Section 3.2**, including the elements of its construction and operation that could interact with the receiving environment.

4.2 Selection of Qualifying Features for Impact Assessment

The purpose of the Appropriate Assessment is to determine whether the Proposed Development, individually or in combination with other plans or projects, will adversely affect the integrity of the two European sites identified in **Section 4.1**, in view of their conservation objectives.

The assessment considers the environmental aspects of the Proposed Development that could interact with the ecological requirements or sensitivities of the qualifying habitats and species, including potential effects associated with:

- Water quality;
- Habitat loss or alteration;
- Disturbance and/or displacement of species;
- Habitat or species fragmentation; and
- Cumulative or in-combination effects.

The test applied at Stage 2 is whether the Proposed Development will adversely affect the integrity of a European site. Where potential adverse effects are identified, appropriate mitigation measures are prescribed to avoid or reduce those effects.

Where a European site is carried forward to Stage 2, all qualifying features of that site must initially be considered to identify the particular qualifying habitats or species requiring detailed assessment. Qualifying features are considered relevant where a credible Source-Pathway-Receptor linkage exists between the Proposed Development and the ecological requirements or sensitivities of the qualifying habitat or species.

The identification of a theoretical risk does not necessarily mean that an adverse effect will occur. The potential for an adverse effect depends upon the nature and magnitude of the impact, the degree of exposure and the ecological characteristics and sensitivities of the receptor. Accordingly, consideration has been given to the nature, scale and location of the Proposed Development, the distribution of the relevant qualifying habitats and species, and the degree of ecological or hydrological connectivity between the Proposed Development and those receptors.

The following subsections provide a brief description of each European site carried forward from Stage 1. This is followed by an evaluation of all qualifying features to determine which represent plausible ecological receptors for potential effects of the Proposed Development in the absence of mitigation and therefore require further assessment within this Natura Impact Statement.

4.2.1 Brief Description of Kenmare River SAC (002158)

The following text summarises the Natura 2000 Standard Data Form, site synopsis and conservation objectives for Kenmare River SAC.

Kenmare River SAC is a large coastal and marine site extending approximately 50km inland from the mouth of Kenmare Bay to the town of Kenmare. The SAC encompasses approximately 25,100ha and includes a diverse range of marine, coastal and terrestrial habitats. These include large shallow inlets and bays, reefs, sea cliffs, saltmarsh, coastal dunes, heath, grassland and sea caves.

Kenmare River is notable for the extent and diversity of its marine habitats. The deeply indented coastline contains numerous bays, islands, reefs and sheltered inlets, supporting extensive intertidal and subtidal communities. The site also supports important examples of coastal and terrestrial Annex I habitats.

The SAC is designated for a range of Annex I habitats and Annex II species, including Narrow-mouthed Whorl Snail (*Vertigo angustior*), Lesser Horseshoe Bat (*Rhinolophus hipposideros*), Harbour Porpoise (*Phocoena phocoena*), Otter (*Lutra lutra*) and Harbour Seal (*Phoca vitulina*).

The Proposed Development is located approximately 500m from the SAC boundary. An indirect hydrological connection exists between the Proposed Development and the SAC via the Lissaniska 21 River and Finnihy River, which discharge to the Kenmare River receiving environment. Lesser Horseshoe Bat activity was also recorded within the study area, providing a potential ecological pathway between the Proposed Development and this qualifying species.

The location and extent of Kenmare River SAC relative to the Proposed Development are shown in **Figure 19**.

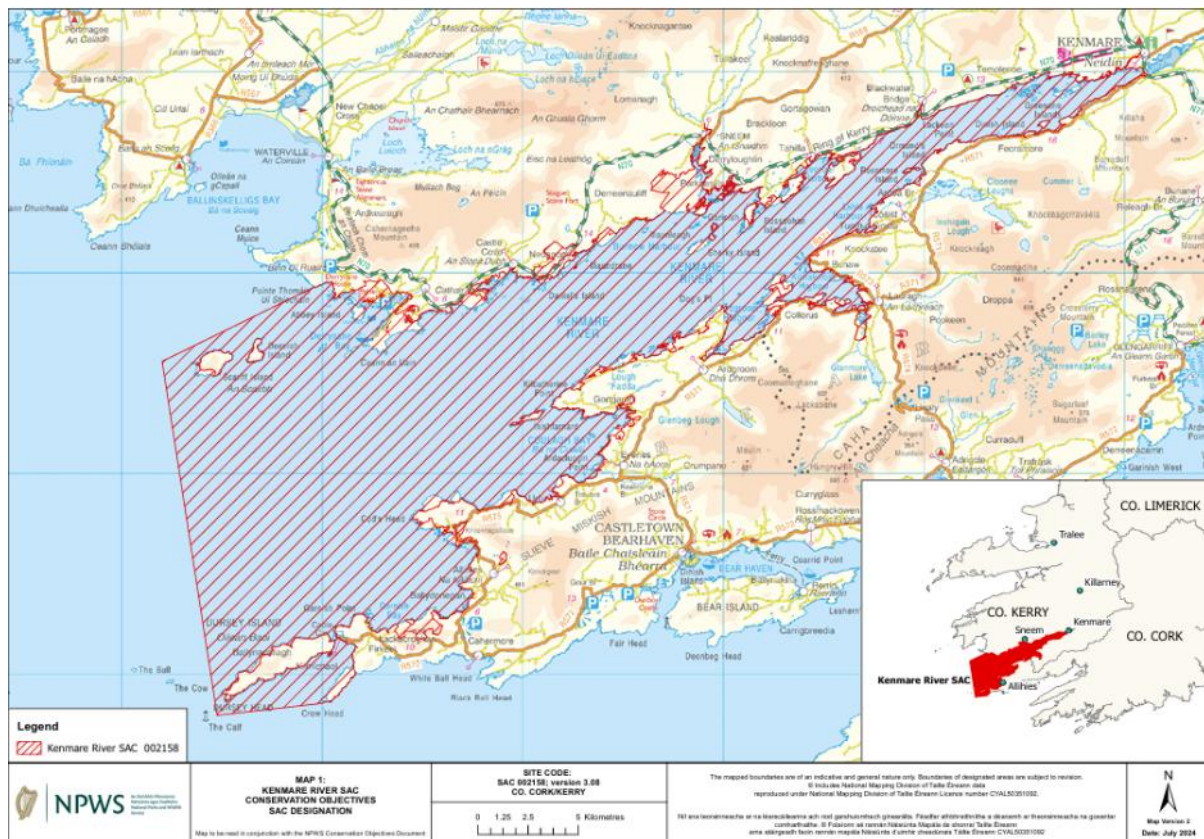


Figure 19: Extent of Kenmare River SAC (002158) relative to the Proposed Development.

4.2.2 Brief Description of Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC (000365)

The following text summarises the Natura 2000 Standard Data Form, site synopsis and conservation objectives for Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC.

Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC is an extensive and ecologically diverse site encompassing mountainous, woodland, freshwater, heath, grassland, bog and wetland habitats in County Kerry. It includes the Macgillicuddy's Reeks mountain range, the Killarney lakes and substantial parts of the surrounding river catchments.

The SAC supports numerous Annex I habitats, including oligotrophic lakes, watercourses, wet and dry heath, alpine and boreal heath, blanket bog, Molinia meadows, old sessile oak woodland, alluvial woodland and yew woodland. Several of these are priority habitats under the Habitats Directive.

The site is also designated for a diverse assemblage of Annex II species, including Kerry Slug (*Geomalacus maculosus*), Freshwater Pearl Mussel (*Margaritifera margaritifera*), Marsh Fritillary (*Euphydryas aurinia*), lamprey species, Atlantic Salmon (*Salmo salar*), Otter (*Lutra lutra*), Lesser Horseshoe Bat (*Rhinolophus hipposideros*), Slender Naiad (*Najas flexilis*), Killarney Shad (*Alosa fallax killarnensis*) and Killarney Fern (*Vandenboschia speciosa*).

The nearest boundary of the SAC is located approximately 4.7km north of the Proposed Development. There is no direct hydrological connection or spatial overlap between the Proposed Development and the SAC. However, Lesser Horseshoe Bat activity was recorded within the study area, and the potential for an ecological connection involving this mobile qualifying species has been retained for further assessment on a precautionary basis.

The location and extent of Killarney National Park, Macgillicuddy’s Reeks and Caragh River Catchment SAC relative to the Proposed Development are shown in **Figure 20**.

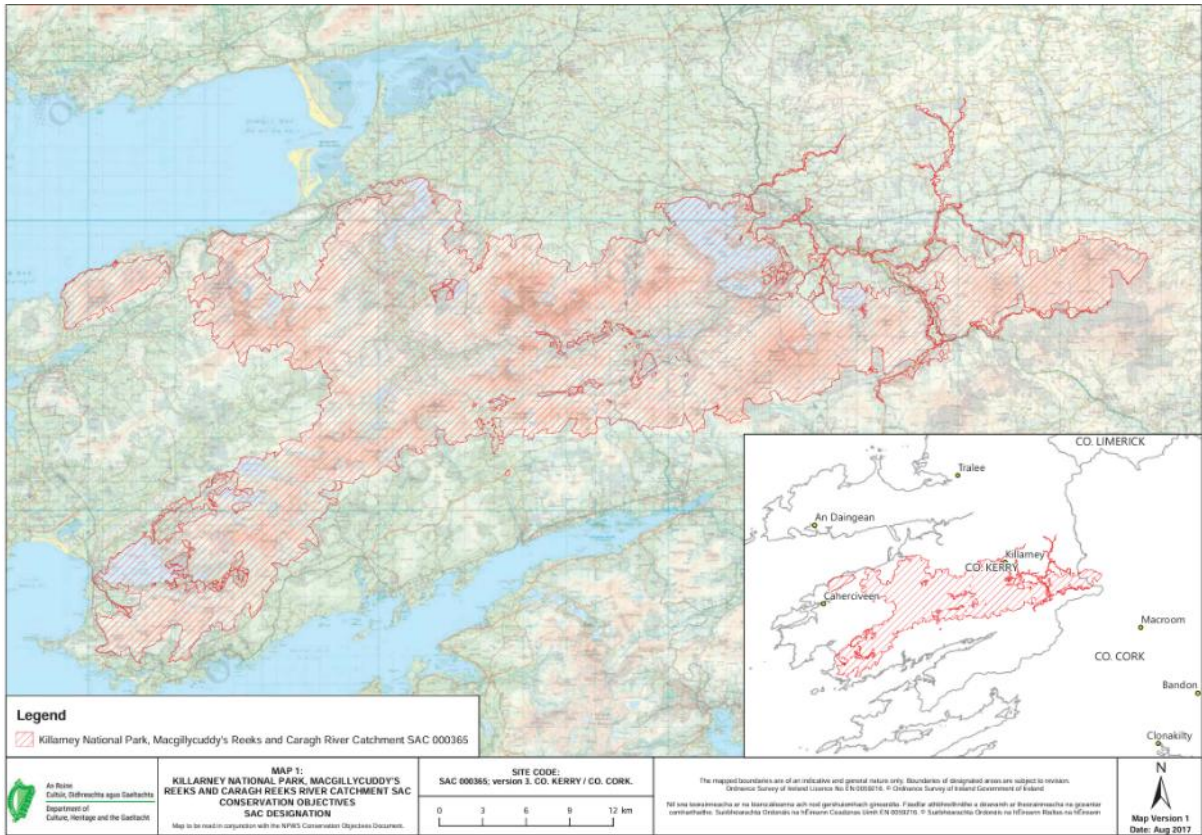


Figure 20: Extent of Killarney National Park, Macgillicuddy’s Reeks and Caragh River Catchment SAC (000365) relative to the Proposed Development.

4.2.3 Selection of Qualifying Features for Impact Assessment

Table 13 lists the qualifying features of Kenmare River SAC and Killarney National Park, Macgillicuddy’s Reeks and Caragh River Catchment SAC and evaluates, through a scientific examination of the available evidence and data, whether each qualifying feature should be selected for detailed impact assessment within this Natura Impact Statement.

The two SACs are considered together because Lesser Horseshoe Bat (*Rhinolophus hipposideros*) is a qualifying interest of both sites and represents a potentially shared ecological receptor. The assessment also considers the indirect hydrological connection between the Proposed Development and Kenmare River SAC via the Lissaniska 21 River and Finnihy River.

Table 13: Selection of qualifying features of Kenmare River SAC (002158) and Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC (000365) for impact assessment.

Qualifying features of conservation interest ⁴	Potential Impact	Rationale
Kenmare River SAC (002158)		
Large shallow inlets and bays [1160]; Reefs [1170]	Yes	The Finnihy River discharges to the inner Kenmare River and provides an indirect hydrological connection between the Proposed Development and the marine receiving environment of the SAC. In the absence of mitigation, sediment or pollutants released during construction, and contaminants conveyed through operational surface-water or wastewater pathways, could reach the SAC and affect water quality, benthic communities or the ecological functions supporting these marine habitats. Further assessment is required.
Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]; Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]	Yes	These are tidally influenced coastal habitats whose structure and vegetation can be affected by changes in water quality, sedimentation and tidal deposition. An indirect hydrological pathway exists from the Proposed Development through the Lissaniska 21 River and Finnihy River to the inner Kenmare River. In the absence of mitigation, indirect effects cannot be excluded and further assessment is required.
Submerged or partially submerged sea caves [8330]	Yes	This habitat is dependent upon marine water quality and hydrological conditions. Although occurrences are separated from the Proposed Development and substantial dilution would occur within the receiving marine environment, an indirect hydrological pathway exists to the SAC. Applying the precautionary principle, indirect effects through deterioration of water quality cannot be excluded at this stage and further assessment is required.
Perennial vegetation of stony banks [1220]; Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]; Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]; Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	No	These qualifying habitats occur above the normal aquatic receiving environment and depend primarily upon coastal geomorphological processes, substrate condition and terrestrial vegetation structure. The Proposed Development will not overlap with these habitats and will not alter coastal sediment supply, erosion, deposition or vegetation succession. The indirect hydrological connection does not provide a credible pathway capable of affecting their extent, distribution, structure or function.

⁴ Asterisk (*) denotes a priority habitat considered to be in danger of disappearance.

Qualifying features of conservation interest ⁴	Potential Impact	for Rationale
European dry heaths [4030]; Juniperus communis formations on heaths or calcareous grasslands [5130]; Calaminarian grasslands of the Violetalia calaminariae [6130]	No	These are terrestrial habitats. There is no spatial overlap and no ecological, hydrological or groundwater pathway through which the Proposed Development could affect their extent, distribution, vegetation composition, structure or supporting processes within the SAC.
Narrow-mouthed Whorl Snail (<i>Vertigo angustior</i>) [1014]	No	Narrow-mouthed Whorl Snail is associated with humid dune slacks, dune grassland, saltmarsh margins and other permanently moist coastal vegetation. No suitable habitat for the species occurs within the Proposed Development site, and no habitat supporting the SAC population will be removed or altered. No credible pathway capable of affecting the species or its supporting habitat has been identified.
Lesser Horseshoe Bat (<i>Rhinolophus hipposideros</i>) [1303]	Yes	Lesser Horseshoe Bat was recorded during surveys of the study area. The species is dependent upon dark, sheltered and connected landscape features for movement between roosting and foraging areas. Vegetation clearance, alteration of woodland-edge habitat and the introduction of temporary or permanent artificial lighting could affect habitat function or connectivity. Given the recorded presence of the species and its status as a qualifying interest of the SAC, further assessment is required.
Harbour Porpoise (<i>Phocoena phocoena</i>) [1351]	Yes	Harbour Porpoise is dependent upon the marine habitat and prey resources of the SAC. The Proposed Development has no direct interaction with the species; however, an indirect hydrological pathway exists to the marine receiving environment through the Lissaniska 21 River and Finnihy River. In the absence of mitigation, the possibility of indirect effects through water-quality deterioration or effects on prey resources cannot be excluded.
Otter (<i>Lutra lutra</i>) [1355]	No	No otter breeding or resting site was identified within or adjoining the Proposed Development site, and the site does not overlap with habitat forming part of the SAC. Although a downstream hydrological pathway exists, the intervening distance, the absence of direct disturbance to SAC habitat and the limited scale and duration of any potential unmitigated water-quality event mean that no appreciable effect on the distribution, resting sites or terrestrial and freshwater habitat of the SAC otter population is predicted.

Qualifying features of conservation interest ⁴	Potential Impact	for	Rationale
Harbour Seal (<i>Phoca vitulina</i>) [1365]	Yes		Harbour Seal is dependent upon the marine habitat and prey resources of Kenmare River SAC. No direct disturbance or loss of breeding, moulting or resting habitat will occur. However, an indirect hydrological pathway exists to the marine receiving environment. Applying the precautionary principle, indirect effects associated with deterioration in water quality or effects upon prey resources cannot be excluded in the absence of mitigation.
Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (000365)			
Oligotrophic waters containing very few minerals of sandy plains [3110]; Oligotrophic to mesotrophic standing waters [3130]; Water courses of plain to montane levels with <i>Ranunculus fluitans</i> and <i>Callitriche-Batrachion</i> vegetation [3260]	No		The Proposed Development is situated outside the SAC and within a separate surface-water catchment. No surface-water, groundwater or wastewater pathway connects the Proposed Development to the lakes or watercourses supporting these qualifying habitats. Consequently, their water quality, hydrological regime, extent, structure and vegetation composition cannot be affected.
Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010]; European dry heaths [4030]; Alpine and Boreal heaths [4060]; <i>Juniperus communis</i> formations [5130]; Calaminarian grasslands [6130]; <i>Molinia</i> meadows [6410]; Blanket bogs [7130]; Depressions on peat substrates of the <i>Rhynchosporion</i> [7150]	No		These terrestrial and peatland habitats are geographically and hydrologically separated from the Proposed Development. There will be no land-take within the SAC and no pathway exists through which the Proposed Development could alter their area, distribution, hydrology, vegetation composition, structure or function.
Kerry Slug (<i>Geomalacus maculosus</i>) [1024]; Marsh Fritillary (<i>Euphydryas aurinia</i>) [1065]; Killarney Fern (<i>Vandenboschia speciosa</i>) [6985]	No		No habitat supporting these qualifying species within the SAC will be lost or altered. The Proposed Development is geographically separated from the SAC, and no credible pathway exists through which it could affect the distribution, population condition or supporting habitat of these terrestrial species.

Qualifying conservation interest ⁴	features of	Potential Impact	for	Rationale
Freshwater (Margaritifera) [1029]; Sea Lamprey (Petromyzon marinus) [1095]; Brook Lamprey (Lampetra planeri) [1096]; River Lamprey (Lampetra fluviatilis) [1099]; Atlantic Salmon (Salmo salar) [1106]; Slender Naiad (Najas flexilis) [1833]; Killarney Shad (Alosa fallax killarnensis) [5046]	Pearl Mussel (Margaritifera margaritifera)	No		These qualifying species depend upon freshwater habitats within the SAC and its associated catchments. The Proposed Development lies within a separate surface-water catchment, and no hydrological connection exists to the waterbodies supporting these populations. No pathway for water-quality, habitat or disturbance effects has therefore been identified.
Otter (Lutra lutra) [1355]		No		The Proposed Development has no hydrological connection with the SAC, and no evidence establishes that the Proposed Development site forms part of the breeding, resting or foraging resource supporting the SAC otter population. The distance between the Proposed Development and the SAC, together with the absence of a functional aquatic or terrestrial connection, excludes a credible impact pathway.
Lesser (Rhinolophus) [1303]	Horseshoe Bat (hipposideros)	Yes		Lesser Horseshoe Bat activity was recorded within the study area. As a mobile species, individuals may move beyond designated-site boundaries and depend upon connected, dark landscape features for commuting and foraging. In view of the recorded activity and the precautionary inclusion of this SAC at Stage 1, potential effects associated with vegetation alteration, habitat connectivity and artificial lighting are carried forward for further assessment.

4.2.3.1 Qualifying Interests Selected for Further Assessment

It has been determined in **Table 13** that the construction and/or operational phases of the Proposed Development, as described in **Section 3.2**, have the potential to affect the conservation objectives of the following qualifying interests. These qualifying interests are therefore selected for further assessment:

Kenmare River SAC (002158):

- Large shallow inlets and bays [1160];
- Reefs [1170];
- Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330];
- Mediterranean salt meadows (Juncetalia maritimi) [1410];
- Submerged or partially submerged sea caves [8330];
- Lesser Horseshoe Bat (Rhinolophus hipposideros) [1303];

- Harbour Porpoise (*Phocoena phocoena*) [1351]; and
- Harbour Seal (*Phoca vitulina*) [1365].

Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC (000365):

- Lesser Horseshoe Bat (*Rhinolophus hipposideros*) [1303].

4.3 Assessment of Potentially Significant Effects

The following sections evaluate the potentially significant effects that may arise as a result of the Proposed Development on the qualifying interests selected for further assessment in **Section 4.2.3.1**, together with the potential effects identified in **Section 3.6**.

Following this evaluation, a determination is made as to whether the Proposed Development, either individually or in combination with other plans or projects, will adversely affect the integrity of the two European sites selected for assessment, namely:

- Kenmare River SAC (002158); and
- Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC (000365).

As in **Section 3.6**, the potential for adverse effects on the integrity of these European sites is assessed using the following indicators:

- Water quality;
- Habitat loss or alteration;
- Disturbance and/or displacement of species; and
- Habitat or species fragmentation.

The potential for significant cumulative or in-combination effects is assessed separately in **Section 4.4**.

4.3.1 Water Quality

As detailed in **Section 3.3.2**, no watercourse traverses the Proposed Development site and there is no spatial overlap between the site and either European site selected for assessment. Consequently, the Proposed Development will not result in direct effects on water quality within Kenmare River SAC or Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC.

However, the Lissaniska 21 River is located approximately 22m north of the Proposed Development site. It flows into the Finnihy River, which subsequently discharges to the inner Kenmare River. An indirect hydrological connection therefore exists between the Proposed Development and Kenmare River SAC.

The Proposed Development will also be connected to the public foul-water network. Wastewater will be conveyed to Kenmare Wastewater Treatment Plant for treatment prior to discharge to the Kenmare River receiving environment. This represents a separate operational hydrological pathway between the Proposed Development and Kenmare River SAC.

As identified in **Table 13**, deterioration in water quality could potentially affect the following qualifying interests of Kenmare River SAC:

- Large shallow inlets and bays [1160];
- Reefs [1170];
- Atlantic salt meadows [1330];
- Mediterranean salt meadows [1410];

- Submerged or partially submerged sea caves [8330];
- Harbour Porpoise (*Phocoena phocoena*) [1351]; and
- Harbour Seal (*Phoca vitulina*) [1365].

No hydrological connection exists between the Proposed Development and Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC. Lesser Horseshoe Bat is not dependent upon the aquatic receiving environment potentially affected by the Proposed Development. Consequently, no adverse water-quality effects on this SAC, or on Lesser Horseshoe Bat as a qualifying interest of either SAC, are predicted.

4.3.1.1 Construction Phase

During construction, the Proposed Development will involve site establishment, vegetation clearance, earthworks, excavation, construction of buildings, roads and buried services, installation of drainage infrastructure and construction of the proposed surface-water outfall to the Lissaniska 21 River.

In the absence of pollution-prevention controls, these activities could affect the aquatic environment through the generation of sediment-laden runoff or the accidental release of fuels, oils, concrete, cementitious materials, chemicals, wastewater or other potentially polluting substances.

The proximity of the Proposed Development to the Lissaniska 21 River, together with the proposed drainage connection and outfall, provides a pathway through which contaminants generated within the construction site could enter the river and subsequently reach the Finnihy River and Kenmare River SAC.

4.3.1.1.1 Sediment-Laden Runoff

Site clearance, stripping and storage of topsoil, excavation, earthworks, stockpiling of materials, installation of roads and services and the movement of construction plant have the potential to expose and disturb soils. During rainfall, sediment could become suspended in surface-water runoff and be transported towards the site drainage system or the Lissaniska 21 River.

Construction of the proposed headwall and outfall within the bank of the Lissaniska 21 River, outside the application red-line boundary, will result in localised disturbance of the riverbank and watercourse margin. In the absence of appropriate controls, these works could generate sediment and provide a direct pathway for pollutants to enter the aquatic environment.

The introduction of elevated concentrations of suspended solids could increase turbidity, cause sediment deposition, alter substrate conditions and reduce light penetration. Sediment may also transport nutrients or other contaminants attached to soil particles.

The aquatic surveys recorded Brown Trout (*Salmo trutta*), European Eel (*Anguilla anguilla*) and Three-spined Stickleback (*Gasterosteus aculeatus*) within the surveyed watercourses. Although these species are not qualifying interests of Kenmare River SAC, their presence demonstrates ecological connectivity through the receiving surface-water network and the capacity of the watercourses to support aquatic fauna.

Sedimentation or nutrient enrichment within the Lissaniska 21 River and Finnihy River could subsequently contribute to deterioration in water quality within the inner Kenmare River. This could indirectly affect the selected marine and coastal qualifying habitats or the prey resources supporting Harbour Porpoise and Harbour Seal.

Consequently, in the absence of appropriate mitigation, adverse effects on the selected qualifying interests of Kenmare River SAC arising from sediment-laden runoff cannot be excluded. Measures for the control of runoff, erosion and sediment are therefore set out in **Section 5**.

4.3.1.1.2 Fuels, Oils, Concrete and Other Potentially Polluting Substances

The operation, refuelling and maintenance of construction plant and machinery will require fuels, oils, lubricants and other potentially polluting substances. The storage and handling of these materials creates a risk of accidental leakage or spillage.

Concrete, cementitious materials and associated washout water can have a high pH and may contain fine suspended solids and chemical additives harmful to aquatic organisms. Concrete pouring, handling of wet cement and inappropriate disposal of washout water therefore represent potential risks to water quality.

Other potential pollutants associated with construction include paints, solvents, cleaning products, construction chemicals and wastewater generated by temporary welfare facilities. Improper storage, handling or disposal could allow these substances to enter surface-water runoff, the site drainage system or the Lissaniska 21 River.

An accidental release could result in acute or chronic effects on aquatic organisms, deterioration of downstream water quality and effects on the ecological functions supporting qualifying marine habitats and species within Kenmare River SAC.

Therefore, in the absence of appropriate mitigation, adverse effects on the selected qualifying interests of Kenmare River SAC arising from fuels, oils, concrete, wastewater or other potentially polluting substances cannot be excluded. Measures governing storage, refuelling, concrete management, spill response and welfare facilities are provided in **Section 5**.

4.3.1.2 Operational Phase

During operation, surface-water runoff will be generated from roofs, roads, parking areas, footpaths and other hardstanding within the Proposed Development.

The proposed surface-water drainage system incorporates Sustainable Drainage Systems, including bioretention rain gardens and filter drains, integrated with the conventional storm-sewer network. The system will convey runoff to an attenuation tank, with runoff from trafficked areas passing through a petrol interceptor. Discharge will be restricted to the calculated greenfield runoff rate by a Hydro-Brake flow-control device before outfalling to the Lissaniska 21 River through the proposed headwall.

The drainage system is designed to attenuate runoff and provide treatment before discharge. Nevertheless, the permanent outfall establishes an operational hydrological connection to the Lissaniska 21 River. Potential risks could arise from contaminated runoff from roads and parking areas, accidental spills, failure or inadequate maintenance of drainage components, exceedance of the treatment system or mobilisation of pollutants during extreme rainfall events.

Wastewater generated by the residential development will be conveyed through the public foul-water network to Kenmare Wastewater Treatment Plant. Following treatment, effluent is discharged to the Kenmare River receiving environment. The Proposed Development will therefore contribute additional hydraulic and organic loading to the wastewater collection and treatment system.

The capacity and operation of the public wastewater infrastructure are matters for Uisce Éireann. However, because treated effluent ultimately discharges to the Kenmare River receiving environment, wastewater represents a potential indirect pathway to Kenmare River SAC requiring consideration alongside the surface-water pathway.

In the absence of effective design, operation and maintenance of the surface-water and foul-water systems, contaminated runoff or inadequate wastewater treatment could contribute to deterioration in water quality

within the downstream receiving environment. Such deterioration could adversely affect the selected water-dependent qualifying interests of Kenmare River SAC.

Operational surface-water and wastewater protection measures are therefore set out in **Section 5**.

4.3.1.3 Water Quality – Conclusion

Water quality is an environmental factor supporting the conservation condition of the marine and coastal habitats and species for which Kenmare River SAC is designated.

There is no spatial overlap between the Proposed Development and the SAC. Nevertheless, indirect hydrological pathways exist through:

- Surface-water runoff and the proposed outfall to the Lissaniska 21 River, which flows through the Finnihy River to the inner Kenmare River; and
- Foul wastewater conveyed to Kenmare Wastewater Treatment Plant, from which treated effluent is discharged to the Kenmare River receiving environment.

In the absence of effective water-quality protection measures, construction activities could result in sedimentation, nutrient enrichment, hydrocarbon contamination, changes in pH or the release of other pollutants. During operation, risks could arise from contaminated surface-water runoff, failure or inadequate maintenance of drainage infrastructure and additional loading on the public wastewater system.

Although the downstream distance, dilution and dispersal available within the receiving environment would reduce the magnitude of any potential effect, the existence of hydrological pathways means that adverse effects on the selected qualifying interests of Kenmare River SAC cannot be excluded in the absence of mitigation.

A programme of water-quality protection and pollution-prevention measures is therefore provided in Section 5 to ensure that the Proposed Development will not adversely affect the integrity of Kenmare River SAC.

No hydrological pathway exists to Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC. Accordingly, no adverse water-quality effect on the integrity of that SAC is predicted.

4.3.2 Habitat loss or alteration

There is no spatial overlap between the Proposed Development and either Kenmare River SAC or Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC. Consequently, the Proposed Development will not result in the direct loss of any qualifying habitat located within either European site.

Habitat loss arising from the Proposed Development will be confined to the application site. The habitats affected predominantly comprise previously disturbed and modified habitats, including recolonising bare ground, dry meadows and grassy verges, scrub and buildings and artificial surfaces. These habitats do not correspond to any Annex I qualifying habitat for which either SAC is designated.

Two potential pathways for indirect habitat loss or alteration have nevertheless been identified:

- Deterioration in water quality affecting marine and coastal qualifying habitats within Kenmare River SAC; and
- Loss, alteration or reduced functionality of habitats potentially used by Lesser Horseshoe Bat for commuting and foraging.

As established in **Section 4.3.1**, an indirect hydrological connection exists between the Proposed Development and Kenmare River SAC via the Lissaniska 21 River and Finnihy River. In the absence of mitigation, sediment-laden

runoff or the release of hydrocarbons, cementitious materials, wastewater or other contaminants could contribute to deterioration in water quality within the downstream receiving environment.

