



Ecological Impact Assessment

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

KPH Construction Ltd.

September 2026

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- Appendix 1 – NRA Ecological Evaluation
- Appendix 2 – Bat Report (Greenleaf Ecology)
- Appendix 3 – Aquatic Ecology and Fish Report

Project No.	Doc. No.	Rev.	Date	Prepared By	Checked By	Approved By	Status
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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

A Planning Application is being lodged to Kerry County Council (KCC) by KPH construction LTD., (the Applicant') for a Large-scale Residential Development (LRD) for permission to construct a Large Residential Development (LRD) on lands located at Killowen, Kenmare, County Kerry.

Malachy Walsh and Partners Engineering and Environmental Consultants (MWP) have been engaged by the Applicant to prepare an Ecological Impact Assessment (EclA) report for the Proposed Development, to accompany the Planning Application. This report describes the existing biodiversity and ecological characteristics of the Proposed Development site and assesses the significance of predicted effects on ecological receptors arising from the Proposed Development.

A Stage 1 screening for Appropriate Assessment (AA) report, an Environmental Impact Assessment screening report, and a preliminary Construction Environmental Management Plan (CEMP) have also been prepared by MWP in relation to the proposal and will be submitted as part of the planning application.

A separate report prepared by Green Leaf Ecology Consultants has informed this Ecological Impact Assessment, namely a Bat Survey Report, which accompanies the planning application.

1.1 Scope of Assessment

- Identify and document protected habitats and species in the study area through desk-top studies,
- Undertake baseline ecological surveys at the site,
- Evaluate the nature conservation importance of the ecological resources identified using a scientifically robust and objective methodology based on current National and International best practice guidelines,
- Predict the potential direct, indirect and cumulative effects of the project on biodiversity,
- Prescribe mitigation measures to prevent and minimise potential effects on biodiversity,
- Identify site-specific measures that could be employed for the purpose of local biodiversity enhancement.

1.2 Statement of Competency

This Ecological Impact Assessment has been prepared by Petr Dobes, Ecologist with MWP.

Petr, a graduate of Kerry College's Ecology program, 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 exhibits a deep commitment to environmental stewardship. Passionate about nature, Petr actively participates in Citizen Science projects, contributing to the monitoring of local wildlife and flora. He is a dedicated birdwatcher, conducting annual bird population surveys for both BirdWatch Ireland and the Irish Raptor Study Group. Petr has been formally trained in aquatic macroinvertebrate identification through the Freshwater Biological Association, Biological Water Quality Assessment using the Q-value method (Pascal Sweeney), and surveying techniques for white-clawed crayfish as well as Stage 1 and 2 freshwater pearl mussel surveys (also under Pascal Sweeney). He has completed formal bat survey training with leading bat specialist Conor Kelleher.

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.

2. Details of Proposed Development

2.1 Site Location and Context

The Proposed Development site is situated in Killowen, Kenmare, Co. Kerry in a semi-urban setting on the outskirts of Kenmare town, approximately 0.5 km north-east of the town centre. The site is surrounded by a mix of existing residential development, private lands and associated infrastructure.

The site is currently accessed via Pat Scarteen Road, located immediately to the east of the site. This road runs in a north-west to south-east direction and connects the regional road R569 to Railway Road which extends in a north-south direction through Kenmare town (**Figure 1**).

Woodland, locally known as Lodge Wood, is present along the southwestern boundary of the site and represents the principal ecological feature. A residential development (Scarteen Park) is situated to the west. The Keelnagower stream is located to the north of the site, while areas of scrub occur to the east, beyond Pat Scarteen Road.

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)



Figure 1. Site location map

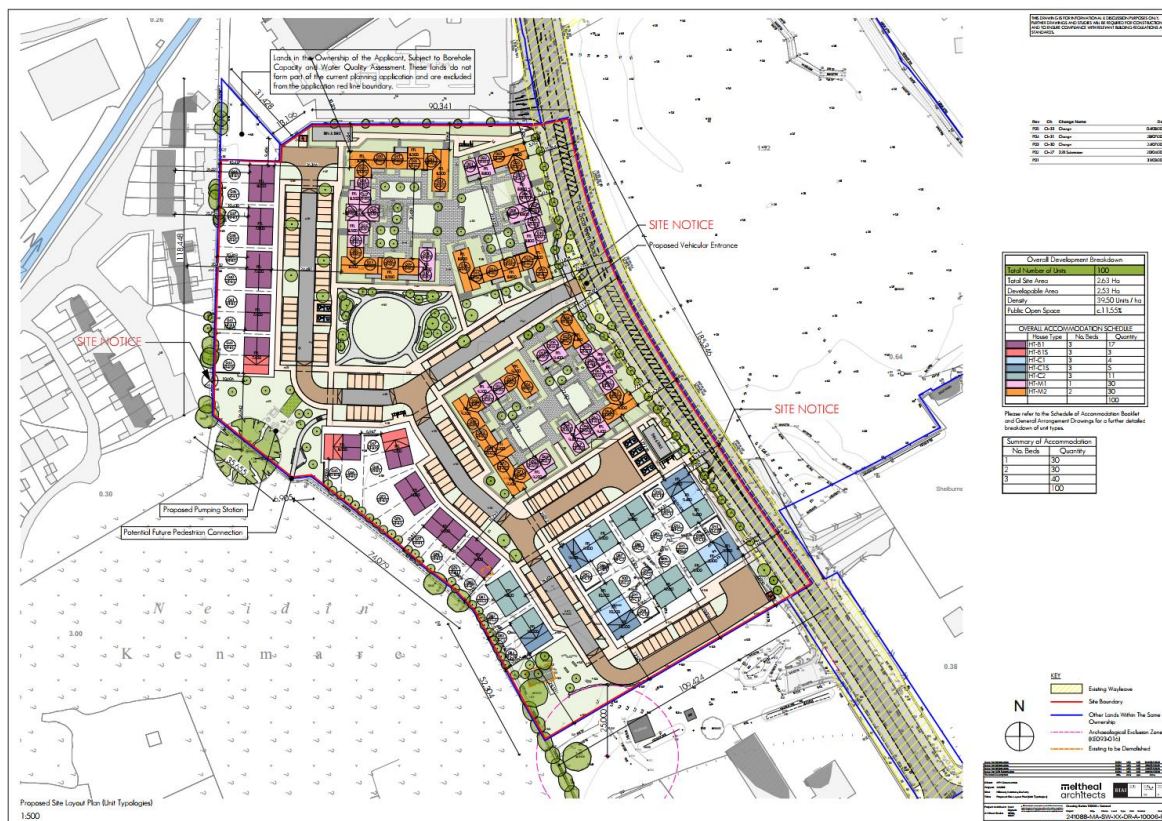
2.2 Overview of the Project

The Proposed Development comprises a Large-scale Residential Development (LRD) at Killowen, Kenmare, County Kerry. The development will consist of the construction of 100 no. residential units, including a mix of house types.

The Proposed Development will include the provision of internal access roads, pedestrian pathways, public open space, landscaping, public lighting, and all associated site development works. The total site area extends to approximately 2.63 ha, with a developable area of approximately 2.56 ha.

The Proposed Development will also include the provision of foul and surface water drainage infrastructure. Surface water generated on-site will be managed via an engineered drainage network and discharged to the receiving environment in accordance with the final detailed design and relevant regulatory requirements.

See **Figure 2** below for site layout of the Proposed Development.



2.3 Characteristics of the Project

The main elements of the Proposed Development are summarised as follows:

- The Proposed Development comprises a Large-scale Residential Development (LRD) consisting of 100 no. residential units on a site area of approximately 2.7 ha, together with associated roads, footpaths, public open space, landscaping, lighting, drainage and utility infrastructure.
- Prior to construction, site preparation and enabling works will be undertaken, including localised vegetation clearance, topsoil stripping where required, establishment of temporary site compounds, and installation of temporary drainage and site services.
- Construction works will comprise excavation and groundworks, installation of surface water and foul drainage infrastructure, construction of internal roads and services, and the construction of residential units and associated infrastructure.
- The final phase will comprise hard and soft landscaping works, installation of public lighting, boundary treatments and completion of public open space areas.
- Construction activities will be undertaken over an estimated period of approximately 18–24 months.
- Construction will require the use of standard materials including aggregates, concrete, asphalt and building materials, together with plant and machinery such as excavators, dumpers, cranes and delivery vehicles.
- Surface water runoff will be managed through a SuDS-based drainage system, including treatment and attenuation measures prior to discharge.

- Construction waste will comprise typical construction and demolition waste, including excavated soils, inert materials, packaging and general construction waste. Suitable excavated materials may be reused on site, with surplus materials removed off-site to authorised facilities.
- During operation, the development will function as a residential scheme with associated traffic movements, lighting, landscaping, drainage and utility services infrastructure.
- Domestic wastewater generated by the development will discharge to the public foul sewer network via a proposed on-site pumping station and rising main before treatment at Kenmare Wastewater Treatment Plant (WWDA D0184-01). Potable water will be supplied via connection to the existing public water supply network. Site investigations are currently underway to confirm the condition of the existing well, including water quality testing, yield assessment and determination of any treatment requirements.
- During operation, the development will generate typical domestic waste streams, which will be managed through established waste collection services.
- No decommissioning phase is proposed, as the development is intended as a permanent residential development.

3. Methodology

3.1 Legislation and published guidance

The impact assessment was undertaken with regard to the following publications:

- *'Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)'* (EPA, 2022),
- *'Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine'* (CIEEM, 2018),
- *'Guidelines for Assessment of Ecological Impacts of National Road Schemes'* (NRA, 2009).

The following legislative framework was also considered:

- EU Habitats Directive (92/43/EEC),
- EU Birds Directive (2009/147/EC),
- EU Water Framework Directive (WFD, 2000/60/EC),
- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011), as amended,
- Planning and Development Act 2000, as amended,
- Wildlife Act 1976, as amended,
- Flora (Protection) Order, 2015 ,
- European Communities (Quality of Salmonid Waters) Regulations, 1988.

The following literature was referred to with regard to the desktop study and the field surveys:

- Irish Wildlife Manuals (IWM) 116 Checklists of protected and threatened species in Ireland (Nelson, *et al.*, 2019), including subsequent updates,

- Irish Red Data Book for Vascular Plants (Curtis and McGough, 1988),
- Review of records of plant species protected under the Flora (Protection) Order of 2015 and the Irish Red Data Book (Wyse Jackson, *et al.*, 2016),
- Irish Red List: Terrestrial Mammals (Marnell, *et al.*, 2019),
- Irish Red List: Amphibians, Reptiles and Freshwater Fish (King, *et al.*, 2011),
- Birds of Conservation Concern in Ireland 2020 – 2026 (Gilbert *et al.*, 2021),
- ‘*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*’ NRA (2009),
- ‘*Best Practice Guidance for Habitat Survey and Mapping*’ Smith *et al.*, (2011) and
- ‘*A Guide to Habitats in Ireland*’ Fossitt (2000). Other information sources and reports footnoted in the course of the report.

3.2 Important Ecological Features (IEFs)

An Important Ecological Feature (IEF) is defined as a habitat, species, ecosystem or designated site that is considered to be of sufficient ecological importance to warrant detailed assessment within the EcIA. IEFs are identified based on their conservation value, legal status and ecological function, and are typically those evaluated as being of Local Importance (higher value) or greater, in accordance with NRA (2009).

3.3 Zone of Influence (ZOI)

The zone of influence (ZOI) of the Proposed Development is the area over which ecological features may be affected by biophysical changes that result from the Proposed Development and its associated activities. The ZOI differs from project to project in light of the nature, size and location of each project and varies for different ecological features depending on their sensitivity to an environmental change.

The features affected could include habitats, species, and ecosystems, and the processes on which they depend. These features may be geographically distant from a proposed project, but their ecological interests may be indirectly affected by the construction and/or operation of it. The Zone of Influence was defined having regard to the following:

- The nature, size and location of the project,
- Sensitive habitats and species identified within the study area,
- Any suitable habitats for high conservation value species identified within the study area and extending away from the study area,
- Ecological connectivity between the project and the wider landscape,
- The sensitivities of the relevant key ecological receptors,
- Any identified potential effect pathways to key ecological receptors, and
- Habitat connectivity and foraging ranges of fauna.

3.4 Assessment Criteria

This section outlines the criteria upon which evaluations of the importance of ecological features and the assessments of the ecological impact of the project on these features are made, referring to relevant legislation and guidelines.

3.4.1 Evaluation

The evaluation outlined in this report and the assessment of the effects of the proposed project follows methodologies set out in '*Guidelines for Ecological Impact Assessment in the UK and Ireland*' (CIEEM, 2018; updated 2022) and '*Guidelines for Assessment of Ecological Impacts of National Roads Schemes*' (NRA, 2009).

These guidelines set out the context for the determination of value on a geographical basis with a hierarchy (International through to Local) assigned based on the importance of any particular ecological receptor. The guidelines provide a basis for determination of whether any particular ecological receptors of importance on the following adapted scale:

- International,
- National,
- County,
- Local Importance (higher value) and
- Local Importance (lower value).

The NRA (2009) guidelines clearly set out the criteria by which each geographic level of importance can be assigned. At the lowest end of the scale, Locally Important (lower value) receptors contain habitats and species that are widespread, of low ecological significance, and are of importance only in the local area. In contrast, Internationally Important sites are either designated for conservation at an international level as part of the European Site/Natura 2000 Network (SAC or SPA) or provide the best examples of habitats or internationally important populations of protected flora and fauna.

The criteria used to evaluate the value of ecological resources has been included in **Appendix 1**. The value of habitats is assessed based on habitat condition, size, rarity, conservation and legal status. The value of fauna is assessed on biodiversity value, legal status and conservation status. Biodiversity value is based on its national distribution, abundance or rarity, and associated trends.

IEFs are referred to by NRA (2009) as those ecological features for which detailed assessment is required. IEFs are taken to be those features that are evaluated as Locally Important (higher value) or higher. The significance of the ecological effects of the project was assessed on each of the IEFs identified.

3.4.2 Impact Assessment

The ecological significance of potential effects is assessed with regard to CIEEM (2018), which defines a 'significant effect' as one that either supports or undermines biodiversity conservation objectives for Important Ecological Features or biodiversity in general

Conservation objectives may be specific or broad and can be considered at a wide range of scales ranging from international to local (CIEEM, 2018). An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status.

Significant effects encompass impacts on the structure and function of defined sites, habitats or ecosystems and the conservation status of habitats and species (including extent, abundance and distribution). CIEEM (2018) defines the 'conservation status' for habitats and species, as follows:

- Habitats: conservation status is determined by the sum of the influences on the habitat that may affect its extent, structure and functions as well as its distribution and its typical species within a given geographical area.
- Species: conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

Significant effects should be qualified with reference to an appropriate geographic scale (CIEEM, 2018).

EPA (2022) guidance and criteria were also considered in determining significance and for assessing impact. Professional judgement is used. The EPA (2022) criteria for assessing quality of effects and the significance of effects are set out in **Table 1** and **Table 2**.

Table 1: Criteria for assessing impact quality based on EPA (2022)

Quality of Effect	Criteria
Positive	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Neutral	No effects or effects that are imperceptible within normal bounds of variation or within the margin of forecasting error.
Negative/Adverse	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

Table 2. Criteria for assessing effect significance based on EPA (2022)

Significance of Effects	Definition
Imperceptible	An effect capable of measurement but without significant consequences
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends
Significant	An effect which, by its character, magnitude, duration or intensity significantly alters a sensitive aspect of the environment
Very significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
Profound	An effect which obliterates sensitive characteristics

The following terms are used when quantifying the duration and frequency of the potential effects:

- Momentary – effects lasting from seconds to minutes.
- Brief – effects lasting less than a day,

- Temporary – effects lasting less than a year,
- Short-term – effects lasting 1 to 7 years,
- Medium term – effects lasting 7 to 15 years,
- Long term – effects lasting 15 to 60 years,
- Permanent – effects lasting over 60 years,
- Reversible – effects that can be undone, for example through remediation or restoration
- Frequency – How often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).

Where potentially significant ecological effects are identified, mitigation measures are proposed to avoid, reduce or offset such effects. The significance of cumulative effects is assessed by considering the ecological effects of the Proposed Development in combination with other developments that have planning permission, are under construction, or are already in existence within the area. The cumulative effects associated with existing land uses and ongoing activities are also considered. The significance of residual effects following mitigation is then assessed.

3.5 Study Area

The study area comprises the full extent of lands within the red line boundary, which covers the entire Proposed Development site (**Figure 3**).

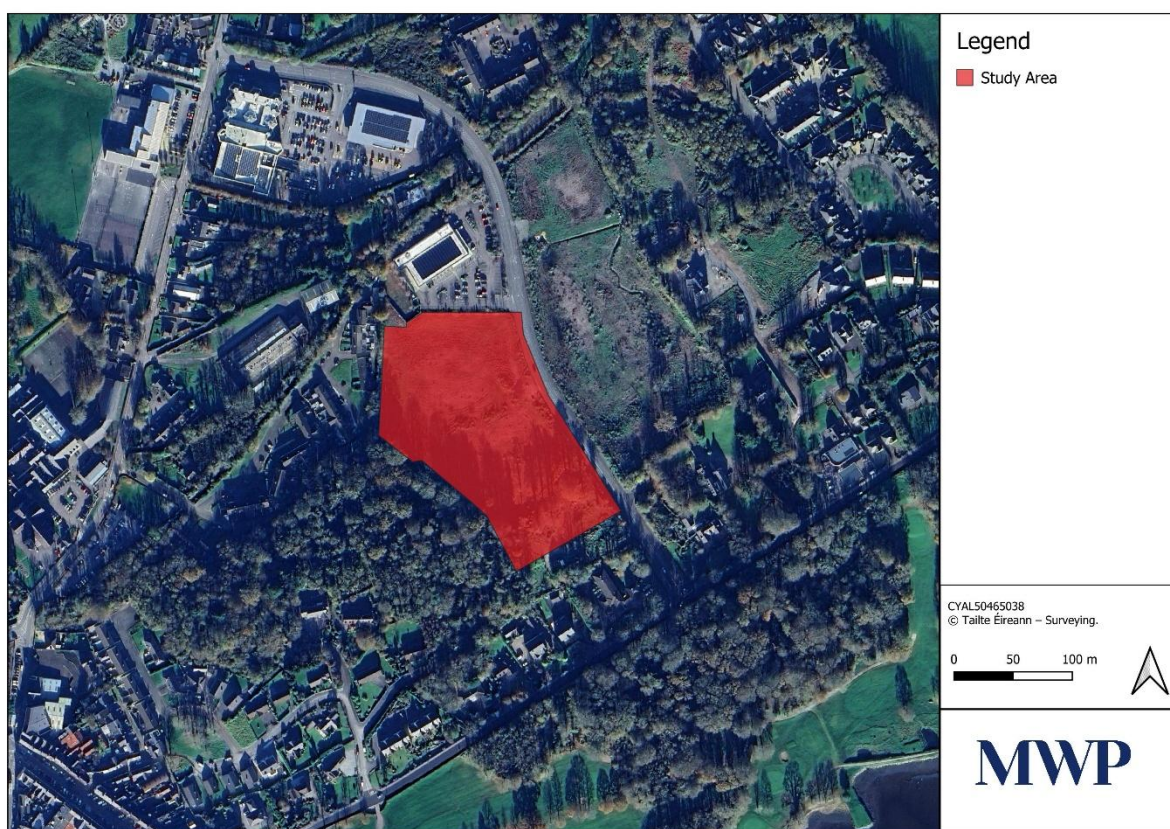


Figure 3: Study area boundary

3.6 Desk-top Study

A desk-top study was undertaken to collate and review available information relating to the study area and the surrounding landscape, including habitats, species and ecological resources considered to be connected to the site.

The following publications, which include current best practice guidance, current scientific literature, up to-date data and datasets were reviewed:

- Ordnance Survey Ireland (OSI) aerial photography, 1:50000 mapping, GeoHive and online satellite imagery sources,
- National Parks and Wildlife Service (NPWS) datasets,
- National Biodiversity Data Centre (NBDC) (online map-viewer),
- Central Statistics Office (CSO) – Census of Agriculture (online),
- BirdWatch Ireland and Irish Wetland Bird Survey (I-WeBS) (online datasets),
- Teagasc soil area maps (NBDC website),
- Geological Survey Ireland (GSI) area maps,
- Environmental Protection Agency (EPA) water quality data,
- Kerry County Development Plan 2022-2028³
- Kerry County Biodiversity Action Plan 2022-2028⁴
- Kenmare municipal District Local Area Plan 2024-2030⁵
- Review of requested records from NPWS Rare and Protected Species database and BCI bat species were reviewed
- Review of records of plant species protected under the Flora (Protection) Order of 2015 and the Irish Red Data Book (Wyse Jackson *et al.*, 2016). Other information sources and reports footnoted in the course of the report.

3.6.1 Database Searches and Data Requests

The study area is located within Ordnance Survey National Grid hectad V97. Species records for this hectad were obtained from the National Biodiversity Data Centre (NBDC) online database and reviewed.

BirdWatch Ireland resources, including the Birds of Conservation Concern in Ireland (BoCCI) listings, were also consulted.

Information gathered from these sources was used to inform the baseline ecological surveys and the subsequent impact assessment for the Proposed Development.

³ [County Development Plan | \(c\) Kerry County Council](#) Accessed on 14/04/2026

⁴ [Volume 6](#) Accessed on 14/04/2026

⁵ [Kenmare Municipal District LAP 2024-2030 | kerrycoco.ie](#) Accessed on 14/04/2026

3.6.2 Consultations

Inland Fisheries Ireland (IFI) was consulted in July 2026 regarding the aquatic ecology assessment and fish survey findings for the Proposed Development. In correspondence dated 28 July 2026.

Additional information relating to the proposed surface water outfall headwall was subsequently provided to IFI. At the time of writing, no further observations or specific fisheries-related recommendations had been received from IFI. Should any response be received prior to determination of the application, any relevant recommendations will be incorporated where appropriate.

3.7 Field Surveys

The desk-top study was supplemented by multi-disciplinary ecological walkover survey of the study area, undertaken by MWP ecologist on 26th March 2026 to inform supplementary baseline data including habitats and species present.

Summaries of MWP field survey methodologies are provided in the sections below.

3.7.1 Habitats and Flora

Baseline habitat and flora surveys were undertaken during March, which falls outside the optimal survey period for detailed botanical assessment⁶. To address this limitation, an additional walkover survey was undertaken in July, within the optimal botanical survey season, to confirm habitat classifications and record any plant species not detectable during the earlier survey period.

However, it was noted that the subject site was previously used as a compound and area for spoil storage during the Pat Scarteen Relief Road construction and the subsequent habitat on-site consisted largely of recolonising scrub vegetation. For the purposes of site investigation and surveys there has been clearance of this scrub and overgrowth. This site history was reflected in the habitat and flora survey results which indicated that the site comprises predominantly disturbed and cleared ground, and therefore the ability to characterise habitats present was not significantly constrained.

Surveys had regard to 'Best Practice Guidance for Habitat Survey and Mapping' (Smith *et al.*, 2011) and 'A Guide to Habitats in Ireland' (Fossitt, 2000). Habitats within and bounding the study area were categorised to Level 3 according to Fossitt (2000). Habitats occurring within the site were assessed for their potential suitability for terrestrial mammal species.

Following surveys, a habitat map for the study area was prepared (see **Section 4.3.2**).

3.7.2 Fauna

Walkover surveys for protected terrestrial mammals were undertaken within the study area. Habitats were systematically inspected for evidence of mammal activity, including footprints, droppings, burrows, dens or setts, feeding signs, well-used activity trails, and areas of disturbed vegetation. The surveys were informed by recognised best-practice guidance, including Animal Tracks and Signs (Bang and Dahlström, 2006) and Surveying for Badgers: Good Practice Guidelines (Scottish Badgers, 2018).

Areas of suitable habitat were subject to targeted examination for signs indicative of badger presence. This included searches for setts, latrines, footprints, discarded hairs, scratch marks, snuffle holes, and evidence of

⁶ Sub-optimal survey period is from October until March inclusive, Optimal survey period is from April to September inclusive.

digging activity, with reference to the NRA (2005) guidelines. Habitat suitability for badger was also considered, taking into account factors such as soil type, topography, vegetation cover, and proximity to foraging areas.

In addition, all bird species observed or heard calling during the course of the field surveys were recorded to assist in characterising the avian assemblage utilising the site and its immediate surroundings. Observations included species presence, behaviour, and habitat use, providing contextual information on the bird community associated with the survey area.

3.7.3 Non-native/Invasive Species

During the multi-disciplinary ecological walkover survey, the study area was surveyed for the presence of terrestrial and aquatic invasive alien plant species (IAPS), with a focus on those species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011, as amended). Any infestations encountered were recorded and the species, location and extent of infestation was noted, and a photographic record made. Further information including survey results for IAPS can be found in **Section 4.3.4.2**.

3.7.4 Aquatic Surveys

A key ecological feature of the Proposed Development site is the Keelnagower Stream (EPA name Lissaniska 21), which flows in close proximity to the northern boundary of the site and discharges to the Finnihy River approximately 500 m downstream. Both watercourses were subject to preliminary assessment during the ecological walkover survey, including appraisal of habitat suitability for otter (*Lutra lutra*) and inspection for field signs such as spraints, tracks and feeding remains, in accordance with Chanin (2003).

Detailed aquatic surveys, including electrofishing surveys and macroinvertebrate (kick sampling) surveys, were undertaken on 6th June and 13th July 2026. A total of four survey sites were assessed, comprising two sites on the Lissaniska Stream and two sites on the River Finnihy. Electrofishing surveys were undertaken at two of the four sites, comprising one site on the Lissaniska Stream (Site 2) and one site on the River Finnihy (Site 3), while macroinvertebrate kick sampling and habitat assessments were completed at all four locations, please see **Figure 4**. The survey programme was designed to assess aquatic habitat quality, fish communities, macroinvertebrate assemblages and biological water quality across representative reaches of both watercourses, including freshwater and tidally influenced sections of the Finnihy River. For summary of results see **Section 4.5.2** for detailed survey results see Aquatic Ecology and Fish Report (25631-ZZ-ZZZ-RP-EC-6007) in **Appendix 3**.

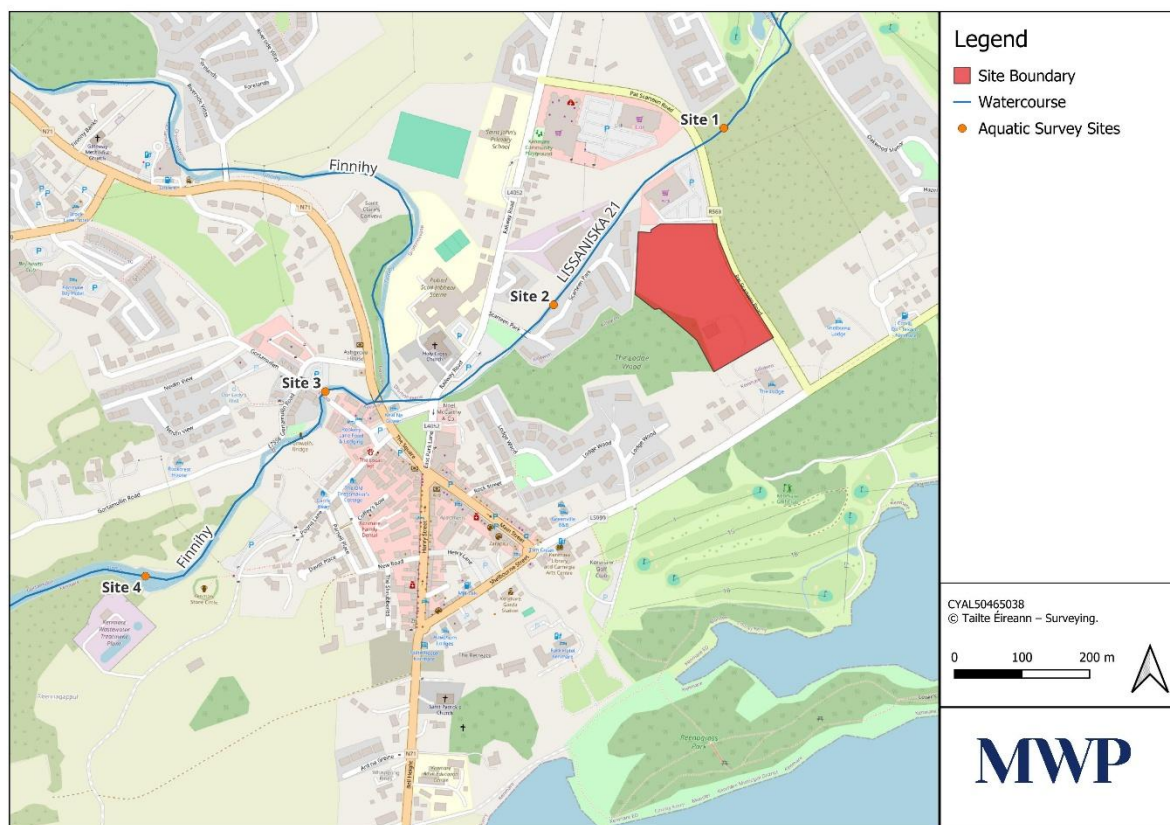


Figure 4: Aquatic survey locations within the Kenmare Town.

3.7.5 Field Survey Limitations

The multi-disciplinary ecological walkover survey was initially undertaken in March. This period is generally favourable for the detection of mammal field signs due to reduced vegetation cover, which improves visibility of features such as tracks, setts, and feeding evidence. As March falls outside the optimal season for detailed botanical surveys and the identification of flowering plant species, an additional ecological walkover survey was undertaken in July, during the optimal botanical survey period. The July survey enabled confirmation of habitat classifications and improved recording of botanical species, thereby addressing any limitations associated with the earlier survey and reducing the likelihood that seasonal or ephemeral flora were under-recorded.

An additional limitation of the survey was that much of the site had been subject to recent vegetation clearance prior to the field visit, resulting in large areas of disturbed ground. This disturbance may have reduced the availability of vegetation-based ecological indicators and limited the detection of certain habitat features.

4. Description of Existing Environment

4.1 Site Overview

The Proposed Development site is located at Killowen, Kenmare, Co. Kerry, in a semi-urban setting on the outskirts of Kenmare town, approximately 0.5 km north-east of the town centre. The site is situated within an area characterised by a mix of existing residential development, private lands, and associated infrastructure.

Pat Scarteen Road runs immediately along the eastern boundary of the site, extending in a north-west to south-east direction and connecting the regional road R569 to Railway Road, which traverses Kenmare town in a north-south orientation. A residential housing estate, Scarteen Park, is located to the east of the site beyond Pat Scarteen Road, while mixed scrub habitat occurs further east.

The south-western boundary of the site adjoins an area of mixed broadleaved woodland, providing a natural boundary feature. To the north of the site lies the Keelnagower Stream, a second-order watercourse (EPA name Lissaniska_21), which flows in a south-westly direction and discharges into the Finnihy River, part of the wider Kenmare Bay SAC hydrological network.

According to the Geological Survey Ireland (GSI) online map viewer, the site is underlain predominantly by Waulsortian Limestone, described as massive, unbedded lime mudstone. The underlying soils are primarily river alluvium, with associated soil types including Boyne (0500BO) sandy river alluvium, Finisk (0570FI) fine loamy soils over non-calcareous gravels, and Aherlow (0570AH) sandy river alluvium. The subsoil across the site is classified as undifferentiated alluvium.

According to CORINE Land Cover (2018), the Proposed Development site is classified as 'Sport and leisure facilities' (Code: 142). Lands immediately adjoining the site are also classified within this landcover category. In the wider surrounding area, land cover is dominated by 'Discontinuous urban fabric' (Code: 112) to the north, west, and east of the site. Further to the east, land cover transitions to 'Pastures' (Code: 231).

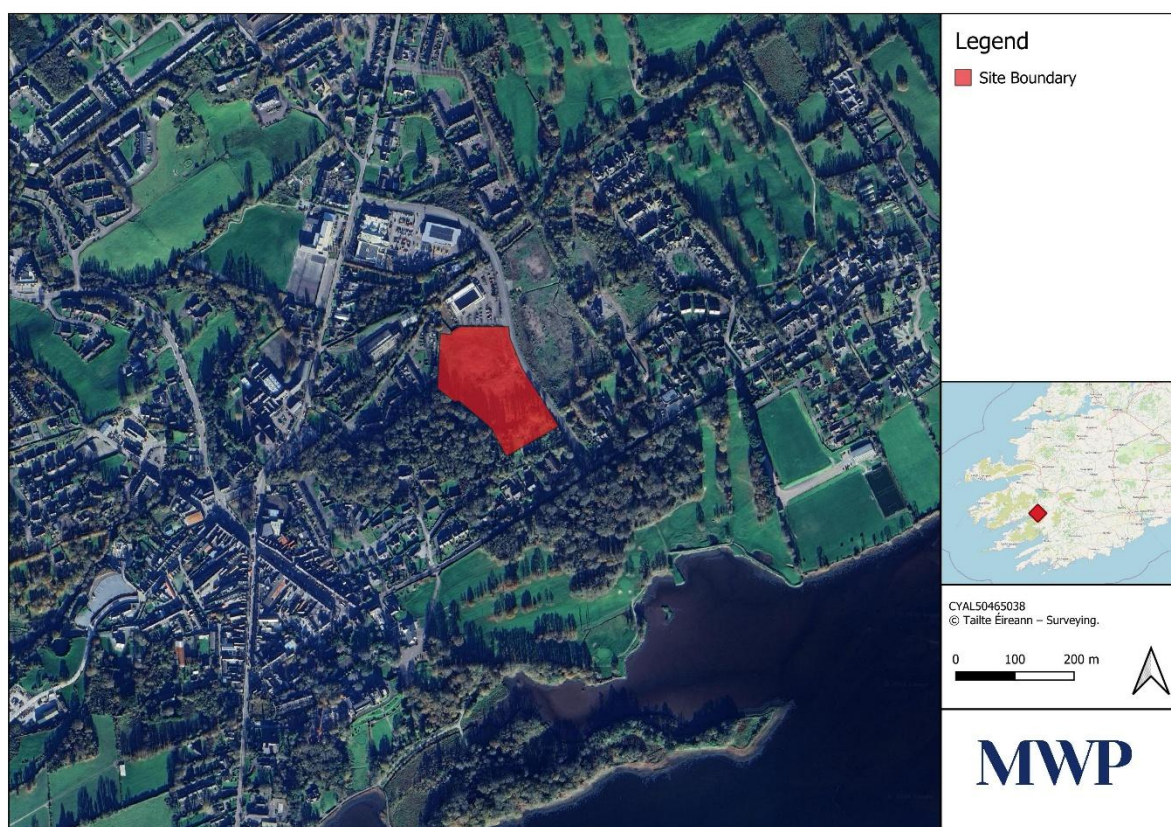


Figure 5. Overview of study area

4.1.1 Hydrology

The Proposed Development site lies within the Southwestern River Basin District and is located within the Dunmanus-Bantry-Kenmare WFD catchment (Catchment ID: 21) covering an area of approximately 193 km². The site is located within the Finnihy river sub catchment (Finnihy_SC_010).

The local catchment includes the Keelnagower Stream (EPA name Lissaniska_21), which forms part of the Finnihy_020 waterbody (WFD Code: IE_SW_21F010510). This watercourse flows to the north of the Proposed Development site in a south-westerly direction and subsequently discharges into the Finnihy River further downstream. It represents the principal surface-water feature in the vicinity of the site.

The Finnihy River ultimately drains into the Inner Kenmare River transitional waterbody (IE_SW_190_0300), which forms part of the Kenmare River SAC, located approximately 500-650m downstream of the Proposed Development.

Compliance with the reporting requirements of the WFD (Directive 2000/60/EC) obliges each member state to publish reports providing summary information about individual waterbodies relating to their status, risks and objectives. According the WFD 3rd Cycle⁷ 'Finnihy_020' has 'Moderate' status and is 'At risk'. Inner Kenmare River transitional waterbody has 'Good' status and is 'Not at risk'. There is also one coastal waterbody within the catchment Outer Kenmare River, which has 'Good' status and is 'At risk'.

There are also two EPA monitoring stations nearby of the Proposed Development. Both located on the Finnihy River (refer to **Figure 6** below)

- FINNIHY - Kenmare- Finnihy Br (RHS) - RS21F010500
- Kenmare: Finnihy Br (LHS) - RS21F010510

The underlying aquifer is classified as a locally Important Aquifer – Karstified (Code: Lk). Groundwater vulnerability across the study area is generally mapped as medium.