Such deterioration could indirectly alter the structure, function or supporting ecological processes of the selected water-dependent qualifying habitats of Kenmare River SAC, namely:

- Large shallow inlets and bays [1160];
- Reefs [1170];
- Atlantic salt meadows [1330];
- Mediterranean salt meadows [1410]; and
- Submerged or partially submerged sea caves [8330].

Potential effects could include increased turbidity, sediment deposition, nutrient enrichment, contamination of substrate or water and indirect effects on the biological communities supported by these habitats. Although the downstream distance and the dilution and dispersal available within the receiving environment would reduce the magnitude of any effect, indirect habitat alteration cannot be excluded in the absence of mitigation.

The Proposed Development site and adjoining lands also contain woodland-edge habitat, mature trees and other vegetated features that may provide commuting and foraging habitat for Lesser Horseshoe Bat. Lesser Horseshoe Bat activity was recorded within the study area, demonstrating that the species uses habitats in the vicinity of the Proposed Development.

Lesser Horseshoe Bat typically commutes and forages along sheltered landscape features, including woodland edges, treelines, hedgerows and watercourses. The species generally avoids open and brightly illuminated areas. The removal or alteration of vegetation, changes to woodland-edge structure or illumination of retained habitat could therefore reduce the suitability or ecological function of these features.

No Lesser Horseshoe Bat roost has been identified within the Proposed Development site. Nevertheless, habitat located outside a European-site boundary may contribute to the ecological requirements of a qualifying species where it provides a functional connection between roosting and foraging areas. Accordingly, the potential for habitat loss or alteration to affect the movement or foraging behaviour of Lesser Horseshoe Bat associated with Kenmare River SAC or Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC requires further consideration.

In the absence of mitigation, the combined effects of vegetation alteration, alteration of habitat function through artificial lighting and artificial lighting could reduce the availability or effectiveness of habitat used by Lesser Horseshoe Bat. Adverse effects on the conservation objectives of the species, and consequently on the integrity of either SAC, cannot therefore be excluded.

Mitigation measures relating to the retention and protection of vegetation, maintenance of dark commuting and foraging corridors, landscape planting and control of artificial lighting are provided in Section 5. Water-quality protection measures relevant to the indirect alteration of qualifying marine and coastal habitats are also provided in **Section 5**.

4.3.3 Disturbance and/or displacement of species

The Proposed Development site does not spatially overlap with either Kenmare River SAC or Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC. Consequently, construction and operational activities will not directly disturb or displace qualifying species within either European site.

Potential disturbance or displacement effects have been considered in relation to Harbour Porpoise, Harbour Seal and Lesser Horseshoe Bat, which were selected for further assessment in **Section 4.2.3.1**.

Harbour Porpoise and Harbour Seal are marine species associated with Kenmare River SAC. The Proposed Development will not involve marine construction, piling, dredging, vessel movements or works within breeding, resting, moulting or feeding habitat used by either species. The inland location and nature of the Proposed Development therefore exclude direct visual, noise or underwater acoustic disturbance.

Potential effects on these marine species are limited to indirect disturbance or displacement resulting from deterioration in water quality or effects on prey resources. These pathways have been assessed in **Section 4.3.1**. In the absence of water-quality protection measures, the possibility of indirect disturbance or displacement cannot be excluded. Relevant mitigation measures are provided in **Section 5**.

Lesser Horseshoe Bat activity was recorded throughout the study area, with comparatively high activity recorded along the western part of the site and within woodland habitat located to the west of the Proposed Development boundary. The Bat Survey Report also identifies two Lesser Horseshoe Bat winter roosts within approximately 1km of the study area, one of which supported more than 120 individuals during winter 2025/2026. The precise locations of these roosts are sensitive and are not reproduced within this report.

No Lesser Horseshoe Bat roost was identified within the Proposed Development site. One oak tree on the western boundary was identified as supporting potential roost features; however, no bats were recorded emerging from this tree during the survey undertaken on 7 July 2026. No trees are proposed for removal to facilitate the Proposed Development.

During construction, temporary artificial lighting, increased noise, construction traffic and the presence of personnel could disturb bats commuting or foraging along woodland-edge habitat. Lesser Horseshoe Bat is particularly light-sensitive and may avoid illuminated areas. Lighting of the western site boundary or adjoining woodland could therefore temporarily reduce the suitability of these features for commuting or foraging and displace individuals onto alternative routes.

During operation, permanent exterior and public lighting could alter bat use of retained woodland-edge habitat. In the absence of an appropriately designed lighting scheme, illumination could create a barrier to movement, reduce access to foraging areas or result in the long-term displacement of Lesser Horseshoe Bat from established commuting and feeding habitat.

However, the NPWS conservation-objective mapping reviewed in the Bat Survey Report indicates that the Proposed Development lies outside the mapped potential foraging grounds and core foraging ranges associated with the Dunkerron souterrain winter roost and Foley's Cottage summer roost, which are identified in connection with Kenmare River SAC.

Although Lesser Horseshoe Bats recorded within the study area may be associated with the nearby internationally important roost, the available evidence does not establish that these individuals form part of the qualifying-interest population of Kenmare River SAC or Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC.

Accordingly, disturbance of Lesser Horseshoe Bat using the study area could represent an ecologically significant effect on the local or wider bat population and requires mitigation under the separate ecological and species-protection assessment. On the available evidence, however, a pathway resulting in an adverse effect on the conservation objectives or integrity of either SAC through disturbance or displacement of its qualifying-interest population has not been demonstrated.

Notwithstanding this conclusion, measures controlling construction and operational lighting and protecting retained woodland-edge habitat are provided in **Section 5**. These measures will ensure that disturbance and displacement of Lesser Horseshoe Bat are avoided and that the ecological functionality of commuting and foraging habitat is maintained.

4.3.4 Habitat or species fragmentation

Habitat fragmentation is the reduction and isolation of areas of habitat that were previously connected. Fragmentation can restrict the movement of species, reduce access to foraging or resting habitat and increase the isolation of populations.

There is no spatial overlap between the Proposed Development and either Kenmare River SAC or Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC. The Proposed Development will therefore not directly fragment any habitat situated within either European site.

The marine and coastal qualifying habitats of Kenmare River SAC are physically separated from the Proposed Development. The project will not create a physical barrier within these habitats or divide their extent. As assessed in **Section 4.3.1**, potential effects on these habitats are limited to indirect alteration resulting from deterioration in water quality. In the absence of effective water-quality protection measures, localised deterioration could affect habitat condition or ecological function; however, it would not physically divide or isolate the qualifying habitats.

No trees are proposed for removal to facilitate the Proposed Development, and the woodland-edge habitats associated with the western and southwestern boundaries are to be retained. Consequently, no direct severance of established treelines or woodland-edge habitat used by bats is proposed.

Nevertheless, artificial lighting can cause functional fragmentation even where vegetation is physically retained. Lesser Horseshoe Bat is particularly sensitive to artificial lighting and generally relies upon dark, sheltered and connected landscape features when commuting between roosting and foraging areas. Illumination of the retained woodland edge could create a behavioural barrier, reduce the effectiveness of an existing commuting route or restrict access to adjoining foraging habitat.

As discussed in **Section 4.3.3**, the available evidence does not establish that Lesser Horseshoe Bats using the Proposed Development site form part of the qualifying-interest population of either SAC. The Proposed Development is located outside the mapped potential foraging grounds and core foraging ranges associated with the relevant qualifying-interest roosts identified for Kenmare River SAC.

Accordingly, while uncontrolled artificial lighting could fragment habitat used by Lesser Horseshoe Bat within the wider landscape, an adverse fragmentation effect on the qualifying-interest population or integrity of either SAC has not been demonstrated.

Measures to maintain dark commuting and foraging habitat, control construction and operational lighting and protect retained woodland-edge vegetation are provided in **Section 5**. These measures will prevent functional fragmentation of bat habitat and maintain connectivity through the study area.

4.4 Assessment of potentially Significant Cumulative Effects

As well as effects arising from the Proposed Development alone, the potential for cumulative or in-combination effects must also be considered. A cumulative effect may arise from incremental changes caused by other past, present or reasonably foreseeable future actions together with the Proposed Development.

The European Commission (2021) guidance on the provisions of Article 6 of the Habitats Directive states that the phrase "in combination with other plans or projects" in Article 6(3) refers to cumulative effects arising from plans or projects that are currently under consideration, together with the effects of existing or proposed plans or projects.

When assessing potential in-combination effects, it is necessary to identify the types of effects that may arise from the Proposed Development and from other sources within the receiving environment that, cumulatively, could affect the structure and function of the relevant European sites (EC, 2021).

The plans, projects and activities considered relevant to the Proposed Development are identified in **Section 3.4**. Their potential to act in combination with the effects identified in **Sections 4.3.1 to 4.3.4** is assessed in the following subsections.

4.4.1 Plans

The Proposed Development was considered in combination with the plans identified in Section 3.4.2, including:

- Kerry County Development Plan 2022–2028;
- Kenmare Municipal District Local Area Plan 2024–2030;
- Uisce Éireann Capital Investment Plan; and
- River Basin Management Plan for Ireland 2022–2027.

The Kerry County Development Plan and Kenmare Municipal District Local Area Plan establish the statutory planning framework for development within County Kerry and the Kenmare area. Both plans contain policies and objectives concerning the protection of European sites, biodiversity, ecological connectivity, water quality and public water-services infrastructure.

Development facilitated under these plans could result in incremental construction activity, surface-water discharges, additional demand upon wastewater infrastructure and the alteration or illumination of habitats used by fauna. Such development would, however, remain subject to the relevant environmental-protection objectives and requirements for project-level environmental assessment.

The Uisce Éireann Capital Investment Plan provides for investment in public water and wastewater infrastructure, while the River Basin Management Plan for Ireland establishes measures and environmental objectives for the protection and improvement of surface waters and groundwaters.

Potential cumulative effects associated with permitted and proposed developments, public wastewater infrastructure, existing land uses and ongoing activities are considered in **Section 4.4.2**.

4.4.2 Existing Land-use and On-going Activities

4.4.2.1 Introduction

Irish waterbodies are frequently subject to anthropogenic activities and pressures that can adversely affect water quality. More than one pressure may act upon an individual waterbody, and the effects of existing pressures must therefore be considered in combination with those potentially arising from the Proposed Development.

As described in **Section 3.3.2**, the Proposed Development is located within the Finnihy_SC_010 sub-catchment of the Dunmanus-Bantry-Kenmare catchment. Surface-water runoff from the Proposed Development will ultimately discharge through the Lissaniska 21 River and Finnihy River to the Inner Kenmare River.

The Lissaniska 21 River and Finnihy River are classified as having Moderate ecological status for the 2019–2024 assessment period and are identified as At Risk of not achieving their environmental objectives. The identified pressures on these waterbodies comprise domestic wastewater treatment systems, hydromorphological pressures and urban runoff.

The Inner Kenmare River is classified as having Good ecological status for the 2019–2024 assessment period and is identified as Not at Risk of failing to achieve its environmental objectives.

Existing land uses and ongoing activities within the catchment include residential and commercial development, roads, urban surface-water drainage, wastewater collection and treatment, recreation, tourism and agriculture. These activities may contribute diffuse or point-source pressures to the receiving water environment.

The pathways of greatest relevance to the Proposed Development are urban runoff and urban wastewater, together with hydromorphological and drainage-related changes. These pathways are considered in the following subsections.

4.4.2.2 Urban Run-off and Urban Wastewater

Pollution arising from urban runoff and urban wastewater can exert pressure on the ecological condition of receiving waterbodies. Sources may include runoff from paved and unpaved areas, misconnections, leaking sewers, combined sewer overflows and inadequately treated wastewater. These sources can result in elevated nutrient concentrations, organic enrichment, reduced dissolved oxygen, increased suspended solids and the introduction of hydrocarbons or other contaminants.

Urban runoff is identified as an existing pressure on the Lissaniska 21 River and Finnihy River. Further residential and other development within Kenmare could increase the extent of impermeable surfaces and the volume of surface-water runoff generated within the catchment. In the absence of appropriate drainage design and treatment, the Proposed Development could act in combination with existing and future urban runoff to increase hydraulic loading or pollutant inputs to these waterbodies and the downstream Inner Kenmare River.

The Proposed Development incorporates a Sustainable Drainage Systems management train to manage surface-water runoff. This includes bioretention rain gardens, filter drains, petrol interceptors, catch pits and cellular attenuation storage. Discharge will be restricted to the calculated greenfield runoff rate by a Hydro-Brake flow-control device before outfalling to the Lissaniska 21 River. The system has been designed to attenuate runoff and provide treatment before discharge.

The Proposed Development will also generate foul wastewater. This will drain by gravity to an onsite pumping station and will then be pumped by rising main along Pat Scardeen Road before discharging to the existing public foul sewer network. Wastewater will subsequently be conveyed to Kenmare Wastewater Treatment Plant for treatment prior to discharge to the Finnihy River and Inner Kenmare River receiving environment.

Other permitted and proposed developments identified in **Section 3.4.3** may also connect to the public wastewater network and contribute additional hydraulic and organic loading. The permitted upgrade of Kenmare Wastewater Treatment Plant is also relevant to the future treatment capacity and performance of the agglomeration.

A pre-connection enquiry for the Proposed Development was submitted to Uisce Éireann. Uisce Éireann advised that connection is feasible subject to the upgrades specified in its Confirmation of Feasibility. Accordingly, connection of the Proposed Development to the public wastewater network will be subject to Uisce Éireann's requirements and the completion of any necessary network upgrades.

In the absence of effective surface-water controls and adequate wastewater collection and treatment, the Proposed Development could act in combination with existing urban runoff, wastewater discharges and other development to affect water quality within the Lissaniska 21 River, Finnihy River and Inner Kenmare River. This could indirectly affect the water-dependent qualifying interests of Kenmare River SAC selected for further assessment in **Section 4.2.3.1**.

However, subject to implementation of the drainage design and water-quality mitigation measures set out in **Section 5**, together with compliance with Uisce Éireann's connection requirements, the Proposed Development will not contribute to a significant cumulative deterioration in water quality. Consequently, no adverse effect on the integrity of Kenmare River SAC is predicted as a result of urban runoff or urban wastewater arising from the Proposed Development in combination with other plans or projects.

4.4.2.3 Hydromorphology and Drainage

Hydromorphological pressures include physical alterations to the form, flow, banks, bed or connectivity of a waterbody. Such pressures may arise from culverting, channel modification, embankments, outfalls, flow controls, bank protection and other drainage infrastructure.

Hydromorphological pressure is identified as an existing pressure on the Lissaniska 21 River and Finnihy River. Existing and future development within the catchment may require additional surface-water drainage infrastructure or physical works affecting watercourses. In combination, such works could contribute to incremental alteration of channel form, flow conditions or riparian habitat.

The Proposed Development does not involve the culverting or diversion of the Lissaniska 21 River or Finnihy River. The principal physical interaction with the surface-water network will be the construction of the proposed headwall outfall within the bank of the Lissaniska 21 River, outside the application red-line boundary. The works will comprise localised excavation, installation of the outfall pipe and headwall, connection to the development's surface-water drainage system, and reinstatement of the affected riverbank and watercourse margin.

Construction of the outfall will result in a minor and localised alteration of the riverbank at the discharge point. There will be no corresponding physical works within the Finnihy River or Inner Kenmare River. The proposed surface-water system will attenuate runoff to the calculated greenfield runoff rate before discharge, thereby limiting changes to the existing flow regime.

In the absence of appropriate controls, construction of the headwall could result in localised bank disturbance, erosion, sediment mobilisation or damage to riparian vegetation. During operation, poorly designed or uncontrolled discharge could contribute to erosion or alteration of channel morphology at the outfall.

Other drainage works or outfalls associated with development in the catchment could act in combination with the Proposed Development to increase hydromorphological pressure. However, the physical effect of the Proposed Development will be confined to the immediate outfall location and will not result in fragmentation, culverting or substantial modification of the receiving watercourse.

Subject to implementation of the outfall-construction methodology, erosion and sediment controls, bank reinstatement measures and operational flow controls set out in Section 5, the Proposed Development will not result in a significant cumulative hydromorphological effect on the Lissaniska 21 River, Finnihy River or Inner Kenmare River.

Consequently, no adverse effect on the integrity of Kenmare River SAC is predicted as a result of hydromorphological or drainage effects arising from the Proposed Development in combination with other plans, projects or activities.

4.4.3 Permitted and Proposed Developments

The Proposed Development has been assessed in combination with the plans, permitted and proposed developments, EPA-licensed or registered facilities, existing land uses and ongoing activities identified in **Section 3.4**.

The principal potential in-combination pathways relate to urban runoff, wastewater collection and treatment, construction-related pollution and localised hydromorphological effects within the receiving surface-water network. Potential cumulative effects associated with artificial lighting and the ecological functionality of habitat used by Lesser Horseshoe Bat have also been considered.

In the absence of mitigation, the Proposed Development could contribute to cumulative pressure on water quality within the Lissaniska 21 River, Finnihy River and Inner Kenmare River. Mitigation measures addressing construction-phase pollution prevention, surface-water treatment and attenuation, wastewater management, outfall construction and operational maintenance are therefore prescribed in **Section 5**.

Subject to implementation of these measures, and compliance with Uisce Éireann's connection requirements, the Proposed Development will not contribute to cumulative effects capable of adversely affecting the integrity of Kenmare River SAC.

No functional pathway has been demonstrated through which the Proposed Development could act in combination with the identified plans, projects or activities to adversely affect the qualifying-interest population of Lesser Horseshoe Bat associated with Kenmare River SAC or Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC.

Accordingly, following implementation of the mitigation measures prescribed in **Section 5**, the Proposed Development, either individually or in combination with other plans or projects, will not adversely affect the integrity of either European site in view of its conservation objectives.

4.4.4 EPA-Licensed or Registered Facilities

The EPA-licensed or registered facilities identified in **Section 3.4.4** were considered in combination with the Proposed Development. These comprise Kenmare Wastewater Treatment Plant (Wastewater Discharge Licence D0184-01) and Kenmare Transfer Station (Waste Licence W0086-01).

Kenmare Wastewater Treatment Plant is located approximately 900m southwest of the Proposed Development. The Proposed Development will connect to the public foul sewerage network, with wastewater conveyed to the treatment plant prior to discharge to the Finnihy River and Inner Kenmare River receiving environment. The potential for in-combination effects associated with additional hydraulic and organic loading, treatment performance and the discharge of treated effluent has been assessed in **Section 4.4.2.2**.

Connection of the Proposed Development to the public wastewater network will be subject to Uisce Éireann's requirements and the upgrades specified in its Confirmation of Feasibility. Kenmare Wastewater Treatment Plant is also subject to the conditions and emission requirements of its EPA wastewater discharge authorisation.

Kenmare Transfer Station is located approximately 3.6km northwest of the Proposed Development. No direct interaction or shared operational infrastructure exists between the transfer station and the Proposed Development. The facility operates under an EPA waste licence that regulates its emissions and environmental performance. No credible hydrological or ecological pathway has been identified through which the Proposed Development could act in combination with the transfer station to adversely affect either European site.

Subject to compliance with the relevant EPA authorisations, Uisce Éireann's connection requirements and the mitigation measures prescribed in **Section 5**, no adverse in-combination effects on the integrity of Kenmare River SAC or Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC are predicted.

4.4.5 Cumulative Effects – Conclusion

The Proposed Development has been assessed in combination with the plans, permitted and proposed developments, EPA-licensed or registered facilities, existing land uses and ongoing activities identified in **Section 3.4**.

The principal potential in-combination pathways relate to urban runoff, wastewater collection and treatment, construction-related pollution and localised hydromorphological effects within the receiving surface-water network. Potential cumulative effects associated with artificial lighting and the ecological functionality of habitat used by Lesser Horseshoe Bat have also been considered.

In the absence of mitigation, the Proposed Development could contribute to cumulative pressure on water quality within the Lissaniska 21 River, Finnihy River and Inner Kenmare River. Mitigation measures addressing construction-phase pollution prevention, surface-water treatment and attenuation, wastewater management, construction of the proposed outfall and operational maintenance are therefore prescribed in **Section 5**.

Subject to implementation of these measures, compliance with Uisce Éireann's connection requirements and continued compliance of relevant facilities with their applicable EPA authorisations, the Proposed Development will not contribute to cumulative effects capable of adversely affecting the integrity of Kenmare River SAC.

No functional pathway has been demonstrated through which the Proposed Development could act in combination with the identified plans, projects, facilities or activities to adversely affect the qualifying-interest population of Lesser Horseshoe Bat associated with Kenmare River SAC or Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC. Accordingly, following implementation of the mitigation measures prescribed in **Section 5**, the Proposed Development, either individually or in combination with other plans or projects, will not adversely affect the integrity of Kenmare River SAC or Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC in view of their respective conservation objectives.

5. Mitigation

5.1 Introduction

As identified in the assessment presented in **Sections 4.3 and 4.4**, the construction and operation of the Proposed Development have the potential, in the absence of mitigation, to result in indirect adverse effects on the qualifying interests of Kenmare River SAC selected for further assessment in **Section 4.2.3.1**.

The principal impact pathway relates to potential deterioration in water quality through the release of sediment, hydrocarbons, concrete, cementitious materials, wastewater or other pollutants during construction, together with potential effects associated with operational surface-water drainage and foul-wastewater treatment.

Potential effects associated with artificial lighting and the ecological functionality of habitats used by Lesser Horseshoe Bat have also been identified. Although the available evidence does not establish that bats using the Proposed Development site form part of the qualifying-interest population of either SAC, precautionary measures are included to protect retained commuting and foraging habitat and avoid disturbance to the species.

Consequently, the mitigation measures set out below are proposed to remove, prevent or reduce the identified effects to a level at which they will not adversely affect the integrity of Kenmare River SAC or Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC in view of their respective conservation objectives.

The mitigation measures comprise construction environmental management, environmental and ecological supervision, pollution-prevention measures, protection of surface-water and foul-water systems, waste management, sensitive lighting, protection of retained habitat, biosecurity and emergency-response procedures.

These measures shall be incorporated into the final Construction Environmental Management Plan and relevant construction method statements and shall be implemented in full during the construction and operational phases, as applicable.

5.2 Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) has been prepared to support the planning application for the Proposed Development. The CEMP shall be updated before commencement of construction to incorporate the mitigation measures contained within this Natura Impact Statement, the requirements of the detailed design, applicable planning conditions and the commitments contained within the supporting environmental and engineering documents.

The final CEMP shall be implemented throughout the construction phase to minimise the risk of pollution and ensure that the works are undertaken in accordance with best practice and with minimum impact on the receiving environment.

The mitigation measures prescribed in this Natura Impact Statement shall be incorporated into the final CEMP as binding environmental commitments. Where necessary, activity-specific construction method statements shall also be prepared before the relevant works commence. These shall identify the sequence of works, environmental risks, pollution-prevention measures, monitoring requirements and responsibilities applicable to each activity.

The construction works shall be managed in accordance with the final CEMP and associated method statements. These documents shall include procedures for the management of fuels, oils, concrete, excavated material, stockpiles, construction runoff, waste and accidental spills, together with appropriate emergency-response procedures.

The final CEMP shall include, but shall not be limited to, the following environmental controls:

- Management of site establishment and excavations;
- Management and storage of excavated materials and stockpiles;
- Surface-water management and sediment control;
- Installation, protection and maintenance of temporary drainage infrastructure;
- Protection of the Lissaniska 21 River and existing drainage pathways;
- Methodology for construction of the proposed headwall and outfall;
- Management of fuels, oils and hazardous substances;
- Management of concrete and cementitious materials;
- Management of temporary welfare facilities and wastewater;
- Resource and construction-waste management;
- Dust management;
- Noise and vibration management;
- Construction traffic management;
- Protection of retained trees, woodland-edge habitat and other vegetation;
- Measures for the protection of fauna;
- Management of invasive alien plant species and biosecurity;
- Environmental monitoring, inspection and auditing;
- Environmental incident reporting and corrective action; and

- Emergency preparedness and spill-response procedures.

The CEMP shall identify the parties responsible for implementing, inspecting and maintaining each environmental control. It shall be kept under review throughout construction and updated where necessary to reflect the detailed construction programme, site conditions, approved method statements and any requirements imposed by the competent authority.

Implementation of the CEMP shall ensure that no untreated construction runoff, sediment, concrete, hydrocarbons, wastewater or other potentially polluting substance is permitted to enter the Lissaniska 21 River, Finnihy River or downstream Kenmare River receiving environment.

5.3 Environmental Manager and Ecological Clerk of Works

A suitably competent Environmental Manager shall be appointed for the duration of the construction works and shall report to the Project Manager. The Environmental Manager shall communicate regularly with the Construction Manager and Ecological Clerk of Works (ECoW) to ensure that the environmental and ecological mitigation measures are implemented during the relevant construction activities.

The Environmental Manager shall be responsible for the development, implementation and maintenance of the final CEMP and associated environmental documentation. The Environmental Manager shall undertake regular documented inspections of the site to confirm that works are being completed in accordance with the CEMP, relevant method statements, planning conditions and the mitigation measures contained within this Natura Impact Statement.

The Environmental Manager's responsibilities shall include:

- Ensuring that environmental controls are installed before the relevant construction activities commence;
- Inspecting and maintaining surface-water and sediment-control measures;
- Ensuring the appropriate storage and management of fuels, oils, concrete, chemicals and waste;
- Monitoring compliance with approved construction method statements;
- Maintaining environmental inspection, monitoring and incident records;
- Ensuring that corrective actions are implemented promptly where deficiencies are identified;
- Coordinating the response to environmental incidents or accidental spillages; and
- Retaining waste-transfer documentation, inspection records and other environmental records for handover to the Applicant following completion of the works.

A suitably qualified and experienced ECoW shall also be appointed for the construction phase. The ECoW shall oversee the implementation of the ecological mitigation measures prescribed within this Natura Impact Statement and advise the Applicant, Environmental Manager and Contractor on ecological matters arising during construction.

The ECoW's responsibilities shall include:

- Undertaking pre-construction ecological inspections where required;
- Reviewing relevant construction method statements and environmental-management documentation;
- Delivering ecological toolbox talks to relevant site personnel before works commence and, where necessary, during the construction programme;
- Confirming the establishment of ecological protection measures before the relevant works commence;
- Monitoring the protection of retained trees, woodland-edge habitat and other retained vegetation;
- Advising on the control of construction lighting near bat commuting and foraging habitat;
- Overseeing biosecurity measures and the management of invasive alien plant species where necessary;

- Monitoring compliance with the ecological mitigation measures contained within this Natura Impact Statement;
- Advising the Contractor on ecological matters encountered during construction; and
- Liaising with Kerry County Council and the National Parks and Wildlife Service where required.

The ECoW shall have authority to advise that works in a particular area be temporarily suspended where an immediate risk of environmental harm, a protected species or a previously unidentified ecological constraint is encountered. Works shall not recommence in that area until the ECoW has advised on the appropriate course of action and any required protection measures have been implemented.

5.4 Surface-Water and Foul-Water Regimes

The Proposed Development shall maintain separate surface-water and foul-water drainage systems during construction and operation. No foul wastewater, untreated construction runoff or contaminated surface water shall be permitted to discharge to the Lissaniska 21 River or any other surface-water feature.

5.4.1 Construction-Phase Surface-Water Management

Before earthworks commence, the Contractor shall prepare and implement a temporary surface-water management system appropriate to the construction programme and site conditions. Temporary drainage and pollution-control measures shall be installed before the areas they are intended to protect are disturbed.

Clean surface water arising outside active construction areas shall be intercepted and diverted away from exposed ground, excavations, stockpiles and other potential sources of contamination, where practicable. Runoff arising within active construction areas shall be collected and treated before discharge or otherwise managed through an appropriately authorised disposal arrangement.

Temporary surface-water controls may include appropriately located cut-off drains, interceptor drains, settlement areas, silt traps, check dams, filter media, settlement tanks or other equivalent measures. The precise combination and location of controls shall be specified in the final CEMP and relevant construction method statements.

The following requirements shall apply:

- No untreated construction runoff shall discharge to the Lissaniska 21 River or the permanent surface-water drainage network;
- Temporary drainage measures shall be sized and maintained to accommodate expected construction-phase runoff;
- Temporary controls shall remain operational until disturbed areas have been stabilised and the permanent drainage system is capable of receiving runoff;
- Discharge points and drainage pathways shall be inspected regularly and following significant rainfall;
- Accumulated sediment shall be removed in a controlled manner and managed as construction waste;
- Pumped water from excavations shall not be discharged directly to a watercourse or surface-water drain;
- Water requiring discharge shall be inspected and, where necessary, passed through settlement or filtration measures before discharge;
- The discharge of visibly contaminated, discoloured or sediment-laden water shall be prohibited; and
- Temporary drainage measures shall not result in erosion, uncontrolled concentrated flow or flooding of adjoining land.

Weather forecasts shall be reviewed when planning earthworks and works near the Lissaniska 21 River. Exposed ground and stockpiles shall be secured where heavy rainfall is forecast, and works with a heightened risk of sediment mobilisation shall be postponed where controls cannot be demonstrated to be effective.

5.4.2 Construction of the Proposed Headwall and Outfall

The proposed headwall and outfall will be constructed within the bank of the Lissaniska 21 River, outside the application red-line boundary. These works will require localised excavation, installation of the outfall pipe and headwall, connection to the surface-water drainage system, and reinstatement of the affected riverbank and watercourse margin.

A site-specific construction method statement shall be prepared for the proposed headwall and outfall before works commence. The method statement shall be reviewed by the Environmental Manager and ECoW and shall incorporate the mitigation measures contained within this Natura Impact Statement, together with any requirements arising from consultation with Inland Fisheries Ireland and the detailed engineering design.

The method statement shall specify:

- The precise location and extent of the works;
- The proposed construction sequence and programme;
- The plant and materials required;
- Access arrangements;
- Measures to isolate the working area from flowing water;
- Management of excavated material and disturbed bank material;
- Erosion and sediment controls;
- Management of concrete and cementitious materials;
- Measures for preventing fuel, oil or other pollutants from entering the watercourse;
- Bank protection and reinstatement measures;
- Environmental monitoring and inspection requirements; and
- Emergency-response and stop-work procedures.

The works area shall be kept to the minimum practicable extent. Plant and materials shall be positioned away from the watercourse where practicable, and no fuel, oil, wet concrete, concrete washout, excavated material or construction waste shall be stored within the riparian working area.

The headwall shall be constructed in a manner that minimises disturbance of the riverbank and channel. Disturbed ground shall be stabilised and reinstated promptly following completion. No uncured concrete or concrete-contaminated water shall be permitted to contact flowing water.