⁷ [21 Dunmanus-Bantry-Kenmare Catchment Summary WFD Cycle 3.pdf](#) Accessed 15/04/2026

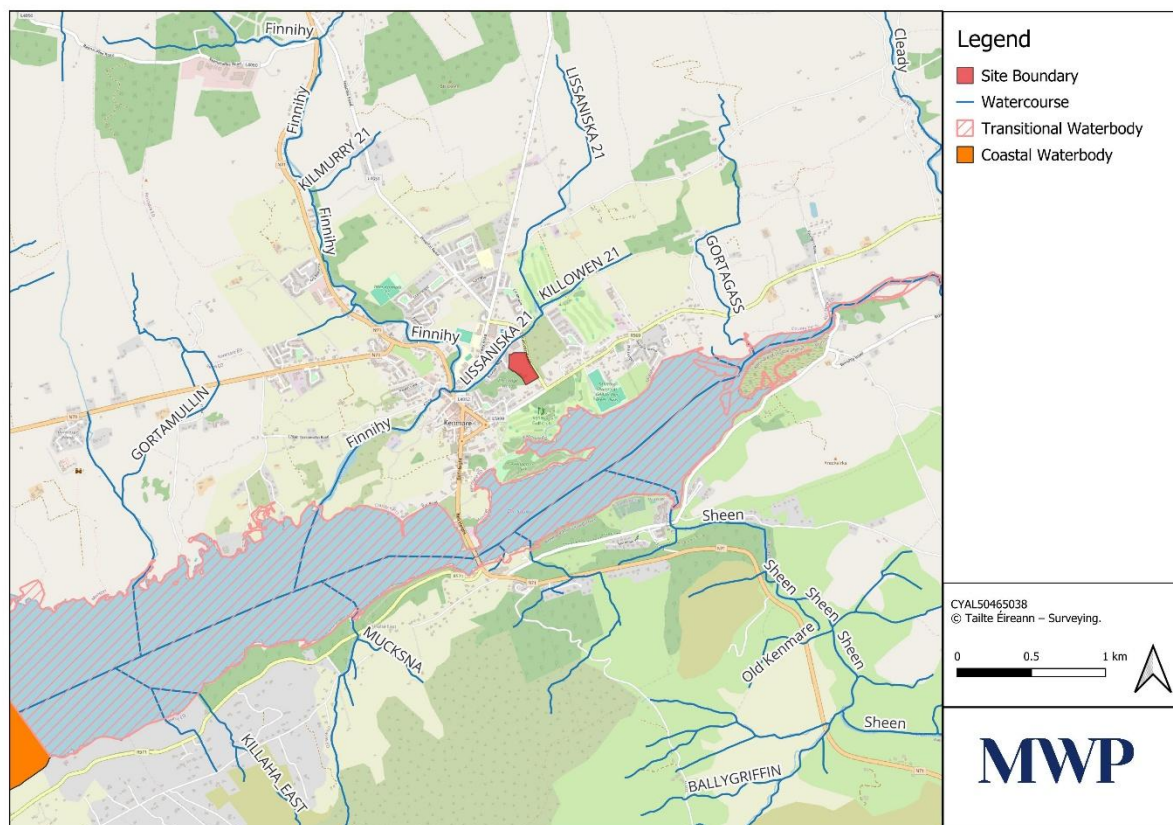


Figure 6. The closest waterbodies and watercourses to the study area.

4.2 Designated Sites

This section describes the designated sites considered to be within the Zone of Impact (ZOI) of the proposal, including their qualifying features, approximate distance from the study area, and whether it is considered that a source-receptor ecological pathway exists between the Proposed Development and each designated site.

4.2.1 Sites of International Importance

The Habitats Directive (92/43/EEC) seeks to conserve natural habitats of wild fauna and flora by the designation of European sites⁸ such as Special Areas of Conservation (SACs), and the Birds Directive (2009/147/EC) seeks to protect birds of special importance by the designation of Special Protected Areas (SPAs). It is the responsibility of each European Union (EU) member state to designate SPAs and SACs, both of which form part of Natura 2000, a network of protected sites throughout the European Union. [Table 3](#) below lists the European sites located within the ZOI of the proposal and includes each site's qualifying features of conservation interest. [Figure 7](#) below shows the location of each European site listed in [Table 3](#) in relation to the study area. The sites listed include those within the wider study area and those considered within a precautionary Zone of Influence; however, subsequent assessment is based on the presence or absence of source–pathway–receptor linkages.

⁸ 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.

As outlined in **Section 5.1**, only Kenmare River SAC (002158) and Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC (000365) were identified through the Screening for Appropriate Assessment process as requiring further consideration and assessment through the Natura Impact Statement (NIS).

Table 3. European sites within the ZOI of study area

Designated Site	Distance from study area	Qualifying Features of Conservation Interest (QI's)
Kenmare River SAC (002158)	Approx. 500m southwest	• 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 maritima</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] •
Mucksna Wood SAC (001371)	Approx. 1.4km southwest	• Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]
Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC (000365)	Approx. 4.7km north	• 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] • <i>Molinia</i> 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] • 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]

Designated Site	Distance from study area	Qualifying Features of Conservation Interest (QI's)
		- Petromyzon marinus (Sea Lamprey) [1095] - Lampetra planeri (Brook Lamprey) [1096] - Lampetra fluviatilis (River Lamprey) [1099] - Salmo salar (Salmon) [1106] - Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303] - Lutra lutra (Otter) [1355] - Najas flexilis (Slender Naiad) [1833] - Alosa fallax killarnensis (Killarney Shad) [5046] - Vandenboschia speciosa (Killarney Fern) [6985]
Killarney National Park SPA (004038)	Approx. 6.8km north	- Merlin (Falco columbarius) [A098] - Greenland White-fronted Goose (Anser albifrons flavirostris) [A395]
Maulagowna Bog SAC (001881)	Approx. 7.2 land km SW of the site	Blanket bogs (* if active bog) [7130]
Kilgarvan Ice House SAC (000364)	Approx. 7.4km east	Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303]
Blackwater River (Kerry) SAC	Approx. 6.2 land km NW	- European dry heaths [4030] - Geomalacus maculosus (Kerry Slug) [1024] - Margaritifera margaritifera (Freshwater Pearl Mussel) [1029] - Salmo salar (Salmon) [1106] - Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303] - Lutra lutra (Otter) [1355]
Old Domestic Building, Dromore Wood SAC (000353)	Approx. 7.9km west	Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303]
Erik Bog SPA (004108)	Approx. 9km north	Greenland White-fronted Goose (Anser albifrons flavirostris) [A395]
Glanlough Woods SAC (002315)	Approx. 9km east	Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303]
Caha Mountains SAC (000093)	Approx. 9.4km south	- Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] - Natural dystrophic lakes and ponds [3160] - Northern Atlantic wet heaths with Erica tetralix [4010] - European dry heaths [4030] - Alpine and Boreal heaths [4060] - Species-rich Nardus 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 (Androsacetalia alpinae and Galeopsietalia ladani) [8110] - Calcareous rocky slopes with chasmophytic vegetation [8210] - Siliceous rocky slopes with chasmophytic vegetation [8220] - Geomalacus maculosus (Kerry Slug) [1024] - Vandenboschia speciosa (Killarney Fern) [6985]
Cloonee and Inchiquin Loughs, Uragh Wood SAC (001342)	Approx. 10.8km southwest	- Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae) [3110] - Northern Atlantic wet heaths with Erica tetralix [4010] - European dry heaths [4030] - Siliceous rocky slopes with chasmophytic vegetation [8220] - Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] - Geomalacus maculosus (Kerry Slug) [1024]

Designated Site	Distance from study area	Qualifying Features of Conservation Interest (QI's)
		- Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303] - Najas flexilis (Slender Naiad) [1833] - Vandenboschia speciosa (Killarney Fern) [6985]
Derryclogher (Knockboy) Bog SAC (001873)	Approx. 11.5km southeast	Blanket bogs (* if active bog) [7130]
Glengarriff Harbour and Woodland SAC (000090)	Approx. 14km south	- Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0] - Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0] - Geomalacus maculosus (Kerry Slug) [1024] - Rhinolophus hipposideros (Lesser Horseshoe Bat) [1303] - Lutra lutra (Otter) [1355] - Phoca vitulina (Harbour Seal) [1365]
Old Domestic Building, Curraglass Wood SAC (002041)	Approx. 14.1km northeast	<i>Rhinolophus hipposideros</i> (Lesser Horseshoe Bat) [1303]

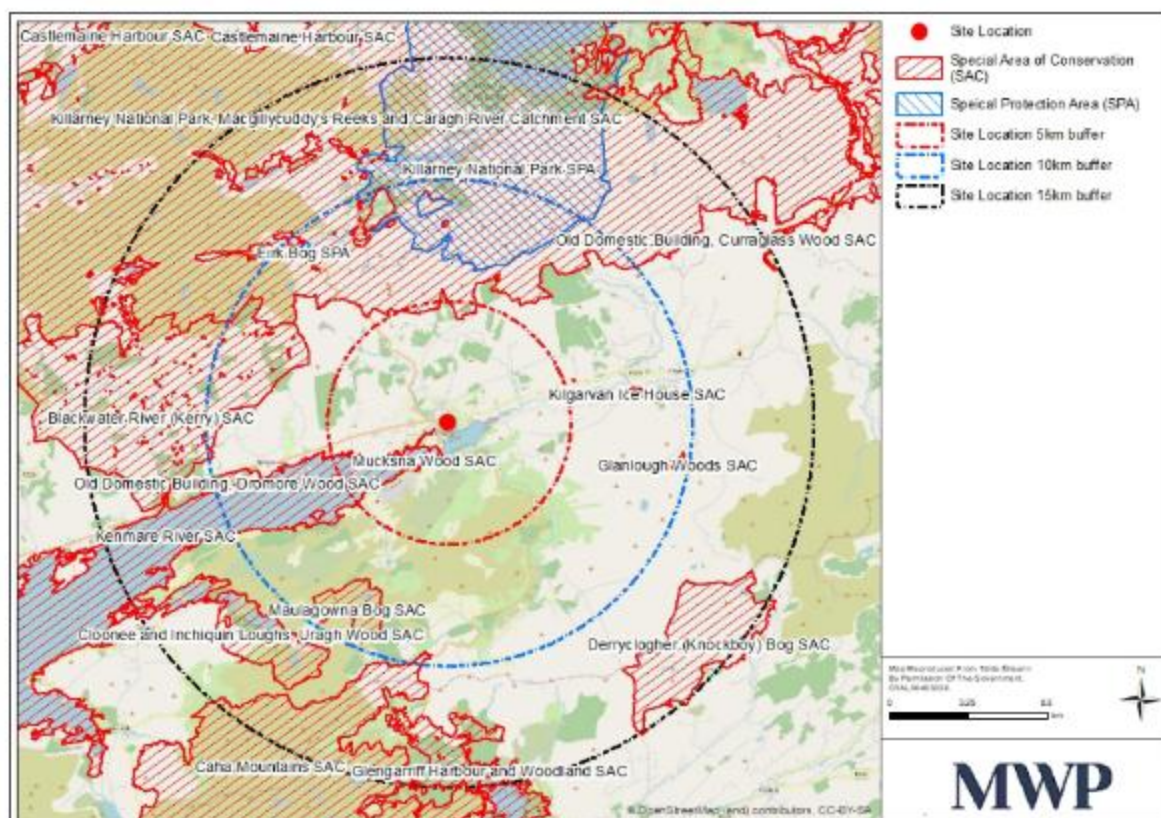


Figure 7: European sites within the ZOI of the study area.

4.2.2 Sites of National Importance

In Ireland, sites of national importance are termed Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs). While the Wildlife (Amendment) Act 2000 has been passed into law, pNHAs will not have legal backing until the consultative process with landowners has been completed. This process currently remains ongoing. There are two NHAs situated within the ZOI of the study area. A number of proposed Natural Heritage

Areas (pNHA's) are also located within the ZOI of the study area and are listed in **Table 4** along with each site's features of interest. **Figure 8** below shows the location of each NHA and pNHA within the ZOI of the study area.

Table 4: Designated sites of national importance within ZOI of the study area

Designated Site	Distance from study area	Features of Interest
Doughill Bog NHA (000383)	Approx. 5.6 and km to the southeast	Peatlands [4]
Roughly River Estuary pNHA (002092)	Approx. 0.2 land km to southeast	- Site supports wintering waterfowl with regionally to locally important populations of mute swan, wigeon, teal, mallard, scaup, oystercatcher, dunlin, curlew, redshank and greenshank. - Diverse site that comprises of mudflats and estuarine channels, smaller saltmarsh, woodland, and damp grassland areas
Kenmare River Islands pNHA (000363)	Approx. 3.7 land km to the southeast	- Important for breeding, nesting and roosting bird species - Integral part of wider Kenmare River
Mucksna Wood pNHA (001371)	Approx. 1.4 km to southeast	Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]
Killarney National Park, Macgillicuddy's Reeks And Caragh River Catchment pNHA (000365)	Approx. 4.2 land km to the north	Part of Killarney National Park, Macgillicuddy's Reeks and Caragh River Catchment SAC
Kilgarvan Ice House pNHA (000364)	Approx. 7.4 land km to the east	Overlaps with the Kilgarvan Ice House SAC (000364), and its conservation interests align with those for the SAC present in Table 3 above.
Maulagowna Bog pNHA (001881)	Approx. 7.2 land km to the southwest	Overlaps with the Maulagowan Bog SAC (001881), therefore its qualifying interests align with those of the SAC present in Table 3 above.
Old Domestic Building, Lettir pNHA (002040)	Approx. 7.7 land km to the east	Lesser horseshoe bat roost.
Caha Mountains pNHA (000093)	Approx. 9.4 land km to the southwest	Overlaps partly with the Caha mountain SAC (000093). Its features of conservation interest align with those in Table 3 above
Old Domestic Building, Dromore Wood pNHA (000353)	Approx. 8 land km to the west	The site aligns with the Old Domestic Building, Dromore Wood SAC (000353), and its qualifying interests align with those for the SAC Old Domestic Building, Dromore wood SAC present in Table 3 above.

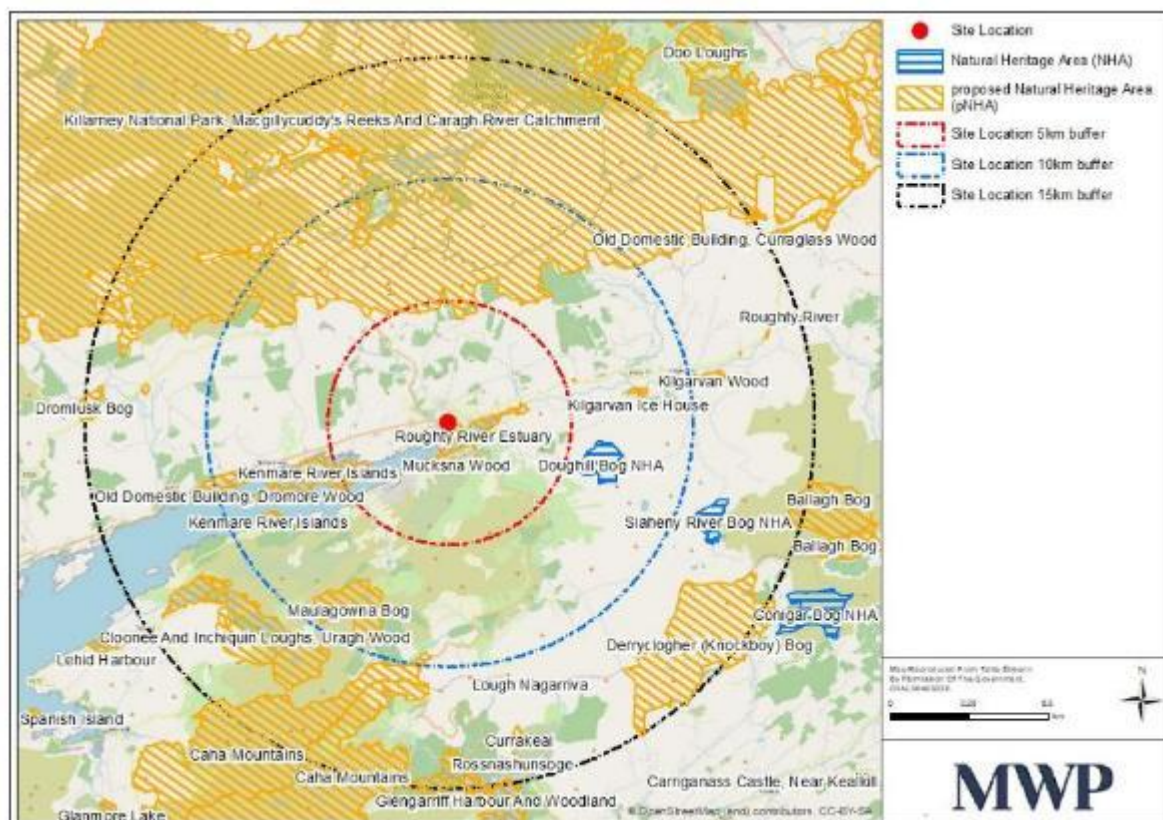


Figure 8: Sites of National Importance within ZOI of the study area.

4.2.3 Other Designated Sites

I-WeBS (Irish Wetland Bird Survey) is a long-running monitoring programme coordinated by BirdWatch Ireland to record the distribution and abundance of waterbirds at wetlands throughout Ireland. The survey focuses on sites of local to international importance and provides key data on population trends, site usage, and seasonal patterns, supporting the conservation and management of wetland habitats and bird species

There are two I-Webs site located within the 10 km radius.

- Kenmare estuary (site code: 0K422), located approx. 650 m to the south; and
- Dromoghty lake (site code: 0K006), located approx. 6 km to the southwest.

No Ramsar sites⁹ are located within the ZOI of the study area.

4.3 Habitats and Flora

4.3.1 Desk-top Study

A review of habitat mapping available on the NPWS website determined that the lands within the study area are not mapped as any type of Annex I habitat, as per EU Article 17 reporting.

⁹ The Convention on Wetlands of International Importance especially as Waterfowl Habitat, more commonly known as the Ramsar Convention, was ratified by Ireland in 1984 and came into force on 15th March 1985. Ireland presently has 45 sites designated as Wetlands of International Importance, with a surface area of 66,994ha

4.3.2 Field Survey Results

All habitats were classified in accordance with Fossitt (2000). The location and description of each habitat recorded within the study area are provided in the subsections below. A habitat map is presented in **Figure 9**, illustrating the distribution of all habitats discussed.

4.3.2.1 Recolonising Bare Ground (ED3)

As the site had been previously cleared of vegetation, the predominant habitat within the site boundary is Recolonising Bare Ground (ED3). This habitat supports a range of ruderal and early-successional plant species, including dandelion (*Taraxacum officinale*.), willowherb (*Epilobium* spp.), field speedwell (*Veronica persica*), clover (*Trifolium* spp.), wild angelica (*Angelica sylvestris*), ribwort plantain (*Plantago lanceolata*), wild strawberry (*Fragaria vesca*), St. John's wort (*Hypericum perforatum*), 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 with adjacent woodland, additional species typical of shaded and damp conditions were recorded, including wood club-rush (*Scirpus sylvaticus*), common nettle (*Urtica dioica*), figwort (*Scrophularia nodosa*), lesser celandine (*Ficaria verna*), foxglove (*Digitalis purpurea*), ivy (*Hedera helix*), and lady fern (*Athyrium filix-femina*).

In areas of the southern part of the site where bedrock occurs close to the surface, fern species characteristic of rocky substrates were noted, including hart's-tongue fern (*Asplenium scolopendrium*) and lady fern (*Athyrium filix-femina*).



Plate 1: Recolonising Bare Ground (ED3)

4.3.2.2 Spoil and Bare Ground (ED2)

Areas of spoil and bare ground were widespread across the site and were characterized by exposed soil, compacted mud, and pockets of coarse gravel. As noted above these areas have resulted from previous ground clearance and disturbance, originally dating back to the site's use as a compound and area for spoil storage during construction of the Pat Scarteen Relief Road and were largely devoid of vegetation at the time of survey. No vascular plant species or other floral assemblages were recorded within these areas.



Plate 2: Spoil and Bare Ground (ED2)

4.3.2.3 Scrub (WS1)

A small, localised area of Scrub habitat (WS1) is present in the south-eastern corner of the site. This patch comprises early-successional scrub vegetation dominated by sycamore (*Acer pseudoplatanus*) and willow (*Salix spp.*) saplings. The scrub layer is interspersed with dense bramble (*Rubus fruticosus agg.*), with a sparse ground flora including ivy (*Hedera helix*), ribwort plantain (*Plantago lanceolata*), and clover (*Trifolium spp.*).



Plate 3: Scrub (WS1)

4.3.2.4 Buildings and Artificial Surfaces (BL3)

There are two sheds within the site boundary. Adjacent to the smaller shed is small area of concrete hardstanding, likely used for parking. Pat Scarteen Road also forms a linear artificial surface along the eastern boundary.



Plate 4: Buildings and Artificial Surfaces (BL3)

4.3.2.5 Stone Walls and other Stoneworks (BL1)

Along the south-western boundary of the site, forming a boundary feature between the site and adjacent woodland, there is a stone wall (BL1). The wall is low in height and discontinuous in places, with sections showing signs of structural collapse or disrepair. Parts of the wall are partially overgrown with ivy (*Hedera helix*), which further reduces its visibility and structural integrity.



Plate 5: Stone Wall and other Stoneworks (BL1)

Other notable habitats of ecological value are present within the wider surrounding area. These include the Keelnagower Stream, a second-order watercourse classified as a Depositing / Lowland River (W2), which occurs in close proximity to the north of the site and forms an important hydrological and ecological feature within the local landscape.

Additionally, Mixed Broadleaved Woodland (WD2) is present along the south-western boundary adjacent to the site. This woodland provides increased habitat diversity and structural complexity relative to habitats within the site itself and contributes to the overall ecological value of the wider area.

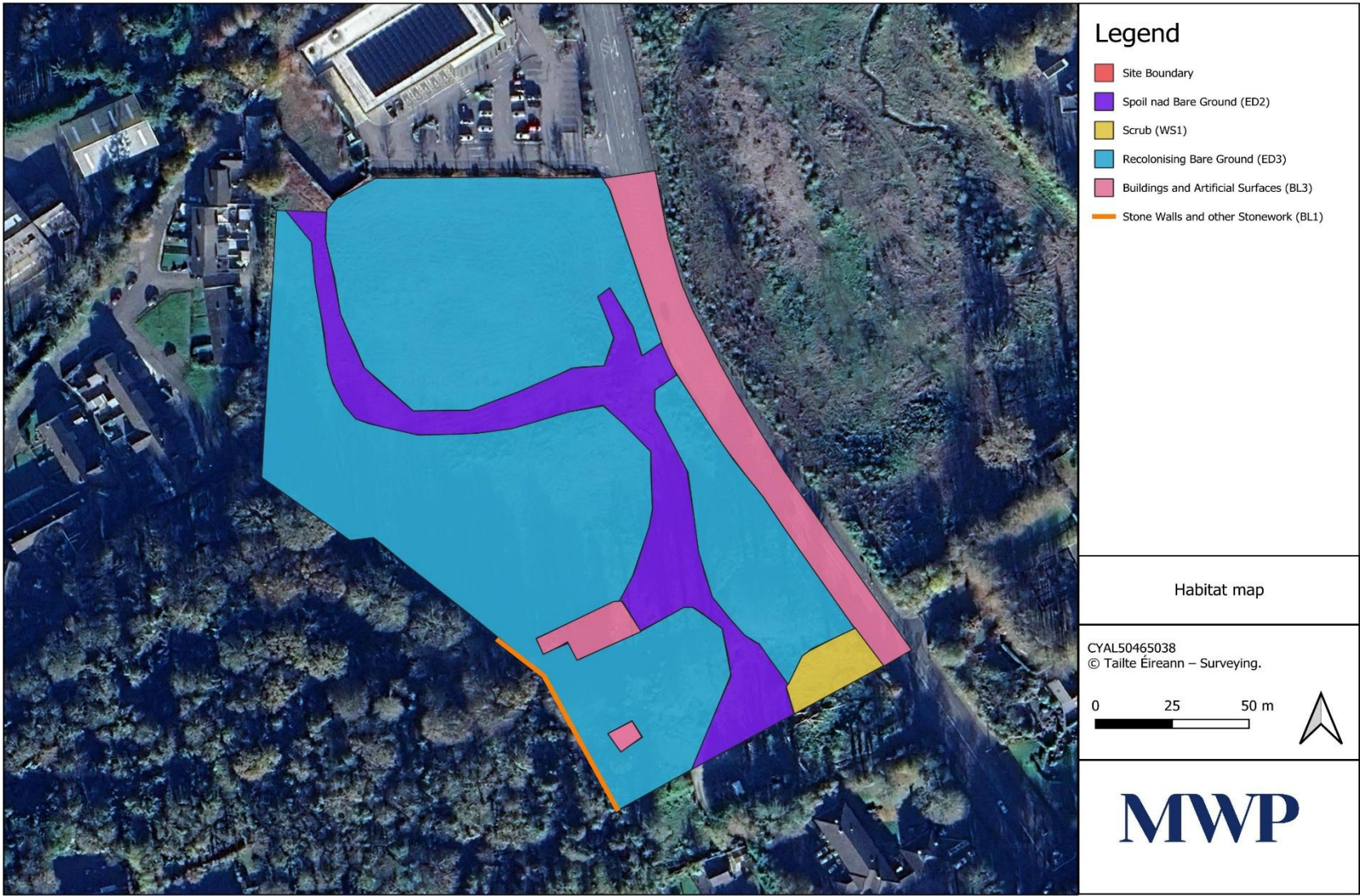


Figure 9: Habitat map of the Study Area.

4.3.3 Rare and Protected Flora

4.3.3.1 Desk-top Study

The study area lies within Ordnance Survey National 10 km grid square V97. An online search of the NBDC database for species of conservation interest recorded within the hectad V97 was carried out. There were no Flora Protection Order (FPO) species previously recorded within the hectad V97.

4.3.3.2 Field Study Results

During ecological surveys at the site, no rare/protected flora species were observed.

4.3.4 Non-native invasive Flora

4.3.4.1 Desktop Study

Documented records from the National Biodiversity Data Centre (NBDC) indicate the presence of high- impact and medium-impact invasive or non-native flora species within hectad V97. Species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477 of 2011, as amended) are shown in bold in **Table 5** along with summaries of the non-native flora species previously recorded, together with their location and distance from the study area.

Table 5: Non-native Invasive Species found within hectad V97.

Species Name	Scientific name	Impact/Risk	Closest Species Record to Study Area
Butterfly-bush	<i>Buddleja davidii</i>	Medium	Approx. 169 metres to the SE on Killowen road
Cherry Laurel	<i>Prunus laurocerasus</i>	High	Approx. 1.2 km to the SE at old Kenmare graveyard. Occurs as treelines
Himalayan Honeysuckle	<i>Leycesteria formosa</i>	Medium	Approx. 600 metres to the NW in Kenmare. Occurs on earth banks
Japanese Knotweed	<i>Fallopia japonica</i>	High	Approx. 440 metres to the SW at killarney road Kenmare. Occurs on BL3
Rhododendron	<i>Rhododendron ponticum</i>	High	Approx. 470 metres to the SW on Killarney Road Kenmare. Occurs on BL3
Sycamore	<i>Acer pseudoplatanus</i>	Medium	Approx. 182 metres to the SE of the site on Killowen road.
Three-cornered Garlic	<i>Allium triquetrum</i>	Medium	Approx 4.7 km to the NE on Ardtully House, Kilgarvan. Occurs on riparian zone.
Traveller's-joy	<i>Clematis vitalba</i>	Medium	Approx. 180 metres to the SE of the site on Killowen road.
Wall Cotoneaster (Cotoneaster horizontalis)	<i>Wall Cotoneaster (Cotoneaster horizontalis)</i>	Medium	Approx. 160 metres to the south of the site on Reenagross Peninsula, Kenmare

4.3.4.2 Field Survey Results

Butterfly-bush (*Buddleja davidii*) and old men's beard (*Clematis vitalba*) were the only invasive alien plant species (IAPS) recorded within the study area, both of which are classified as Medium Risk species. Butterfly-bush was the most widespread IAPS present, occurring throughout the study area and particularly along the site boundaries. Traveller's joy was also recorded primarily along the site boundaries, with notable concentrations along the northwest boundary (refer to **Plate 6**).

No invasive alien plant species listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011, as amended) were recorded within the study area. However, rhododendron (*Rhododendron ponticum*) was noted on a landscaped earth bank within the Scarteen Park Estate, located outside the study area to the north-west.



Plate 6: Butterfly bush along the wall (on the left) and traveller's joy along the fence (on the right).

4.4 Fauna

4.4.1 Mammals (excluding bats)

4.4.1.1 Desk-top Study

NBDC species lists, and distribution maps generated on-line were examined to assess the distribution of rare and protected terrestrial mammal species within the hectad V97. **Table 6** lists protected mammal species which have been previously recorded and summarises their legal and conservation status in Ireland with regards to national and international legislation, and the most recent Irish Red List for Mammals (2019)¹⁰.

¹⁰ <https://www.npws.ie/sites/default/files/publications/pdf/Red%20List%20No.%2012%20Mammals.pdf>

Table 6. NBDC records of terrestrial mammal species within the hectad V97

Common Name	Distribution	Conservation/Legal Status	Closest NBDC species record to study area
Hedgehog <i>Erinaceus europaeus</i>	<i>Throughout Ireland</i>	Irish Red Data Book: 'Least Concern'; Wildlife Acts	Record of hedgehog in Kenmare, approx. 480 metres to the west.
Otter <i>Lutra lutra</i>	<i>Throughout Ireland</i>	Irish Red Data Book: 'Least Concern'; EU Habitats Directive Annex II and IV; Wildlife Acts; CITES Appendix 1	Record of otter in Kenmare, approx. 480 metres to the west in the Inner Kenmare River
Red squirrel <i>Sciurus vulgaris</i>	<i>Throughout Ireland</i>	Irish Red Data Book: 'Least Concern'; Wildlife Acts	Records of red squirrel approx. 834 metres to the NW of the site.
Pygmy shrew <i>Sorex minutus</i>	<i>Throughout Ireland</i>	Irish Red Data Book: 'Least Concern'; Wildlife Acts	Records of pygmy shrew approx. 1.4 km from the site at Turner's Rock, Esk Mountain
Badger <i>Meles meles</i>	<i>Throughout Ireland</i>	Irish Red Data Book: 'Least Concern'; Wildlife Acts	Records of badger are recorded within the site in Kenmare
Pine marten <i>Martes martes</i>	<i>Throughout Ireland</i>	Irish Red Data Book: 'Least Concern'; EU Habitats Directive [92/43/EEC] Annex V; Wildlife Acts	Records of pine marten are recorded approx. 547 metres SW of the site.
Irish stoat <i>Mustela erminea</i>	<i>Throughout Ireland</i>	Irish Red Data Book: 'Least Concern'; Wildlife Acts	Records of stoat approx. 2.1 km NE of the site
Irish hare <i>Lepus timidus subsp. hibernica</i>	<i>Throughout Ireland</i>	Irish Red Data Book: 'Least Concern'; Wildlife Acts; EU Habitats Directive Annex V	Records of irish hare approx. 450 metres SW of the site
Red Deer (<i>Cervus elaphus</i>)	<i>Throughout Ireland</i>	Irish Red Data Book: 'Least Concern'; Wildlife Acts	Records of red deer approx. 2.4 km NW of the site
Wood Mouse (<i>Apodemus sylvaticus</i>)	<i>Throughout Ireland</i>	Irish Red Data Book: 'Least Concern'; Wildlife Acts; EU Habitats Directive [92/43/EEC] Annex IV	Records of wood mouse are present throughout the site

NBDC species lists generated online were also examined to assess the distribution of invasive terrestrial mammal species within the hectad V97. The following invasive species have been recorded.

- American Mink (*Mustela vison*),
- Brown Rat (*Rattus norvegicus*),
- Bank Vole (*Myodes glareolus*),
- European Rabbit (*Oryctolagus cuniculus*),
- Fallow Deer (*Dama dama*)
- House Mouse (*Mus musculus*)

4.4.1.2 Field Survey Results

During the ecological field survey, the study area and surrounding habitats were systematically searched for evidence of mammal activity, including footprints, spraints, feeding signs, and potential resting or breeding sites.

Evidence of mammal presence was limited to deer tracks recorded in soft ground conditions within the study area. In addition, a small number of mammal trails were observed leading from the site into the adjacent woodland, indicating occasional movement through the area. No other evidence of mammal activity, such as spraints, feeding remains, or resting or breeding sites, was identified.



Plate 7: Unidentified deer tracks.

4.4.2 Bats

4.4.2.1 Desk-top Study

NBDC

The following bat species have previously been recorded in the 10 km grid squares V97 in which the study area is located:

Table 7: Bat species previously recorded in the 10 km grid square V97

Common Name	Latin name	Date of Last Record
Lesser Horseshoe bat	<i>Rhinolophus hipposideros</i>	28/01/2015
Brown Long-eared bat	<i>Plecotus auritus</i>	12/08/2006
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	17/08/2019
Soprano Pipistrelle	<i>Pipistrelus pygmaeus</i>	17/08/2019

Common Name	Latin name	Date of Last Record
Leisler's bat	<i>Nyctalus leisleri</i>	17/08/2019
Natterer's bat	<i>Myotis nattereri</i>	12/08/2006
Daubenton's bat	<i>Myotis daubentonii</i>	26/07/2009
Nathusius's pipistrelle	<i>Pipistrelle nathusii</i>	27/07/2006

Bat Habitat Suitability Index (BHSI)

The National Biodiversity Data Centre's online mapper includes a Bat Habitat Suitability Index (BHSI) layer derived from an analysis of the habitat and landscape associations of Irish bats compiled in *Model of Bat Landscapes for Ireland* (Lundy *et al.*, 2011). The index evaluation ratings range from 0 to 100 with 0 being the least favourable, and 100 the most favourable. Index evaluations are available for each species and an overall rating is also available for all species in combination.

As the bat suitability ratings are mapped at a 2 km grid square resolution. The study area lies within grid square V97A, which has an overall bat suitability index of 40.33/100. Overall, this value indicates that the wider landscape is moderate suitability for bats.

The suitability index for lesser horseshoe bat (*Rhinolophus hipposideros*) is classified as high within the 2 km grid square V97A, indicating that this area represents particularly favourable habitat for the species. Known lesser horseshoe bat roost is known in the vicinity of the Proposed Development. This is a notable consideration given the conservation sensitivity of lesser horseshoe bat and its reliance on high-quality, connected habitats. The suitability indices for all bat species within the 2 km grid square are presented in **Table 8**.

Table 8: Suitability index for all bat species within the 2 km square grid V97A

Common Name	Latin name	Suitability index
Lesser Horseshoe bat	<i>Rhinolophus hipposideros</i>	74
Brown Long-eared bat	<i>Plecotus auritus</i>	57
Common pipistrelle	<i>Pipistrellus pipistrellus</i>	46
Soprano Pipistrelle	<i>Pipistrellus pygmaeus</i>	44
Leisler's bat	<i>Nyctalus leisleri</i>	43
Natterer's bat	<i>Myotis nattereri</i>	42
Daubenton's bat	<i>Myotis daubentonii</i>	32
Whiskered bat	<i>Myotis mystacinus</i>	24
Nathusius's pipistrelle	<i>Pipistrelle nathusii</i>	1

4.4.2.2 Survey Results

Bat Foraging and Commuting Habitat

The study area is currently dominated by disturbed and modified habitats, including recolonising bare ground and areas of spoil, which offer limited suitability for bats in isolation. The site has undergone recent vegetation clearance, and as such, the availability of foraging and commuting habitat within the red line boundary (RLB) is now significantly reduced.

Notwithstanding this, key linear landscape features within and immediately adjacent to the site provide ecological connectivity and increase the overall value of the surrounding area for bats. The principal features of ecological relevance are the Keelnagower Stream (EPA waterbody: Lissaniska_21) located immediately north of the site, and the associated treeline and adjacent mixed broadleaved woodland (Lodge Wood) along the western and south-western boundaries. These features form continuous, vegetated corridors within the landscape and are considered to provide **moderate to high suitability** for bat commuting and foraging.

In contrast, the majority of the site interior, characterised by open, disturbed ground with limited vegetation structure, provides **low suitability** for bat activity.

Desk study and survey data indicate that a range of bat species utilise the wider landscape, including lesser horseshoe bat (*Rhinolophus hipposideros*), which is a qualifying interest of Kenmare River SAC. A known lesser horseshoe bat roost is present within 1 km of the site, including a significant winter roost, and activity surveys have confirmed the presence of the species within the wider area. While the Proposed Development site lies outside mapped core foraging areas associated with designated sites, the recorded activity indicates that the adjacent woodland and stream corridor are used for commuting and foraging.

Overall, bat activity within the study area is most likely to be associated with the Keelnagower Stream corridor and adjacent woodland edge habitats, which provide connectivity to the wider landscape. The remainder of the site is of comparatively low ecological value for bats.

Daytime visual inspections of trees within the study area identified **negligible to low roosting potential**, and no evidence of bat roosting (e.g. droppings, staining or feeding remains) was recorded. A small number of trees with potential roost features (PRFs) were identified along the site boundaries, indicating limited potential for occasional use by individual bats.