The ECoW shall inspect the environmental controls before the headwall works commence and shall monitor the works at a frequency appropriate to the environmental risk. Works shall be suspended where controls are ineffective or where sediment or another pollutant is observed entering the watercourse.

5.4.3 Operational Surface-Water Drainage

During operation, runoff from roofs, roads, parking areas, footpaths and other hardstanding shall be managed through the permanent surface-water drainage system described in **Section 3.2.4.6** and detailed in the Drainage Impact Report.

The drainage system shall incorporate a Sustainable Drainage Systems treatment train comprising bioretention rain gardens, filter drains, dry swales, permeable paving or permeable asphalt, catch pits, petrol interceptors,

cellular attenuation storage and associated flow-control infrastructure, as applicable to the final approved drainage design.

Surface-water runoff shall pass through the treatment train before discharge. Runoff from trafficked areas shall pass through an appropriately specified petrol interceptor. Flows shall be attenuated and discharged at the calculated greenfield runoff rate through a Hydro-Brake flow-control device before outfalling to the Lissaniska 21 River through the proposed headwall.

The drainage system shall be designed to accommodate the specified design storm, including the applicable climate-change allowance. An appropriate exceedance route shall be maintained for rainfall events exceeding the design capacity or in the event of blockage.

The surface-water network and SuDS infrastructure shall be inspected and maintained throughout the operational life of the Proposed Development in accordance with the schedules contained in the Drainage Impact Report and manufacturers' recommendations. Maintenance shall include, as applicable:

- Removal of accumulated sediment and debris;
- Inspection and cleaning of gullies, catch pits and filter drains;
- Inspection and maintenance of bioretention areas and dry swales;
- Inspection and maintenance of permeable surfaces;
- Inspection and maintenance of petrol interceptors;
- Inspection of attenuation storage and flow-control infrastructure;
- Inspection of the headwall and outfall for blockage, erosion or structural damage; and
- Prompt repair or replacement of defective drainage components.

Maintenance records shall be retained by the party responsible for the operational management of the drainage infrastructure.

5.4.4 Foul-Water Drainage

The foul-water and surface-water drainage systems shall remain separate during construction and operation to prevent cross-contamination.

Foul wastewater generated by the Proposed Development shall drain by gravity to the proposed onsite pumping station. It shall then be pumped through a rising main along Pat Scarteen Road to a discharge manhole before flowing by gravity to the existing public foul sewer network for treatment at Kenmare Wastewater Treatment Plant.

Connection to the public wastewater network shall be undertaken in accordance with Uisce Éireann's requirements and shall be subject to the upgrades and conditions specified in its Confirmation of Feasibility.

The pumping station shall incorporate appropriate operational controls, alarms and emergency storage or contingency arrangements in accordance with the final approved design and Uisce Éireann requirements. Access shall be maintained to enable inspection, maintenance and tanker attendance in the event of pump failure.

No untreated foul wastewater shall be discharged to the surface-water drainage system, the Lissaniska 21 River or the surrounding environment. Any temporary welfare facilities used during construction shall be connected to an approved wastewater arrangement or comprise sealed units serviced by an appropriately authorised contractor.

5.5 General Protection of Water Quality During Construction

The measures set out below shall be implemented throughout the construction phase to prevent sediment, concrete, hydrocarbons, chemicals, wastewater or other pollutants from entering the surface-water drainage system, Lissaniska 21 River, Finnihy River or downstream Kenmare River receiving environment.

These measures shall be incorporated into the final CEMP and relevant construction method statements. The Environmental Manager shall inspect their implementation and maintenance, with input from the ECoW where ecological risks arise.

5.5.1 Construction Runoff and Sediment Control

Erosion and sediment controls shall be installed before earthworks or other ground-disturbing activities commence. Controls shall be adapted as construction progresses to ensure that runoff from active construction areas is intercepted and treated.

The following measures shall be implemented:

- Earthworks shall be undertaken in a phased manner, where practicable, to minimise the area of exposed ground;
- The duration for which soils remain exposed shall be minimised;
- Clean runoff shall be diverted away from disturbed areas, excavations, haul routes and stockpiles, where practicable;
- Construction runoff shall be intercepted and passed through appropriate settlement or filtration measures before discharge;
- No untreated or sediment-laden construction runoff shall be permitted to enter the permanent surface-water drainage system or receiving environment;
- Temporary drainage channels and outfalls shall incorporate appropriate erosion protection;
- Stockpiles shall be established on stable ground away from drainage pathways and shall be protected against erosion and sediment mobilisation;
- Excavated material shall not be stored within the riparian working area associated with the Lissaniska 21 River;
- Silt fencing, check dams, settlement facilities, filter media or equivalent controls shall be used where required;
- Silt controls shall be installed along the downslope boundaries of disturbed areas where runoff could migrate towards a drain or watercourse;
- Roadways and construction access routes shall be maintained to minimise the tracking of soil and sediment;
- Where necessary, road-sweeping facilities shall be used to prevent sediment from entering roadside drainage;
- Water pumped from excavations shall be treated before discharge and shall not be discharged directly to a watercourse;
- Disturbed ground shall be stabilised or reinstated as soon as practicable following completion of the relevant works; and
- Construction runoff controls shall remain in place until disturbed areas have been stabilised and the permanent drainage system is operational.

Sediment-control measures shall be inspected regularly and following periods of heavy rainfall. Accumulated sediment shall be removed before it reduces the effectiveness of the control measure and shall be stored or disposed of in a manner that prevents its re-entry into the drainage system.

Weather forecasts shall be monitored when planning earthworks. Where heavy or prolonged rainfall is forecast, exposed ground and stockpiles shall be secured, and high-risk earthworks shall not proceed unless the Environmental Manager is satisfied that the installed controls are adequate.

5.5.2 Management of Concrete

Concrete, cementitious materials and associated washout water pose a risk to aquatic environments due to their elevated pH, suspended solids and potential chemical additives. The following measures shall therefore be implemented:

- Concrete batching shall not be undertaken within the Proposed Development site unless within a specifically designed and controlled area;
- Ready-mixed concrete shall be used where practicable;
- Concrete pouring shall be supervised and shall take place only within controlled working areas;
- Concrete mixing, handling and pouring shall be undertaken away from surface-water drains and the Lissaniska 21 River;
- No uncured concrete or concrete-contaminated water shall be permitted to enter the drainage system or receiving environment;
- Concrete washout shall take place only within designated impermeable and contained washout facilities;
- Washing of concrete delivery vehicles, chutes or equipment shall not take place close to a drain or watercourse;
- Concrete washout facilities shall be inspected regularly and emptied or maintained before their containment capacity is exceeded;
- Concrete pours shall be planned with regard to weather forecasts and shall not proceed during intense or prolonged rainfall where an unacceptable pollution risk exists;
- Spill kits and appropriate containment materials shall be available during concrete works;
- Surplus concrete and concrete-contaminated materials shall be collected and managed as construction waste;
- Precast concrete components shall be used where practicable to reduce the requirement for wet concrete near sensitive receptors; and
- Concrete-contaminated material shall be removed by an appropriately authorised waste contractor or managed at an authorised facility.

For works associated with the proposed headwall, the construction method statement required under **Section 5.4.2** shall specify how the working area will be isolated and how contact between uncured concrete and flowing water will be prevented.

5.5.3 Management of Fuel, Oil and Hazardous Substances

Fuels, oils, lubricants, chemicals and other hazardous substances shall be stored, handled and used in a manner that prevents their release to soil, groundwater, drainage infrastructure or surface water.

The following measures shall be implemented:

- Fuel, oil and chemical storage shall be located within designated secure areas away from surface-water drains and the Lissaniska 21 River;

- Liquid fuels, oils and chemicals shall be stored within appropriately sized bunded areas;
- Bunds shall be impermeable and shall have sufficient capacity to contain the contents of the largest container together with an appropriate allowance;
- Containers shall be clearly labelled, securely closed and maintained in good condition;
- Refuelling shall be undertaken only within designated controlled areas using appropriate spill-containment measures;
- Mobile plant shall not be refuelled within the riparian working area associated with the Lissaniska 21 River;
- Drip trays shall be used beneath stationary plant and during refuelling or maintenance where leakage could occur;
- Plant and machinery shall be inspected regularly for fuel, oil or hydraulic-fluid leaks and shall be maintained in good working order;
- Defective or leaking plant shall be removed from service until repaired;
- Fuel deliveries shall be supervised by a competent person;
- Spill kits suitable for the substances present shall be available at fuel-storage areas, refuelling locations and within mobile plant;
- Site personnel shall be trained in the use of spill-response equipment and emergency procedures;
- Contaminated absorbent material and soil shall be collected promptly and managed as hazardous waste where appropriate; and
- Waste oils and other hazardous wastes shall be stored separately and removed by appropriately authorised waste contractors.

In the event of a spill, the source shall be stopped where safe to do so, the spill shall be contained immediately and the Environmental Manager shall be notified. Where a spill has entered or has the potential to enter a drain or watercourse, the emergency-response procedure contained within the CEMP shall be activated immediately and the relevant authorities shall be notified where required.

5.6 Management of Construction Waste

Construction waste shall be managed in accordance with the Resource and Waste Management Plan prepared for the Proposed Development and the final CEMP.

Waste management shall follow the waste hierarchy, with priority given to the prevention of waste, followed by reuse, recycling, recovery and disposal as a last resort. The Contractor shall ensure that waste is stored, handled, transported and treated in a manner that prevents pollution of soil, groundwater, the surface-water drainage system and the receiving environment.

Before construction commences, designated waste-storage areas shall be established within the construction compound. Waste-storage areas shall be located away from surface-water drains, drainage pathways and the Lissaniska 21 River and shall be appropriately surfaced, contained and secured according to the waste types stored.

The following measures shall be implemented:

- Waste streams shall be segregated to facilitate reuse, recycling and appropriate treatment;
- Suitable excavated soil and stone shall be reused within the Proposed Development where technically and environmentally appropriate;
- Surplus excavated material shall be classified and removed to an appropriately authorised facility;
- Waste shall not be buried or burned within the Proposed Development site;

- Waste containers and skips shall be clearly labelled and covered or enclosed where necessary;
- Windblown litter shall be prevented through the use of covered containers and regular housekeeping;
- Hazardous and non-hazardous wastes shall be stored separately;
- Liquid wastes and hazardous substances shall be stored within suitable sealed and bunded containers;
- Concrete waste and concrete-contaminated materials shall be stored separately from other waste streams;
- Green waste arising from vegetation clearance shall be stored and removed in a controlled manner;
- Waste-storage areas shall be inspected regularly for leakage, damage, overfilling or inappropriate segregation;
- Waste shall be removed from the site regularly to prevent unnecessary accumulation;
- Only appropriately authorised waste collectors shall be used;
- Waste shall be transported only to facilities authorised to accept the relevant waste type; and
- Waste-transfer records, receipts and disposal or recovery documentation shall be retained by the Contractor.

Where potentially contaminated soil or other unexpected material is encountered, works in the affected area shall cease until the material has been assessed and an appropriate management procedure agreed. Suspected contaminated material shall be segregated, covered and prevented from generating runoff pending classification and removal or treatment.

Wastewater from temporary welfare facilities shall be contained within sealed units or managed through another approved arrangement. Welfare wastewater shall be removed by an appropriately authorised contractor or discharged through an approved connection. It shall not be discharged to the surface-water drainage system or receiving environment.

The Environmental Manager shall monitor compliance with the Resource and Waste Management Plan and retain the relevant waste documentation. These measures shall prevent construction waste or waste-related contaminants from entering the Lissaniska 21 River, Finnihy River or downstream Kenmare River receiving environment.

5.7 Construction and Operational Lighting

Artificial lighting shall be designed and managed to avoid disturbance of bats and the functional fragmentation of commuting and foraging habitat. Particular protection shall be afforded to retained woodland and treeline habitat along the western boundary of the Proposed Development, where comparatively high levels of Lesser Horseshoe Bat activity were recorded.

5.7.1 Construction-Phase Lighting

Construction operations during the hours of darkness shall be kept to the minimum necessary. Where practicable, construction works shall be undertaken during daylight hours.

Where temporary construction lighting is required during the bat activity period between April and September, the following measures shall apply:

- Lighting shall be restricted to the areas in which it is required for safe working;
- Lighting shall be directed away from retained woodland, treelines, mature trees and other habitats used by bats;
- Light spill onto the western woodland and treeline boundary shall be avoided;

- Directional luminaires shall be used to direct light towards the active working area;
- Luminaires shall be mounted and orientated to prevent unnecessary horizontal or upward light spill;
- Hoods, cowls, louvres, shields or other suitable accessories shall be used where required to control overspill;
- Lighting shall be switched off when it is not required;
- Lighting shall not be directed towards any known or potential bat-roost feature; and
- The ECoW shall inspect temporary lighting arrangements where works are undertaken close to retained bat habitat.

The position and orientation of temporary lighting shall be reviewed as the construction area changes. Where light spill onto a retained ecological feature is identified, the lighting shall be repositioned, shielded, dimmed or removed as appropriate.

5.7.2 Operational Lighting

The operational lighting design shall maintain dark and connected habitat along retained woodland and treeline features, particularly at the western site boundary. Lighting shall provide the minimum illumination necessary for public safety and operational requirements while avoiding the creation of barriers to commuting and foraging bats.

The following principles shall be incorporated into the final operational lighting design:

- Sensitive lighting regimes shall be applied close to woodland, treelines and other bat foraging or commuting habitat;
- Dark buffer zones shall be retained around woodland-edge and treeline habitat;
- Light spill onto retained woodland, treelines and mature trees shall be avoided;
- Buffer zones shall be used to ensure that illumination adjacent to sensitive habitat remains appropriately low;
- Public lighting shall be positioned and directed away from the woodland and treeline habitat along the western site boundary;
- Private external lighting shall be limited to appropriately positioned downlighters or equivalent directional luminaires;
- Luminaires shall not include ultraviolet elements;
- LED luminaires shall be used due to their directional control, dimming capability and sharp cut-off;
- LED luminaires shall have a warm-white spectrum with a maximum correlated colour temperature of 2700 K and no UV component;
- Light sources should have peak wavelengths greater than 550 nm to reduce the blue-light component;
- Luminaires shall have a negligible or zero upward-light ratio and good optical control;
- Luminaires shall be mounted horizontally, without upward tilt or light output above 90 degrees;
- Column heights and locations shall be selected to minimise light spill and glare;
- Lighting shall be dimmed or switched off during periods when it is not required, where compatible with safety requirements;
- External security lighting shall use motion sensors and the shortest practicable activation period;
- Waymarking, where required, shall use low-output and appropriately shielded fittings;
- Bollards and other low-level luminaires shall be avoided unless their use can be demonstrated not to result in unacceptable glare, upward light or spill onto bat habitat; and
- Baffles, hoods or louvres shall be used as supplementary controls where required, but shall not substitute for appropriate luminaire selection and positioning.

The final public and private lighting designs shall be revised, where necessary, to incorporate the ecological lighting requirements specified above and to demonstrate that a dark buffer is maintained along the woodland and treeline habitat at the western site boundary. The final lighting designs shall be reviewed by a suitably qualified ecologist before installation to confirm compliance with the mitigation measures contained within this Natura Impact Statement and the recommendations of the Bat Survey Report.

Following installation, the lighting shall be inspected during the hours of darkness to confirm that no unintended spill occurs onto retained woodland or treeline habitat. Where unintended light spill is identified, corrective measures shall be implemented through reorientation, shielding, dimming or replacement of the relevant luminaire.

The operational lighting system shall be maintained throughout the lifetime of the Proposed Development. Any subsequent replacement or alteration of luminaires shall retain the ecological-performance requirements specified above.

5.8 Protection and Management of Retained Habitats

Existing trees, woodland-edge habitat, treelines and other retained vegetation shall be protected throughout construction and appropriately managed during operation. These features provide ecological connectivity and commuting and foraging habitat for bats and other fauna.

No trees are proposed for removal to facilitate the Proposed Development. Vegetation clearance shall be restricted to the areas shown on the approved drawings, and unnecessary clearance or disturbance of retained habitat shall be prohibited.

5.8.1 Construction-Phase Habitat Protection

Before construction commences, retained trees and vegetation shall be clearly identified on the construction drawings and marked or fenced on site where necessary.

The following measures shall be implemented:

- Protective fencing shall be installed around retained trees, woodland-edge habitat and other sensitive vegetation before nearby construction works commence;
- Tree-protection measures shall be established in accordance with the recommendations of the project arborist and the approved tree-protection plan;
- Protective fencing shall remain in place for the duration of construction and shall not be moved or removed without authorisation;
- Construction plant, vehicles and personnel shall remain outside protected habitat areas unless access has been specifically approved;
- Materials, spoil, waste, fuels, chemicals and equipment shall not be stored within protected habitat areas or root-protection areas;
- Excavation, ground compaction, level changes and the installation of services shall not occur within root-protection areas unless specifically provided for in the approved design and supervised where necessary;
- Cementitious materials, contaminated runoff and other pollutants shall not be allowed to enter retained vegetated areas;
- Fires shall not be permitted within or close to retained habitat;
- Damage to protective fencing or retained vegetation shall be reported immediately to the Environmental Manager and ECoW;

- Any accidental damage shall be assessed by the project arborist or ECoW and appropriate remedial action implemented; and
- Retained woodland-edge and treeline habitat shall remain connected and unobstructed throughout the construction phase.

The ECoW shall inspect the habitat-protection measures before works commence and periodically throughout construction. The ECoW shall advise on corrective action where the protection measures are damaged, displaced or ineffective.

5.8.2 Works Affecting Trees with Potential Roost Features

One oak tree on the western boundary was identified as supporting potential bat-roost features. No bats were recorded emerging from this tree during the survey undertaken on 7 July 2026. Nevertheless, precautionary measures shall apply to pruning or other arboricultural works affecting trees with potential roost features.

Before pruning commences, all trees scheduled for pruning shall be subject to an updated inspection by a suitably qualified bat specialist. Where the inspection cannot conclusively exclude bat use, further presence-or-absence survey shall be undertaken where necessary.

Where a bat roost is identified, no pruning or other works affecting the roost shall proceed unless the works can be completed lawfully and in accordance with advice from the bat specialist. Where required, a derogation licence shall be obtained from the National Parks and Wildlife Service before works commence.

Where works to a tree with potential roost features are permitted to proceed, the following measures shall apply:

- Works shall be undertaken during an appropriate seasonal period advised by the bat specialist, preferably between late August and late October or early November;
- Works shall be undertaken during mild weather conditions;
- The bat specialist shall inspect the relevant potential roost features on the day works are scheduled;
- Access to elevated features shall be provided by a qualified arborist using an appropriate climbing method or mobile elevated working platform;
- The arborist shall be briefed by the bat specialist before works commence;
- Cracks or crevices shall be wedged open before load-bearing sections are removed, where appropriate;
- Limbs containing potential roost features shall be cut in sections and lowered carefully to the ground;
- Potential roost features shall not be cut through unless the bat specialist has confirmed that bats are absent;
- The bat specialist shall be present during the relevant pruning works;
- Any bat encountered shall be handled only by an appropriately licensed bat specialist and dealt with in accordance with the applicable licence and approved procedure;
- Removed sections containing potential roost features shall be positioned safely and left undisturbed on the ground for at least 24 hours, with openings unobstructed, to allow any unidentified bat to escape; and
- A record of the inspection, supervision and outcome of the works shall be retained.

5.8.3 Operational Habitat Management

Retained woodland-edge habitat, treelines, mature trees and associated vegetation shall be managed to maintain their ecological function and connectivity throughout the operational life of the Proposed Development.

Landscape management shall:

- Maintain continuous vegetated links along retained boundaries;
- Avoid unnecessary removal or intensive pruning of retained trees and shrubs;
- Maintain a structurally diverse woodland edge;
- Ensure that arboricultural works are undertaken in accordance with relevant wildlife legislation;
- Prevent encroachment by storage, waste or inappropriate garden development into retained ecological areas;
- Use native species of local provenance in replacement or supplementary planting where practicable;
- Replace failed planting during the next appropriate planting season;
- Manage invasive alien plant species in accordance with Section 5.9; and
- Maintain the dark habitat requirements specified in Section 5.7.

Any future arboricultural works affecting potential bat-roost features shall be preceded by appropriate ecological assessment. The operational management of retained habitat shall complement the approved landscape proposals and maintain suitable commuting and foraging habitat along the western site boundary.

5.9 Biosecurity and Invasive Alien Plant Species

Butterfly-bush (*Buddleja davidii*) and Traveller's-joy (*Clematis vitalba*) were recorded within the Proposed Development site. Both species are classified as Medium Risk invasive species. Neither species is listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended.

Rhododendron (**Rhododendron ponticum**), a Third Schedule invasive alien plant species, was recorded outside the Proposed Development boundary within Scarteen Park. No works are proposed at the recorded location. Nevertheless, appropriate biosecurity measures shall be implemented to prevent its accidental disturbance or spread.

5.9.1 Pre-construction Measures

Before site clearance or earthworks commence, the ECoW shall undertake an updated inspection of the Proposed Development site and immediately adjoining working areas to confirm the distribution of invasive alien plant species.

The inspection shall:

- Confirm the location and extent of Butterfly-bush and Traveller's-joy within the works area;
- Confirm that the recorded Rhododendron remains outside the works area;
- Identify any additional invasive alien plant species that may have established since the previous survey;
- Clearly mark or map invasive plant locations requiring management;
- Identify any risk of contaminated soil or plant material being disturbed or transported; and
- Determine whether a species-specific management plan or specialist treatment is required.

The Contractor shall be informed of the locations of invasive alien plant species during the site induction and ecological toolbox talk.

Where a Third Schedule species is identified within or immediately adjoining the works area, no disturbance of the plant or potentially contaminated soil shall occur until the ECoW has advised on the appropriate legal and management requirements. A species-specific management plan shall be prepared where required.

5.9.2 Construction-Phase Biosecurity

The following biosecurity measures shall be implemented during construction:

- Works shall avoid the Rhododendron recorded outside the Proposed Development boundary;
- Construction personnel and machinery shall not enter areas containing invasive vegetation unless access is required under an approved management procedure;
- Invasive plant material shall not be mixed with general vegetation waste;
- Soil potentially containing invasive plant material, seeds, rhizomes or root fragments shall not be reused or transported without appropriate assessment;
- Plant material and contaminated soil shall be stored securely and separately pending treatment or disposal;
- Loads containing invasive plant material or contaminated soil shall be securely covered during transport;
- Disposal shall take place only at a facility authorised to accept the relevant material;
- Machinery, vehicles, footwear and equipment used within an affected area shall be inspected and cleaned before leaving that area;
- Cleaning shall take place within a designated area where washings and plant material can be contained and appropriately managed;
- Invasive plant material shall not be stockpiled close to surface-water drains, retained habitat or the Lissaniska 21 River;
- Herbicide treatment shall be undertaken only by a suitably trained and competent person and in accordance with the product authorisation;
- Herbicide shall not be applied close to a watercourse or drainage feature unless the proposed treatment is lawful, suitable for use near water and approved through the relevant management procedure; and
- The ECoW shall monitor invasive-species controls during works affecting identified infestations.

Butterfly-bush and Traveller's-joy requiring removal shall be managed in a manner that prevents seed dispersal, vegetative spread or re-establishment within retained habitat. The method of removal shall be determined according to the size and condition of the infestation and the proposed works.

5.9.3 Unexpected Discovery

If an invasive alien plant species not previously identified is encountered during construction, works in the immediate area shall cease temporarily and the ECoW shall be notified.

The species and extent of the infestation shall be confirmed before works recommence. Where necessary, an exclusion zone shall be established and a species-specific management procedure prepared.

Where a Third Schedule species is encountered, the material shall not be cut, excavated, transported or otherwise disturbed except in accordance with applicable legal requirements and the advice of a suitably qualified specialist.

5.9.4 Operational Management

Retained habitat and landscape planting shall be monitored for the establishment or spread of invasive alien plant species as part of routine landscape management.

Any invasive plant identified during operation shall be managed promptly using an appropriate treatment method. Management shall prevent spread into retained woodland-edge habitat, drainage features, neighbouring land or the receiving water environment.

Where treatment requires repeated control, follow-up monitoring shall be undertaken until the infestation has been effectively controlled and no regrowth is observed.

5.10 Risk of Accidents and Emergency Response

The construction and operation of the Proposed Development involve a risk of accidental events that could result in the release of sediment, fuel, oil, chemicals, concrete, wastewater or other pollutants to the receiving environment.

An Emergency Response Plan shall be incorporated into the final CEMP and communicated to all relevant site personnel before construction commences. The plan shall identify foreseeable environmental incidents, assign responsibilities and specify the actions required to prevent pollutants from reaching the surface-water drainage system or Lissaniska 21 River.

The Emergency Response Plan shall include procedures for:

- Fuel, oil and chemical spills;
- Concrete or cementitious-material spills;
- Failure of temporary drainage or sediment controls;
- Uncontrolled release of sediment-laden runoff;
- Flooding of excavations or construction areas;
- Failure or overflow of temporary welfare facilities;
- Discovery of contaminated soil or unexpected hazardous material;
- Firewater or contaminated firefighting runoff;
- Extreme rainfall and severe-weather events;
- Damage to the permanent or temporary drainage system;
- Pollution entering or threatening to enter a watercourse; and
- Discovery of protected species or previously unidentified ecological constraints.

Emergency contact details shall be displayed within the construction compound and made available to relevant personnel. These shall include the Project Manager, Environmental Manager, ECoW, emergency services and relevant regulatory authorities.

Appropriate spill-response materials shall be maintained at the construction compound, fuel-storage areas, refuelling locations and within mobile plant. Spill kits shall be appropriate to the types and quantities of substances present and shall be replenished immediately following use.

In the event of an environmental incident:

- The activity causing the incident shall cease immediately, where safe to do so.
- The source of the release shall be stopped or isolated.
- The pollutant shall be contained using appropriate spill-response materials, bunding or drainage-isolation measures.
- Surface-water drains and pathways to the Lissaniska 21 River shall be protected.
- The Environmental Manager and Project Manager shall be notified immediately.
- The ECoW shall be notified where an ecological receptor may be affected.
- Contaminated materials shall be collected and stored securely pending removal by an appropriately authorised contractor.
- The relevant authorities shall be notified where required.
- The cause and environmental consequences of the incident shall be investigated.

- Corrective and preventive actions shall be implemented before the relevant activity recommences.

Site personnel shall receive training appropriate to their roles in spill prevention and emergency response. Emergency-response drills shall be undertaken where considered necessary by the Environmental Manager.

Temporary drainage and pollution-control measures shall be inspected before forecast heavy rainfall and following severe-weather events. Additional controls shall be installed where necessary, and activities presenting an elevated pollution risk shall be postponed where the available controls cannot adequately manage the forecast conditions.

During operation, the surface-water drainage system, attenuation infrastructure, petrol interceptors, flow-control device, pumping station and associated alarms shall be inspected and maintained in accordance with the relevant maintenance schedules and manufacturers' requirements.

Any operational failure or pollution incident shall be investigated and remedied promptly. Where there is a risk of contaminated water entering the Lissaniska 21 River, appropriate containment and notification procedures shall be implemented without delay.

Implementation of these measures will minimise the likelihood of an accidental event and ensure that any incident is contained and managed before it can adversely affect the water-dependent qualifying interests of Kenmare River SAC.

6. Residual Impacts

Based on the best scientific information available, it has been determined that, in the absence of mitigation, the construction and operation of the Proposed Development could result in adverse water-quality effects on the selected water-dependent qualifying interests of Kenmare River SAC.

Potential construction-phase effects include sediment-laden runoff and the accidental release of hydrocarbons, concrete, cementitious materials, wastewater or other pollutants to the Lissaniska 21 River and downstream receiving environment. Potential operational effects relate to surface-water discharge, the performance and maintenance of the permanent drainage system and the conveyance and treatment of foul wastewater.

Detailed mitigation measures have therefore been prescribed in **Section 5** for:

- Construction environmental management;
- Environmental and ecological supervision;
- Temporary and permanent surface-water management;
- Construction of the proposed headwall and outfall;
- Management of sediment, concrete, fuels, oils and hazardous substances;
- Management of construction waste and wastewater;
- Operation and maintenance of surface-water and foul-water infrastructure;
- Prevention and management of accidents and pollution incidents;
- Construction and operational lighting;
- Protection and management of retained habitat; and
- Biosecurity and invasive alien plant species.

The permanent surface-water drainage system will provide treatment and attenuation before discharging at the calculated greenfield runoff rate. The construction-phase pollution-prevention measures will ensure that untreated runoff, sediment, hydrocarbons, concrete, wastewater or other pollutants do not enter the Lissaniska 21 River or downstream receiving environment.

Foul wastewater will be conveyed separately to the public sewerage network for treatment at Kenmare Wastewater Treatment Plant, subject to Uisce Éireann's connection requirements. Inspection and maintenance of the drainage infrastructure will ensure its continued effective operation throughout the operational life of the Proposed Development.

Precautionary measures relating to artificial lighting and retained woodland-edge habitat will maintain dark and connected commuting and foraging habitat for Lesser Horseshoe Bat. The available evidence does not demonstrate that bats using the Proposed Development site form part of the qualifying-interest population of either SAC; nevertheless, the prescribed measures will avoid disturbance and functional fragmentation of habitat used by the species.

With the implementation in full of the mitigation measures set out in **Section 5**, no pollutants or uncontrolled drainage pathways will remain through which the Proposed Development could adversely affect the selected qualifying interests of Kenmare River SAC.

It is therefore objectively concluded that the Proposed Development will not result in significant adverse residual effects on the conservation objectives or integrity of Kenmare River SAC or Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC, either individually or in combination with other plans or projects.

7. Conclusion

The Habitats Directive (92/43/EEC) provides legal protection for habitats and species of European importance through the designation of Special Areas of Conservation and, together with the Birds Directive (2009/147/EC), establishes the Natura 2000 network of protected European sites.

To maintain or restore the favourable conservation condition of the habitats and species for which European sites are designated, Article 6(3) of the Habitats Directive requires that plans or projects likely to have significant effects on a European site, either individually or in combination with other plans or projects, are subject to Appropriate Assessment in view of the site's conservation objectives.

A Stage 1 screening for Appropriate Assessment was undertaken to determine whether the Proposed Development could result in likely significant effects on European sites. The Zone of Influence was established through application of the Source-Pathway-Receptor model and consideration of potential ecological and hydrological connections between the Proposed Development and European sites.

A total of 15 European sites were considered when establishing the Zone of Influence. Based on objective information, 13 European sites were screened out because no complete Source-Pathway-Receptor linkage capable of resulting in likely significant effects was identified.

Likely significant effects could not be excluded at the screening stage, in the absence of mitigation, in respect of:

- Kenmare River SAC (002158); and
- Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (000365).

The Proposed Development therefore proceeded to Stage 2 of the Appropriate Assessment process and this Natura Impact Statement was prepared.

The Stage 2 assessment considered the potential effects of the Proposed Development on the integrity of the two SACs, either individually or in combination with other plans or projects, in view of their conservation objectives.

The principal potential pathway identified relates to water quality within Kenmare River SAC. An indirect hydrological connection exists through the proposed surface-water discharge to the Lissaniska 21 River, which flows through the Finnihy River to the Inner Kenmare River. A separate operational pathway exists through the public foul sewerage network and Kenmare Wastewater Treatment Plant.

In the absence of mitigation, construction and operational activities could result in indirect effects on the selected water-dependent qualifying interests of Kenmare River SAC through sedimentation, nutrient enrichment, hydrocarbon contamination, changes in pH or the release of other pollutants.

Potential effects associated with artificial lighting and the ecological functionality of habitat used by Lesser Horseshoe Bat were also considered. Lesser Horseshoe Bat activity was recorded within the study area. However, the Proposed Development lies outside the mapped potential foraging grounds and core foraging ranges associated with the relevant qualifying-interest roosts identified for Kenmare River SAC, and the available evidence does not demonstrate that bats using the Proposed Development site form part of the qualifying-interest population of either SAC.

A comprehensive programme of mitigation has been prescribed in **Section 5**. This includes construction environmental management, environmental and ecological supervision, pollution-prevention measures, temporary and permanent drainage controls, protection of water quality, management of construction waste, operational drainage maintenance, sensitive lighting, protection of retained habitat, biosecurity and emergency-response procedures.

Following an examination, analysis and evaluation of the relevant information and best scientific knowledge, and provided that the mitigation measures prescribed in Section 5 are implemented in full, it is objectively concluded that the construction and operation of the Proposed Development will not adversely affect, either directly or indirectly, the integrity of:

- Kenmare River SAC (002158); or
- Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC (000365).

The Proposed Development will not prevent the achievement of the conservation objectives of either SAC and will not adversely affect their qualifying interests, conservation condition, structure or function.

It is also concluded that the Proposed Development, either individually or in combination with other plans or projects, will not adversely affect the integrity of any other European site.

This Natura Impact Statement contains the information required to enable Kerry County Council, as the competent authority, to undertake a complete, precise and definitive Appropriate Assessment and to determine that no reasonable scientific doubt remains as to the absence of adverse effects on the integrity of the relevant European sites.

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Appendix 1

Stages of Appropriate Assessment

Stage 1 - Screening

This is the first stage of the Appropriate Assessment process and is undertaken to determine the likelihood of significant direct and indirect effects on Natura 2000 sites, in light of their conservation objectives, because of a proposed project or plan, individually or in-combination with other plans or projects. It determines the need for a full Appropriate Assessment.

If it can be concluded that no significant direct and indirect impacts to Natura 2000 Sites are likely, in light of their conservation objectives, either individually or in-combination with other plans or projects, then the assessment can stop here. If not, it must proceed to Stage 2 for a more detailed assessment.

Stage 2 - Natura Impact Statement (NIS)

The second stage of the Appropriate Assessment process assesses the impact of the proposal (either alone or in combination with other projects or plans) on the integrity of the Natura 2000 Site(s) with respect to the conservation objectives of the site(s) and its ecological structure and function. This is a much more detailed assessment than Stage 1. A Natura Impact Statement containing a professional scientific examination of the proposal is required and includes any mitigation measures deemed necessary to avoid, reduce or offset negative impacts.

If the outcome of Stage 2 is negative i.e. adverse impacts to the Natura 2000 site(s) cannot be scientifically ruled out, despite mitigation, the plan or project should proceed to Stage 3 or be abandoned.

Stage 3 - Assessment of alternative solutions

A detailed assessment must be undertaken to determine whether alternative ways of achieving the objective of the project/plan exists.

Where no alternatives exist, the project/plan must proceed to Stage 4.

Stage 4 - Assessment where no alternative solutions exist and where adverse impacts remain

The final stage is the main derogation process examining whether there are imperative reasons of overriding public interest (IROPI) for allowing a plan or project to adversely affect a Natura 2000 Site where no less damaging solution exists.

Appendix 2

Aquatic Ecology and Fish Report



AQUATIC ECOLOGY AND FISH REPORT

**Kenmare Large-scale Residential Development
(LRD), Kenmare, Co. Kerry**

KPH Construction Ltd

August 2026

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Appendices

Appendix 1 – Macroinvertebrate Physical Habitat Suitability

Appendix 2 – Q-Rating System

Appendix 3 – Macroinvertebrates

Appendix 4 – Electrofishing Results

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MWP, Engineering and Environmental Consultants
Address: Reen Point, Blennerville, Tralee, Co. Kerry, V92 X2TK, Ireland
www.mwp.ie



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1. Introduction

Malachy Walsh and Partners (MWP) have been commissioned by the Applicant to prepare an aquatic ecology and water quality report in support of a planning application to Kerry County Council (KCC), for a proposed a Large-scale Residential Development (LRD) in the town of Kenmare, Co. Kerry. A suite of aquatic ecology and fish surveys were undertaken to inform this report. The study area includes the water features within the proposed site and watercourses considered to be part of the receiving environment of the project.

This report outlines the methods of obtaining survey information and data in relation to aquatic ecology at the proposed development site and waterbodies considered in the receiving environment of the project. Survey results for aquatic habitats, macroinvertebrates, invasive species and water quality assessments are presented.

2. Guidance and Legislation

The assessment has regard to the following legislation:

- European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. 272 of 2009) and (Amendment) Regulations 2012 and 2015;
- Water Framework Directive (2000/60/EC), transposed in Irish law via S.I. No. 722/2003 and subsequent regulations;
- European Union Floods Directive (2007/60/EC);
- IFI 2016 'Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters';
- The Wildlife Act, 1976 and Wildlife (Amendment) Act, 2000 Regulations, 1990;
- The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) as transposed by the European Communities (Natural Habitats) Regulations, S.I. 94/1997, as amended by S.I. 233/1998 and S.I. 378/2005;
- Environmental Protection Agency: Water Framework Directive Lake Status Classification (2023);
- Fisheries (Consolidation) Act 1959 (Section 171); and
- Local Government (Water Pollution) Acts 1977 to 1990.

CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Institute of Ecology and Environmental Management, Winchester.

The European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. 272 of 2009) and (Amendment) Regulations 2012 and 2015 establish legally binding quality objectives for all surface waters and environmental quality standards for pollutants for purposes of implementing provisions of E.U. legislation on protection of surface waters. These regulations clarify the role of public authorities in the protection of surface waters also concern the protection of designated habitats.

Under the Water Framework Directive (WFD; 2000/60/EC), Member States are required to classify rivers according to their hydromorphological condition, as these physical elements support high ecological status for biological quality elements such as fish, macrophytes, invertebrates and diatoms. The Directive also obliges

Member States to implement mitigation measures necessary to achieve at least Good Ecological Status and to prevent any further deterioration in waterbody status.

The Water Framework Directive operates in six-year planning cycles. Ireland has completed the first (2009–2015) and second (2016–2021) cycles and is currently implementing the Third Cycle (2022–2027). This cycle continues the requirement for Member States to assess, classify and manage waterbodies with a focus on addressing significant pressures, improving ecological status and preventing deterioration. As Ireland progressed into the second cycle of the WFD, assessments were undertaken to identify hydromorphological pressures affecting rivers and streams. These pressures can arise from activities including water abstraction, impoundments (e.g. dams and weirs), channelisation and embankments. The Third Cycle places particular emphasis on targeted measures, catchment-based management and strengthened coordination between agencies to support the achievement of at least Good Ecological Status across Ireland’s rivers, lakes, transitional and coastal waters.

The European Communities Birds and Natural Habitats Regulations 2011 transpose the Habitats Directive and the Birds Directive. The Habitats Directive contributes to ensuring biodiversity in the European Union by conserving natural habitats and wild fauna and flora species. It sets up the ‘Natura 2000’ network, the largest ecological network in the world. Natura 2000 comprises special areas of conservation designated by EU countries under this directive and special protection areas classified under the Birds Directive (Directive 2009/147/EC).

The Wildlife Act, 1976 provided a good legislative base for nature conservation. The species protection provisions, including those regulating hunting, are quite comprehensive, to the extent, for example, that they largely foresaw similar aspects of the EU Birds and Habitats Directives.

Relevant guidance published by the National Roads Authority (NRA, now TII), and applicable to assessing watercourses in Ireland were also followed, including ‘Guidelines for the Crossing of Watercourses during the Construction of National Road Schemes’ (NRA, 2005).

Section 171 of the Fisheries (Consolidation) Act 1959 creates the offence of throwing, emptying, permitting or causing to fall onto any waters deleterious matter. Deleterious matter is defined as not only as any substance that is liable to injure fish but is also liable to damage their spawning grounds or the food of any fish or to injure fish in their value as human food or to impair the usefulness of the bed and soil of any waters as spawning grounds or other capacity to produce the food of fish. It is necessary to get written permission from Inland Fisheries Ireland to proceed with works in any areas where disturbance to the spawning and nursery areas of both salmonids and lampreys occur. Salmon, all lamprey species, and their habitats are further protected under the EU Habitats Directive.

Under Section 3 of the Local Government (Water Pollution) Act, 1977 (as amended by Sections 3 and 24 of the 1990 Act) it is an offence to cause or permit any polluting matter to enter waters. Suspended solids would be a key parameter here. Likewise, any visual evidence of oil/fuel in the river would constitute an offence.

3. Statement of Competency

This report was prepared by Maureen Kelliher (BSc. Hons) and Petr Dobes. Maureen has over 6 years of fieldwork experience from her degree and ecological consultancy, and over 2 years of consultancy experience in reporting and surveying for numerous projects and schemes across Ireland. She has authored and co-authored dedicated protected species reports, including freshwater pearl mussel *Margaritifera margaritifera*, Kerry slug *Geomalacus maculosus*, Killarney fern *Vandenboschia speciosa* and white-clawed crayfish *Austropotamobius pallipes*. In 2022 and 2024, she contributed to EPA biological monitoring of rivers under the Water Framework Directive, performing macroinvertebrate identification, phytobenthos sampling and preservation, and River Hydromorphology Assessment Technique (RHAT) surveys. She drafted the EPA River Assessment Value Report for

Hydrometric Areas 25 and 06. Maureen is an accredited FPM Stage I and II and white-clawed crayfish surveyor, with relevant experience across Munster and Leinster. Maureen has notable experience in electrofishing surveys and conducting fish habitat assessments for salmonids, lamprey *Lampetra spp* and European eel *Anguilla Anguilla* as part of Flood Relief Schemes and other projects.

Petr has been a valuable member of MWP's Ecological team since May 2023. As a qualifying member of the Chartered Institute of Ecology and Environmental Management (CIEEM), he demonstrates a strong commitment to environmental stewardship. His fieldwork experience includes invasive species surveys, bird surveys, freshwater macroinvertebrate sampling and identification, as well as standard ecological survey methodologies such as mammal surveying and habitat mapping. He has also gained experience in conducting Appropriate Assessments (AA) and Ecological Impact Assessments (EclA) across various projects. Additionally, Petr has received formal training in aquatic macroinvertebrate identification (Freshwater Biological Association), Biological Water Quality Assessment using the Q-value method (Pascal Sweeney), white-clawed crayfish surveying, and Stage 1 & 2 freshwater pearl mussel surveying (Pascal Sweeney).

Surveying to inform this report was completed by Orla van der Noll (BSc., MSc.) and Petr Dobes (CIEEM), ecologists of Malachy Walsh and Partners. Orla is an Ecologist at MWP with experience in consultancy since 2021. She has completed a number of ecological reports including screening for AA reports, NIS, and EclA reports for a range of projects across Ireland. Orla has strong ecological field survey skills, particularly in ornithology, bats (NPWS bat survey licenses (DER/BAT 2025-222; DER-BAT-2026-137)) and aquatics (electrofishing, freshwater pearl mussel and white-clawed crayfish). In 2020 she qualified with a first-class honours master's degree in Marine Biology from Bangor University in Wales, after graduating from University College Cork in 2018 with a Bachelors (Hons) degree in Ecology and Environmental Biology. She also holds a C-permit under the British Trust for Ornithology (BTO) ringing scheme in Ireland and is registered with the Chartered Institute of Ecology and Environmental Management (CIEEM) as a Qualifying member, working towards an Associate membership.

This report was reviewed by Rob Beer (BSC, MRSB) Senior Ecologist at MWP. Rob is a Senior Ecologist with eight years full-time experience, since graduating in 2017. Before joining MWP in March 2024, Rob had previously been working in the UK. Rob is experienced in a range of standard and complex ecological surveys in accordance with British standards, including, but not limited to, UK habitat classification surveys and JNCC1 Phase 1 surveys, Biodiversity Net Gain (BNG) metric and reporting, bat surveys (stages 1 & 2), reptile surveys, badger surveys, & great crested newt (GCN) surveys. Rob has also authored ecological reports within an Irish setting including, but not limited to, Screenings for Appropriate Assessment Reports, Natura Impacts Statements and Ecological Impact Assessments. Rob is a holder of a Natural England bat license level 2, a holder of a Natural England GCN license level 1 and has a FISC2 level 2 certificate. Rob is also a holder of a National Parks and Wildlife Service (NPWS) bat survey license (License Number: DER-BAT-2026-174). Rob also has extensive experience with ecological clerk of works (ECow) for a range of species across diverse project types, from small household projects to large infrastructure projects such as rail and road schemes. This includes conducting supervisions and overseeing licenced works in relation to bat, badger and GCN.

¹ Joint Nature Conservation Committee (JNCC) - Public body that advises the Government of the United Kingdom on UK-wide and international nature conservation.

² Field Identification Skills Certificate (FISC) from the Botanical Society of Britain and Ireland (BSBI)

4. Methodology

4.1 Desk Study

A desktop review was carried out to collate information on fish and to identify features of aquatic ecological importance within the study area. Records of protected aquatic species in the environs of the proposed development were identified. This information was obtained by accessing the website of the National Parks & Wildlife Service (NPWS)³ and Inland Fisheries Ireland (IFI) on 1st July 2026. The database of the National Biodiversity Data Centre (NBDC)⁴ was consulted to assess the presence of aquatic faunal species and records of protected species from records of the study area. The document 'Quantification of the freshwater salmon habitat asset in Ireland' by McGinnity et al. (2003) was also reviewed to classify the salmonid habitats in the study area. Watercourse names follow EPA nomenclature. Stream order is described using the classification system given in Strahler (1957) which defines stream size based on a hierarchy of tributaries (with 1st order streams being the smallest).

4.2 Field Surveys

MWP carried out aquatic surveys in the Finnihy catchment (Finni SC_010, WFD Sub-basin FINNIHY_020, EU Code: IE_SW_21F010510) on 6th June and July 13th 2026. The aquatic surveys are referenced as Site 1, Site 2, Site 3 and Site 4.

Site 1 located ca. 0.15 rkm upstream from the PDS and Site 2 situated 0.23 rkm downstream of the Proposed Development site, both sites on the watercourse EPA name: LISSANISKA 21 (Segment ID: 21_6311). Site 3 and Site 4 (EPA name: Finnihy, Segment ID: 21_2495) situated ca. 0.59 rkm and 0.89 rkm downstream of the proposed development site (**Figure 1**). Additionally, one RHAT was conducted on the LISSANISKA Stream at Site 2 and four Spot Checks on the Finnihy River and are discussed in detail below.

The study area was defined as fluvial habitats (watercourses) potentially affected by the proposed development, including within the proposed development site, and those downstream, within the receiving environment. Sites were selected on waterbodies within and downstream of the proposed development as indicated in **Figure 1** and **Table 1**. While survey locations down-gradient of the proposed development area are influenced by factors outside of the site boundary, downstream biota are nonetheless receptors with regard to potential effects of the proposed development, and acquisition of baseline information at these locations is deemed important in a complete understanding of aquatic sensitivities in the receiving environment. Indeed, the larger size of watercourses downstream of the proposed development provide more habitat and are considered more suitable for aquatic biota than reaches inside the proposed development site boundary.

The field surveys comprised an evaluation of aquatic assessments at representative accessible locations on watercourses within the receiving environment of the proposed development (**Figure 1**). Four sites including four Spot Check sites were selected at/near roads and/or tracks, given that these sites may require monitoring. The following aquatic assessments were carried out on selected watercourses:

- River Hydromorphological Assessment Techniques (RHAT);

³ <https://www.npws.ie/maps-and-data>

⁴ <http://www.biodiversityireland.ie/>

- Aquatic habitats (benthic macroinvertebrate habitat and fish habitat assessment);
- Biotic assessment using aquatic macroinvertebrates; and
- Fish survey.

Water quality affects the viability and quality of salmonid habitat so is useful in assessing habitats for aquatic organisms, including trout and salmon. To this end biological sampling and water quality indices, as well as macroinvertebrate functional feeding group analysis were used to evaluate watercourses at selected locations.

An RHAT was undertaken on 6th June on the banks of the LISSANISKA 21 watercourse at Site 2. Three Spot Check surveys were conducted at three different locations downstream of the Proposed Development site on the lower Finnihy River on July 13th 2026 (**Figure 2**). Field work pertaining to aquatic habitats, electrical fishing, sampling for macroinvertebrates and fish habitat assessment surveys were also carried out on July 13th at Sites 1, 2, 3 and 4.

Table 1. Aquatic ecology and fish survey locations on watercourses draining the proposed LRD, Kenmare, Co. Kerry.

Hydrometric Area	Sub-catchment	Sub-basin	EPA Watercourse Name	Order	River Segment Code	Site	Coordinate (ITM)	
							x	y
21 (Dunmanus-Bantry-Kenmare)	Finnihy_SC_010	FINNIHY_020	LISSANISKA 21	2	21_6311	1	491422	571460
			LISSANISKA 21	2	21_6311	2	491147	571168
			Finnihy	4	21_2495	3	490831	571068
			Finnihy	4	21_2495	4	490561	570786

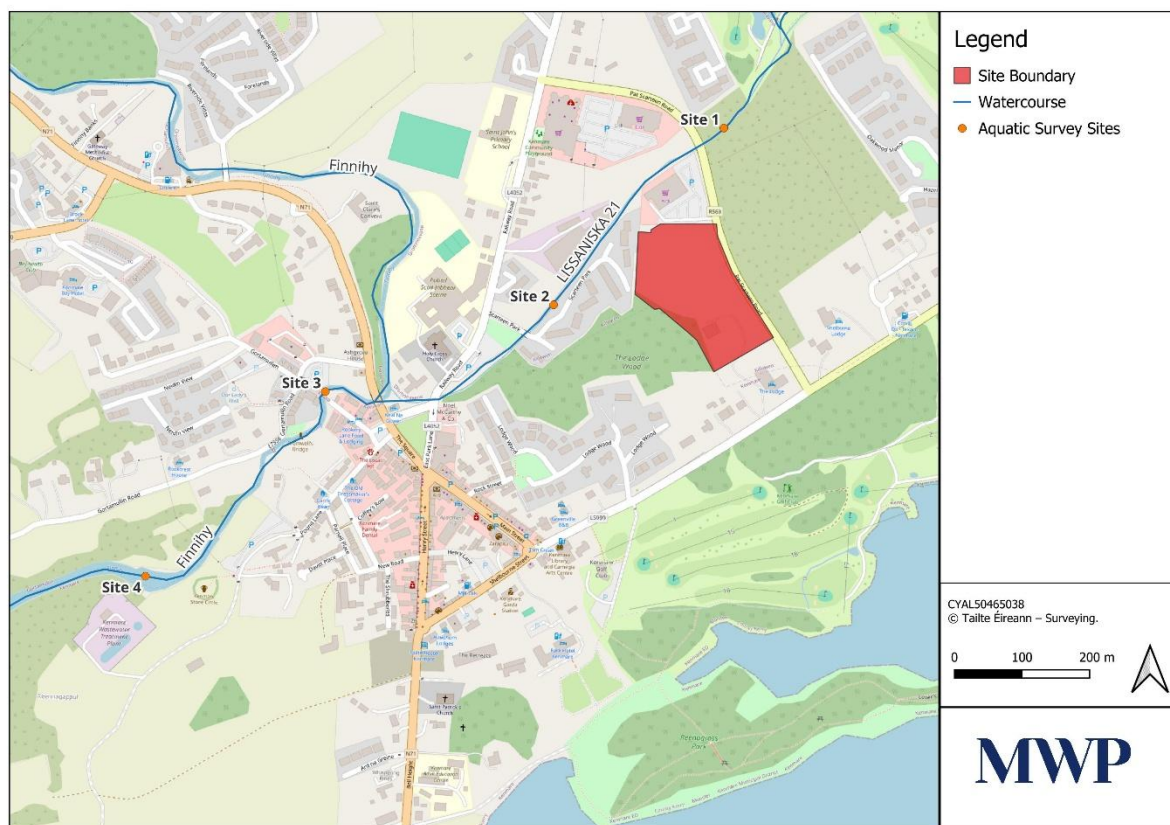


Figure 1. MWP aquatic survey site locations within the Kenmare town environs.

4.2.1 RHAT/Spot Checks

The hydromorphological characteristics of the potential works area was assessed using the River Hydromorphology Assessment Technique (RHAT), in accordance with Murphy and Toland (2014) and The River Habitat Survey (RHS) (EA 2003, Raven et. al. 1998). The RHAT is a bank-based field survey used to evaluate the physical condition and naturalness of river channels in accordance with the Water Framework Directive (WFD) and the CEN hydromorphology standards EN 14614 (CEN 2004) and EN 15843 (CEN 2010). The method provides a consistent, semi-quantitative assessment of hydromorphological functioning and the degree of departure from natural reference conditions.

Each site selected for RHAT/Spot Checks are determined by classifying rivers in terms of hydromorphology to support high ecological status (fish, macrophytes, invertebrates and diatoms) and where potential proposed work is required. RHAT's can be used to assess hydromorphological conditions before and after such works are carried out. The Spot Check approach evaluates a rivers physical habitat from a bridge or strategic viewpoint, while still evaluating all relevant attributes of a comprehensive RHAT survey. This type of survey technique involves high-level monitoring to supplement data in difficult to access areas in comparison to a full RHAT survey.

A Full RHAT (500m) was conducted on the LISSANISKA 21 (Lissinisca Stream) which runs parallel to the Proposed Development site. Spot Checks covering an observable distance of between ca. 75 m and 500 m was undertaken on the lower reaches of the Finnihy River incorporating upstream and downstream of the Proposed Development site (Figure 2). Table 2 presents RHAT/Spot Check survey information

To align with RHAT hydromorphology site-coding requirements, the site names were updated from generic labels (e.g., “Site 1”, “Site 2”) to the hydromorphology site code format. Accordingly, all assessment locations on the Lissinska Stream and Finnihy River were renamed using the prefix ‘LIS / FIN’ followed by sequential numbers (e.g., LIS01, FIN01). This ensures consistency and allows each assessment point on the river to be uniquely and correctly identified.

Eight hydromorphological attributes representing key bank, channel, and geomorphological features were assessed. Each attribute was assigned a score from 0 (Bad) to 4 (High), reflecting its condition and level of naturalness (see **Table 3**). This scoring system supports classification of the river’s morphological quality and its deviation from expected natural conditions.

The attributes assessed include:

- Channel morphology and flow types
- Substrate composition and diversity
- Channel vegetation
- Barriers to continuity
- Bank structure and stability
- Bank-top vegetation
- Riparian land cover
- Floodplain interaction

Where features were not visible during the survey, scores were assigned based on the best available information. In the absence of supporting data, a default score of 2 was applied (or 1 per bank for bank related attributes).

The combined attribute scores were used to calculate a RHAT Band Class, following the percentage deviation thresholds set out in the CEN standards. This classification aligns directly with the WFD morphological quality classes: High, Good, Moderate, Poor, and Bad. The RHAT outputs, therefore, provide a clear indication of hydromorphological condition and assist in identifying pressures relevant to WFD compliance and flood-relief scheme design.

Table 2. River Hydromorphology Assessment Technique Survey Locations

Survey Site	Sub-basin	EPA Watercourse Name	Survey Type	River Segment Code	Hydromorphology Site Code	Approximate Survey Extent (m) (u/s and d/s) ⁵
LIS01		LISSANISKA 21	RHAT	21_6311	LIS01	500
FIN01	FINNIHY_020	FinniHy	Spot Check	21_2495	FIN01	90
FIN02		FinniHy	Spot Check	21_2495	FIN02	75

⁵ Approximate survey extent totaling the observable view of the upstream (u/s) and downstream (d/s) reach at each survey site.

Survey Site	Sub-basin	EPA Watercourse Name	Survey Type	River Segment Code	Hydromorphology Site Code	Approximate Survey Extent (m) (u/s and d/s) ⁵
FIN03		Finnihy	Spot Check	21_2495	FIN03	100

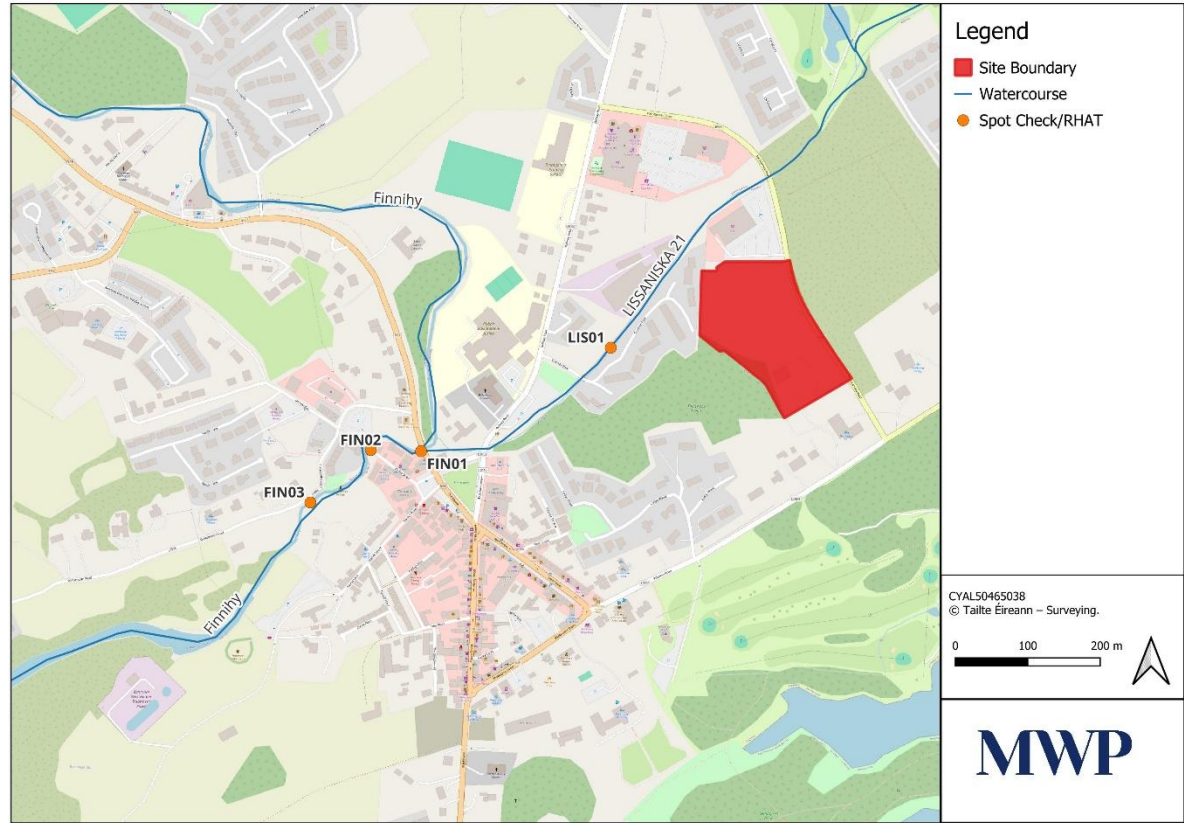


Figure 2. RHAT and Spot Check survey locations within the Kenmare environs of the Proposed Development

Table 3. RHAT Band Class Score	
Classification	Score
High	≥26
Good	≥19.5 to <26
Moderate	≥12 to <19.5
Poor	≥6.5 to <13
Bad	≥6.5

4.3 Aquatic Habitats

The study area was defined as fluvial habitats (watercourses) potentially affected by the proposed development, including within the proposed development site, and those downstream, within the receiving environment. While survey locations down-gradient of the proposed development area are influenced by factors outside of the site boundary, downstream biota are nonetheless receptors with regard to potential effects of the proposed development, and acquisition of baseline information at these locations is deemed important in a complete understanding of aquatic sensitivities in the receiving environment. Indeed, the larger size of watercourses downstream of the proposed development provide more habitat and are considered more suitable for aquatic biota than reaches inside the proposed development site boundary.

Habitat assessment was carried out at these sites using the methodology given in the Environment Agency's 'River Habitat Survey in Britain and Ireland Field Survey Guidance Manual 2003' (EA, 2003) and the Irish Heritage Council's 'A Guide to Habitats in Ireland' (Fossitt, 2000). Watercourses were photographed at survey site locations and at various locations throughout the study area. Anthropogenic and livestock influences on fluvial and riparian habitats were noted along the surveyed stretches. Aquatic survey sites were assessed in terms of:

- Stream width and depth and other physical characteristics;
- Substrate type, listing substrate fractions in order of dominance, i.e. large rocks, cobble, gravel, sand, mud etc.;
- Flow type, listing percentage of riffle⁶, glide⁷ and pool⁸ in the sampling area;
- Instream vegetation, listing plant species occurring and their percentage coverage of the stream bottom at the sampling site (as applicable) and on the bankside; and
- Estimated cover by bankside vegetation, giving percentage shade of the sampling site.

4.3.1 Macroinvertebrate Habitat Evaluation

Habitat has a key influence on the macroinvertebrate communities, which occur in rivers and streams. The physical habitats of study sites were assessed in relation to macroinvertebrates using a method given by Barbour and Stribling (1991). This method assesses habitat parameters and rates each parameter as optimal, sub-optimal, marginal or poor (scores 5, 10, 15 and 20 respectively). The scores for each parameter are then added up to give an overall habitat score. All four survey sites were subjected to a macroinvertebrate habitat evaluation survey. **Appendix 1** shows how habitats are assessed using this method.