Bat activity Surveys

Bat surveys were conducted by Karen Banks MCIEEM of Greenleaf Ecology. These comprised a Bat Roost Inspection Survey, Bat Activity Surveys (including transect surveys), and a programme of monthly passive monitoring using automated bat detectors. A summary of bat activity survey results is provided below. Full details are provided in the Bat Report in **Appendix 2**.

Passive monitoring and activity surveys undertaken between April 2025 and July 2026 recorded eight bat species within the study area, namely common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*P. pygmaeus*), Leisler's bat (*Nyctalus leisleri*), brown long-eared bat (*Plecotus auritus*), Daubenton's bat (*Myotis daubentonii*), Natterer's bat (*M. nattereri*), whiskered bat (*M. mystacinus*) and lesser horseshoe bat (*Rhinolophus hipposideros*). In addition, calls attributable to unidentified *Myotis* species were recorded. Common pipistrelle was the dominant species recorded, followed by soprano pipistrelle and Leisler's bat.

Overall, the surveys recorded a high level of bat activity and species diversity across the site. The site is used extensively by foraging and commuting bats, particularly along treelines, woodland edge habitats and associated linear features. Lesser horseshoe bat activity was recorded throughout the study area, with the highest levels recorded in proximity to the western boundary. During activity transects, common and soprano pipistrelles were

regularly observed foraging along the woodland edge and treelines, while Leisler's bat was recorded foraging and commuting overhead.

Survey results also indicate the likely presence of a spring/summer pipistrelle roost in the immediate environs of the site, outside the development boundary, based on observations of common and soprano pipistrelles commuting into the site shortly after sunset. The woodland and treeline habitats, particularly along the western site boundary, are therefore considered to provide important commuting and foraging habitat for bats and contribute to ecological connectivity within the wider landscape.

A dusk emergence survey undertaken on 7th July 2026 recorded no bats emerging from the mature oak tree located at the woodland edge along the western site boundary. Although the tree supports potential roost features, no evidence of bats using the tree as a roost was identified during the survey.

4.4.3 Birds

4.4.3.1 Desk-top Study

Birds

A review of species records generated via the NBDC online mapping tool was undertaken. A wide variety of bird species, including several of conservation concern, have been previously recorded within hectad V97. The study area lies within the 2 km grid square V97A. Within this grid square, 63 protected bird species have been recorded. All Annex I bird species listed under the EU Birds Directive and BoCCI¹¹ Red-listed species previously recorded within V97A are presented in **Table 9** below. Green-listed species are not of conservation concern; Amber-listed species are of medium conservation concern; and Red-listed species are of high conservation concern (Gilbert et al., 2021).

Table 9: Annex I bird species and BoCCI Red-listed species previously recorded within 2 km grid square V97

Species	Scientific Name	BoCCI Status
Arctic Tern	<i>Sterna paradisaea</i>	Amber-listed
Barn Owl	<i>Tyto alba</i>	Red-listed
Bar-tailed Godwit	<i>Limosa lapponica</i>	Amber-listed
Blackbird	<i>Turdus merula</i>	Green-listed
Blackcap	<i>Sylvia atricapilla</i>	Green-listed
Chough	<i>Pyrrhocorax pyrrhocorax</i>	Amber-listed
Common Tern	<i>Sterna hirundo</i>	Amber-listed
Goldcrest	<i>Regulus regulus</i>	Amber-listed
Great Northern Diver	<i>Gavia immer</i>	Amber-listed
Hen Harrier	<i>Circus cyaneus</i>	Red-listed
Kingfisher	<i>Alcedo atthis</i>	Amber-listed

¹¹ Birds of Conservation Concern in Ireland

Species	Scientific Name	BoCCI Status
Lesser Redpoll	<i>Acanthis cabaret</i>	
Little Egret	<i>Egretta garzetta</i>	Green-listed
Night-heron	<i>Nycticorax nycticorax</i>	
Peregrine	<i>Falco peregrinus</i>	Green-listed
Sandwich Tern	<i>Thalasseus sandvicensis</i>	Amber-listed
White-tailed Eagle	<i>Haliaeetus albicilla</i>	Red-listed

4.4.3.2 Field Survey Results

During the ecological walkover survey, a total of ten bird species were recorded within the study area and its immediate surroundings. Of these, nine species are listed as green under the Birds of Conservation Concern in Ireland (BoCCI), with one species classified as Amber-listed.

The majority of bird activity was associated with the adjacent woodland or involved birds commuting across the site. A small number of species, including jackdaw, juvenile lesser black-backed gulls, and hooded crow, were observed foraging on the ground within the site itself. All species observed are common and widespread in the wider area and shown in **Table 10** below.

Table 10: Bird species recorded during the ecological walkover of the study area.

Species name	Scientific name	BoCCI status
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

The study area offers limited suitable habitat for local breeding bird populations as a result of previous vegetation clearance across the site. The absence of mature trees, scrub, and dense vegetation significantly restricts nesting opportunities. However, some limited potential for foraging is present, particularly within areas of disturbed ground, which may be used opportunistically by common and adaptable species.

Most bird species are protected under the Irish Wildlife Acts (1976–2012), which make it an offence to disturb or destroy their breeding or resting places except under statutory licence or permission.

4.4.4 Amphibians, Reptiles and Invertebrates

4.4.4.1 Desk-top Study

Amphibians

NBDC records within V97 exist for two amphibian species, the common frog (*Rana temporaria*) and the smooth newt (*Lissotriton vulgaris*). Smooth newt is widespread in Ireland but is locally distributed. Common frog has a widespread distribution in Ireland. Newts and frogs are amphibious, breeding in freshwater and utilising woodland, damp grassland, marsh and scrub for foraging.

Reptiles

NBDC records within V97 do not exist for common lizard.

Invertebrates

NBDC records for hectad V97 indicate that a range of terrestrial invertebrate groups have also been documented in the wider area, including butterflies and moths (Lepidoptera), beetles (Coleoptera), bees (Hymenoptera), worms (Annelida) and other invertebrate taxa.

Records of Kerry slug (*Geomalacus geomalacus*) are known within hectad V97; however, all records are confined to Killarney National Park.

4.4.4.2 Field Survey Results

Amphibians

No amphibians were recorded during the ecological walkover survey. Amphibians are dependent on freshwater habitats for breeding and typically utilise a mosaic of habitats such as woodland, damp grassland, marsh, and scrub for foraging and terrestrial refuge.

Within the study area, scrub represents the only habitat type with limited suitability for amphibian foraging or shelter. No ponds, ditches, or other standing or slow flowing waterbodies suitable for amphibian breeding were identified within the study area. As such, opportunities for amphibian reproduction are considered to be absent.

The survey was undertaken in March, which coincides with the optimal survey period for amphibians. The absence of amphibians is therefore considered representative of site conditions rather than a constraint of survey timing.

Reptiles

Common lizard (*Zootoca vivipara*) was not recorded during the survey. While this species can occur in a range of habitats, including grassland, scrub, and disturbed areas, only limited suitable habitat is present within the study area, primarily associated with pockets of scrub. Overall habitat suitability for reptiles within the site is considered low.

Invertebrates

No butterflies or other notable invertebrate species were recorded during the ecological surveys. It should be noted that surveys were undertaken in March, which is outside the optimal period for many invertebrate groups, particularly flying insects that are more active between April and September.

Notwithstanding this seasonal constraint, the habitats present within the study area are considered to offer only limited suitability for invertebrates due to extensive prior vegetation clearance and the predominance of disturbed ground. As a result, invertebrate diversity and abundance within the site are expected to be low.

4.5 Aquatic Surveys

4.5.1 Desktop Study

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 (*Pyrrhosoma 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*.

4.5.2 Field Survey Results

The findings of the aquatic surveys are summarised in the subsection below. Full details of the survey methodology, results and assessment are provided in the Aquatic Ecology Report and Fish Report included as Appendix 3.

4.5.2.1 Otter (*Lutra lutra*)

No evidence of otter presence was recorded during aquatic surveys undertaken on the Finnihy River and the Lissaniska Stream (the Kealnagower Stream). Specifically, no holts, couches, spraints, footprints, feeding remains or other signs of otter activity were identified along the surveyed sections of watercourse or adjacent riparian habitats. While the absence of field signs does not preclude occasional use of the wider area by this highly mobile species, there was no indication that the study area supports an otter breeding site, resting place or regularly used habitat at the time of survey.

4.5.2.2 Biological Sampling and Water Quality

Aquatic habitat quality and biological conditions varied across the four survey sites. The Lissaniska Stream (Kealnagower Stream) sites were characterised by low-gradient, depositional conditions with extensive glide habitat, significant fine sediment accumulation and abundant growth of macrophytes, filamentous algae and *Vaucheria*. Historical channel modification and limited flow diversity reduced habitat complexity, resulting in conditions generally less favourable for pollution-sensitive aquatic invertebrates.

Macroinvertebrate surveys recorded communities dominated by Group C (pollution-tolerant) taxa, including *Baetis rhodani*, *Gammarus duebeni*, *Potamopyrgus antipodarum* and *Simulium* spp. Pollution-sensitive taxa were present in lower numbers, although *Rhithrogena* spp. and *Leuctra* spp. were recorded at some locations, indicating that suitable water quality conditions remain present within parts of the catchment. Trichopteran diversity was highest at Site 3 on the Finnihy River, where several caddisfly families associated with clean coarse substrate and riffle habitat were recorded.

The Finnihy River generally supported more diverse macroinvertebrate communities than the Lissaniska Stream (Kealnagower Stream), reflecting the presence of cleaner coarse substrates, greater channel size and improved flow diversity. Site 3 supported the greatest macroinvertebrate diversity of all survey locations. However, diversity declined in the lower reaches of the river where tidal influence and saline intrusion altered community composition. At Site 4, freshwater taxa were less abundant and the macroinvertebrate assemblage contained a higher proportion of tolerant species, while estuarine taxa such as Nereididae (ragworms) confirmed the strong brackish influence at the site.

Biological water quality assessments assigned Q3–4 (Moderate Status) to all survey sites. The Q3–4 rating indicates moderate ecological quality and is consistent with the macroinvertebrate communities recorded during the survey. The lower diversity observed at Site 4 should be interpreted in the context of regular saline intrusion, which naturally influences freshwater macroinvertebrate assemblages and can affect the outcome of standard freshwater biological assessments. The Q3–4 classification recorded for the Finnihy River is also consistent with recent EPA biological monitoring results for the catchment.

Overall, the principal pressures affecting ecological condition within the study area were identified as fine sediment deposition, nutrient enrichment, excessive macrophyte and algal growth, historical channel modification and, within the lower Finnihy River, saline intrusion associated with tidal influence. These factors collectively influence habitat quality and the diversity and abundance of aquatic macroinvertebrate communities.

4.5.2.3 Fish

4.5.2.3.1 Fish Habitat

The Finnihy River and Lissaniska Stream (the Kealnagower Stream) provide habitat suitable for a range of fish species, including Atlantic salmon (*Salmo salar*), brown trout (*Salmo trutta*) and European eel (*Anguilla anguilla*). Habitat suitability varied between sites and was strongly influenced by substrate condition, flow diversity and tidal influence.

The Finnihy River generally provided the highest quality fish habitat, particularly at Site 3 where clean gravel and cobble substrates, together with a mixture of riffle, glide and pool habitats, created potentially suitable spawning and nursery habitat for salmonids. However, this reach is subject to periodic saline intrusion, which may reduce the suitability of otherwise favourable spawning habitats compared to upstream freshwater sections. Site 4 was strongly tidally influenced and exhibited pronounced brackish conditions; consequently, it is not considered suitable for salmonid spawning or juvenile development, although it remains an important migratory corridor between freshwater and marine environments.

The Lissaniska Stream (the Kealnagower Stream) may provide localised spawning opportunities for brown trout owing to the presence of gravel substrates. However, the predominance of slow-flowing glide habitat, extensive silt deposition, channel modification and excessive algal growth reduce the overall suitability of the stream for salmonid reproduction and juvenile rearing. Fine sediment accumulation may impair egg survival by reducing oxygen exchange within spawning gravels.

Suitable habitat for European eel was present throughout both watercourses, particularly where coarse substrates provided refuge within interstitial spaces. The lower reaches of the Finnihy River are likely of greatest importance for eel due to their proximity to the estuary and associated migration routes.

Habitat suitability for lampreys was generally limited. While some spawning habitat may occur within parts of the Finnihy River, suitable nursery habitat for ammocoete larvae was restricted by the scarcity of stable sand and fine sediment deposits. The lower Finnihy River sites were dominated by coarse substrate and also subject to saline intrusion, reducing their suitability for lamprey spawning and larval development. The Lissaniska Stream (the Kealnagower Stream) contained some fine sediment accumulations, but these were generally shallow and considered suboptimal as lamprey nursery habitat.

4.5.2.3.2 Electrofishing Results

Electrofishing surveys were completed at Site 2 (Lissaniska Stream) and Site 3 (Finnihy River). Brown trout was the dominant species recorded at both sites, confirming the importance of both watercourses as salmonid habitat. At Site 2, a total of 12 brown trout were recorded, ranging in length from 6 cm to 22 cm, together with a single European eel and two three-spined sticklebacks (*Gasterosteus aculeatus*). Site 3 supported eight brown trout and five European eels, with eels being considerably more abundant at this location than within the Lissaniska Stream. The occurrence of multiple size classes of brown trout at both sites indicates that these reaches provide suitable habitat for juvenile and adult life stages.

European eel was particularly well represented at Site 3, reflecting the suitability of the coarse gravel and cobble substrate for refuge and the proximity of the lower Finnihy River to migratory routes. It should be noted that several additional eels were observed escaping capture during the survey by moving between cobbles and boulders in shallow water areas. Consequently, eel abundance within this reach is likely to have been underestimated.

Overall, the Finnihy River supports the most valuable fish habitat within the study area due to its greater channel size, habitat diversity and availability of coarse substrates. The Lissaniska Stream also supports important salmonid habitat but is constrained by sedimentation, nutrient enrichment, extensive aquatic vegetation and historical channel modification.

4.6 Flood Risk and Hydrology

A Site-Specific Flood Risk Assessment (FRA) was undertaken for the Proposed Development and considered flood risk from fluvial, pluvial, coastal and groundwater sources. The site lies within the Dunmanus–Bantry–Kenmare catchment and is hydrologically connected to the Kealnagower Stream, which flows southwest to the Finnihy River downstream of the site.

The FRA identified fluvial flooding associated with the Kealnagower Stream as the principal flood risk mechanism requiring consideration. Hydraulic modelling undertaken as part of the FRA indicates that the Proposed Development site is located predominantly within Flood Zone B, which is defined as an area with a moderate probability of flooding from rivers or the sea. By comparison, Flood Zone A represents areas with a high probability of flooding. The extent of Flood Zones A and B within and adjacent to the Proposed Development site is illustrated in **Figure 10** showing Flood zones within and in vicinity of the Proposed Development.

From an ecological perspective, elevated flows and flood events have the potential to increase the mobilisation and transport of sediments and pollutants to downstream aquatic habitats if not appropriately managed. However, the FRA concluded that, subject to the implementation of the proposed mitigation measures, including SuDS infrastructure, attenuation storage and surface water management measures, the Proposed Development will not result in an increase in flood risk within the site or elsewhere in the catchment. Consequently, no significant adverse effects on the Kealnagower Stream or associated aquatic habitats are predicted as a result of flood risk or surface water runoff associated with the Proposed Development. Full details are provided in the accompanying Flood Risk Assessment.

Full details are provided in the accompanying 25631-ZZ-ZZZ-RP-CE6008-FRA Flood Risk Assessment.

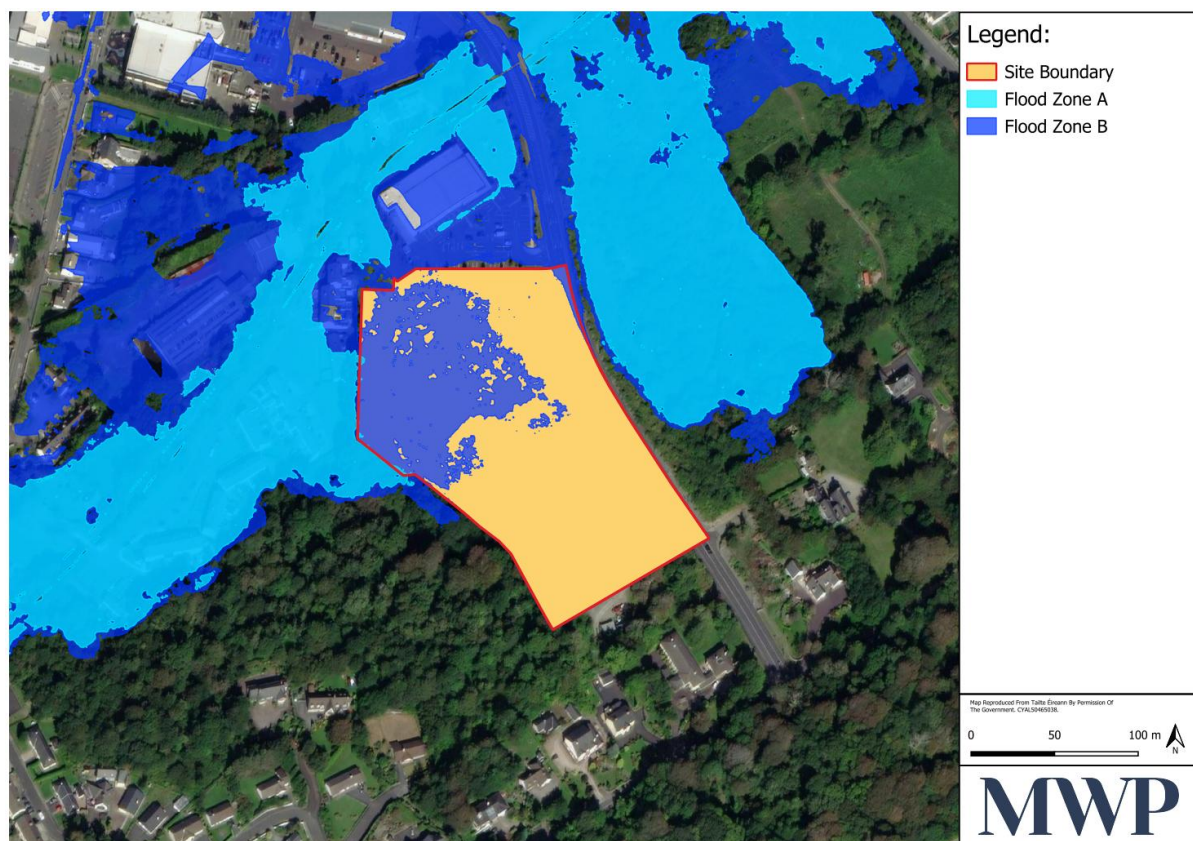


Figure 10: Flood zone map (taken from FRA report)

5. Evaluation of Designated Sites as Ecological Receptors

5.1 Sites of International Importance

With regard to European sites, a Screening for Appropriate Assessment (AA) was undertaken to determine, on the basis of objective scientific information, whether the Proposed development, alone or in-combination with other plans or projects, could have significant effects on European sites in view of their conservation objectives.