4.3.2 Fish Habitat Evaluation

The results of the aquatic habitat survey were used in conjunction with the document 'Ecology of the Atlantic Salmon' (Hendry and Cragg-Hine, 2003) to assess habitat suitability for salmonids at selected representative sites. All survey sites (n=4) were subjected to a fish habitat evaluation survey.

The results of the stream habitat surveys were used in conjunction with the leaflet '*The Evaluation of habitat for Salmon and Trout*' (DANI, 1995) to assess habitat suitability for salmonids at selected representative sites. This

⁶ Described in EA (2003) as shallow, fast-flowing, water with a distinctly disturbed surface over unconsolidated gravel-pebble, or cobble, substrate

⁷ Laminar flow where water movement did not produce a disturbed surface

⁸ Little/no observable flow

leaflet (Advisory leaflet No. 1) was produced by the Department of Agriculture for Northern Ireland Fisheries Division and was designed for use in the EU salmonid enhancement programme.

4.3.2.1 Salmonids

Fisheries habitat for salmonids was assessed using the Life Cycle Unit Method (Kennedy, 1984; O'Connor & Kennedy, 2002) to map the survey sites as spawning, nursery and holding habitats, by assigning quality scores per each type of habitat. Habitats assessed with poor quality substrata, shallow depths and a poorly defined river profile received a higher score. Higher scores in the LCU method of fisheries quantification are represent of poorer value and lower scores represent more optimal value, despite appearing counterintuitive. The overall scores are calculated as a function of the sum of individual habitat scores. **Table 4** below presents the Life Cycle scoring system.

Table 4. Life Cycle Unit scoring system for salmonid spawning, nursery and holding value for habitat types.

Habitat Quality	Habitat Score	Total Score ⁹
Poor	4	12
Moderate	3	9-11
Good	2	6-8
Excellent	1	3-5

4.3.2.2 Lamprey

An evaluation of lamprey nursery habitat was carried out based on the habitat requirements of juvenile lampreys including the suitability of adult spawning habitat as outlined in Maitland (2003) and other relevant literature (e.g. Gardiner, 2003). Searches for juvenile lampreys were carried out using agitation sampling where suitable nursery habitat occurred.

Lamprey habitat evaluation for all four sites were assessed using the Lamprey Habitat Quality Index (LHQI) scoring system devised by Macklin et. al (2028) (**Table 5**). The LHQI broadly follows a similar rational as the LCU score for salmonids. Those habitats with a lack of soft, largely organic sediment areas for ammocetes burrowing, a shallow sediment depth (<10 cm) of a compacted sediment nature, receive a higher score. Higher scores in the LHQI are of poorer value, with lower scores being more optimal. Overall scores are calculated as a function of the sum of individual scores. Unlike the salmonid LCU index, holding habitat for adult lamprey is not assessed owing to their different migratory and life strategies, and that electro-fishing surveys routinely only sample larval lamprey.

The LHQI scoring system provides additional information compared to the habitat classification based on the observations of Applegate (1950) and Slade et al. (2003), which deals specifically with larval (sea) lamprey settlement attachment. Under this scheme, habitat is classified into three different types: preferred (Type 1), acceptable (Type 2) and not acceptable for larva (Type 3) (Slade et al. 2003). A description of the habitat types are presented in **Table 6** below. The classification can be broadly applied to other lamprey species ammocetes (*Lampetra* species).

⁹ Comprises of three components: salmonids spawning, nursery and holding.

Table 5. LHQI scoring system for lamprey spawning and nursery habitat value (Macklin et al., 2018).

Habitat Quality	Habitat Score	Total Score ¹⁰
Poor	4	8
Moderate	3	6-7
Good	2	3-5
Excellent	1	2

Table 6. Devised habitat classification for larval lamprey (Slade et al. 2003).

Habitat Type	Classification for larvae	Habitat Description
Type 1	Preferred	Soft substrates usually consisting of a mixture of sand and fine organic matter, some detritus cover in deposition areas, lamprey present.
Type 2	Acceptable	Substrates consisting shifting sand with little (if any) organic matter, may contain gravel and cobble, lamprey may be present in lower densities than Type 1.
Type 3	Not acceptable	Consists of materials considered hard for burrowing larvae including bedrock and highly compacted sediment.

4.4 Benthic Macroinvertebrates

Semi-quantitative sampling of benthic macroinvertebrates, or aquatic insects, was undertaken at n=4 river sites using kick-sampling (Toner *et al.*, 2005) (**Plate 1**). The sites sampled for benthic macroinvertebrates included Site1 to Site 4. Benthic (bottom dwelling) macroinvertebrates are small stream-inhabiting creatures that are large enough to be seen with the naked eye and spend all or part of their life cycle in or on the stream bottom. Three replicate, 3-minute, supplemented by a 1-minute hand search, multi-habitat kick samples were taken within a 50m stretch using a 1mm mesh kick net. All samples of invertebrates were combined for each site and live sorted on location. The relative abundance and numbers of macroinvertebrates was recorded on-site at each site. Macroinvertebrate sampling was carried out in accordance with ISO 7828: 'Water Quality – Methods of biological sampling – Guidance on Hand net sampling of aquatic benthic macro-invertebrates'. Macroinvertebrates were identified using keys listed in the references section. Biological water quality assessments was carried out for each

¹⁰ Comprises of two components: lamprey ammoeetes spawning and nursery.

site using biotic indices, based on the range and abundances of macroinvertebrates recorded. Details of biotic indices are provided in **Appendix 2**.



Plate 1. Kicksampling efforts on the Lissiniska Stream

4.4.1 Biological Water Quality

Benthic macroinvertebrates, or aquatic insects were used as an indicator of water quality at each sampling site. The Quality Rating (Q) System and other biotic indices described below were used to classify biological water quality at all aquatic survey sites. Further detail is provided in **Appendix 2**.

4.4.1.1 Quality rating (Q) system)

The Quality Rating (Q) System devised by Toner *et al.* (2005) was used to obtain a water quality rating, or Q-value. As per S.I. No. 258 of 1998, 'biological quality rating' means a rating of water quality for any part of a river based principally on the composition of macroinvertebrate communities/faunal groups present and their general sensitivity to organic pollution. This method categorises invertebrates into one of five groups (A-E), depending on their sensitivity to pollution. Q values range from Q1-Q5 with Q1 being of the poorest quality and Q5 representing pristine/unpolluted conditions. The Q index system is used by the Environment Protection Agency (EPA) and is currently the standard biological assessment technique used in surveying rivers in Ireland under the Water Framework Directive (WFD).

Biological quality elements are classified into five WFD ecological status classes, High, Good, Moderate, Poor, and Bad. These and have been intercalibrated with the EPA Q-rating system as shown in **Appendix 2**. These tables also provide a description of each of the ecological status classes based on the definitions in the WFD and the typical ecological responses associated with each class.

Table 7: Q-value classification.

Q-Value	WFD Status	Pollution	Condition
Q5, Q4-5	High	Unpolluted	Satisfactory
Q4	Good	Unpolluted	Satisfactory
Q3-4	Moderate	Slightly polluted	Unsatisfactory
Q3, Q2-3	Poor	Moderately polluted	Unsatisfactory
Q2, Q1-2, Q1	Bad	Seriously polluted	Unsatisfactory

4.5 Fish

An electric fishing survey was carried out at n=2 sites under authorisation from the Department of Communication, Energy and Natural Resources under Section 14 of the Fisheries Act (1980). **Table 8** below presents the upstream and downstream limits of the electrical fishing surveys including survey locations. **Figure 3** presents the electro fishing survey location and the extent of each survey. The purpose of this survey was to assess fish populations present at selected sites on watercourses adjoining/draining the proposed development study area. Sites were surveyed following the methodology outlined in the CFB guidance 'Methods for the Water Framework Directive - Electric Fishing in Wadable Reaches' (CFB, 2008). A 'Smith Root' portable electrical fishing unit was used during the assessment (see **Plate 2**). Electric fishing focused on Site 2 on the Lissiniska Stream and Site 3 on the Finnihy River in the Finnihy catchment as the Proposed Development upstream of these sites. An electro-fishing backpack was energised with the appropriate voltage and frequency to provide enough draw to attract salmonids, European eel and other fish species to the anode without harm.

A hand-held single anode HANS GRASSL IG600 (24 V/max DC input, 565V, 650W DC output) was utilised to electrofish the two watercourses. The watercourse and fish holding container water temperatures were monitored continually at each electrofishing site to ensure temperatures of 20°C were not exceeded to minimise stress to any captured fish due to low dissolved oxygen levels.

For salmonid species and European eel, as well as other incidental species, electro-fishing was carried out in an upstream direction for a 10-minute CPUE, an increasingly common standard approach for wadable streams (Matson et al., 2018). A total of approx. 10-100 m channel length was surveyed at each site, where feasible, in order to gain a better representation of fish stock assemblages. Captured fish were collected into a container of river water using dip nets. On completion of the survey, fish were then identified and measured to the nearest mm using a measuring board. Subsequent to this the fish were allowed to recover in a container of river water and were then released alive and spread evenly over the sampling area. Records were taken of fish captured from each pass immediately after each pass (1 pass at subject sites).

Targeted electrical fishing for lampreys was carried out at selected areas where substrates deemed suitable for juveniles occurred, based on the habitat requirements of juvenile lampreys as outlined in Maitland (2003). Subsequent to this, fish were allowed to recover in a container of river water and were then released alive and spread evenly over the sampling area.

Table 8. Downstream and upstream limits of the electrical fishing surveys undertaken on watercourses draining the proposed development

Watercourse	Site No.	Stream Order	Survey extent (ITM)				Length fished (m)	Width fished (m)	Area fished (m ²)	Time fished (min)	Passes
			Downstream		Upstream						
			X	Y	X	Y					
LISSINISKA 21	Site 2	2	491196	571232	491239	571288	72	3	216	10	1
Finnihy	Site 3	4	490826	571033	490852	571075	63	4	252	10	1

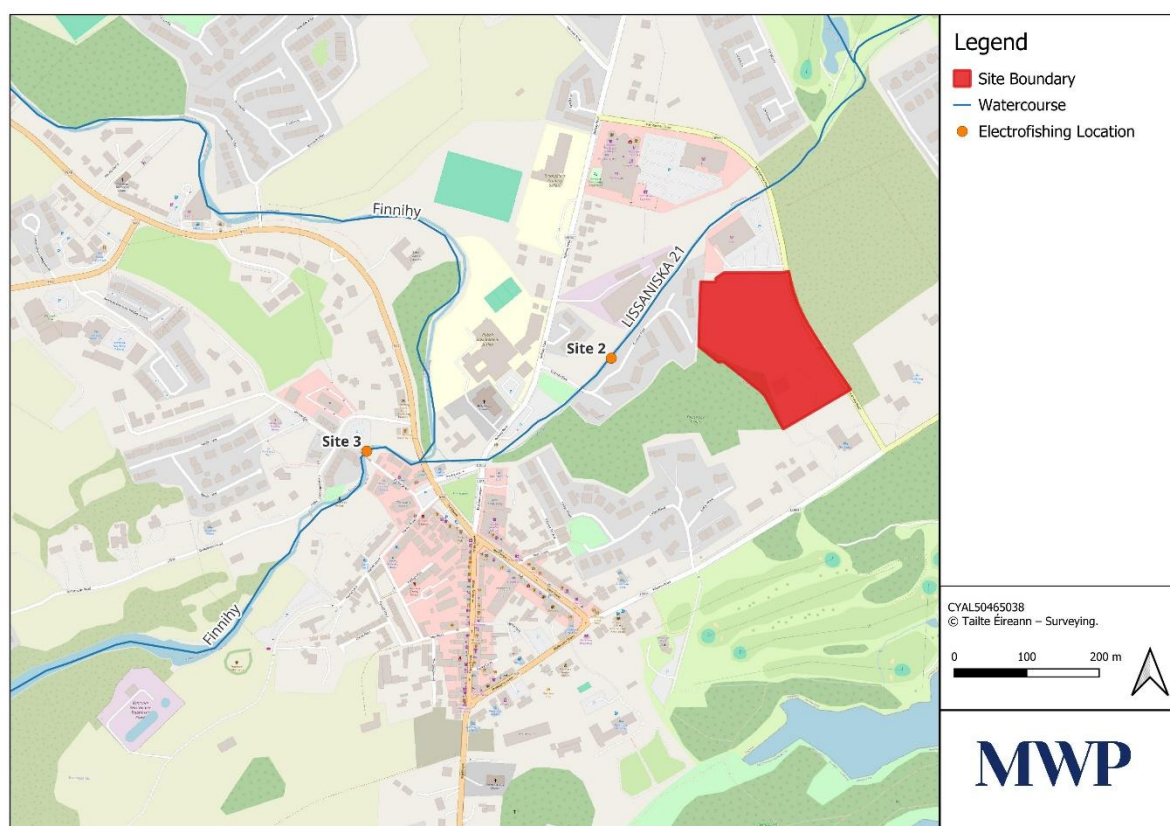


Figure 3. Electrofishing locations downstream of the Proposed Development site on the Lissiniska Stream and Finnihey River.

4.6 Biosecurity

In cognisance of the risk of spread of non-native invasive alien species, the Inland Fisheries Ireland (IFI) document '*Biosecurity Protocol for Field Survey Work*' (IFI 2010) was followed at all stages of field work. All equipment (including waders etc.) was disinfected with spray bleach disinfectant after use, washed, dried out and put in storage.

4.7 Survey Limitations

The surveys were undertaken during a period of high air temperatures and low water levels, which may have influenced both habitat availability and the composition of aquatic communities. Elevated water temperatures can place physiological stress on aquatic organisms, particularly fish species, while reduced flows can limit the availability of suitable habitat and reduce connectivity between riffle, glide and pool habitats.

Low water levels were evident across the study area and resulted in reduced flow diversity, with many survey reaches being dominated by glide habitat and exhibiting a notable lack of well-developed riffles. As riffles provide important habitat for many pollution-sensitive macroinvertebrates, their limited availability may have influenced the diversity and abundance of taxa recorded during kick sampling.

Survey constraints were particularly evident at Site 4 on the lower Finnihy River, where sampling was undertaken during low tide. Water levels were exceptionally low and the channel was strongly influenced by tidal conditions at the time of survey. Extensive aquatic vegetation, including large quantities of seaweed and macrophytes, reduced the availability of exposed substrate and made effective kick sampling more difficult. Similar, although less pronounced, effects were encountered at other sites where luxuriant macrophyte growth and filamentous algae covered substantial areas of the streambed.

Low water levels also influenced the effectiveness of the electrofishing surveys. At Site 3, a number of European eel (*Anguilla anguilla*) were observed escaping capture by moving rapidly between cobbles and boulders within shallow water areas. The combination of reduced water depth, coarse substrate and limited access for the dip net operator made capture more difficult, and it is therefore likely that the abundance of eels at this site was underestimated.

Consequently, the biological results should be interpreted with some caution as the combination of low flows, limited riffle habitat, extensive aquatic vegetation, tidal influences and reduced electrofishing efficiency may have affected both sampling effectiveness and the diversity and abundance of aquatic organisms recorded during the surveys.

5. Results

5.1 RHAT /Spot Check Results

Table 9 below presents the RHAT/ Spot Check survey results and includes the attenuated scoring and class categorisation.

Table 9. RHAT / Spot Check survey results.

Hydromorphology Site Code	Survey Date	RHAT/Spot Check	Σ Attenuated Scores	RHAT Class
LIS01	June 6 th	RHAT	16.5	Moderate
FIN01	July 13 th	Spot Check	13.5	Moderate
FIN02	July 13 th	Spot Check	13	Poor/Moderate

Hydromorphology Site Code	Survey Date	RHAT/Spot Check	Σ Attenuated Scores	RHAT Class
FIN03	July 13 th	Spot Check	14.5	Moderate

* Bad (< 6.5), Poor (≥ 6.5 to <13), Moderate (≥ 13 to <19.5), Good (≥ 19.5 to <26) and High (≥ 26).

5.1.1 Field Results

5.1.1.1 LIS01

This reach had evidence of historical straightening, widening, and deepening which deviated significantly from its natural form. These modifications can reduce hydromorphological diversity and limited a channel's ability to naturally regulate fluvial processes. Flow conditions were reduced and despite the modified form, the reach exhibited a shallow riffle-glide-pool sequence at the time of the survey. This type of hydraulic heterogeneity is beneficial hydromorphological as it promotes variation in depth, velocity and substrate sorting which in turn supports diverse macroinvertebrate assemblages and improves ecological functioning. However, it is likely that under general conditions the flow exhibits a glide dominant form due to the channel modifications present. Although the channel was modified the site provided some natural habitat value within an otherwise a relatively constrained system.

Substrate composition was dominated by mixed-sized cobble with small interstitial patches of coarse gravel between cobbles. Channel vegetation was limited and primarily comprised bryophyte species with some patches of foals water-cress *Apium nodiflorum* and *Callitriche sp.* present where gaps in shading occurred. This reflected the heavy shading and cobble-dominated nature of the reach that reduced resources (e.g. light) and habitat availability for rooting macrophytes. Montbretia, a non-native species, was recorded in the herb layer. Filamentous green algae presence was moderate and occurred throughout the reach of the channel as matts.

Both banks were broadly similar in structure and stability along the survey reach. The right bank was approximately 1.6 m in height and comprised vegetated mixed sized rocks and herbaceous flora on the bank top. The left bank had a mean height of approximately 1.2 m and had a similar structure and plant composition. The buffering capacity was considered simple along both banks of the reach. A narrow strip of riparian cover extended for the length of the site. A minor bridge structure occurs on the lower reach of the site, however, it was not considered a barrier to fish passage. Riparian land use was predominantly urbanised with stone walls, roads and buildings which is resultant of modified river corridor and narrow riparian strip. Floodplain connectivity was generally poor due to channel deepening, straightening, and adjacent urban infrastructure with little to no opportunities for lateral exchange during high flows.

Despite a shift from naturalness, the channel featured some natural aspects, and the site was categorised as 'Moderate'.



Plate 2. General fluvial conditions at LIS01.

5.1.1.2 FIN01

This section of the Finnihy River was situated within a confined urban area bordered by buildings, hardstanding, and private dwellings. The channel was relatively wide and exhibited relatively low naturalness due to extensive modification and confinement. The extremely low water levels demonstrated a relatively uniform shallow glide flow which was more evident downstream. There was minimal water present upstream for most of the channel length. Channel form was strongly constrained by reinforcement and urban infrastructure, limiting natural planform development and hydromorphological expression.

The substrate was relatively uniform with mixed-sized cobble dominating the channel bed. Patches of fine sediment were also noted at channel margins. Dense trailing filamentous green algae dominated the instream flora in areas predominantly in direct sunlight. The presence of rooting macrophyte species was generally low within the channel. A bridge crossing at the site represented a partial barrier to continuity, although it is unlikely to fully impede fish passage under typical flow conditions. No additional barriers were observed. The left bank was heavily modified, comprising stone and concrete retaining walls associated with private dwellings. Vegetation on this side was narrow and dense with bare soil observed in disturbed areas. In contrast, the right bank supported a more natural structure with trees, shrubs, and dense riparian vegetation, providing some stability and ecological value. Despite this, overall bank naturalness remained low due to modification and confinement.

Bank vegetation was unevenly distributed between the two margins. The left bank supported some cover of vegetation and was structurally limited by modification, and suburban land use. The right bank exhibited greater structural diversity, species composition and extent. The right bank was relatively low and comprised a herb and scrub layer with a narrow strip of riparian corridor. The reach is strongly influenced by adjacent urban

development including private dwellings, hardstanding, and managed grassland. Riparian width was narrow, particularly on the left bank, where built infrastructure extended close to the channel edge. The right bank retained more natural riparian character, but overall land-use pressures restricted natural regeneration and reduce riparian function. Floodplain connectivity was absent on the left bank due to retaining walls, embankments, and adjacent infrastructure. Some connectivity was noted to the riparian strip on the right bank. The channel was confined within a wide corridor with limited opportunity for lateral connection. This reach, remained hydromorphologically disconnected from its floodplain, reflecting the urban context of Kenmare town.

The site was categorised as Moderate.



Plate 3. Low flow conditions at FIN01.

5.1.1.3 FIN02

This section of the Finnihy River was similar to the form and flow observed at FIN01. The reach was characterised by a mixture of stable, relatively homogenous sections and reaches constrained by embankments of with stone retaining walls that restricted lateral adjustment and limiting natural planform development. This reflected a simplified form within an urbanised landscape. Flow at the time of the survey was extremely low and comprised mostly glide with limited riffle expression due to the decrease in water levels. Homogenisation in channel form and flow as a result of anthropogenic influences can lead to reduced habitat diversity and flow variability. Hydromorphological diversity was low and also limited in natural channel processes.

Dense instream algal growth was observed for majority of the channel's length during the extended period of hot and dry weather. Channel modifications have likely influenced instream vegetation by producing conditions less conducive to macrophytes and margin vegetation growth in areas where bank modifications have reduced the natural fluvial processes (e.g. erosion, sediment input, etc). The substrate comprised primarily mixed cobble, with some interstitial patches of gravels, and finer sediments such as sand and silt noted bankside.

A bridge crossing forms a partial barrier to continuity, although it does not appear to fully impede fish passage under typical flow conditions. No additional barriers were observed within the assessed reach. This is broadly similar to Finn01, where structures influenced channel form but did not create significant longitudinal discontinuity. Both banks exhibit heavy modification, with stone and concrete retaining walls dominating the margins. Natural bank structure was largely absent and stability was artificially maintained. Reinforced banks and confined margins similarly reduced natural bank function and stability. Riparian margins were narrow or absent, and structurally simple on both banks. Although species comprised ivy, bramble, sycamore, and ash, shading was low on both banks. Bankside vegetation was lacking a layered structure typical of a natural riparian corridor. The buffer strip was relatively simple on the left bank and bare/uniform (predominantly artificial with some vegetation present) on the right bankside. A single stand of immature butterfly bush *Buddleja davidii*, a non-native invasive species, was recorded on the left bank. Bank vegetation was relatively continuous on the left bank but ecologically limited on the right due to modification, and suburban influence.

The riparian reach was influenced by adjacent urban/suburban infrastructure which restricted natural regeneration. Riparian width was relatively narrow on the left bank and mostly absent on the right bank. Human activity and maintenance regimes further constrain riparian processes where suburban land use limited riparian function. There was no evidence of floodplain connectivity along this reach due to presence of embankments, retaining walls, and adjacent infrastructure. The channel is effectively constrained within a narrow corridor and little opportunity for lateral exchange during high flows. Floodplain disconnection was a defining hydromorphological constraint at this site.

This site was categorised as 'Moderate'.



Plate 4. Site conditions at FIN02.

5.1.1.4 FIN03

The reach had a predominantly a shallow glide-dominated flow regime at the time of the. The channel form was moderately confined by adjacent infrastructure which likely influences reduced flow heterogeneity within this reach. Channel morphological diversity was reduced by a road, bridge and reinforcement infrastructure e.g. continuous high stone wall on both banks which further reduced the natural condition.

Instream vegetation abundance and composition was low and not generally typical of a low-energy system. Filamentous green algae was moderately present within the water column throughout the length of the survey reach. The channel was limited in supporting patches of emergent and marginal vegetation. The limited vegetation present was likely influenced by unsuitable substrate for plant anchorage (e.g., bedrock and mixed cobbles/gravel) and further constrained by suburban land-use pressures which together can restrict the establishment and persistence of emergent and marginal macrophytes within this reach.

Although direct observation of the riverbed was reduced due to elevated water levels and moderate turbidity, the presence of exposed bedrock along the banks, the scarcity of instream vegetation, and bedrock outcrops within the reach indicated that the substrate was likely a mixed assemblage of bedrock, cobble, gravel, and finer sediments such as sand and silt accumulating in depositional areas, including the inner bend where a small pooling habitat was present. No significant barriers to fish passage were recorded within the assessed reach. Although

localised reinforcement and a bridge crossing are present, these do not impede longitudinal connectivity. The channel remains passable under typical flow conditions.

Bank structure compromised narrow strip of riparian buffer on both banks reduced due to bank reinforcement and limited bankside availability for establishment. Both banks deviated from their natural state through modified stabilisation. Urban edge pressures reduced the natural functioning of both margins. Bank vegetation was continuous on the left bank but absent/limited on the right bank. The vertical wall on the right bank was structurally poor, comprising trailing and creeping vegetation. The left bank was limited in species composition with splash zone bryophyte species and graminoids dominating. The channel and bank modifications resulted in simplified vegetation structure and reduced ecological value.

Riparian land use comprised parkland and urban edge features which constrained the riparian width, limited natural regeneration and reduced the potential for a diverse riparian corridor. Human activity and maintenance regimes further restricted natural processes. Floodplain connectivity was restricted due to embankments, channel reinforcement and adjacent infrastructure. The channel was effectively constrained within a narrow corridor, with no opportunity for lateral exchange during high flows. This disconnection contributed to the overall reduced hydromorphological functioning of the reach.

This site was categorised as 'Moderate'.



Plate 5. Fluvial conditions at Fin03.

5.2 Aquatic Habitats

5.2.1 Description of Aquatic Habitats

5.2.1.1 Site 1

Site 1 is a narrow, shallow watercourse with a mean wetted width of ca. 2.5 m and mean depth of ca. 20 cm. The channel is strongly glide-dominated (95% glide) with limited hydraulic diversity comprising only 5% riffle and limited pool habitat. Substrates are characteristic of a low-gradient depositing system with gravel forming 75% of the bed and smaller proportions of cobble (10%), sand (10%) and silt (10%) in slow flow reaches and channel margins. Overlying silt was moderate (15%), indicating reduced velocities and a tendency for fine material to accumulate in the thalweg and margins. Riparian shading is moderate (40% - 50%) and bank cover was complete (100%), with banks rising to ca. 2 m in height. Instream vegetation was present (5%) and algae cover was low to moderate (10%), suggesting some nutrient enrichment and slow-flowing conditions. The overall morphology and substrate composition indicate a low-energy reach with limited instream hydraulic complexity, functioning primarily as a glide-dominated lowland channel with reduced benthic habitat quality due to siltation.



Plate 6. General fluvial conditions at Site 1.

5.2.1.2 Site 2

Site 2 was slightly wider (3 m) and shallower (15 cm) than Site 1, with a similar low-gradient character. The channel was glide-dominated (75% glide) with some riffle (15%) and limited/no pool habitat. Substrates comprised 70% gravel and 20% cobble, with 10% sand and 10% silt at channel margins, indicating a mixed but predominantly coarse bed. Overlying silt was lower than at Site 1 (5%).

Riparian shading was high (ca. 90%), reflecting dense canopy cover that likely suppressed some macrophyte growth while promoting filamentous algae (10% cover). Instream vegetation was approximately 10%, likely due to stable margins and potentially increase in resource availability (e.g. available substrate for root anchorage). Bank cover is complete (100%) and banks are moderately low (1.5 m), indicating good stability and buffering. Site 2 represents a low-energy and heavily shaded glide-pool system with moderate siltation and mixed coarse substrates. The high shading and reduced hydraulic diversity limit ecological carrying capacity for both fish and macroinvertebrates



Plate 7. Survey reach at Site 2.

5.2.1.3 Site 3

Site 3 was located on the lower Finnihy River within Kenmare Town. The site occurs within a partially tidally influenced reach of the river and is subject to saline intrusion, particularly during higher tides and periods of low freshwater flow. As a result, the site exhibits transitional characteristics, supporting habitat conditions that differ from the upstream freshwater sections of the river. Site 3 has a mean wetted width reach of ca. 5 m and

maintained a shallow mean depth (15 cm) with a maximum depth of 50 cm at the time of the MWP survey efforts. This site exhibits the greatest hydraulic diversity, with 85% riffle, 15% glide, and little to no pool habitat present. Substrates are dominated by cobble (60%) and gravel (35%), with minor boulder (5%) and some silt at channel margins (5%), reflecting a higher-energy, more erosive environment than Sites 1 and 2. Notably, minimal overlying silt was recorded, indicating effective sediment transport and good flushing capacity. Riparian shading was low (<5%), allowing greater light penetration and supporting higher algal cover (40%). Instream vegetation was relatively absent (<5%), likely due to the dominance of riffle habitat and coarse substrates. Bank cover was ca. 90% and banks had a mean height of approximately 0.4 m, suggesting more exposed margins and potential for localised erosion. Site 3 represented a transitional reach with some hydraulic complexity. The coarse bed, riffle prevalence, and absence of silt indicate good habitat potential for rheophilic macroinvertebrates and juvenile salmonids.



Plate 8. Conditions as Site 3 during extended period of hot and dry weather.

5.2.1.4 Site 4

Site 4 is located on the lower reaches of the Finnihy River at the Kenmare Wastewater Treatment Plant outfall within Kenmare Town. The site lies within the Kenmare River SAC and is strongly influenced by tidal fluctuations. At the time of survey, conditions were assessed at low tide, and the reach exhibited a pronounced brackish character, reflecting the regular influence of saline water within the lower river. Site 4 is a wide brackish reach with a mean wetted width of ca. 7 m and a mean depth of 20 cm and maximum depth of 50 cm at the time of the MWP survey efforts. The reach is glide-dominated (70% glide) with pool habitat (10%) and some riffle (20%).

Substrates comprised 55% gravel, 20% cobble, 10% bedrock, 5% boulder, 5% sand and silt (5%), indicating a mixed bed with both stable coarse elements and exposed bedrock typical of a moderately higher-gradient system. Overlying silt was minimal (5%), suggesting moderate flushing capacity. Riparian shading covered an estimated 10% of the channel and instream vegetation was abundant (70%) and comprised primarily of marine flora, reflective of slower velocities in glide and pool sections. Algal cover was low (5%), likely due to shading and competition from macrophytes. Bank cover was approximately 70% as a mix of vegetated banks and exposed bedrock was present. Banks had a mixed mean height, varying from ca. 0.50 m to 2.5 m, suggesting some stable margins. Strips of riparian aeras were present primarily in from the right bank, providing some moderate riparian buffering.



Plate 9. General aquatic habitat conditions at Site 4.

Table 10. Physical characteristics of the subject survey sites within the proposed development area.

Site	1	2	3	4
Wetted width (m)	2.5	3	5	7
Mean depth (cm)	20	15	15	20
Max depth (cm)	60	40	50	50
Bedrock (%)	0	0	0	10
Boulder (%)	0	0	5	5

Site	1	2	3	4
Cobble (%)	10	20	60	20
Gravel (%)	75	70	35	55
Sand (%)	10	10	0	5
Silt (%)	10	10	5	5
Overlying silt (%)	15	5	<5	5
Riffle (%)	10	15	85	20
Pool (%)	10	0	0	10
Glide (%)	80	75	15	70
Shade (%)	45	90	<5	10
Instream veg. (%)	5	50	<5	70
Bank cover (%)	100	100	90	70
Bank height (m)	2	1.5	0.4	2.5
Algae cover (%)	10	10	40	5

5.2.2 Macroinvertebrate Habitat Evaluation

The physical habitat suitability assessment of the survey sites for macroinvertebrate production is provided in **Table 11**. Based on the physical attributes of the surveyed sites and assessment criteria, the sites are generally rated between marginal and suboptimal. This rating was applied to all, mainly due to the domination of substrates by one size class (rock/cobble), suboptimal habitat complexity, coupled with mainly marginal pool quality (<1m deep), bank stability (eroding in some instances) and canopy conditions (heavily shaded, or insufficient shade). The sites on the Lissiniska Stream were rated least suitable for aquatic macroinvertebrates primarily due to small size and consequent pool quality, along with features described above.

Table 11. Physical habitat assessment of the survey sites regarding suitability for macroinvertebrate production (adapted from Barbour and Stribling, 1991).

Site	Waterbody	Bottom substrate	Habitat complexity	Pool quality	Bank stability	Bank protection	Canopy	Score	Average score	Overall Assessment*
1	LISSINISKA 21	5	10	5	10	15	5	50	8.3	Marginal
2	LISSINISKA 21	10	15	5	15	15	10	60	10	Marginal
3	Finniuhy	20	15	10	10	15	5	75	12.5	Marginal/Suboptimal

Site	Waterbody	Bottom substrate	Habitat complexity	Pool quality	Bank stability	Bank protection	Canopy	Score	Average score	Overall Assessment*
4	Finnihy	10	15	15	10	10	10	80	13.3	Marginal/Suboptimal

* scale: poor (5) - marginal (10) – suboptimal (15) – optimal (20).

Habitats of this classification can limit taxa richness as there are fewer ecological niches available, noting that mixed gradient streams are generally suitable for macroinvertebrates with morphologies evolved for fast flows (such as Heptagenid mayflies) as well as those with other life strategies (e.g. burrowing larvae of Ephemeridae mayflies). With increasing size and depth, generally corresponding to distance downstream, the stream macroinvertebrate suitability generally increases. The best habitat score was in the River Finnihy at Site 3, this primarily due to the size, complexity of substrates and stability of the channel. It is noted that this reach is influenced by the tide however, so this physico-chemical feature affects species composition with limited freshwater animal diversity.

Habitat suitability also depends on water quality, and impacted conditions (e.g. below ‘good’ status) will also result in fewer taxa. The synergistic effect of river morphological character (including physical habitat) and stressors (e.g. silt) along with other water quality influences (e.g. nutrient loading) could explain the variation in results at the study sites (See **Section 5.3**).

5.2.3 Fish Habitat Evaluation

5.2.3.1 Salmonids

The River Finnihy and its tributary support habitat suitable for various life stages of salmonids, including Atlantic salmon (*Salmo salar*) and brown trout (*Salmo trutta*). Habitat suitability is influenced by channel gradient, flow diversity, substrate composition and water quality. Spawning typically occurs in well-oxygenated gravel substrates in transitional riffle–pool areas where flows maintain clean gravels and allow deposition of eggs within the substrate.

Site 3 on the Finnihy River contains coarse gravel and cobble substrates associated with riffle and glide habitats consistent with the Grade 2 spawning and nursery ratings (“*Spawning grade 2; Nursery grade 2; Overall evaluation: Marginal*”). These physical characteristics indicate potentially suitable spawning and juvenile rearing habitat supported by flow diversity and instream complexity. However, this reach lies within the lower river and is subject to periodic tidal influence and saline intrusion, particularly during low flows and higher tides. While the physical habitat remains favourable, saline intrusion may affect egg development and juvenile survival (Crisp, 2000), reducing overall suitability. Consequently, Site 3 provides some suitable spawning and nursery habitat but its overall value is considered marginal, reflecting the influence of tidal processes.

The lower tidal reaches of the Finnihy River, particularly Site 4, are subject to strong tidal influence and regular saline intrusion. Spawning and nursery habitats are absent at this site and the reach is classified as ‘Unsuitable’ for these functions. Brackish conditions and transitional estuarine habitat significantly limit its value for freshwater salmonid reproduction. Nonetheless, this part of the river remains an important migratory corridor for salmon and sea trout moving between freshwater and marine environments.

The Lissaniska Stream, a small lowland tributary of the Finnihy, contains areas of gravel substrate; however, it is unsuitable for salmonid spawning and nursery (“*Spawning grade 4; Nursery grade 3; Overall evaluation: Unsuitable*”), while Site 2 is marginal (“*Spawning grade 2/3; Nursery grade 2/3; Overall evaluation: Marginal*”).

These ratings reflect the predominance of slow-flowing glide habitat, silt deposition and channel modification. Although localised pockets of suitable gravel occur, excessive fine sediment reduces water circulation through redds and limits oxygen availability to developing eggs, constraining overall reproductive potential.

Across both watercourses, salmonid habitat quality is shaped by channel morphology, substrate condition, flow diversity and water quality. Fine sediment accumulation, nutrient enrichment, filamentous algal growth and historical channel modification may reduce spawning and nursery habitat quality. As salmonids are particularly sensitive during early life stages, these pressures can affect long-term reproductive success and juvenile development.

Table 12 presents a summary of the habitat suitability of the surveyed reaches for salmonid spawning and nursery function.

Table 12. Salmonid habitat rating at the aquatic survey sites

Site	Watercourse	Spawning		Nursery		Holding		Overall evaluation [§]
		Habitat grade ¹	fluvial cover ² (≈%)	Habitat grade ¹	fluvial cover ² (≈%)	Habitat grade ¹	fluvial cover ² (≈%)	
1	LISSINISKA 21	4	5	3	40	4	0	Unsuitable
2	LISSINISKA 21	2/3	10	2/3	50	4	0	Marginal
3	Finnihy	3	20	2	60	3/4	5	Marginal
4*	Finnihy	n/a	-	n/a	-	4	50	Unsuitable

Following DCAL's advisory leaflet 'The Evaluation of habitat for Salmon and Trout'

¹Grade 1 is optimal habitat and habitat quality reduces with increases in Grade (Grade 4 = poor)

²Fluvial cover relates to river substrate under water and available to fish

[§] scale: Optimal (3), Suboptimal (4-6), Marginal (7-9) and unsuitable (10-12).

*Brackish site, so not utilised as a salmonid spawning or nursery area

5.2.3.2 European Eel

European eel (*Anguilla anguilla*) utilises various aquatic habitats, including rivers, drainage ditches, lakes and ponds. The most important habitat for eel is considered large river substrates such as boulder and cobble under which eel can take refuge. Higher gradient stretches of river are considered best for holding larger eel due to the larger gaps in the substrate interstices, while lower gradient areas are deemed to provide suitable niches for smaller eels. Suitable eel habitat occurs throughout the River Finnihy system, but the lower reaches of the river are likely the most important given proximity to the sea. Some eel habitat is present at Site 2 but relatively low at Site 1.

5.2.3.3 Lampreys

Lampreys have similar habitat requirements to salmonids for spawning, typically requiring clean gravel substrates and well-oxygenated flowing water. While suitable spawning habitat may be present within parts of the Finnihy River, habitat suitability for juvenile lampreys is dependent on the availability of stable deposits of fine sand and silt into which ammocoetes can burrow. During the survey, the lower Finnihy River reaches at Site 3 and Site 4 were found to contain limited areas of suitable fine sediment habitat. These reaches were dominated by coarse gravel and cobble substrates, with relatively little sand accumulation evident.

The Lissaniska Stream contained some fine sediment deposits along the channel margins; however, these accumulations were generally limited in extent and depth and are considered suboptimal for supporting significant populations of juvenile lampreys.

Table 13. Lamprey habitat rating at the aquatic survey sites

Site	Watercourse	Habitat Score		Score	Habitat Type	Habitat Quality
		Spawning	Nursery			
1	LISSINISKA 21	4	3	7	Type 3	Moderate
2	LISSINISKA 21	3	3	6	Type 3	Moderate
3	Finnihy 21	2	3	5	Type 2/3	Good
4	Finnihy 21	4	4	8	Type 3	Poor

*Scale: excellent (2), good (3-5), moderate (6-7) and poor (8).

5.3 Benthic Macroinvertebrate

5.3.1 Existing Information

The proposed development and the watercourses examined during the current assessment occur within the 2 km grid square V97A. Records obtained from the National Biodiversity Data Centre (NBDC) indicate a diverse assemblage of aquatic and semi-aquatic invertebrates within the area encompassing the survey sites. More than 70 aquatic taxa have been recorded, including representatives of the Coleoptera (water beetles), Ephemeroptera (mayflies), Plecoptera (stoneflies), Trichoptera (caddisflies), Odonata (dragonflies and damselflies) and Diptera (true flies).

Water beetles are particularly well represented, with records including species of *Agabus*, *Hydroporus*, *Haliphus*, *Enochrus*, *Gyrinus*, *Elmis aenea*, *Esolus parallelepipedus*, *Oulimnius tuberculatus* and *Dytiscus marginalis*. Mayfly records include *Baetis* spp., *Ecdyonurus* spp., *Rhithrogena*, *Heptagenia sulphurea* and *Serratella ignita*, while stoneflies are represented by *Leuctra* spp. and members of the family Nemouridae. Numerous caddisfly taxa have also been recorded, including *Hydropsyche*, *Rhyacophila*, *Sericostoma*, *Philopotamus montanus*, *Glossosomatidae*, *Lepidostomatidae*, *Limnephilidae* and *Philopotamidae*.

Additional aquatic insect records include dragonflies and damselflies such as the Common Hawker (*Aeshna juncea*), Common Darter (*Sympetrum striolatum*), Ruddy Darter (*Sympetrum sanguineum*) and Large Red Damselfly (*Pyrrosoma nymphula*). Aquatic Diptera recorded within the area include blackflies (*Simuliidae*), non-biting midges (*Chironomidae*), *Rheotanytarsus*, *Dicranota*, *Pedicia rivosa* and several other species associated with freshwater habitats.

Other aquatic invertebrates previously recorded in the area include the freshwater shrimp *Gammarus duebeni*, the water louse *Asellus aquaticus*, and several freshwater molluscs including *Ancylus fluviatilis*, *Physella* sp., *Theodoxus fluviatilis* and *Ampullaceana balthica*.

5.3.2 Benthic Macroinvertebrates Sampling

The results of the macroinvertebrate surveys are presented in **Appendix 3**, where a species list of macroinvertebrates recorded at each survey location has been provided. The bulk of macroinvertebrates recorded belong to pollution sensitivity group C across the survey sites (pollution tolerant) as per Toner *et al*, (2005). The greatest diversity of macroinvertebrates was recorded at Site 3 on the Finnihy River, where thirteen taxa was recorded. Only 3 families were recorded at Site 4 on tidal part of the River Finnihy. Family diversity shown in Table 14 below.

Table 14: Family diversity at the aquatic sites

Site	1	2	3	4
Family richness	9	8	13	3

The macroinvertebrate communities recorded during the survey were dominated by taxa belonging to the orders Ephemeroptera (mayflies), Plecoptera (stoneflies), Diptera (true flies), Coleoptera (beetles) and a range of non-insect aquatic invertebrates including molluscs, crustaceans and annelids. Community composition varied considerably between sites, reflecting differences in habitat quality, flow diversity, substrate composition and, in the lower Finnihy River, the influence of saline intrusion.

Ephemeropterans (mayflies) comprised both pollution-sensitive and pollution-tolerant taxa. Group A mayflies were represented by *Rhithrogena* spp., including *Rhithrogena semicolorata*, which were recorded at Sites 2 and 3. Group C Ephemeropterans included *Baetis rhodani* and *Serratella* sp., which were recorded at Sites 1, 2 and 3. Mayflies were absent from Site 4 in the tidally influenced lower reaches of the Finnihy River, where brackish conditions are likely to limit the occurrence of freshwater taxa.

Plecopterans (stoneflies) were represented exclusively by *Leuctra* spp. (Group B), which were recorded at Sites 1, 2 and 3. The presence of this genus indicates that suitable water quality and habitat conditions remain present within both the Lissaniska Stream and upper Finnihy River reaches, although abundance was generally low.

Trichopterans (caddisflies) were restricted to Site 3 on the Finnihy River and included representatives of the families Limnephilidae, Glossosomatidae and Sericostomatidae. The occurrence of these taxa reflects the availability of clean coarse substrate and riffle habitat within this reach and contributed significantly to the diversity of the macroinvertebrate assemblage recorded at this site.

Dipteran larvae accounted for an important component of the macroinvertebrate communities. The most frequently recorded true flies were *Simulium* spp. (blackfly larvae), which were present at Sites 1, 2 and 3 and were particularly abundant at Site 3. *Chironomus* sp. (non-biting midge larvae) was recorded at Site 1 and represented the most pollution-tolerant indicator group encountered during the survey.

Aquatic beetles were represented by members of the family Haliplidae (crawling water beetles), which were recorded in the Lissaniska Stream and occurred in high numbers at Site 1. Water mites (Hydracarina) were recorded at Sites 2 and 3 and formed a minor component of the macroinvertebrate assemblage.

Molluscs were represented primarily by the invasive snail *Potamopyrgus antipodarum* (Jenkin's spire snail), which was recorded at all four sites and was particularly abundant within the Finnihy River and upper Lissaniska Stream. The general occurrence of this species reflects its ability to colonise a broad range of aquatic habitats.

Crustaceans comprised principally *Gammarus duebeni* (freshwater shrimp), which was recorded at all sites and was often among the dominant taxa present. *Asellus aquaticus* (water louse) was recorded in the lower Finnihy River at Site 4, while water mites (Hydracarina) were present at Sites 2 and Site 3. The predominance of these

taxa at the lower river sites reflects the more tolerant nature of the community inhabiting slower-flowing and tidally influenced habitats.

Other invertebrates recorded included *Piscicola geometra* (fish leech) and *Dugesia* (flatworm) at Site 3 and *Erpobdella* sp. at Site 1. In addition, members of the family Nereididae (ragworms) were recorded at Site 4. As these are marine and estuarine organisms associated with brackish environments, they were not included in the EPA Q-value assessment, although their presence confirmed the strong tidal influence at the site.

In summary, the Finnihy River sites supported a more diverse macroinvertebrate assemblage than the Lissaniska Stream sites, principally due to the presence of riffle habitat, greater flow diversity and cleaner coarse substrates. However, diversity declined in the lower tidal reaches where saline intrusion influenced community composition. The Lissaniska Stream sites were characterised by lower diversity and a greater proportion of pollution-tolerant taxa, reflecting the effects of slow flows, sediment deposition and extensive algal growth.

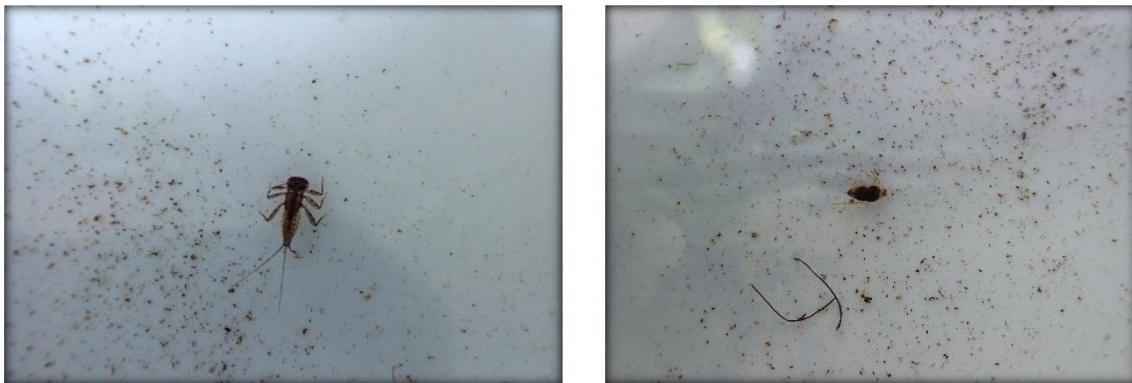


Plate 10: Flatheaded mayfly, *Rhitrogena* sp. (left) and crawling water beetle *Haliphus* sp (right) recorded at Site 2 on Lissaniska Stream.

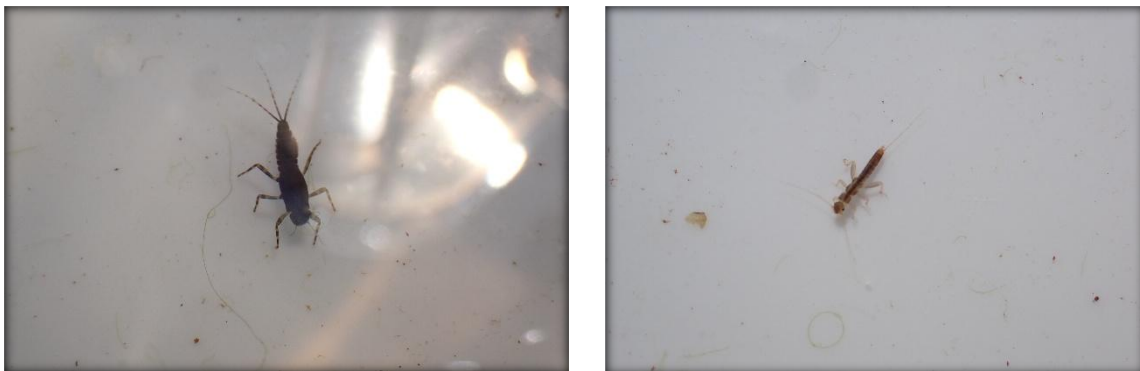


Plate 11: Mayfly, *Seratella* sp. (left) and stonefly, *Luctra* sp. (right) observed at Site 3 on Finnihy River.



Plate 12: Freshwater leech, *Erpobdella* sp. and *Gammarus daubeni* (left) recorded at Site 1 on Lissaniska stream and Nereididae recorded at Site 4 on the Finnihy River.

5.4 Water Quality

5.4.1 Biological Water Quality

Biological water quality within the Lissaniska Stream and Finnihy River were generally indicative of moderate ecological condition. Q-ratings derived from the diversity and relative abundance of macroinvertebrates recorded at the survey sites are presented in **Table 15**.

All sites were assigned a Q3–4 rating, corresponding to Moderate Ecological Status under the Water Framework Directive (WFD). These sites supported a low to moderate diversity of macroinvertebrates at the time of the MWP biological survey efforts, including a limited number of pollution-sensitive taxa, reflecting generally better habitat quality and flow diversity.

The general biological community through the biological sampling was characterised by low to moderate diversity. At Site 1, a predominance of pollution-tolerant taxa consistent with the extensive algal growth, significant silt deposition and limited flow diversity was recorded during the habitat assessment.

The MWP Q3-4 rating assigned to Site 4 should be interpreted with some caution as this reach is located within the strongly tidally influenced lower Finnihy River and is subject to regular saline intrusion. These brackish conditions naturally limit the diversity of freshwater macroinvertebrates and influence community composition, thereby affecting the applicability of standard freshwater biological water quality indices. The reduced diversity recorded at this site is therefore likely attributable, at least in part, to natural estuarine influences rather than solely reflecting water quality pressures.

There are two EPA river monitoring stations located on the Finnihy River in the downstream vicinity of the Proposed Development site. The upstream station, Finnihy – Kenmare – Finnihy Br (RHS) (Station Code: RS21F010500), located at the confluence with the Lissaniska Stream, recorded a Q-value of Q3-4 during an EPA biological survey in 2024. The second station, Kenmare: Finnihy Br (LHS) (Station Code: RS21F010510), also recorded a Q-value of Q3-4 in the same year. Both monitoring stations are situated approximately 500 m and 584 m downstream of the Proposed Development site, respectively. The results of the biological assessment undertaken as part of the MWP survey demonstrated consistent results with the EPA monitoring Q values for 2024 at station RS21F010500 located ca. 0.24 rkm and 0.28 rkm downstream of Site 2 and 0.06 rkm and 0.12 rkm upstream from Site 3.

Table 15: Biological water quality results and interpretations at the aquatic sites surveyed.

Site	Watercourse	Q-rating	Quality Status	Corresponding WFD Status
1	Lissaniska 21	Q3-4	Slightly Polluted	Moderate
2	Lissaniska 21	Q3-4	Slightly Polluted	Moderate
3	Finnihey	Q3-4	Slightly Polluted	Moderate
4	Finnihey	Q3-4	Slightly Polluted	Moderate

The overall biological water quality results indicate generally moderate ecological conditions across the study area, with evidence of environmental pressures affecting several of the surveyed reaches. The principal pressures identified during the habitat assessment were nutrient enrichment, excessive growth of algae. The predominance of slow-flowing glide habitat, extensive growths of filamentous algae and *Vaucheria* sp. and regular saline intrusion are considered to have reduced habitat quality and limited the diversity and abundance of pollution-sensitive macroinvertebrates.

Fine sediment deposition can adversely affect aquatic ecosystems through the clogging of coarse substrates, reduction of interstitial habitat and smothering of aquatic fauna and their life stages (Kelly-Quinn & Reynolds, 2020). Nutrient enrichment may further exacerbate these impacts by promoting excessive growth of algae and macrophytes, altering habitat structure and affecting dissolved oxygen dynamics within the channel (EPA, 2018).

In contrast, the Finnihey River generally exhibited greater flow diversity and cleaner coarse substrates, supporting a more diverse macroinvertebrate community. However, biological diversity within the lower reaches of the river was influenced by tidal effects which naturally alter species composition and reduce the occurrence of freshwater indicator taxa. Consequently, the biological communities recorded at the downstream Finnihey sites reflect a combination of ecological quality and natural estuarine influences.

5.5 Fish

5.5.1 Fish Survey Results

Brown trout, European eel, three-spined stickleback (*Gasterosteus aculeatus*) were recorded during the electrical fishing at Site 2 and Site 3. A total of 28 fish were recorded during the electrical fishing surveys: brown trout (N=20), European eel (N=6), three-spined stickleback (N=2). Electrofishing results are presented in **Appendix 4**.

Length descriptive statistics for fish captured during the surveys are presented in **Table 16**. The fish community is dominated by salmonids, and the results indicate that the freshwater rivers in the study area are particularly important for the early life stages of trout, most of the salmonids captured during the surveys being juvenile fish. The size ranges of the fish species caught were generally juveniles. It is likely that the extended period of dry, hot weather influenced fish presence within the surveyed reaches, as elevated water temperatures can cause thermal stress and prompt salmonids and other species to migrate towards cooler, shaded refuges. The lower reaches of the River Finnihey and the Lissaniska Stream are important areas for European eel, attributable to proximity to the

sea. Three-spined stickleback were confined to the lower part of Lissaniska Stream with none recorded during the MWP electrofishing efforts on the Finnihy watercourse. **Table 17** below gives the Catch Per Unit Effort (CPUE) indices for trout and eel. Length-frequency distribution graphs for all trout and eel captured are presented in **Figure 4** and **Figure 5** respectively.

Brown trout occur in almost every rivulet, brook, stream, river and lake in Ireland (Kennedy & Fitzmaurice, 1971). Populations occur in the upper reaches of estuaries (slob trout) and anadromous (sea trout) populations occur in many river systems all around the coast. Brown trout are not specifically listed for protection by EU directives. In Ireland, brown trout fisheries are regulated by national legislation and bye laws governing closed seasons, angling methods, size limits, bag limits, etc. Angling clubs may also have their own regulations.

According to Byrne *et al.* (2011), eels are widespread in fisheries surveys of rivers and lakes of all sizes in Ireland. Recruitment of juveniles into Irish catchments has declined dramatically along the Atlantic seaboard.

Three spined stickleback is commonly recorded in fish surveys in rivers, lakes and transitional waters in all parts of the country. The stickleback appears to be a relatively pollution tolerant species and a good coloniser of rivers recovering from chronic historical pollution (Pottinger *et al.* 2002).

Table 16: Length descriptive statistics for fish species captured during the 2026 electrofishing surveys of watercourses examined.

Site	Species	Number of fish	Length (cm)			
			Mean	Minimum	Maximum	Standard deviation
2	Brown trout	12	14.1	6	22	4.8
	European eel	1	11.5	11.5	11.5	-
	Three-spined stickleback	2	2.25	1.0	3.5	1.7
3	Brown trout	8	11.1	6	16	3.2
	European eel	5	20.6	15	30	5.8

Table 17: Catch Per Unit Effort (CPUE) indices for brown trout and eel captured during the 2026 electrofishing surveys of watercourses examined.

Site	Area fished (m ²)	Time fished (minutes)	Brown trout			Eel		
			N	CPUE		N	CPUE	
				fish/m ²	fish/min		fish/m ²	fish/min
2	216	10	12	0.06	1.2	1	0.005	0.1
3	252	10	8	0.03	0.8	5	0.02	0.5

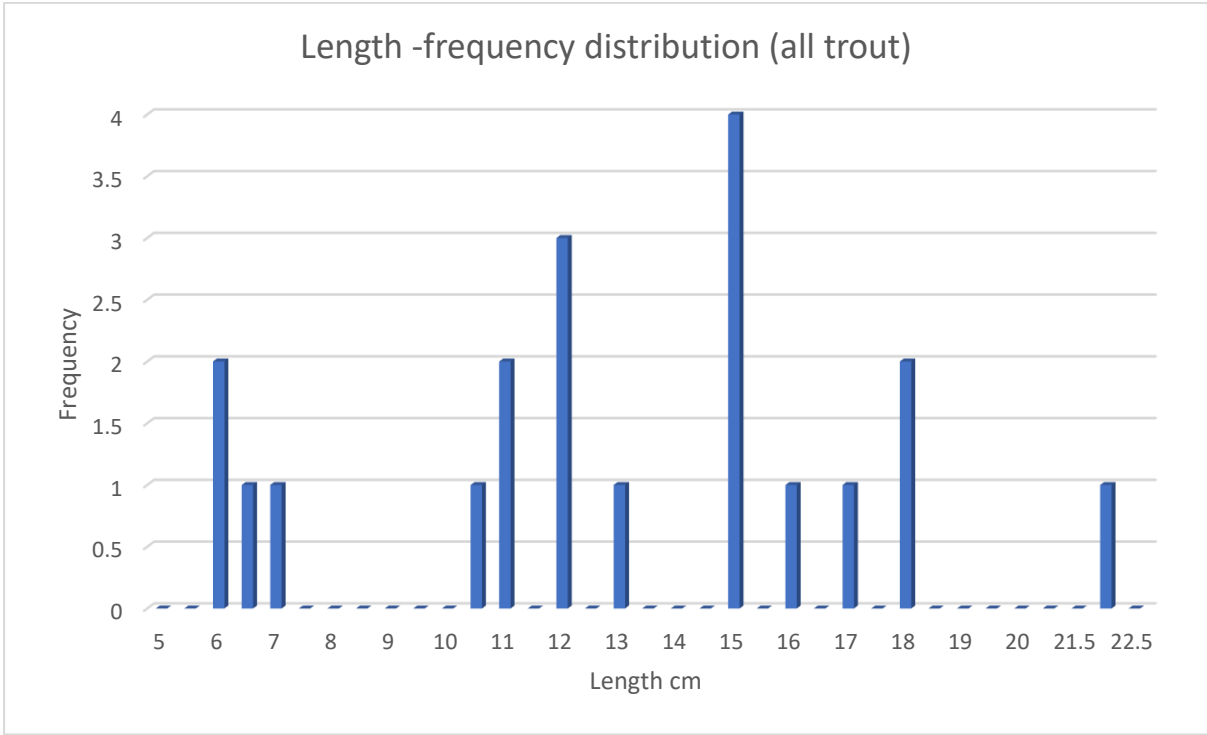


Figure 4: Length-frequency distribution for all trout captured during the electrofishing surveys.

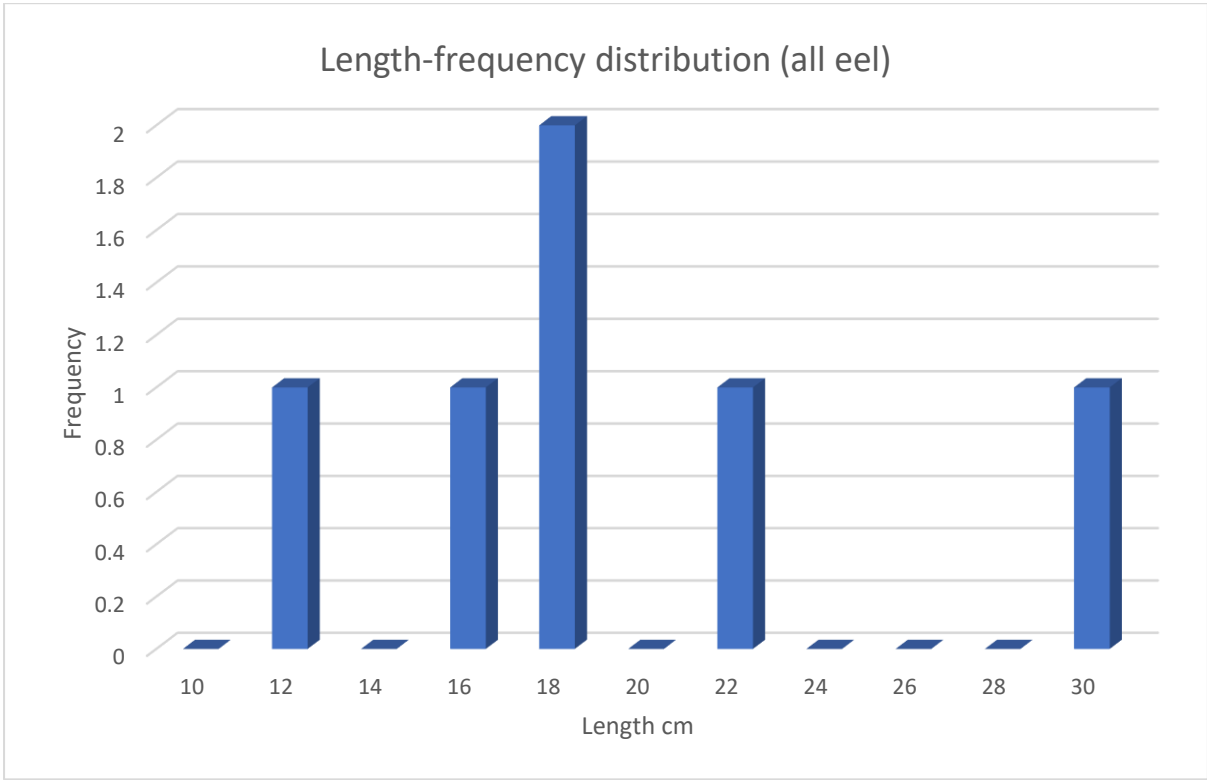


Figure 5: Length-frequency distribution for all eel captured during the electrofishing surveys.