The Screening for Appropriate Assessment Report (AASR) identified that potential impact pathways exist between the Proposed Development and the following European sites:

- Kenmare River SAC (002158)

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

These sites were therefore subject to further consideration at screening stage. However, following assessment, it was concluded that the Proposed Development, either alone or in-combination with other plans or projects, will not result in likely significant effects on a European site.

All other European sites were screened out at an earlier stage due to the absence of any plausible source–pathway–receptor linkage.

5.2 Sites of National Importance

A total of 9 sites of National Importance were identified in the desk study as being within the potential ZOI, 8 of them being pNHA sites, and 1 of them being NHA sites. Each are listed below:

- Doughill Bog NHA (000383)
- Roughy River Estuary pNHA (002092)
- Kenmare River Islands pNHA (000363)
- Mucksna Wood pNHA (001371)
- Killarney National Park, Macgillycuddy's Reeks And Caragh River Catchment pNHA (000365)
- Kilgarvan Ice House pNHA (000364)
- Maulagowna Bog pNHA (001881)
- Caha Mountains pNHA (000093)
- Old Domestic Building, Dromore Wood pNHA (000353)

Kenmare River Islands pNHA (000363) lies within the boundary of the Kenmare River SAC. As set out in the Appropriate Assessment Screening Report (AASR), potential pathways were identified between the Proposed Development and the Kenmare River SAC at screening stage; however, it was concluded that the Proposed Development will not result in likely significant effects on this European site. Accordingly, no impacts on the Kenmare River Islands pNHA are predicted.

All the other sites of national importance are located at distances from the study area with no hydrological or ecological connectivity, and are separated by intervening land occur with no plausible source–pathway–receptor linkage. Accordingly, these sites of national importance are not considered further in this evaluation.

6. Identification and Evaluation of Habitats, Flora and Fauna as Important Ecological Features (IEF)

The habitats and associated flora, fauna and other ecological features or resources identified in **Sections 4.3 to 4.5** are now evaluated on the basis of their local, national and international conservation importance using the evaluation criteria described in **Section 3.4** and **Appendix 1**.

On the basis of these evaluations, an assessment is made as to which of these habitats or species are considered Important Ecological Features (IEFs) that may be impacted by the Proposed Development, i.e. which habitats or species have the potential to be significantly affected during the construction and/or operational phases of the project (see [Table 11](#) and [Table 12](#) below). With regard to designated sites, reference should be made to **Section 5** above.

6.1 Habitats

The following table presents an evaluation of the ecological value of the habitats identified within the study area and the rationale for their inclusion or exclusion as an IEF.

Table 11. Evaluation of habitats within the study area

Habitat Code and Type	Ecological value relative to study area (NRA, 2009)	IEF (Y/N)	Rationale
Buildings and Artificial Surfaces (BL3)	Local importance (lower value)	No	Artificial habitat of negligible ecological value.
Scrub (WS1)	Local importance (lower value)	No	Only small, discrete areas of scrub are present within the study area, and this habitat is neither extensive nor well connected. The scrub comprises occasional sycamore (<i>Acer pseudoplatanus</i>) and willow (<i>Salix</i> spp.) saplings, some of which will be removed as part of the Proposed Development. These trees are not considered to represent important ecological features due to their young age, limited extent, and common species composition. Overall, the scrub habitat is of low local biodiversity value and provides only limited shelter and foraging opportunities for common bird and invertebrate species. Its loss is therefore not considered ecologically significant in the context of the wider and higher-value habitats present in the surrounding area.
Spoil and bare ground (ED2)	Local importance (lower value)	No	Habitat without any significant ecological value.
Recolonising Bare Ground (ED3)	Local importance (lower value)	No	This habitat is the most widespread within the study area. Although a number of plant species were recorded within it (refer to Section 4.3.2.1), the habitat is characterised by disturbed ground conditions and early-successional vegetation arising from historic site clearance. The habitat is structurally simple, species poor in a functional ecological context, and is dominated by common, widespread species of low conservation interest. It does not support priority habitats or species, nor does it provide evidence of regular use by protected fauna for breeding, roosting or shelter. Ecological connectivity is limited, and the habitat is therefore considered to be of low local biodiversity value.
Stone Walls and Other Stoneworks (BL1)	Local importance (lower value)	No	Artificial man-made habitat of generally low ecological value. While the feature may provide limited shelter for small mammals and invertebrates, its ecological function within the study area is restricted and it is not considered an Important Ecological Feature.

6.2 Rare and Protected Flora Species

No rare or protected plant species were recorded during the ecological surveys. The habitats present within the study area are common and of low botanical diversity and are not considered suitable to support rare or notable flora. Accordingly, rare and protected flora are not considered an Important Ecological Feature for the purposes of this EclA.

6.3 Fauna

The following table presents an evaluation of the ecological value of the faunal species identified within the receiving environment of the Proposed Development and rationale for inclusion, or exclusion as an IEF.

Table 12. Evaluation of faunal species within the study area

Species	Ecological value relative to study area (NRA, 2009)	IEF (Y/N)	Rationale
Hedgehog (<i>Erinaceus europaeus</i>)	Local importance (higher value)	Yes	No evidence of hedgehog recorded within the study area, but local records exist, with the closest 480 m west of the study area. Some habitats present, such as scrub may provide suitable shelter and foraging opportunities. Applying the precautionary principle, hedgehog is retained as an Important Ecological Feature of Local Importance (higher value).
Irish stoat (<i>Mustela erminea</i>)	Local importance (lower value)	No	No direct evidence of Irish stoat was recorded within the study area during the field survey. The only habitats within the site offering any potential suitability for this species are a low stone wall and a small, localised patch of scrub, both of which may provide limited cover or movement opportunities. However, habitat availability within the study area is otherwise restricted. Irish stoat has been recorded previously approximately 2.1 km to the north-east of the site, indicating that the species is present within the wider local area. Given the low habitat suitability within the study area and the absence of supporting evidence, Irish stoat is not considered for further assessment.
Otter (<i>Lutra lutra</i>)	Local importance (lower value)	Yes	No evidence of otter (<i>Lutra lutra</i>) activity was recorded within the study area during the field surveys. However, the Keelnagower Stream is located immediately north of the site and drains to the Finnihy River, and desk study data indicate that otter is present within the wider area. While the study area itself provides limited suitability for otter, the adjacent watercourse and downstream receiving environment provide a potential ecological pathway. On a precautionary basis, otter should be retained as an Important Ecological Feature of Local Importance (higher value).
Red squirrel (<i>Sciurus vulgaris</i>)	Local importance (lower value)	No	No evidence of red squirrel activity was recorded within the study area during the field surveys. Suitable habitat for the species is largely absent within the study area, which lacks mature woodland, tree connectivity, or suitable nesting and foraging features. Although adjacent woodland outside the site boundary provides suitable red squirrel habitat, the study area itself does not support habitats of sufficient quality or function to be regularly used by the species. Given the absence of field evidence and the low suitability of habitats within the site, red squirrel is not considered an Important Ecological Feature (IEF) for the purposes of this Ecological Impact Assessment.
Pygmy shrew (<i>Sorex minutus</i>)	Local importance (lower value)	No	No evidence of pygmy shrew was recorded within the study area during field surveys. While some habitats within the site may be considered potentially suitable, habitat availability is limited and the closest known record is approximately 1.4 km from the site. Accordingly, pygmy shrew is not considered an

Species	Ecological value relative to study area (NRA, 2009)	IEF (Y/N)	Rationale
			Important Ecological Feature for the purposes of this EclA.
Badger (<i>Meles meles</i>)	Local importance (higher value)	Yes	No evidence of badger activity was recorded within the study area during the field surveys. However, desk-study data indicate that badger has been recorded within hectad V97, confirming the species' presence locally. Habitats within the study area are generally of low suitability for badger breeding, as they lack features such as well-established hedgerows, suitable soils, or undisturbed banks capable of supporting setts. Some areas of the site may offer limited foraging potential only. In contrast, the adjacent woodland outside the site boundary provides more suitable habitat for badger, including cover, foraging opportunities, and potential sett locations. Given the presence of suitable habitat in the immediate surroundings and existing local records and applying the precautionary principle, badger is retained as an Important Ecological Feature of Local Importance (higher value).
Pine marten (<i>Martes martes</i>)	Local importance (lower value)	No	No evidence of pine marten (<i>Martes martes</i>) was recorded within the study area during the field survey. The nearest known record is located approximately 547 m to the south-west, confirming the species' presence in the wider area. Although adjacent woodland outside the site boundary provides more suitable habitat for pine marten, the study area does not form part of this habitat and does not provide a functional ecological role for the species. Given the absence of field evidence and the low suitability of habitats within the site, pine marten is not considered an Important Ecological Feature (IEF) for the purposes of this Ecological Impact Assessment.
Irish hare (<i>Lepus timidus</i> subsp. <i>Hibernica</i>)	Local importance (lower value)	No	No evidence of this species recorded within the study area. The closest record is approx. 450 m to the southwest. Habitats within the study area are not considered suitable with only small, fragmented patches of scrub. Irish hare typically favours open grassland, heath and bog habitats, and while it may occur in agricultural landscapes, it is most associated with areas containing rough grass margins and low disturbance.
Red Deer (<i>Cervus elaphus</i>)	Local importance (lower value)	No	Unidentified deer tracks were recorded within the study area, though it was not possible to determine whether these were attributable to red deer. The site provides no suitable habitat for deer beyond limited commuting or incidental foraging. Given the low habitat suitability, the absence of breeding or resting features, and the widespread abundance of red deer in Ireland, deer are considered to be of low ecological importance.
Wood Mouse (<i>Apodemus sylvaticus</i>)	Local importance (lower value)	No	No evidence of this species was recorded within the study area during field surveys. While some habitats present may offer partial suitability, overall habitat availability and quality are limited. Consequently, the

Species	Ecological value relative to study area (NRA, 2009)	IEF (Y/N)	Rationale
			species is considered to be of low ecological importance.
Bats (all)	Local importance (higher value)	Yes	The study area is currently dominated by disturbed and modified habitats of generally low suitability for bats; however, the Keelnagower Stream corridor and adjacent woodland edge habitats along the western and south-western boundaries provide suitable commuting and foraging habitat. A known lesser horseshoe bat roost is present within adjacent woodland, and bat survey data confirm activity by a range of species within the wider area, including lesser horseshoe bat. Given the ecological sensitivity of these adjacent features, and the potential for disturbance effects arising from lighting and construction activity, bats are retained as an Important Ecological Feature of Local Importance (higher value).
Birds	Local importance (higher value)	Yes	While habitats within the study area itself offer limited suitability for breeding birds due to the general absence of mature trees or dense vegetation, adjacent woodland and boundary habitats provide suitable nesting and foraging opportunities. The site also offers some limited foraging value, particularly within areas of disturbed ground. Given the use of the site and its immediate surroundings by birds, and the potential for disturbance during construction, birds are retained as an Important Ecological Feature of Local Importance (higher value).
Amphibians	Local importance (lower value)	No	No evidence of amphibians was recorded within the study area during the field survey. Although desk-study data indicate the presence of amphibians in the wider area, habitats within the study area do not provide suitable conditions for amphibian breeding or foraging.
Reptiles	Local importance (lower value)	No	No evidence of reptiles was recorded within the study area during field surveys, and desk-study data do not indicate the presence of reptiles in the wider area. Habitats within the study area do not provide suitable conditions for reptiles, and the site is considered to be of low ecological importance for this species group.
Invertebrates	Local importance (lower value)	No	No protected invertebrate species were recorded during the field survey. Desk study data indicate records of protected invertebrates, including Kerry slug, within hectad V97; however, all such records are confined to Killarney National Park. Habitats within the study area are common, heavily disturbed and of low structural diversity, offering limited suitability for protected invertebrate species. Accordingly, invertebrates are not considered an Important Ecological Feature for the purposes of this EclA.

7. Do-nothing Scenario

The Proposed Development site was formerly a greenfield area but has since been subject to vegetation clearance, and much of the former semi-natural vegetation has been removed. Should the Proposed

Development not proceed beyond the planning stage, it is anticipated that the site would remain in its current disturbed condition in the short term.

Over time, and in the absence of active management or redevelopment, further natural succession is likely to occur, with recolonisation of disturbed ground by grasses and ruderal vegetation, followed potentially by the development of scrub in places.

Given the location of the site within the urban fringe of Kenmare and the ongoing development pressure in the area, it is also reasonably foreseeable that an alternative development proposal may come forward in the future. Accordingly, the do-nothing scenario would not necessarily result in long-term ecological enhancement of the site.

8. Potential Impacts of the Project

This section identifies the ecological impacts of the construction and operational phases of the Proposed Development on the local receiving environment.

For the Proposed Development, the construction phase is likely to give rise to the greatest potential for ecological effects, particularly in relation to disturbance, lighting, temporary pollution risks and limited habitat loss.

The potential impacts of the Proposed Development were considered and assessed to ensure that all effects on identified IEFs are adequately addressed, and that no significant residual effects are likely to remain following the implementation of mitigation and best practice measures, where required.

8.1 Construction Phase

The construction phase effects associated with the Proposed Development may include the following:

Table 13. Construction phase effects potentially associated with the project

Construction Phase Effect	Source
Direct habitat loss and alteration	Construction of temporary site compound, vegetation clearance, excavations for structure foundations, movement of plant and machinery, ancillary site development works, landscaping and installation of services.
Indirect surface water and groundwater quality effects / indirect habitat alteration	Sediment/pollutant laden run-off may arise from exposed areas during groundworks and excavations, from material storage areas or from construction vehicles/plant. On-site temporary toilets and washing facilities. Leaching of fuels/oils etc to groundwater in the event of accidental spillage. Construction works also pose a risk of spreading of invasive species.
Direct species disturbance/displacement	Increased activity and human presence, noise/vibration/lighting/vegetation clearance associated with construction works.
Indirect species disturbance/displacement	Via indirect water quality effects. Via loss/fragmentation/direct or indirect alteration of foraging, commuting, breeding or resting habitat. Via impacts on prey biomass. Increased anthropogenic activity and noise at the site. Physical disturbance (injury/mortality).

8.2 Operational Phase

The operational phase effects associated with the Proposed Development may include the following:

Table 14. Operational phase effects potentially associated with the project

Operational Phase Effect	Source
Direct/indirect species disturbance/displacement	Due to increased lighting/noise, indirect impacts on prey biomass, indirect alteration of foraging, breeding or commuting habitat.

9. Assessment of Potentially Significant Effects

9.1 Construction Phase

9.1.1 Potential Habitat Loss/Alteration Impacts

The habitats occurring within the study area comprise mainly disturbed habitat types, including recolonising bare ground, spoil and bare ground, small areas of scrub, and artificial surfaces. These habitats are considered to be of low ecological value at the local scale.

The Proposed Development will result in the loss of limited areas of scrub and recolonising bare ground to facilitate construction. Given the low ecological value, disturbed nature and limited structural diversity of these habitats, the loss is assessed as a **Permanent, Not Significant, Negative effect at the local scale.**

9.1.2 Invasive Alien Plant Species (IAPS)

Construction activity can pose a risk of spreading invasive alien plant species (IAPS) through soil and vegetation disturbance and the movement of plant, machinery and materials. Vehicles, tools, equipment, workers' footwear and clothing, as well as imported soils, fill and construction materials, may inadvertently carry viable seeds or contaminated material, thereby increasing the potential for IAPS to be introduced or dispersed within the site.

Without appropriate control measures, IAPS could be spread within the study area during construction works. Given that butterfly-bush and traveller's joy were recorded within the site, there is potential for localised spread if biosecurity and vegetation management measures are not implemented. The potential spread and subsequent treatment or management of IAPS could have implications for habitats and flora within the site. The significance of this effect is assessed as a **Medium-term, Moderate, Negative effect.**

9.1.3 Potential Impacts to water quality

During the construction phase, the proposed development has the potential to result in impacts on downstream aquatic receptors through a direct hydrological connection to the Lissaniska_21 WFD waterbody. Construction activities, including site clearance, excavation, earthworks and material storage, have the potential to generate sediment-laden runoff and accidental releases of pollutants such as hydrocarbons, fuels, concrete washings and other contaminants. In the absence of appropriate mitigation measures, these substances could enter the site drainage network and discharge via the proposed headwall outfall directly to the Lissaniska_21 waterbody.

A downstream hydrological pathway exists from the Lissaniska_21 waterbody to the Finnihy_020 waterbody and ultimately to the Kenmare River SAC further downstream. Consequently, there is potential for indirect effects on water quality and associated aquatic habitats and species. While no direct habitat loss or physical habitat alteration will occur, there is potential for indirect effects on aquatic habitats and water-dependent species, including otter (*Lutra lutra*), through a deterioration in water quality.

Given the direct hydrological connection between construction activities and the **Keelnagower Stream (EPA waterbody: Lissaniska_21)**, direct effects on the aquatic environment cannot be entirely discounted in the absence of mitigation. **This effect is assessed as Temporary, Slight, Negative.**

9.1.4 Potential Impacts to faunal species

The following table describes the potential construction phase effects on faunal IEFs at the study area and characterises the significance of these unmitigated impacts.