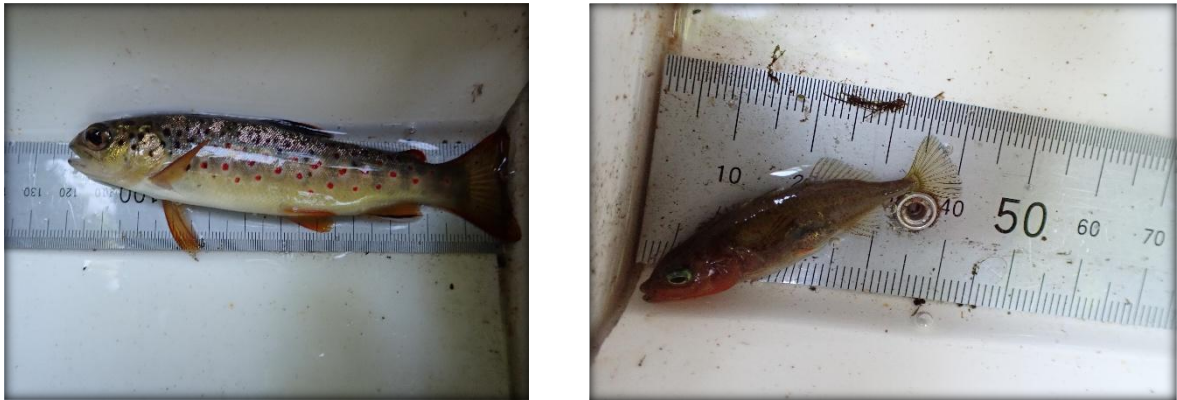


Plate 13: Juvenile brown trout (left) and three-spined stickleback (right) captured during the electrofishing at Site 2 on Lissaniska Stream.



Plate 14: Brown trout (left) and eel (right) captured during electrofishing at Site 3 on Finnihy River.

5.5.2 Red List Status

All fifteen native species of freshwater fish were assessed in Byrne et al. (2011) using the latest IUCN categories. The red list status of the fish recorded during the current assessment are provided in Table 12 below. The classification of the European eel as ‘Critically Endangered’ is a reflection of its significant decline in Ireland and the Europe-wide decline in eel populations.

Table 18: Red list status of the fish recorded during the current Red List assessment (adapted from Byrne et al. 2011).

Species	Irish Red List status	Legal status	Rationale for assessment
Brown Trout	Least concern	Fisheries Acts 1959 to 2006	Previously assessed as not threatened. There are serious concerns about the declines in sea trout stocks, particularly in

Species	Irish Red List status	Legal status	Rationale for assessment
			the mid-west. Nonetheless, trout remain widespread in all major river and lake systems on the island, at satisfactory levels in terms of population structure, for the water in question, and of stock density, justifying a conservation assessment of 'least concern'.
European eel	Critically Endangered	Fisheries Acts 1959 to 2006; Conservation of Eel fishing bye-law No. C.S. 303, 2009; EC Regulation (Council Regulation 1100/2007) for the recovery of the eel stock, CITES Annex II	Previously assessed as least concern and still widespread in fisheries surveys of rivers and lakes of all sizes in Ireland. However, recruitment into Irish catchments has declined dramatically, in line with experience along the Atlantic seaboard. The assigned status of Critically Endangered also reflects the status of the pan-European stock and the overall decline in recruitment of that stock. Density-dependent compensation in lifetime survival rates, sex ratio and biomass may cause the scale of reduction in freshwater populations to be less than that in recruitment. However, it is expected that freshwater populations will continue to decline as the history of low recruitment feeds through the long lifecycle.
Three-spined stickleback	Least concern	Fisheries Acts 1959 to 2006	Previously assessed as least concern and still considered of least concern as it is widely distributed in fishery surveys in rivers of all sizes and in lakes and transitional waters around the coast.

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Appendix 1

Macroinvertebrate Physical Habitat Suitability

Table A1 1: Physical habitat assessment of streams for their suitability for macroinvertebrate production (adapted from Barbour and Stribling, 1991).

	Optimal	Suboptimal	Marginal	Poor
Score	20	15	10	5
Bottom substrate	More than 60% of bottom is gravel, cobble, and boulders. Even mix of substratum size classes.	30-60% of bottom is cobble or boulder substrata. Substrate may be dominated by one size class.	10-30% of substrata consists of large materials. Silt or sand accounts for 70-90% of bottom.	Substrate dominated by silt and sand. Gravel, cobble and larger substrate sizes <10%.
Habitat complexity	A variety of types and sizes of material form a diverse habitat.	Structural types or sizes of material are less than optimum but adequate cover still provided.	Habitat dominated by only one or two structural components. Amount of cover is limited.	Monotonous habitat with little diversity. Silt and sand dominate and reduce habitat diversity and complexity.
Pool quality	25% of the pools are as wide or wider than the mean stream width and area >1m deep.	<5% of the pools are >1m deep and wider than the mean stream width.	<1% of the pools are >1m deep and wider than the mean stream width. Pools present may be very deep or very shallow. Variety of pools or quality is fair.	Majority of pools are small and shallow. Pools may be absent.
Bank stability	Little evidence of past bank failure and little potential for future mass wasting into channel.	Infrequent or very small slides. Low future potential of slides.	Mass wasting moderate in frequency and size. Raw spots eroded during high floods.	Frequent or large slides. Banks unstable and contributing sediment to the stream.
Bank protection	Over 80% of streambank surfaces are covered by vegetation, boulders, bedrock, or other stable materials.	50-80% of the streambanks covered with vegetation, cobble, or larger material.	25-50% of the streambank is covered by vegetation.	<25% of the streambank is covered by vegetation or stable materials.
Canopy	Vegetation of various heights provides a mix of shade and filtering light to water surface.	Discontinuous vegetation provides areas of shade alternating with areas of full exposure. Or filtering shade occurs <6h/day.	Shading is complete and dense. Or filtering shade occurs <3h/day.	Water surface is exposed to full sun nearly all day long.

Appendix 2

Q-Rating System

Table A2 1: Intercalibration of EPA Q-rating system with Water Framework Directive status based on macroinvertebrates

Q Value*	WFD Status	WFD Intercalibration Common Metric Value ¹¹	Pollution Status	Condition**	Ecological description
Q5, Q4-5	High	0.92	Unpolluted	Satisfactory	No or only minor difference from reference condition. Normal community structure, sensitive species present. Ecological processes functioning normally.
Q4	Good	0.853	Unpolluted	Satisfactory	Slight difference from reference condition. Slight change in community structure. Fewer sensitive species present, but increase in species richness and productivity. Ecological processes functioning normally.
Q3-4	Moderate	0.764	Slightly polluted	Unsatisfactory	Moderate difference from reference condition. Moderate change in community structure and loss of some niche species. Some ecological processes altered. Reduced resilience and ability to absorb external shocks.
Q3, Q2-3	Poor	0.627	Moderately polluted	Unsatisfactory	Major difference from reference condition. Significant change in community structure. Significant loss of niche species. Food chains and biogeochemical pathways significantly altered. Limited ability to absorb external shocks
Q2, Q1-2, Q1	Bad	0.42	Seriously polluted	Unsatisfactory	Severe difference from reference condition. Severe change in community structure. Severe loss of niche species and ecological functioning. Food chains collapse and biogeochemical pathways breakdown. Water body incapable of supporting most aquatic life.

* These Values are based primarily on the relative proportions of pollution sensitive to tolerant macroinvertebrates (the young stages of insects primarily but also snails, worms, shrimps etc.) resident at a river site.

** "Condition" refers to the likelihood of interference with beneficial or potential beneficial uses.

¹¹From: https://www.epa.ie/pubs/reports/water/other/wfd/EPA_water_WFD_monitoring_programme_main_report.pdf

Table A2 2: Q-value for use in eroding (i.e. riffle-glide) river stretches

EPA Biological Assessment of Water Quality in Rivers and Streams*										
Biotic Indices (Q Values) and typical associated macroinvertebrate community structure										
WFD Status Groups	Families	High Q5	High Q4-5	Good Q4	Moderate Q3-4	Poor Q3	Poor Q2-3	Bad Q2	Bad Q1-2	Bad Q1
Group A Plecoptera Ephemeroptera Lamellibranchiata	All except Leuctridae Heptageniidae Siphonuridae <i>Ephemera danica</i> <i>Amelanus inopinatus</i> <i>Margaritifera margaritifera</i>	At least 3 taxa well represented i.e., common to dominant. Expect 5 or more Group A taxa outside of June – Sept period	At least 2 taxa well represented i.e., common to dominant. Expect >2 Group A taxa outside of June-Sept period	At least 1 taxon in reasonable numbers	At least 1 taxon Few - Common	Absent	Absent	Absent	Absent	Absent
Group B Plecoptera Ephemeroptera Trichoptera Odonata Hemiptera	Leuctridae Baetidae (excl <i>B. rhodani</i> agg.) Leptophlebiidae All Cased Trichoptera Odonata Aphelocheiridae	Few to Numerous	Few to Numerous	Few to Numerous	Few/Absent to Numerous	Few/Absent	Absent	Absent	Absent	Absent
Group C Ephemeroptera Trichoptera Hemiptera Coleoptera Hydracarina Diptera Crustacea Gastropoda Lamellibranchiata Hirudinea Platyhelminthes Oligochaeta	<i>Baetis rhodani</i> / <i>Baetis atrolaticus</i> Ephemerellidae Caenidae All Uncased Trichoptera All excl Aphelocheiridae All All All (excl <i>Chironomus</i> & <i>Eristalis</i>) Simuliidae All (excl <i>Asellidae</i> & <i>Crangonyx</i> spp.) <i>Gammarus t. fl. thubeni</i> All (excl <i>Radix peregra</i> , <i>Physella</i>) <i>Anodonta</i> sp. <i>Pisicola</i> sp. All Lumbriculidae, Lumbricidae	Few to Dominant Few to Numerous Group C taxa can represent over 70% of total abundance with good diversity and no single taxa dominant	Few to Dominant Few to Numerous Group C taxa can represent over 70% of total abundance with good diversity and no single taxa dominant	Numerous to Dominant Common to Numerous (Never Excessive)	Numerous to Excessive Common to Excessive (usually Dominant or Excessive as a group) Diversity can be reduced with a few taxa dominant	Numerous to Excessive Dominant to Excessive Diversity reduced with a few taxa dominant	Few to Common Few to Common Diversity reduced with a few taxa	Absent Absent Absent	Absent Absent Absent	Absent Absent Absent
Group D Crustacea Megalopectera Gastropoda Lamellibranchiata Hirudinea Oligochaeta	<i>Asellidae</i> , <i>Crangonyx</i> <i>Sialis</i> <i>Radix peregra</i> , <i>Physella</i> <i>Sphaeriidae</i> All excl <i>Pisicola</i> <i>Naididae</i> , <i>Enchytraeidae</i>	Few or Absent	Few or Absent	Few or Absent	Few/Absent to Common	Few/Absent to Common	Dominant to Excessive	Dominant to Excessive	Few to common	Few or Absent
Group E Oligochaeta Diptera	Tubificidae, Chironomus, <i>Eristalis</i> spp.	Few or Absent	Few or Absent	Few or Absent	Few or Absent	Few or Absent	Few to Common	Few/Absent to Common	Common to Numerous	Dominant

* This scheme is not intended for assessment of conditions in stagnant waters or where substratum is mud, bedrock or sand. It should be borne in mind that faunal composition is affected by such factors as ground water input, calcification, drainage, canalisation, culverting, marked shading and seasonal factors. Note: **The occurrence/abundance of groups in above table refers to some but not necessarily all the constituents of the group. Single specimens may be ignored.**

Appendix 3

Macroinvertebrates

Table A3 1: Macroinvertebrates recorded at aquatic sites within Kenmare Town.

	Pollution sensitivity group	Functional feeding group	1	2	3	4
MAYFLIES (Uniramia, Ephemeroptera)						
Baetidae						
<i>Baetis rhodani</i>	C	Scraper & gathering collector	F	P	F	
Ephemerellidae						
<i>Serratella ignita</i>	C	Scraper & gathering collector	P		P	
Heptageniidae						
<i>Rithrogena sp.</i>				P	P	
CASED CADDIS FLIES (Tricoptera)						
Limnephilidae						
	B	Shredder			F	
<i>Limnephilus sp.</i>	B	Shredder				
Sericostomatidae						
<i>Sericostoma sp.</i>	B	Shredder			P	
Glossosomatidae						
<i>Glossosoma sp.</i>	B	Scraper			F	
STONEFLIES (PLECOPTERA)						
Leuctridae						
<i>Leuctra sp.</i>	B	Shredders	P	P	F	
CRUSTACEANS (Crustacea)						
Isopods, Asellidae						
<i>Asellus aquaticus</i>	D	Shredder				N
AMPHIPODS (Amphipoda, Gammaridae)						
<i>Gammarus sp.</i>	C	Shredder		N	F	D
TRUE FLIES (Diptera)						
Simuliidae						
	C	Filtering collector				
<i>Simulium sp.</i>	C	Filtering collector	F	C	D	

Family Chironomidae						
<i>Chironomus sp.</i>	E	Gatherer collector	P			
Green chironomid	C	Gatherer collector				
BEETLES (Coleoptera)						
Halipedeidae						
<i>Halipuss p.</i>	C	Predator	N	F		
SNAILS (Mollusca, Gastropoda)						
Hydrobiidae						
<i>Potamopyrgus antipodarium</i>	C	Grazer	N	P	D	P
<i>Potamopyrgus jenkinsi</i>						
Arachnids (Acari)						
Hydracarina/Hydracnidae	C	Predator		P	P	
LEECHES (Hirudinae)						
Erpobdellidae						
<i>Erpodella sp</i>	D	Predator	P			
Piscicolidae						
<i>Piscicola geometra</i>	C	Predator			P	
Dugesia	D				P	

Few (<5%), Common (6-20%), Numerous (21-50%), Dominant (51-74%), Excessive (>75%)

Appendix 4

Electrofishing Results

Table A4 1: All fish captured during the electrofishing surveys within the Kenmare Town.

Site	Species	Length (cm)
Site 2	Brown trout	22
	Brown trout	17
	Brown trout	18
	Brown trout	18
	Brown trout	11
	Brown trout	15
	Brown trout	15
	Brown trout	15
	Brown trout	15
	Brown trout	10.5
	Brown trout	6
	Brown trout	6.5
	Eel	11.5
Site 4	Three-spined stickleback	3.5
	Three-spined stickleback	1.0
	Brown trout	13
	Brown trout	16
	Brown trout	12
	Brown trout	7.0
	Brown trout	12
	Brown trout	11
	Brown trout	12
	Brown trout	6.0
	Eel	30
	Eel	18
	Eel	18
	Eel	15
	Eel	22

Appendix 3

Bat Report (Greenleaf Ecology)

Bat Survey

Residential Development

Kenmare

Co. Kerry

Report prepared for KPH Construction

By Karen Banks MCIEEM

19th July 2026



Tel: 0834218641

Email: greenleafecology@outlook.com

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1 Introduction

Greenleaf Ecology were commissioned by KPH Construction Ltd to undertake a bat survey for the proposed Residential Development at Kenmare, Co. Kerry. The location of the proposed development is illustrated in Figure 1-1.



Figure 1-1: Site location

1.1 Legislative Context

All Irish bats are protected under the Wildlife Acts. Also, the EU Habitats Directive, and Irish implementing legislation, seeks to protect rare species, including bats, and their habitats, and requires that appropriate monitoring of populations be undertaken. Moreover, the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982) exists to conserve all bat species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) protects migrant bat species across all European boundaries. Ireland has ratified both these conventions.

All bats are listed in Annex IV to the Habitats Directive (92/43/EC) and the lesser horseshoe bat is further listed under Annex II to the same Directive. Article 12 of the Directive establishes a system of strict protection for species listed in Annex IV by prohibiting a number of actions which could cause those species to decline in the wild or which would impair their chances of successful breeding. It recognises that species need safe places to rest and to breed and rear young. Disturbance during breeding, migration or hibernation can have a detrimental effect on species survival. Carrying out of any work which has the potential to capture or kill any specimen of a Strictly Protected species, or to disturb these species, or to take or destroy eggs of such a species, and for which a derogation licence has not been granted, may constitute an offence. Article 16 of the Directive recognises that there may be circumstances when a derogation from the strict protection of the species in Annex IV(a) is

necessary. Derogations, however, should only be used as a last resort and the provisions of the article need to be both interpreted and implemented restrictively.

A derogation licence may only be granted by the Minister if it meets the three specific conditions set out in Article 16.

- First, a derogation can only be issued for one of the reasons listed in Article 16(1)(a)-(e);
- Second, there can be no satisfactory alternative; and
- Third, the derogation cannot be detrimental to the objective of maintaining the species at favourable conservation status.

The details with regards to the strict parameters within which derogation licences may be issued and the procedures by which and the order in relation to the planning and development regulations such licences should be obtained, are set out in NPWS Guidance Series 2 *“Strict Protection Of Animal Species: Guidance for Public authorities on the Application of Articles 12 and 16 of the EU Habitats Directive to development/works undertaken by or on behalf of a Public authority”*.

1.2 Objectives

The objectives of the bat survey were to:

- Establish the location of any potential or actual bat roosts at the proposed site;
- Establish the value of the proposed site to bats for foraging and commuting;
- Assess the results of the survey and determine the potential impact of the proposed development on any bats that might use the site;
- Provide recommendations for the project design in light of the survey results as appropriate; and
- Provide recommendations for mitigation following the survey.

2 Methodology

2.1 Study Area

The study area for the desk study is described in Section 2.2. The survey area comprised the landholding and adjacent areas of broadleaved woodland, as illustrated in Figure 2-1.



Figure 2-1: Survey area

2.2 Desk Study

A pre-survey data search was conducted in order to collate existing information from the study area and the surrounding area on bat activity, roosts and landscape features that may be used by bats. The data search comprised the following information sources:

- Collation of known bat records from within a 4km radius¹ of the study area from the National Bat Database held by the National Biodiversity Data Centre (www.biodiversityireland.ie);
- Review of Ordnance Survey mapping and aerial photography of the study area and its environs; and
- Records of European and nationally designated sites from within a 4km radius of the study area where bats form part or all of the reason for designation (<https://www.npws.ie/protected-sites>).

¹ A 4km radius search distance was selected to encompass records of bat roosts within Core Sustenance Zones (CSZ) of the study area for Irish species of bat. A CSZ refers to the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the conservation status of the colony using the roost (Collins, 2016).

2.3 Consultation

Mr Gerald McEnery, National Parks and Wildlife Service Ranger, was consulted by email on 1st April 2026. Mr McEnery responded to the email with information that two lesser horseshoe bat hibernacula (winter roosts) are located within a 1km radius of the study area, one of which is a significant winter roost with over 120 individuals recorded in winter 2025/2026 (the location of this roost is sensitive and is therefore not provided within this report for the protection of the bats).

2.4 Field Survey

This bat survey was cognisant of the following guidelines:

- Andrews, H. (2018) *Bat Roosts in Trees*. A guide to identification and assessment for tree-care and ecology professionals. Pelagic Publishing.
- Collins, J. (ed.) (2023) *Bat Surveys for Professional ecologists: Good Practice Guidelines (4th ed.)*. The Bat Conservation Trust, London;
- Marnell, F., Kelleher, C. & Mullen, E. (2022) *Bat mitigation guidelines for Ireland v2*. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland; and
- Reason, P.F. and Wray, S. (2025). *UK Bat Mitigation Guidelines: a guide to impact assessment, mitigation and compensation for developments affecting bats*. Version 1.2. Chartered Institute of Ecology and Environmental Management, Ampfield.

2.4.1 Surveyor Information

The survey was undertaken by Karen Banks, MCIEEM.

Karen is an ecologist with 19 years' experience in the field of ecological assessment. She holds a BSc in Environment and Development from Durham University and is a full member of the Chartered Institute of Ecology and Environmental Management. Karen is an experienced and skilled bat surveyor, first gaining a scientific licence to disturb bats from Natural England, UK in 2008. Karen is trained in bat handling and capture methods and currently holds a bat disturbance licence granted by the NPWS. Karen has undertaken bat survey and assessment for numerous projects, including bridge repair and replacement works, domestic dwelling repair and demolition works, wind farm developments and large-scale infrastructure projects such as flood relief schemes, road developments and pipeline schemes. Karen has also represented Cork County Council as an expert witness for bats at an Oral Hearing.

2.4.2 Preliminary Ecological Appraisal

A walkover survey of areas within the study area identified as potential roosting, flight paths and foraging habitat during the desk top study was undertaken on 19th April 2025. Potential bat habitat was assessed using the criteria outlined in Table 2-1² and suitability of trees within the study area for bats was assessed using the criteria outlined in Table 2-2.

² Collins, J. (ed.) (2023) *Bat Surveys for Professional ecologists: Good Practice Guidelines (4th ed.)*. The Bat Conservation Trust, London

Table 2-1: Criteria for Assessing the Potential Suitability of the Proposed Development Site for Bats

Suitability	Description	
	Roosting habitats in structures	Potential flight paths and foraging habitats
None	No habitat features on site likely to be used by any roosting bats at any time of the year (i.e. a complete absence of crevices/ suitable shelter at all ground/ underground levels).	No habitat features on site likely to be used by any commuting or foraging bats at any time of the year (i.e. no habitats that provide continuous lines of shade/ protection for flight-lines, or generate/ shelter insect populations available to foraging bats).
Negligible	No obvious habitat features on site likely to be used by roosting bats; however, a small element of uncertainty remains as bats can use small and apparently unsuitable features on occasion.	No obvious habitat features on site likely to be used as flight-paths or by foraging bats; however, a small element of uncertainty remains in order to account for non-standard bat behaviour.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically at any time of the year. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity and not a classic cool/stable hibernation site, but could be used by individual hibernating bats).	Habitat that could be used by small numbers of bats as flight-paths such as a gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only, such as maternity and hibernation- the categorisation described in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for flight paths such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat. These structures have the potential to support high conservation status roosts e.g. maternity or classic cool/ stable hibernation site.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by bats for flight paths such as river valleys, streams, hedgerows, lines of trees and woodland edge. High quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

Table 2-2: Guidelines for assessment of the suitability of trees on proposed scheme area for bats (Collins, 2023)

Suitability	Description
None	Either no PRFs in the tree or highly unlikely to be any
FAR	Further assessment required to establish if PRFs are present in the tree
PRF	A tree with at least one PRF present

2.4.3 Bat Roost Inspection Survey

2.4.3.1 Trees

A detailed inspection of the exterior of trees was undertaken on 14th April 2025 and 5th December 2025 to ascertain whether any features that bats could use for roosting (Potential Roost Features, or PRFs) were present. The objective of the survey was to determine the actual or potential presence of bats to carry out an impact assessment and determine the need for further survey and/or mitigation.

A detailed inspection of each potential tree roost within the study area was undertaken. The inspection was carried out in daylight hours from ground level, and information was compiled on the tree, PRFs and evidence of bats. Where PRFs were recorded, the tree was numbered and marked on a map and a description of each PRF observed was recorded. PRFs that may be used by bats include:

-

- Rot holes;
- Hazard beams;
- Other horizontal or vertical cracks or splits (e.g. frost cracks) in stems or branches;
- Lifting bark;
- Knotholes arising from naturally shed branches or branches previously pruned back to the branch collar;
- Man-made holes (e.g. flush cuts) or cavities created by branches tearing out from parent stems;
- Cankers in which cavities have developed;
- Other hollows or cavities;
- Double leaders forming compression forks with included bark and potential cavities;
- Gaps between overlapping stems or branches;
- Partially detached ivy with stem diameters in excess of 50mm; and
- Bat or bird boxes.

Signs of a bat roost (excluding the actual presence of bats), include:

- Bat droppings in, around or below a PRF;
- Odour emanating from a PRF;
- Audible squeaking at dusk or in warm weather; and
- Staining below the PRF.

It should be noted that bats or bat droppings are the only conclusive evidence of a roost and many roosts have no external signs. In the current survey, potential roost sites were viewed by a bat specialist working from ground level. Trees were categorised in accordance with the criteria detailed in Table 2-3.

Table 2-3: Categorisation of potential suitability of PRFs in trees at the proposed site

Suitability	Description
PRF-I	PRF is only suitable for individual bats or very small numbers of bats either due to size or lack of suitable surrounding habitats.
PRF-M	PRF is suitable for multiple bats and may therefore be used by a maternity colony.

2.4.3.2 Structures

On 14th April 2025 the derelict dwelling within the study area was surveyed for potential roost sites and signs of bats. The survey utilised a high-powered torch, close focussing binoculars and an endoscope (Explorer Premium 8803 with 9mm camera) where required. The external inspection involved looking for bat droppings on the ground, stuck to walls, windowsills or in crevices in the stonework and recording suitable entry and exit points.

The internal inspection involved looking for features that may be suitable for roosting bats, such as joints and crevices in wood, holes or crevices between stonework in the walls and searching for bat droppings, urine stains and feeding signs on the floor.

2.4.4 Bat Activity Survey

Bat activity surveys were conducted across the study area using an Anabat Walkabout detector, which records bat echolocation calls directly on to an internal SD memory card. Each time a bat is detected, an individual time-stamped (date and time to the second) file is recorded. Data were then downloaded and all recordings were analysed using the Anabat Insight spectrogram sound analysis software Version 2.1.7. Dusk activity surveys (from sunset, for a minimum of 90 minutes) were conducted. These surveys enable a determination of the approximate numbers and species of bats present within the study area, areas used for foraging and commuting routes to and from roosts. The approximate flying height and direction taken by bats were estimated and detailed where possible.

Bat activity transect surveys were undertaken on 19th April 2025, 22nd August 2025 and 20th September 2025 and 22nd April and 7th July 2026. Each survey was conducted in appropriate weather conditions (avoiding periods of very heavy rain, strong winds (> Beaufort Force 5), mists and dusk temperatures below (10°C) (Table 2-4).

Table 2-4: Proposed development site at Countess Road: bat activity survey dates and conditions

Survey Date	Times	Weather conditions
19/04/2025	20:40- 22:35, sunset 20:42	Precipitation: none, temperature at sunset: 10°C, wind F2
22/08/2025	20:40- 22:15, sunset 20:46	Precipitation: none, temperature at sunset: 18°C, wind F1
20/09/2025	20:05-22:00, sunset 20:08	Precipitation: light rain starting at 21:15, temperature at sunset: 13°C, wind F3
22/04/2026	20:40- 22:35, sunset 20:45	Precipitation: none, temperature at sunset: 10°C, wind F4
07/07/2026	21:50-22:20, sunset 21:52	Precipitation: none, temperature at sunset: 20°C, wind F1

In order to supplement the information gathered from the manual activity surveys, a passive monitoring system of bat detection was also deployed for this survey scheme (i.e. a bat detector is left in the field, there is no observer present and bats which pass near enough to the monitoring unit are recorded and their calls are stored for later analysis). This results in a far greater sampling effort over a shorter period of time. Bats are identified by their ultrasonic calls. The passive detectors record bat ultrasonic calls on a continuous basis and store the information onto an internal SD card. Each time a bat is detected, an individual time-stamped (date and time to the second) file is recorded.

Passive monitoring was completed monthly between April and September 2025 and April and July 2026 using Anabat Swift bat monitors. The passive monitors were positioned in or adjacent to

hedgerow and woodland habitats in five locations as illustrated in Figure 2-2. The detectors were set to record from approximately 30 minutes before sunset until sunrise and recorded for 7 nights at each location. Data were then downloaded and bat echolocation calls were later analysed by the Anabat Insight software analysis programme version 2.1.7. Each time-stamped file was analysed and the species of bat recorded was noted as a bat pass.

2.4.5 Emergence Survey

A dusk survey of a mature Oak tree on the western boundary of the proposed site was undertaken on 7th July 2026 in order to watch and listen for bats exiting bat roosts to determine the presence or absence of bats at the time of survey. The dusk emergence survey commenced approximately 15 minutes before sunset and ended approximately 90 minutes after sunset. The survey was undertaken in suitable weather conditions (avoiding periods of very heavy rain, strong winds (> Beaufort Force 5), mists and dusk temperatures below (10°C)). An Anabat Walkabout detector was utilised for the survey, which record bat echolocation calls directly on to an internal SD memory card. Each time a bat is detected, an individual time-stamped (date and time to the second) file is recorded. Data was then downloaded and all recordings were analysed by the Anabat Insight software analysis programme version 2.1.7.

The emergence survey was aided by the use of the TrackIR Pro 19 thermal imaging scope.

2.5 Survey Limitations

Brown long-eared bats can be difficult to detect as they echolocate at a low-amplitude and foraging bats often make no sound. Similarly, lesser horseshoe bat can be difficult to detect as their calls are highly directional. The survey design aimed to increase the likelihood of recording these species by the employment of full spectrum monitoring and the positioning of passive monitors at commuting routes, natural corridors through or adjacent to vegetation and suitable brown long-eared bat and lesser horseshoe bat habitats (such as hedgerows).

The monitors were deployed on a monthly basis between April and September and recording occurred throughout a range of different weather conditions. Bat activity transects were all conducted in suitable weather conditions.

No significant constraints to the survey data gathered are noted.



Figure 2-2: Proposed development site at Kenmare- location of passive monitors recording in 2025 and 2026

3 Results

3.1 Existing Bat Data

The review of existing records of bat species in the environs of the study area indicates that eight of the ten known Irish species of bat have been recorded within a 4km radius. These bats include common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*P. pygmaeus*), Nathusius' pipistrelle (*P. nathusii*), Leisler's bat (*Nyctalus leisleri*), brown long-eared bat (*Plecotus auritus*), Daubenton's bat (*Myotis daubentonii*), Natterer's bat (*M. nattereri*) and lesser horseshoe bat (*Rhinolophus hipposideros*) shown in Table 3-1 below. Soprano pipistrelle, brown long-eared bat and lesser horseshoe bat have been recorded roosting within 4km of the study area. Lesser horseshoe bat has been recorded roosting in the townlands of Kilmurry and Killowen in close proximity to the study area and two winter roosts are present within a 1km radius of the study area.

Table 3-1: NBDC bat records from within a 4km radius of the study area

Common Name	Scientific Name	Present (Y/N)	Known Roost within 4km (Y/N)	Date of Last Record
Pipistrelle sp.	<i>Pipistrellus pipistrellus sensu lato</i>	Y	None	21/07/2018
Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	Y	None	17/08/2019
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	Y	Y	17/08/2019
Nathusius's Pipistrelle	<i>Pipistrellus nathusii</i>	Y	None	27/07/2006
Leisler's Bat	<i>Nyctalus leisleri</i>	Y	None	17/08/2019
Brown Long-eared Bat	<i>Plecotus auratus</i>	Y	Y	12/08/2006
Daubenton's Bat	<i>Myotis daubentonii</i>	Y	None	26/07/2009
Whiskered Bat	<i>Myotis mystacinus</i>	N	N/A	N/A
Natterer's Bat	<i>Myotis nattereri</i>	Y	None	12/08/2006
Lesser Horseshoe Bat	<i>Rhinolophus hipposideros</i>	Y	Y	28/01/2015
Brandt's Bat	<i>Myotis brandtii</i>	N	N/A	N/A

The bat landscape association model (Lundy *et al*, 2011) suggests that the study area is part of a landscape that is of moderate to high suitability for bats including common pipistrelle, soprano pipistrelle, brown long-eared, Leisler's, Daubenton's, Natterer's, whiskered bat and lesser horseshoe bat; and low to moderate suitability for Nathusius' pipistrelle.

3.1.1 Designated Sites

The study area is located c.0.55km to the east of Kenmare River SAC at nearest. Lesser Horseshoe bat is a qualifying interest species for this SAC. According to the National Parks and Wildlife Service Conservation Objectives mapping (available at [SSCO-data | National Parks & Wildlife Service](#), accessed 14/04/2026) the proposed site is located outside of the foraging range for the winter lesser horseshoe bat colony at Dunkerron souterrain and the summer roost at Foley's cottage (Figure 3-1).



Figure 3-1: Conservation Objective mapping of Lesser Horseshoe Bat Potential Foraging Grounds and Foraging Range ([SSCO-data](#) | [National Parks & Wildlife Service](#))

3.2 Bat Roost Survey

3.2.1 Preliminary Ecological Appraisal

The study area comprises recently cut scrub (Fossitt code WS1) bound by treelines (WL2), the Lissaniska stream is located to the north of the study area and broadleaved woodland (WD1) is present to the south and west of the study area.

In accordance with the criteria outlined in Table 2-1, the commuting and foraging habitats within the study area are of high suitability for bats.

A summary of foraging and roosting habitats for Irish bats is included in **Appendix A**.

3.2.2 Bat Roost Inspection Survey

3.2.2.1 Trees

No trees within the study area were confirmed as being used as roost sites during the course of the surveys undertaken in 2025. One tree within the study area was categorised as being suitable to support multiple bats and two trees were categorised as being suitable to support individual/ small numbers of bats on an opportunistic basis. The location of the trees with suitability for roosting bats is illustrated in Figure 3-2 and detailed in Table 3-2. It is further noted that many of the trees at the site boundary support Ivy cover that may hide potential roosting features and may support potential for individual bats to roost opportunistically in warmer months.

Table 3-2: Kenmare Residential Development: potential tree roosts

PTR Number	Tree Species	BCT Category	PRFs
1	Oak	PRF-I	Lifting bark, hazard limb, deadwood and knot hole
2	Ash	PRF-M	Heart rot
3	Oak	PRF-I	Knot hole

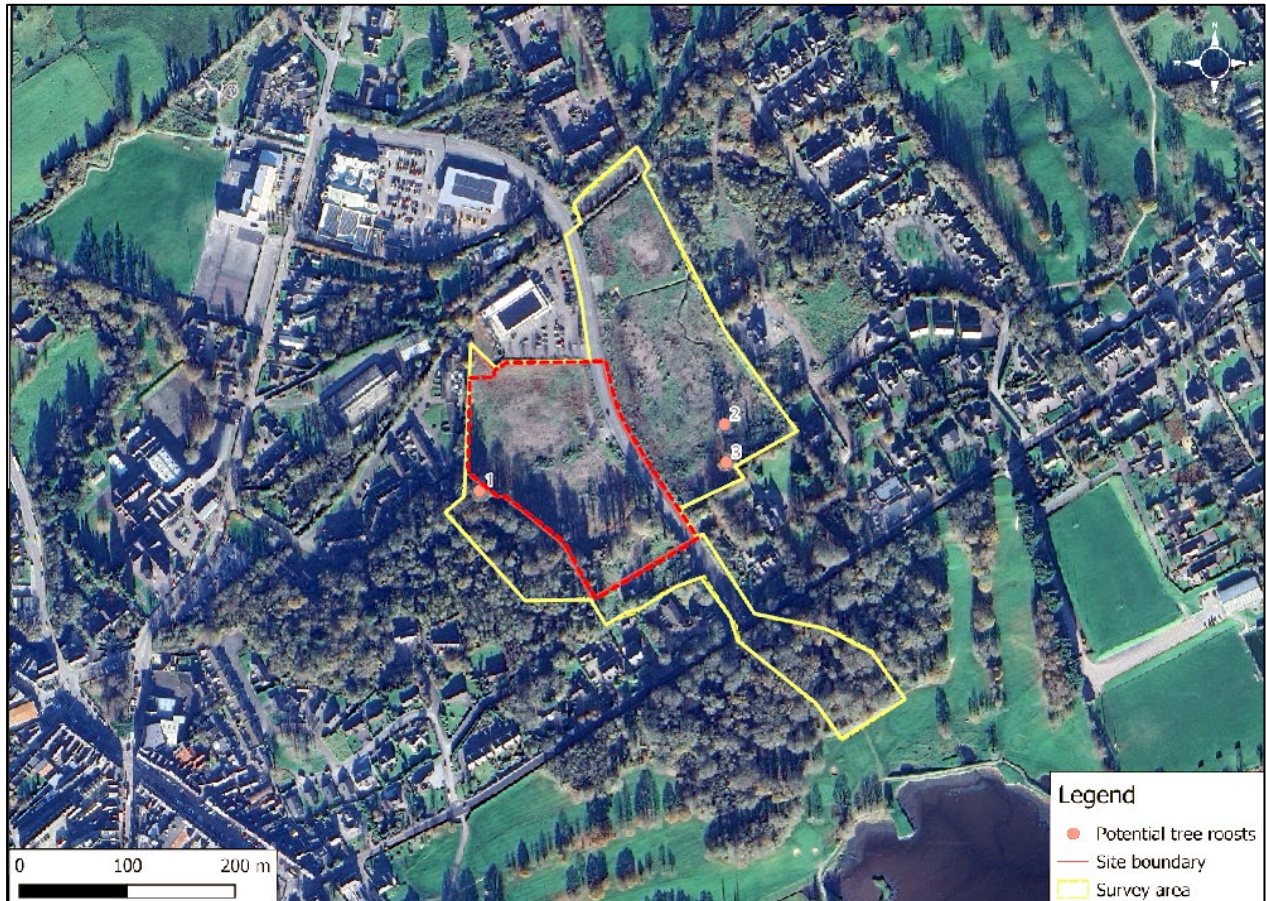


Figure 3-2: Kenmare Residential Development Study Area- location of potential tree roosts

3.2.2.2 Structures

Bridge

Concrete slab structure over the Lissaniska stream at the north of the study area. The bridge is relatively low lying with pointed parapets (Plate 3-1). No potential roosting features were recorded within this structure.



Plate 3-1: Concrete Slab Bridge over Lissaniska Stream

Building

A derelict dwelling at the southeast of the study area. The building is constructed of pointed stone walls with light ivy growth. The roof has collapsed and the windows and doors are missing (Plate 3-2). The building supports potential roosting habitat for individual/ small numbers of bats to roost opportunistically in gaps between stonework however the building is open to the elements and would not provide suitable conditions to support a roost of high conservation importance (i.e. a maternity or hibernation roost).



Plate 3-2: Ruinous Dwelling at the Southeast of the Study Area

Stone Wall

A stone wall is present at the south-eastern boundary of the study area (Plate 3-3). The wall is not pointed and there is potential roosting habitat for individual/ small numbers of bats in gaps between the stonework.



Plate 3-3: Stone Wall at the South of the Study Area

3.3 Activity Survey

The passive monitors recorded eight species of bat, namely common pipistrelle, soprano pipistrelle, Leisler's bat, brown long-eared bat, Natterer's bat, whiskered bat, Daubenton's bat and lesser horseshoe bat. Calls from the *Myotis* genus (unidentifiable to species level) were also recorded.

Common pipistrelle was the most frequently recorded species within the site, followed by soprano pipistrelle then Leisler's bat. Brown long-eared bat was recorded across most of the study area; the highest level of activity from this species was recorded on PM1 at the south-east of the site but no calls from this species were recorded on PM4 in the woodland to the west of the site. A low level of activity from Natterer's bat, whiskered bat and Daubenton's bat was recorded across the study area. Likewise, a low level of activity from the *Myotis* genus (unidentifiable to species level) was recorded across the study area, with a higher level of activity recorded at PM1 in June 2025 (see Table 3-2). Lesser horseshoe bat was recorded across the study area, with a high level of activity at PM2 and PM4 in July 2025.

Overall, a high level of activity and high diversity of species was recorded across the study area, with a lower level of activity recorded within the woodland at the west of the proposed site boundary and at the edge of woodland at the golf club to the south of the proposed site.

The number of bat passes per night recorded on the passive monitors in 2025 and 2026 is summarised in Table 3-3 and Table 3-4 respectively, the location of the passive monitors is illustrated in Figure 2-1.

Three species were recorded regularly within the study area during the bat activity transects undertaken in 2025 and 2026: common pipistrelle, soprano pipistrelle and Leisler's bat, lesser horseshoe bat was also recorded on one occasion at the western boundary of the study area. Soprano and common pipistrelle were recorded foraging along the treelines and woodland edge at the study area boundary and Leisler's bat was recorded foraging and commuting overhead.

During the transects undertaken in April and August 2025, soprano and common pipistrelle were recorded early in the evening (from c.8 minutes to c.14 minutes after sunset) flying along the woodland edge at the west of the study area from a southerly direction, suggesting the likely presence of a spring and summer pipistrelle roost in the immediate environs of the study area, outside of the study area boundary.

Table 3-3: Bat passes recorded during passive monitoring completed in 2025

Species	PM1					PM2					PM3					PM4				PM5		Total
	Apr	Jun	Jul	Aug	Sep	Apr	Jun	Jul	Aug	Sep	Apr	Jun	Jul	Aug	Sep	Jun	Jul	Aug	Sep	Aug	Sep	
Whiskered/ Brandt's	0	0	4	2	0	0	14	36	20	2	2	0	4	0	0	0	0	0	0	0	0	84 (0%)
Daubenton's	2	6	6	16	2	0	4	12	6	0	8	2	0	0	0	0	0	0	0	0	0	64 (0%)
Natterer's	0	0		6	6	0	0	1	2	6	6	10	2	0	2	0	4	0	0	0	0	45 (0%)
Myotis species	23	119	22	5	26	6	0	76	9	5	44	8	9	34	11	0	0	2	0	1	4	404 (0%)
Leisler's	306	540	1743	714	96	176	996	2002	1274	170	330	604	2900	687	53	30	460	52	26	32	29	13220 (13%)
Brown Long- eared	47	11	23	8	57	0	2	13	4	10	18	12	8	12	11	0	0	0	0	0	5	241 (0%)
Common Pipistrelle	3087	4154	8345	1389	1388	1043	3708	5694	2877	645	5187	3273	3746	1443	1406	294	496	606	145	158	373	49457 (49%)
Soprano Pipistrelle	974	748	836	1256	1442	309	528	669	504	193	3794	2030	8075	5789	3292	102	60	422	338	744	888	32993 (33%)
Pipistrelle species	11	31	137	24	20	3	0	6	0	3	9	8	43	75	2	0	0	1	2	62	4	441 (0%)
Lesser horseshoe	121	56	81	54	122	198	362	528	228	274	105	45	316	89	125	38	910	9	18	40	53	3772 (4%)
No ID	0	0	1	0	2	0	0	2	0	0	1	0	2	1	0	0	0	0	0	0	3	12 (0%)
Total	4571	5665	11198	3474	3161	1735	5614	9039	4924	1308	9504	5992	15105	8130	4902	464	1930	1092	529	1037	1359	100733 (100%)

Table 3-4: Bat passes recorded during passive monitoring completed in April and July 2026

Species	PM1		PM2		PM3		PM4		Total
	April	July	April	July	April	July	April	July	
Whiskered/ Brandt's	1	0	0	1	0	0	0	0	2 (0%)
Daubenton's	1	0	1	4	0	0	0	0	6 (0%)
Natterer's	3	1	0	0	0	0	0	0	4 (0%)
Myotis species	9	4	0	13	0	4	6	1	37 (0%)
Leisler's	63	311	19	221	22	219	23	201	1079 (10%)
Brown Long- eared	0	4	0	11	0	1	0	0	16 (0%)
Common Pipistrelle	691	629	130	1194	258	1098	680	1080	5760 (54%)
Soprano Pipistrelle	166	136	36	1214	183	490	555	260	3040 (29%)
Pipistrelle species	6	3	0	0	3	157	4	18	191 (2%)
Lesser horseshoe	31	7	142	120	12	28	108	4	452 (4%)
No ID	1	0	0	0	0	1	0	0	2 (0%)
Total	972	1095	328	2778	478	1998	1376	1564	10589 (100%)

3.3.1 Emergence Survey

No bats were recorded emerging from the mature Oak supporting potential roosting features on the western boundary of the proposed site during the survey conducted on 7th July 2026.

4 Evaluation of Survey Results

A review of existing bat records from within a 4km radius of the study area indicates that eight of the ten known Irish bat species had been recorded. These include common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Leisler's, brown long-eared, Daubenton's, Natterer's and lesser horseshoe bat. Soprano pipistrelle, brown long-eared bat and lesser horseshoe bat have been recorded roosting within 4km of the study area. Lesser horseshoe bat has been recorded roosting in the townlands of Kilmurry and Killowen in close proximity to the study area and two winter roosts are present within a 1km radius of the study area.

Features within the study area that are of potential use by foraging and commuting bats are treelines, woodland edge and a watercourse, which provide connectivity between the study area and other foraging areas in the wider landscape. Overall, the study area is considered to be of high suitability for foraging and commuting bats due to the presence of connectivity to other suitable habitats in the wider landscape.

Results from bat surveys undertaken between April and September 2025 and April and July 2026 indicate that eight species of bat forage within the proposed site boundary. A high amount of common pipistrelle, soprano pipistrelle and Leisler's bat activity was recorded and lower levels of activity from brown long-eared bat, Daubenton's bat, Natterer's bat, whiskered bat and lesser horseshoe bat were also recorded, noting that a relatively high level of lesser horseshoe bat activity was recorded on monitors recording at the west of the proposed site boundary in July 2025.

Soprano and common pipistrelle fly into the proposed site from a nearby roost to the south of the site, outside of the site boundary.

Overall, a high level of activity and high diversity of species was recorded within the proposed site.

Soprano pipistrelle, common pipistrelle, Leisler's bat, Daubenton's, Natterer's, whiskered and brown long-eared bat are all considered to be of Favourable conservation status and the conservation status of lesser horseshoe bat is categorised as being Inadequate (NPWS, 2019).

Soprano pipistrelle, common pipistrelle, Leisler's bat, Daubenton's, Natterer's, whiskered and brown long-eared bat foraging and commuting at the proposed site are considered to be of local conservation interest (higher value).

While the proposed site is not within the core foraging range of QI lesser horseshoe bat populations for Kenmare River SAC, a significant lesser horseshoe bat population of International Importance (i.e. a roost of over 100 individuals) roosts within a 1km radius of the proposed site. Applying the precautionary principle, the lesser horseshoe bats foraging and commuting at the proposed site are considered to be of International Importance.

5 Impact Assessment

This section of the report provides an assessment of the potential impacts on bats of the proposed development of a residential development within the proposed site boundary (as illustrated in Figure 1-1).

5.1 Construction Phase

5.1.1 Loss or Severance of Foraging and Commuting Habitat

The results of the bat activity survey undertaken for the proposed development indicate that the proposed site supports eight species of foraging and commuting bat (soprano pipistrelle, common pipistrelle, Leisler's, Daubenton's, Natterer's, whiskered, brown long-eared and lesser horseshoe bat).

The treelines and woodland edge habitat present at the site boundary provide foraging and commuting habitat for a high diversity of bat species. It is not proposed to remove any trees to facilitate the proposed development, therefore there will be no loss of foraging and commuting habitat at the proposed site during the construction phase.

5.1.2 Loss of Roosting Habitat

One Oak tree supporting potential roosting features was recorded on the western boundary of the proposed site. The Tree Survey Report (Total Tree Services, 2026) recommends pruning of hazard limbs and deadwood on this tree. No bats were recorded emerging from this Oak tree during a survey conducted on 7th July 2026, therefore no direct effects on roosting bats are expected to occur during the construction phase.

5.1.3 Lighting

Linear woodland and woodland edge habitat provides important flyways and feeding sites for a diversity of bats. Artificial lighting at night may have an adverse effect on foraging bats as light-averse bats may be repelled from lit areas and restrict their use of commuting or feeding space. In the absence of mitigation, disturbance of bats due to lighting used during the construction phase, should it be required, would have an indirect, temporary, negative effect for the duration of construction. The effect would be significant at the Local geographic level for soprano pipistrelle, common pipistrelle, Leisler's, Daubenton's, Natterer's, whiskered and brown long-eared bat.

The proposed site is outside of the potential foraging grounds and core foraging range for QI lesser horseshoe bat populations for Kenmare River SAC. Therefore, it is not likely that lighting at the proposed site will result in likely significant effects on QI lesser horseshoe bat populations for Kenmare River SAC. However, a lesser horseshoe bat roost of International Importance is present within a 1km radius of the proposed site. Lesser horseshoe bat commute to the site to forage, with high levels of activity recorded at the west of the site and within woodland to the west of the site, outside of the proposed site boundary. Adverse effects on lesser horseshoe bat as a result of artificial lighting at night would be significant at the International Level.

5.2 Operational Phase

5.2.1 Lighting

As noted in Section 5.1.3, artificial lighting at night may have an adverse effect on commuting and foraging bats.

Habitat degradation due to the use of artificial lighting at night may result in a long-term to permanent, irreversible negative effect on bats. The effect would be significant at the Local geographic level for soprano pipistrelle, common pipistrelle, Leisler's, Daubenton's, Natterer's, whiskered and brown long-

eared bat. There is potential that the lesser horseshoe bat activity recorded at the site is from a roost of International Importance; applying the precautionary principle, effects on lesser horseshoe bat as a result of artificial lighting at night may be significant at the International Level.

6 Mitigation

6.1 Construction Phase

6.1.1 Loss of Roosting Habitats

6.1.1.1 Trees

No roosting bats were recorded within the proposed site. However, as a precautionary measure, pre-construction Potential Roost Feature (PRF) inspection/presence absence surveys of all trees scheduled for pruning shall be undertaken. Following this examination, should any of the trees be identified as a bat roost then a derogation licence application will be made to the NPWS to exclude the bats and fell the tree.

Where bats are recorded roosting in the trees scheduled for pruning, the following mitigation will be required:

- Timing: pruning can be undertaken from late August to late October/early November and all works should ideally be undertaken in this period. During this period bats are still capable of flight having not entered hibernation and undertaking works in this period may reduce the risks of tree-felling if proper measures are undertaken. To carry out the works any later in the bat season creates an additional risk that bats may be in hibernation and thus unable to fly out from a tree that is being felled, although bats can be removed by hand by a licenced bat handler if required. Additionally, disturbance during winter may reduce the likelihood of survival as the bats' body temperature is too low and they may have to consume too much body fat to survive.

Trees to be pruned under the supervision of the bat specialist (as identified during the pre-construction survey) will be examined and where bats are found, they will be translocated to an area where bat boxes will already be installed on appropriate trees within the proposed site.

The proposed process for pruning the trees with PRFs is outlined below:

- The bat specialist will be present during the tree pruning works;
- Works will be undertaken in mild weather to ensure that if bats are found during works that they can be released or safely removed;
- Tree(s) identified as having potential to support bats will be surveyed during the daytime for bats prior to pruning, on the day the pruning is due to take place. The bat specialist will inspect all potential bat roost features of the tree, including those above ground level. This will require the services of a qualified arborist to climb the trees/ use a cherry picker and fell the tree in sections and lower potential roost features slowly to the ground to allow the bat specialist to inspect them. This will include visual inspection as well as use of an endoscope to inspect cavities/crevices;
- The arborist will be briefed on the technique to be followed prior to the commencement of operations. Pruning will follow best practice and mitigation measures, including wedging open cracks/crevices prior to load removal and cutting limbs in sections and lowering to the ground. Trees limbs will only be pruned in longer sections if the bat worker is satisfied that there are no potential roost features present;
- When using a chainsaw, the rate of fall of branches will not be accelerated by the use of a chain and vehicle;
- Any bats found in the trees will be removed by hand to a bat box and will then be relocated to the bat boxes installed in advance of works. Notes of any such activities will be maintained;
- The tree and/or tree sections will be left on the ground for a minimum period of 24 hours to enable any unidentified bats residing in deeper crevices to make good their escape during night time hours.

6.1.2 Lighting

To minimise disturbance to bats and other fauna that are active at night, construction operations during the hours of darkness will be kept to a minimum. If construction lighting is required during the bat activity period (April to September), lighting shall be directed away from all known roosts and woodland habitats to be retained. This can be achieved by using directional lighting (i.e. lighting which only shines on the proposed works and not nearby countryside) to prevent overspill. This shall be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only.

6.2 Operational Phase

6.2.1 Barrier effect as a result of artificial lighting

The protection of dark refuges is essential for bats, particularly in urban and suburban areas. Careful design of the lighting will be important to ensure that the development does not create barriers for bats commuting and foraging in the site, while maintaining health and safety requirements for human use. This is particularly important for bat foraging/commuting habitat within, and at the edge of, retained linear woodland habitats (treelines) and woodland at the site.

The following general principals will be followed in relation to the overall lighting plan for the proposed development site:

- Lighting design will be flexible and be able to fully take into account the presence of protected species. Therefore, appropriate lighting shall be used within the proposed development and adjacent areas with more sensitive lighting regimes deployed in wildlife sensitive areas, including foraging areas for bats along treelines and woodland edge.
- Dark buffer zones will be used to separate habitats or features from lighting by forming a dark perimeter around them. This shall be used for habitat features noted as roosting and foraging areas for bats and light spill onto foraging habitat (i.e. treelines and woodland edge) shall be avoided.
- Buffer zones will be used to protect dark buffer zones and rely on ensuring light levels (levels of illuminance measured in lux) within a certain distance of a feature do not exceed certain defined limits. The buffer zone can be further subdivided into zones of increasing illuminance limit radiating away from the feature or habitat that requires to be protected. This will apply to foraging habitat (i.e. treelines and woodland edge).

Luminaire design is extremely important to achieve an appropriate lighting regime. Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following will be considered when choosing luminaires. This is taken from the most recent BCT Lighting Guidelines (BCT, 2023).

- All luminaires used will lack UV elements to reduce impact.
- LED luminaires will be used due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (<2700 Kelvins) is recommended to reduce the blue light component.
- Light sources shall feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- Waymarking inground markers (low output with cowls or similar to minimise upward light spill) to delineate path edges.

- Column heights shall be carefully considered to minimise light spill and glare visibility. This should be balanced with the potential for increased numbers of columns and upward light reflectance as with bollards.
- Only luminaires with a negligible or zero Upward Light Ratio, and with good optical control, should be considered - See ILP GN01.
- Luminaires shall always be mounted horizontally, with no light output above 90° and/or no upward tilt.
- Where appropriate, external security lighting shall be set on motion sensors and set to as short a possible a timer as the risk assessment will allow. For most general residential purposes, a 1 or 2 minute timer is likely to be appropriate.
- The use of bollard or low-level downward-directional luminaires is strongly discouraged. This is due to a considerable range of issues, such as unacceptable glare, poor illumination efficiency, unacceptable upward light output, increased upward light scatter from surfaces and poor facial recognition which makes them unsuitable for most sites. Therefore, they should only be considered in specific cases where the lighting professional and project manager are able to resolve these issues.
- Only if all other options have been explored, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed. However, due to the lensing and fine cut-off control of the beam inherent in modern LED luminaires, the effect of cowls and baffles is often far less than anticipated and so should not be relied upon solely.

For this development specifically, the public lighting has been designed to avoid light spill onto important bat foraging habitat along the woodland and treeline at the western site boundary.

With regards to private lighting, the proposed lighting design ensures that external lighting shall be limited to downlighters, resulting in minimal light spill and retention of a dark buffer along woodland and treeline habitat at the western site boundary.

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Appendix A: Description of Irish Bat Species

Ireland has ten known bat species from two distinct families. Each is briefly described below. For a more comprehensive overview see Roche *et al* (2014). The conservation status of each species is derived from NPWS (2019).

Vespertilionidae:

Common pipistrelle (*Pipistrellus pipistrellus*)

This species was only recently separated from its sibling, the soprano or brown pipistrelle *P. pygmaeus*, which is detailed below (Barratt et al, 1997). The common pipistrelle's echolocation calls peak at 45 kHz. The species forages along linear landscape features such as hedgerows and treelines as well as within woodland. The conservation status of this species is Favourable.

Soprano pipistrelle (*Pipistrellus pygmaeus*)

The soprano pipistrelle's echolocation calls peak at 55 kHz, which distinguishes it readily from the common pipistrelle on detector. The pipistrelles are the smallest and most often seen of our bats, flying at head height and taking small prey such as midges and small moths. Summer roost sites are usually in buildings but tree holes and heavy ivy are also used. Roost numbers can exceed 1,500 animals in mid-summer. The conservation status of this species is Favourable.

Nathusius' pipistrelle (*Pipistrellus nathusii*)

Nathusius' pipistrelle is a recent addition to the Irish fauna and has mainly been recorded from the north-east of the island in Counties Antrim and Down (Richardson, 2000) and also in Fermanagh, Longford and Cavan. It has also been recorded in Counties Cork and Kerry (Kelleher, 2005). However, the known resident population is enhanced in the autumn months by an influx of animals from Scandinavian countries. The conservation status of this species is Favourable.

Leisler's bat (*Nyctalus leisleri*)

This species is Ireland's largest bat, with a wingspan of up to 320mm; it is also the third most common bat, preferring to roost in buildings, although it is sometimes found in trees and bat boxes. It is the earliest bat to emerge in the evening, flying fast and high with occasional steep dives to ground level, feeding on moths, caddis-flies and beetles. The echolocation calls are sometimes audible to the human ear being around 15 kHz at their lowest. The audible chatter from their roost on hot summer days is sometimes an aid to location. The conservation status of this species is Favourable.

Brown long-eared bat (*Plecotus auritus*)

This species of bat is a 'gleaner', hunting amongst the foliage of trees and shrubs, and hovering briefly to pick a moth or spider off a leaf, which it then takes to a sheltered perch to consume. They often land on the ground to capture their prey. Using its nose to emit its echolocation, the long-eared bat 'whispers' its calls so that the insects, upon which it preys, cannot hear its approach (and hence, it needs oversize ears to hear the returning echoes). As this is a whispering species, it is extremely difficult to monitor in the field as it is seldom heard on a bat detector. Furthermore, keeping within the foliage, as it does, it is easily overlooked. It prefers to roost in old buildings. The conservation status of this species is Favourable.

Natterer's bat (*Myotis nattereri*)

This species has a slow to medium flight, usually over trees but sometimes over water. It usually follows hedges and treelines to its feeding sites, consuming flies, moths, caddis-flies and spiders. Known roosts are usually in old stone buildings but they have been found in trees and bat boxes. The Natterer's bat is one of our least studied species and further work is required to establish its status in Ireland. The conservation status of this species is Favourable.

Daubenton's bat (*Myotis daubentonii*)

This bat species prefers feeding close to the surface of smooth water, either over rivers, canals, ponds, lakes or reservoirs but it can also be found foraging in woodlands. Flying at 15 kilometres per hour, it gaffs insects with its over-sized feet as they emerge from the surface of the water - feeding on caddis flies, moths, mosquitoes, midges etc. It is often found roosting beneath bridges or in tunnels and also makes use of hollows in trees. The conservation status of this species is Favourable.

Whiskered bat (*Myotis mystacinus*)

This species, although widely distributed, has been rarely recorded in Ireland. It is often found in woodland, frequently near water. Flying high, near the canopy, it maintains a steady beat and sometimes glides as it hunts. It also gleans spiders from the foliage of trees. Whiskered bats prefer to roost in buildings, under slates, lead flashing or exposed beneath the ridge beam within attics. However, they also use cracks and holes in trees and sometimes bat boxes. The conservation status of this species is Favourable.

Brandt's bat (*Myotis brandtii*)

According to NPWS (2013), whiskered and Brandt's bats are cryptic species and can only be told apart using DNA techniques. Brandt's bat has been confirmed only once from Ireland; a single specimen found in 2003 in Wicklow (Mullen, 2006). Following this discovery, an intensive re-survey, involving DNA testing, was undertaken of all known whiskered bat roosts in Ireland, by the Centre for Irish Bat Research. Woodland mist-netting was also conducted for the species. Despite the extensive survey-work, no further Brandt's bats were identified. The most recent Red Data List for Irish Mammals (Marnell *et al.* 2009) lists Brandt's bat as data deficient. There is no evidence of any roosts for this species in the country and at present the single record for the species is considered an anomaly. Boston *et al* (2010) concluded that "M. brandtii cannot currently be considered a resident species. This species is now considered a vagrant to the country and consequently, a detailed assessment has not been carried out.

Rhinolophidae:

Lesser horseshoe bat (*Rhinolophus hipposideros*)

This species is the only representative of the Rhinolophidae or horseshoe bat family in Ireland. It differs from our other species in both habits and looks, having a unique nose leaf with which it projects its echolocation calls. It is also quite small and, at rest, wraps its wings around its body. Lesser horseshoe bats feed close to the ground, gleaning their prey from branches and stones. It often carries its prey to a perch to consume, leaving the remains beneath as an indication of its presence. The echolocation call of this species is of constant frequency and, on a heterodyne bat detector, sounds like a melodious warble. The species is confined to six counties along the Atlantic seaboard: Mayo, Galway, Clare, Limerick, Kerry and Cork. The current Irish national population is estimated at 12,500 animals. This species is listed on Annex II of the EC Habitats Directive and 41 Special Areas of Conservation have been designated in Ireland for its protection. Where it occurs, it is often found roosting within farm buildings. The conservation status of this species is Inadequate.