Table 15. Potential impacts on faunal species identified as IEFs during the construction phase and the significance of the impact

Species	Ecological value ¹²	Unmitigated Impacts	Significance of unmitigated impacts (NRA, 2009 and EPA, 2017)
Hedgehog	Local importance (higher value)	<u>Habitat Loss</u> The Proposed Development will result in the loss of small areas of habitat with limited suitability for hedgehog. No evidence of hedgehog presence was recorded during field surveys; however, suitable habitat exists locally. Given the disturbed nature of the site, habitat loss is not considered significant. <u>Disturbance/Displacement/Injury/Mortality</u> Disturbance may occur due to increased noise, lighting, vegetation clearance and human activity during construction.	Habitat loss: Permanent, Slight, Negative Disturbance: Temporary to Short-term, Slight, Negative
Badger	Local importance (higher value)	<u>Habitat Loss</u> The Proposed Development will result in the loss of small areas of habitat with limited suitability for badger foraging. No setts or field signs were recorded, and habitat suitability is low. <u>Disturbance/Displacement/Injury/Mortality</u> Disturbance may occur due to construction activity, including noise, lighting and vegetation clearance	Habitat loss: Permanent, Slight, Negative Disturbance: Temporary to Short-term, Slight, Negative
Otter	Local importance (higher value)	<u>Disturbance/Displacement</u> Construction activity in proximity to the Keelnagower Stream has the potential to result in temporary disturbance to otter through noise, vibration, lighting and increased human activity. There is also potential for direct disturbance via deterioration in water quality in the absence of appropriate mitigation.	Disturbance: Temporary to Short-term, Slight, Negative
Birds	Local importance (higher value)	<u>Habitat Loss</u> The Proposed Development will result in the loss of small areas of habitat of limited suitability for birds. Most bird activity is associated with adjacent woodland rather than the site itself. <u>Disturbance/Displacement/Injury/Mortality</u> Disturbance may occur due to noise, vegetation clearance and human activity during construction.	Habitat loss: Permanent, Slight, Negative Disturbance: Temporary to Short-term, Slight, Negative
Bats	Local importance	<u>Habitat Loss</u> The Proposed Development will result in the loss of small areas of low-value foraging habitat within the	Habitat loss: Permanent, Slight, Negative

¹² Relative to study area (NRA, 2009a)

Species	Ecological value ¹²	Unmitigated Impacts	Significance of unmitigated impacts (NRA, 2009 and EPA, 2017)
	(higher value)	site. However, key commuting and foraging features, including the Keelnagower Stream corridor and adjacent woodland edge, will be retained. <u>Disturbance/Displacement</u> Disturbance may occur due to construction lighting and noise. This is particularly relevant to lesser horseshoe bat, which is sensitive to artificial lighting and relies on dark commuting corridors. Given the proximity of the site to adjacent woodland and the stream corridor, lighting-related disturbance represents the principal risk.	Disturbance: Temporary to Long-term, Moderate, Negative

9.2 Operational Phase

9.2.1 Impacts to Habitats

During the operational phase, no additional habitat loss is anticipated and no significant effects on habitats or flora are expected.

9.2.2 Invasive alien plant species (IAPS)

Provided appropriate control measures are implemented during construction, it is not anticipated that invasive species will establish or spread during the operational phase.

9.2.3 Impacts to water quality

During the operational phase, foul wastewater generated by the development will be discharged to the public sewer network via a dedicated foul drainage system that is entirely separate from the surface water drainage network.

Surface water runoff will be managed through a comprehensive Sustainable Drainage Systems (SuDS) network incorporating bioretention rain gardens/tree pits, dry swales, permeable paving, Class 1 bypass petrol interceptors, attenuation storage tanks and associated flow controls. These measures have been designed to replicate natural drainage processes, provide treatment and attenuation of surface water runoff, and facilitate the removal of sediments, hydrocarbons and other pollutants prior to discharge.

Surface water runoff from roofs, roads, parking areas and other hardstanding surfaces will pass through the SuDS treatment train prior to discharge, thereby reducing sediment loading, pollutant concentrations and peak runoff rates entering the receiving environment. The attenuation system has been designed to accommodate the 1 in 100-year storm event plus a 20% climate change allowance, ensuring that runoff is discharged in a controlled manner.

Surface water will ultimately discharge to the Keelnagower Stream. The proposed drainage strategy has been informed by the Site-Specific Flood Risk Assessment and has been designed to ensure that post-development runoff is appropriately managed, that flood risk is not increased within the site or elsewhere in the catchment, and that adverse effects on water quality, aquatic habitats and downstream ecological receptors are avoided.

Consequently, significant adverse effects on water quality, fish populations, aquatic habitats or downstream aquatic ecological receptors are not predicted during the operational phase of the Proposed Development. **This effect is assessed as Temporary, Slight, Negative.**

9.2.4 Impacts to faunal species

During the operational phase, some disturbance may occur due to increased lighting, traffic, noise and human activity.

Potential impacts on hedgehog, badger and birds are assessed as:

Long-term, Slight, Negative

For bats, the principal risk relates to artificial lighting, particularly along the woodland boundary and stream corridor. A review of the submitted landscaping, drainage and lighting proposals confirms that they are consistent with the environmental protection and mitigation measures identified in this EclA. Collectively, these measures will maintain the ecological integrity of the woodland edge and stream corridor and minimise the potential for adverse effects on bats arising from habitat disturbance or artificial lighting.

While lesser horseshoe bats were recorded within the study area, the Proposed Development site lies outside the Lesser Horseshoe Bat Core Sustenance Zones identified in the Conservation Objectives for Kenmare River SAC. Accordingly, the habitats within the site do not contribute to the SAC conservation objective attributes relating to the extent of potential foraging habitat, the maintenance of linear landscape features used for commuting, or the avoidance of adverse effects associated with light pollution. Therefore, the Proposed Development is not predicted to result in significant effects on the conservation objectives of Kenmare River SAC in relation to lesser horseshoe bats.

Potential impacts on bats are assessed as:

Permanent, Moderate, Negative

10. Mitigation

10.1 Mitigation By Design

10.1.1 Drainage and Sustainable Drainage Systems (SuDS)

- Consultation between the Applicant, Design Team, Engineers and Ecologists informed the drainage design to avoid and minimise potential effects on aquatic habitats, water quality and downstream ecological receptors.
- Separate foul and surface water drainage networks have been incorporated into the design to prevent cross-contamination between drainage systems.
- Foul wastewater pumped to the public sewer network and treated at Kenmare WWTP (D0184-01).
- A comprehensive Sustainable Drainage System (SuDS) treatment train has been incorporated throughout the development to replicate, as far as practicable, natural drainage processes and minimise potential impacts on the receiving environment.

- The SuDS strategy has been developed in accordance with the principles of the CIRIA SuDS Manual and seeks to manage runoff at source, improve water quality, reduce runoff rates and volumes, and provide biodiversity and amenity benefits.
- Surface water runoff from the proposed development will be managed through a combination of conventional drainage infrastructure and SuDS measures. A conventional storm sewer network incorporating road gullies will collect runoff from roads, roofs, parking areas and other hardstanding surfaces and convey it through the SuDS treatment train.
- The SuDS network comprises:
 - Bioretention rain gardens/tree pits; see **Figure 11** below
 - Dry swales; see **Figure 12** below
 - Permeable paving/permeable asphalt;
 - Class 1 bypass petrol interceptors;
 - Underground attenuation storage tanks; see **Figure 13** below
 - Associated flow control and drainage infrastructure.
- Bioretention rain gardens and tree pits will be integrated within landscaped areas and adjacent to paved surfaces throughout the development. These features will promote infiltration, improve water quality, reduce runoff volumes, intercept rainfall and provide biodiversity and amenity benefits.
- Dry swales will be incorporated alongside internal roads and open space areas to intercept sheet runoff from road surfaces. Stone check dams and filter drains within the swales will slow runoff, enhance infiltration, provide attenuation and facilitate the removal of sediments and pollutants from surface water.
- Permeable paving and permeable asphalt will be used where appropriate throughout the development to promote infiltration, reduce runoff volumes and contribute to the overall SuDS treatment train.
- All SuDS features will incorporate overflow connections to the storm sewer network to ensure effective drainage and resilience during extreme rainfall events.
- Class 1 bypass petrol interceptors will be installed within the drainage network to remove hydrocarbons and oil-based contaminants associated with vehicular traffic prior to runoff entering the attenuation system.
- Surface water runoff from roofs, roads, parking areas and other hardstanding surfaces will pass through multiple stages of the SuDS treatment train prior to discharge, thereby reducing sediment loading, pollutant concentrations and peak runoff rates entering the receiving environment.
- Stormwater runoff generated within the development will be directed towards attenuation areas located within the public open space network and subsequently conveyed through the storm sewer network to underground attenuation storage tanks.
- Underground attenuation storage tanks will provide stormwater storage and controlled discharge, reducing pressure on receiving waters and minimising downstream flood risk.
- Catch pits, Hydro-Brake flow controls and associated drainage infrastructure will be incorporated within the drainage network to regulate discharge rates and maintain the effectiveness of the attenuation system.

- Surface water will be discharged from the attenuation system at the calculated greenfield runoff rate via a Hydro-Brake flow control device, ensuring that post-development runoff rates do not exceed pre-development runoff rates.
- The controlled discharge will outfall to the Keelnagower Stream (EPA waterbody: Lissaniska_21) via a proposed headwall structure following treatment and attenuation through the SuDS network.
- The attenuation system has been designed to accommodate the 1 in 100-year storm event plus a 20% climate change allowance.
- The proposed drainage strategy has been informed by the Site-Specific Flood Risk Assessment and is designed to ensure that the development does not increase flood risk within the site or elsewhere in the catchment.
- During extreme rainfall events, the proposed drainage and attenuation measures will reduce the potential for sediment mobilisation, pollutant transport and adverse effects on the Keelnagower Stream and downstream aquatic habitats.
- Collectively, the proposed drainage and SuDS measures will protect water quality, minimise runoff-related impacts, reduce pollutant transport and safeguard fish populations, aquatic habitats, aquatic macroinvertebrate communities and the ecological integrity of the Keelnagower Stream, downstream aquatic habitats and associated ecological receptors.
- All elements of the SuDS network will be subject to an inspection, maintenance and monitoring programme throughout the operational lifetime of the development to ensure continued effectiveness, water quality performance and long-term protection of the receiving environment.



Figure 11: Typical Bioretention Rain Garden Detail (adapted from Drainage Impact Report)

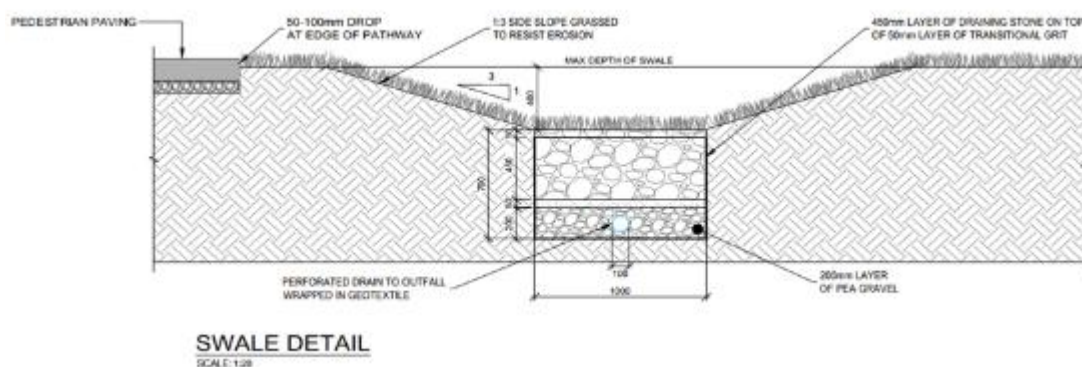


Figure 12: Typical Dry Swale Detail (adapted from Drainage Impact Report)

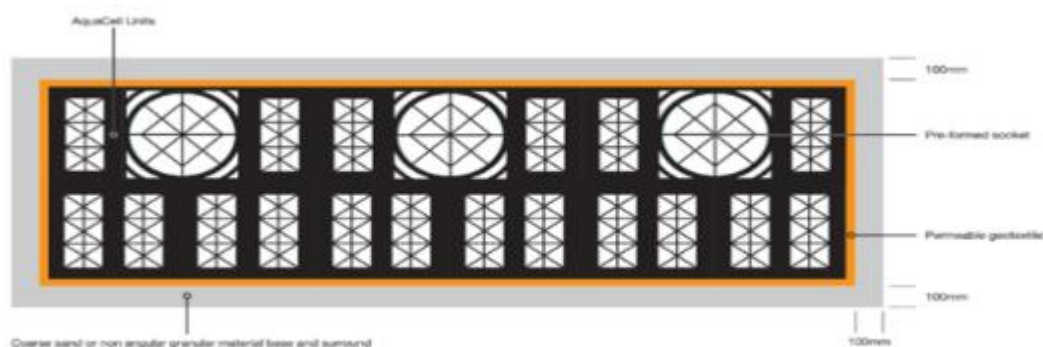


Figure 13: Typical Attenuation Storage Tank Detail (adapted from Drainage Impact Report)

10.1.2 Bats and Lighting

10.1.2.1 Construction Phase

- To minimise disturbance to bats and other nocturnal fauna, construction activities during the hours of darkness shall be kept to a minimum, particularly during the bat active season (April to September).
- Construction lighting shall be temporary, task-specific and used only where required for health and safety purposes. Lighting shall be switched off when not in use.
- Where practicable, night-time working shall be avoided, thereby reducing the requirement for artificial lighting during the construction phase.
- If construction lighting is required during the bat activity period (April to September), lighting shall be directed away from retained woodland, treelines, potential bat roost features and other habitats used by commuting and foraging bats, particularly the woodland and treeline habitats along the western site boundary.
- Directional lighting shall be used to ensure illumination is restricted to the immediate work area and to prevent light spill into adjacent habitats.
- The design and positioning of luminaires shall minimise overspill through the use of hoods, cowls, louvres, shields or similar measures where necessary.

- Lighting levels shall be maintained at the minimum required to meet health and safety requirements and shall avoid unnecessary illumination of retained boundary vegetation and ecological corridors.
- Any security lighting required outside normal working hours shall be fitted with motion sensors and short-duration timers to minimise unnecessary illumination.
- All site personnel shall receive toolbox talks outlining ecological sensitivities associated with the site, including the importance of avoiding light spill onto woodland, treeline and other habitats used by bats

10.1.2.2 Operational Phase

- A sensitive lighting strategy shall be implemented throughout the development to avoid adverse effects on bats and other nocturnal fauna, with particular regard to the woodland and treeline habitats located along the western site boundary.
- A continuous dark buffer zone shall be maintained along the western woodland and treeline boundary. No lighting columns or other permanent light sources shall be installed within this buffer, and light spill onto retained woodland, treelines and associated bat commuting and foraging habitat shall be avoided.
- Public open space and landscaped areas adjacent to the western woodland boundary shall remain unlit where practicable, ensuring the retention of a continuous dark corridor for commuting and foraging bats.
- Internal roads, footpaths and circulation routes adjacent to the woodland edge shall be designed to minimise lighting requirements through appropriate layout and circulation planning.
- Street and pathway lighting shall utilise LED luminaires with a warm white spectrum (<2700 K), negligible upward light output, good optical control and no UV component. Luminaires shall be mounted horizontally and designed to minimise light spill, glare and overspill onto adjacent habitats.
- Lighting columns shall be designed and positioned to minimise illumination of woodland edge habitats, treelines and other wildlife-sensitive areas.
- Lighting levels within buffer zones adjoining bat foraging and commuting habitat shall be controlled to ensure that illuminance levels do not exceed defined ecological thresholds where appropriate.
- Street and pathway lighting shall incorporate dimming regimes during periods of low usage to further reduce disturbance to bats.
- External residential lighting shall be limited to wall-mounted downlighters and shall be directed away from site boundaries, woodland edges and treelines.
- Where installed, residential security lighting shall be fitted with motion sensors and short-duration timers (typically 1–2 minutes) to minimise unnecessary illumination.
- The use of bollard lighting and other low-level lighting adjacent to the western woodland boundary shall be avoided unless it can be demonstrated that no adverse light spill will occur.
- The final lighting design shall demonstrate compliance with the recommendations of the Bat Conservation Trust and Institution of Lighting Professionals Guidance Note Bats and Artificial Lighting at Night (BCT & ILP, 2023).

10.2 Mitigation By Management

10.2.1 Construction and Environmental Management Plan (CEMP)

A detailed, site-specific Construction Environmental Management Plan (CEMP) has been prepared for the Proposed Development and will be implemented by the appointed contractor prior to the commencement of construction works. The CEMP establishes the environmental management framework for the construction phase and sets out the procedures, responsibilities, mitigation measures, monitoring requirements and environmental commitments necessary to ensure compliance with relevant legislation, planning conditions and best practice guidance.

The CEMP provides an overview of the proposed development and construction activities, including site preparation works, establishment of a temporary construction compound, site access arrangements, construction traffic management, project phasing and the construction of 100 residential units together with associated infrastructure, public open space and landscaping.

The CEMP defines the roles and responsibilities of the Project Manager, Construction Manager, Design Engineer, Environmental Manager, Ecological Clerk of Works (ECoW) and other relevant personnel in implementing environmental controls throughout the construction phase. It also requires the preparation of site-specific method statements for activities with potential environmental risks and provides for environmental inductions, toolbox talks and ongoing staff training

A suite of Environmental Management Plans (EMPs) is included within the CEMP covering the management of excavations and materials, surface water runoff, fuels and oils, concrete works, construction waste, traffic, dust, noise, archaeology and cultural heritage, landscape protection, and ecology and biodiversity. These plans set out specific mitigation measures to protect water quality, manage pollution risks, minimise nuisance effects and safeguard ecological and environmental receptors during construction

The CEMP further provides for environmental monitoring, auditing and reporting, including regular site inspections, environmental performance indicators, incident reporting procedures and corrective actions where necessary. Emergency response procedures are also included to address accidental spillages, pollution incidents, flooding events and other environmental emergencies

Overall, the CEMP provides a robust framework for the management of environmental risks during construction and will ensure that construction activities are undertaken in a manner that protects water quality, biodiversity, landscape features and residential amenity, while avoiding significant adverse environmental effects.

10.2.2 Management of Construction Waste

Construction-generated waste will be managed in accordance with the Resource and Waste Management Plan (RWMP) prepared for the Proposed Development. Waste management practices will follow the principles of the waste hierarchy, with priority given to waste prevention, reuse and recycling wherever practicable.

Measures will include:

- Segregation of waste streams at source;
- Appropriate storage and handling of hazardous and non-hazardous waste materials;
- Regular collection and removal of waste by authorised waste contractors;
- Reuse of suitable excavated materials on-site, where feasible;
- Recovery, recycling or disposal of wastes at appropriately authorised facilities;

- Prevention of litter, windblown materials and accidental release of waste to surrounding habitats;
- Prevention of waste, sediments, concrete residues or contaminants entering the surface water drainage network, watercourses or receiving aquatic environment

10.2.3 Ecological Clerk of Works (ECoW)

A suitably qualified and experienced project Ecologist/Ecological Clerk of Works (ECoW) will be employed during the construction phase of the project to ensure all environmental impact prevention controls relevant to construction activities occurring at the time are in place. Duties will include, but are not limited to, a review of all method statements to ensure works are undertaken in compliance with the Conditions of Planning; delivery of toolbox talks; and monitoring of construction phase activities to ensure all environmental controls and mitigation is implemented in full.

The appointed project ecologist/ECoW will be awarded a level of authority and will be allowed to stop construction activities if he/she deems it necessary.

10.2.4 General Protection of Water Quality during Construction

The contractor will appoint a suitably qualified person to oversee the implementation of general measures for the prevention of pollution to the aquatic environment. The following best practice measures will be put in place to avoid or minimise negative effects to water quality as a result of the project during the construction phase.

10.2.4.1 Temporary Site Compound

- Adequate parking facilities will be made available within the Construction Compound for all site workers during the course of construction.
- A designated wash down area within the Contractor's compound will be used for cleaning of any equipment or plant, with the safe disposal of any contaminated water.

10.2.4.2 Excavated Materials, Soil and Surface Water Management

- All excavations and construction works will be supervised by a suitably qualified and experienced engineer. Contractor method statements will be reviewed and approved prior to commencement of works.
- Bulk excavations will be undertaken during dry weather conditions to minimise runoff from exposed ground. Weather conditions will be monitored, and excavation works will not proceed during periods of heavy or prolonged rainfall.
- Plant, equipment and materials will be stored within the designated temporary site compound only and will not be positioned in a manner that could surcharge existing or newly formed slopes.
- It is anticipated that soils arising from excavation works will be reused within the site for bunding, landscaping, landscaping and reinstatement purposes. Off-site removal of soils is not anticipated under the current design proposals. However, should any surplus or unsuitable material arise during construction, it will be removed by an authorised contractor and transported to an appropriately licensed facility for management or disposal.
- Stockpiling of soils will be minimised, and no permanent stockpiles will remain following completion of construction works.

- Appropriate silt control measures will be implemented prior to excavation works commencing. Any temporary stockpiles will be located on level ground at least 50 m from watercourses or drains.
- Silt-retaining measures (e.g. silt fences, silt curtains or equivalent) will be installed along downgradient edges of stockpiles to reduce the risk of sediment-laden runoff entering surface waters.
- Erosion and sediment control measures will be implemented prior to any site clearance works, with runoff managed to prevent mobilisation of sediment from exposed ground.
- Clean surface water will be intercepted and diverted away from construction runoff to avoid cross-contamination with soiled water.
- The extent of exposed ground and excavated material will be minimised to reduce potential effects on local hydrology and geology.
- Excavations will only proceed following installation of appropriate sediment control measures designed to slow runoff and trap suspended sediments.

10.2.4.3 Storage of Construction Materials

- Construction materials will only be stored in designated material storage areas.
- Material stockpiles will be kept to a minimum size. Material stockpiles will be stored at least 50 m away from watercourses and drains, on an impermeable base and away from moving plant and machinery.

10.2.4.4 Storage of Fuels/Oils and other Hazardous Materials

- The storage of oils, chemicals and hydraulic fluids is to take place in secure, designated areas within the site compound.
- All fuels and chemicals will be stored within bunded areas, and where applicable, stored within double-skinned tanks/containers with the capacity to hold 110% of the volume of chemicals and fuels contents.
- Bunds will be located on flat ground.
- Spill kits will be kept on site at all times and all staff trained in their appropriate use.

10.2.4.5 Refuelling of Construction Plant

- All plant will be refuelled at designated refuelling locations within the site compound. Rigid and articulated vehicles will be fuelled off site as will all site vehicles (jeeps, cars and vans).
- Designated fuel filling points will have appropriate oil and petrol interceptors to provide protection from accidental spills.
- Only designated trained and competent operatives will be authorised to refuel plant on site.
- All plant used will be regularly inspected for leaks and fitness for purpose.

10.2.4.6 Spill Control Measures

- Measures will be implemented throughout the construction stage to prevent contamination of the soil and drainage network from oil and petrol leakages.

- Spill kit containment equipment will be stored at all work areas for use in the event of an emergency. The contents of the spill kit will be replenished if used and they will be checked on a scheduled basis during environmental inspections and audits. All crews will be trained in the use of spill kit equipment.
- An Emergency Response Plan will be implemented in the event of any environmental incidents such as spillage of oil/fuel during the construction/operational phase of the project.
- All emergency procedures and equipment will be in place prior to the commencement of any works.
- The local authority will be informed immediately of any spillage or pollution incident that may occur on-site during the construction phase.

10.2.4.7 Use of Concrete

- A designated trained operator, experienced in working with concrete, will be employed during the concrete-pouring phase, and pouring will be supervised by the Construction Manager, a suitably qualified Engineer, and the Environmental Manager/ECOW.
- The area of the pour should be completely drained of water before a pour commences. There shall be no pouring of concrete during extreme/prolonged rainfall or forecasted heavy rainfall. Incidental rainfall from light showers during pour period is typically absorbed into the concrete matrix but heavier showers can result in some runoff from the top surface of the concrete pour. If runoff is encountered, the Environmental Manager will block outflow to retain or treat the runoff until the pH is neutral before discharge to the drainage network.
- Any small volumes of incidental wash generated from cleaning hand tools, cement mixers or other plant, as required, will be trapped on-site to allow sediment to settle out and reach neutral pH before clarified water is released to the surface water drains or allowed to percolate to ground. Settled solids will be removed regularly and appropriately disposed of off-site.
- Washout of concrete trucks will not occur at the site.

10.2.4.8 Construction Wheel-wash Facilities

- Wheel wash facilities are to be provided at all entrances/exits for the site. All construction vehicles leaving site will be required to drive through these wheel wash areas.
- The wheel wash area will be cleaned regularly so as to avoid build-up of residue.
- Vehicle washdown water will discharge to the drainage system for treatment and attenuation.

10.2.4.9 Fish and Aquatic Habitats Protection

The Keelnagower Stream and associated downstream aquatic habitats will be protected throughout the construction phase through implementation of the measures outlined above and the Construction Environmental Management Plan (CEMP).

Particular attention will be given to the prevention of sediment-laden runoff, concrete contamination, hydrocarbon pollution and other pollutants that could adversely affect aquatic habitats and fish populations. All water quality protection measures will be installed prior to the commencement of ground disturbance works and maintained for the duration of construction.

Site inspections will be undertaken regularly to ensure that erosion, sediment control and pollution-prevention measures remain effective, particularly following periods of heavy rainfall. Any deficiencies identified will be rectified immediately.

In the event of an accidental pollution incident, works will cease in the affected area and emergency response procedures will be implemented to prevent pollutants from reaching the Keelnagower Stream or downstream aquatic habitats.

10.2.5 General Protection of Fauna

- Disturbance of fauna generally will be reduced by controlling the movement of construction vehicles and personnel.
- Construction materials and wastes are to be kept in designated areas to reduce risk of accidental injury/entrapment of any wildlife on-site.
- In accordance with Section 40 of the Wildlife Acts, vegetation removal, including tree removal, will be conducted outside of the restricted bird nesting period (March 1st to 31st August, inclusive). This will not only protect nesting birds, but a range of biodiversity.
- Where areas of dense vegetation are to be removed, the ECoW will be present to oversee removal of vegetation and ensure any necessary mitigation measures are in place in the event that a previously unknown breeding or resting site of any protected mammal species is encountered during the works.
- Mammals and birds are mobile and so are expected to disperse from the area; however, young or hibernating animals are vulnerable to impacts during vegetation clearance. Prior to any vegetation clearance, the area will be checked by the ECoW to check for the presence of young or hibernating animals.
- Should any resting or breeding place of any protected species be discovered within the site during the pre-construction or construction phases, the ECoW is to be informed immediately, and the advice of NPWS sought. Any works in the area are to cease immediately, and the area is to be cordoned off until the ECoW has authorised recommencement of works.
- All temporary construction lighting is to be switched off outside daylight hours. Construction lighting is to be directed inwards into the Site to reduce indirect alteration of adjacent habitats outside the Site and minimise nocturnal impacts on faunal species.
- To reduce the level of night-time disturbance to nocturnal fauna, construction activities should be restricted to standard construction hours. Construction work will not take place outside of these hours unless in exceptional circumstances.
- A pre-construction otter survey should be undertaken along the Keelnagower Stream corridor to confirm the absence of otter resting or breeding sites immediately prior to works commencing, and to inform any additional mitigation measures required.

10.2.6 Habitat Management

A dedicated Landscape and Green Infrastructure Report has been prepared for the Proposed Development and has informed the retention, enhancement and long-term management of ecological and landscape features throughout the site. The report integrates biodiversity, ecological connectivity, green infrastructure, pollinator-friendly planting and regenerative landscape principles into the site design, with the objective of enhancing

habitat quality, ecological resilience and overall biodiversity value. A summary of the principal landscape and biodiversity enhancement measures is provided below;

- The landscape strategy has been developed in accordance with the principles of regenerative landscape design, seeking to enhance biodiversity, improve ecological connectivity, support soil health, strengthen water resilience and contribute positively to the long-term ecological value of the site.
- Existing trees, woodland edge habitats, treelines and boundary vegetation will be retained wherever practicable and integrated into the site's green infrastructure network. New planting will reinforce these features and strengthen ecological connectivity within the site and the wider landscape.
- The landscape proposals incorporate a network of public open spaces, communal open spaces, native hedgerows, tree planting, meadow planting and pollinator-friendly landscaping designed to provide habitat diversity and ecological stepping stones throughout the development.
- Existing hedgerows will be retained, protected and enhanced through supplementary planting and gapping-up using native species including hawthorn (*Crataegus monogyna*), blackthorn (*Prunus spinosa*), hazel (*Corylus avellana*) and alder (*Alnus glutinosa*), thereby strengthening wildlife corridors and habitat connectivity.
- The planting strategy has been informed by the All-Ireland Pollinator Plan 2021–2025, with priority given to native trees, shrubs and wildflower species that provide nectar, pollen, fruit and seed resources throughout the year.
- Pollinator-friendly meadow habitats and native wildflower planting will be established within public open spaces, landscape margins and green corridors to provide foraging and nesting resources for bees, butterflies and other pollinating insects.
- Flowering hedgerows and native shrub planting will provide important seasonal food resources for pollinators, birds and other wildlife, while contributing to habitat diversity and ecological resilience.
- The proposed planting palette includes a wide range of native and pollinator-supporting species such as oak (*Quercus robur* and *Q. petraea*), birch (*Betula pendula* and *B. pubescens*), alder (*Alnus glutinosa*), holly (*Ilex aquifolium*), rowan (*Sorbus aucuparia*), bird cherry (*Prunus padus*), hawthorn (*Crataegus monogyna*), guelder rose (*Viburnum opulus*), dogwood (*Cornus sanguinea*), meadowsweet (*Filipendula ulmaria*), bird's-foot trefoil (*Lotus corniculatus*), ox-eye daisy (*Leucanthemum vulgare*) and devil's-bit scabious (*Succisa pratensis*).
- Fruit- and nut-bearing tree species will be incorporated where appropriate within public open space, communal green areas and green infrastructure corridors to provide additional food resources for wildlife and further enhance biodiversity value.
- Landscaping proposals prioritise locally provenanced and Irish-grown planting stock where available and maximise the reuse of on-site soils and existing seed resources where practicable.
- Landscape management practices minimise pesticide use wherever possible, retain areas of flowering vegetation, support pollinator habitat and promote long-term ecological resilience in accordance with Pollinator Plan guidance.
- The landscape strategy seeks to achieve a net gain in biodiversity through the retention and enhancement of existing ecological features, the establishment of native and pollinator-friendly planting, strengthening of habitat connectivity, and the creation of a multifunctional green infrastructure network throughout the site.



Figure 14: Illustrative Masterplan showing Biodiversity Enhancement Strategy (taken from Landscape and Green Infrastructure Report).

The proposed green infrastructure network will provide important habitat, foraging resources and ecological connectivity for birds, bats, small mammals, invertebrates and other wildlife. Routine landscape management shall therefore be undertaken in a manner that maintains the ecological functionality of retained habitats, protects habitat corridors and supports the long-term biodiversity objectives of the development.

Where invasive plant species are identified during the operational lifetime of the development, they shall be managed in accordance with current best practice guidance and relevant legislation to prevent their establishment or spread within retained or newly created habitats.

10.2.7 Management of Invasive Species, Site Biosecurity

To reduce risk of introduction or spread of invasive species to the development site, the following measures are recommended in relation to site biosecurity:

Management

- Butterfly bush and old men's beard were the only species observed at the Proposed Development site. Rhododendron was also found in Scarteen Park estate, just outside the red boundary (please refer to **Section 4.3.4.2**). Management of this species should be carried out in accordance with the following document: *The Management of Invasive Alien Plant Species on National Roads – Technical Guidance. GE-ENV-01105* (2020).

Biosecurity

- Prior to being brought to site, validation should be provided by all suppliers that construction plant, machinery and vehicles are free from invasive species. Similarly, certification is to be obtained from suppliers that all raw materials to be imported to site including soil, fill, sand, gravel and landscaping materials are free from invasive species.
- All vehicles, machinery and equipment/tools are to arrive to site clean and steam washed. Visual inspections are to take place. All Personal Protective Equipment (PPE) brought to site is to be clean and dry with any attached vegetation or debris removed.
- A schedule of regular site inspections for invasive species is to be prepared and undertaken for the duration of the construction works. These inspections are to encompass the IAPS growing season for the duration of the construction works programme to monitor existing IAPS growth, identify any new IAPS stands, inspect materials storage areas and monitor implementation of IAPS management measures on-site, where required e.g., fencing, signage etc.
- Where there is a requirement for IAPS control areas, all vehicles, equipment/tools, footwear etc used in these areas will be thoroughly cleaned in a designated area once works in that area are complete to prevent spread of IAPS. The use of tracked machinery within IAPS infested areas is to be prohibited. The use of tracked machinery within close proximity of IAPS infested areas is to be strictly controlled. This should be undertaken with direction from the ECoW.

10.2.8 Recommendations

10.2.8.1 Tree Protection Plan

All retained trees located within or adjacent to the site shall be protected during the construction phase. Particular attention shall be given to the woodland boundary along the western site boundary, which provides important ecological and landscape functions. Prior to the commencement of works, a Tree Protection Plan should be prepared by a suitably qualified arboriculturist where retained trees are present in proximity to construction activities or proposed boundary treatments. The plan should identify Root Protection Areas (RPAs), specify protective fencing requirements, and detail measures to avoid damage to tree roots, stems and canopies during site clearance, construction and landscaping works, in accordance with BS 5837:2012 *Trees in Relation to Design, Demolition and Construction – Recommendations* (BSI, 2012).

Boundary treatments, excavations, service installations and drainage works shall be designed and implemented to avoid impacts on retained trees and their root systems, with particular emphasis on preventing adverse effects on the woodland boundary along the western site boundary. Protective fencing should be installed prior to the commencement of works and maintained for the duration of the construction phase.

The implementation of tree protection measures will also ensure the retention of ecological functions associated with mature trees, including habitat connectivity, nesting opportunities for birds and potential bat foraging and commuting features.

10.2.8.2 Bird boxes

To enhance biodiversity value within the Proposed Development, a range of bird nesting features should be incorporated throughout the site. Nest boxes for common passerine species should be installed on retained mature trees, treelines and suitable boundary features, particularly along retained green infrastructure corridors. A variety of box designs should be used to support a range of species, including tits (*Parus spp.*), robin (*Erithacus rubecula*), wren (*Troglodytes troglodytes*) and other small garden birds. Nest boxes should be installed in sheltered

locations, protected from prevailing weather conditions and excessive disturbance, in accordance with best practice guidance (BirdWatch Ireland, 2022) ¹³.

In addition, integrated bird nesting features should be incorporated into suitable buildings throughout the development. This should include the installation of swift (*Apus apus*) bricks or integrated swift nest boxes at appropriate elevations on selected dwellings and apartment buildings. Swift bricks are particularly recommended as they provide long-term nesting opportunities for swifts, a species of conservation concern, while also being utilised by a range of other cavity-nesting bird species, including house sparrow (*Passer domesticus*), starling (*Sturnus vulgaris*) and occasionally tit species where suitable. As such, the installation of a greater number of swift bricks than would be required solely for swifts is encouraged as a biodiversity enhancement measure. Swift nesting features should be installed in accordance with current best practice guidance and positioned to provide suitable flight access while minimising disturbance (Swift Conservation Ireland, 2025) ¹⁴.

See **Plate 8** below for examples of swift bricks.



Plate 8: Swift boxes examples.

10.2.8.3 Hedgehog Highways

To support hedgehog movement through the proposed development, boundary treatments should be designed to retain connectivity between gardens and adjacent green areas. This can be achieved through the provision of small “hedgehog gaps” (approximately 13 × 13 cm) at the base of fences or walls to allow hedgehogs to travel freely between plots and avoid habitat fragmentation (Hedgehog Street, 2023)¹⁵. The use of solid, impermeable fencing should be minimised where possible, and landscaping should incorporate native shrub planting and log or leaf piles to provide additional shelter and foraging opportunities within communal green spaces.

Providing hedgehog gaps and maintaining habitat connectivity within new developments is a simple but effective biodiversity enhancement measure. Hedgehogs require access to multiple gardens and green spaces to forage and shelter, and impermeable boundaries can significantly restrict movement and contribute to population decline. Incorporating hedgehog-friendly fencing therefore helps sustain local biodiversity and supports wider ecological networks within urban environments (Hedgehog Street, 2023).

¹³ [Nestboxes for Garden Birds - BirdWatch Ireland](#) Accessed on 16/04/2026

¹⁴ [Which-box-June-2025.pdf](#) Accessed on 16/04/2026

¹⁵ [Link your garden with a hedgehog highway](#) Accessed on 16/04/2026



Plate 9: Hedgehog highway within the fence.

10.2.8.4 Bat Box Scheme

It is recommended that a bat box enhancement scheme is implemented to enhance the ecological value of the site for bats through the provision of additional artificial roosting opportunities. In accordance with good practice, the scheme should be implemented prior to commencement of development works, and in advance of any tree removal, to ensure the continuity of roosting and shelter opportunities for bats (NRA, 2006a).

Bat boxes should be installed within suitable foraging habitat, including retained trees along woodland edges and other appropriate features within or adjacent to the site. The design, siting, orientation, and installation of all bat boxes shall be determined and supervised by a suitably qualified bat specialist or the appointed project ecologist and shall be carried out in accordance with NRA (2006a) guidance and Bat Conservation Ireland (BCIreland) guidance.

To maximise uptake by a range of bat species, the scheme should incorporate a variety of bat box types, reflecting the ecological requirements of species recorded during baseline surveys. This may include:

- Woodland-associated designs (e.g. Miramare boxes) attracting a wide variety of crevice-dwelling species as it mimics a hollow tree.
- Generalist woodcrete box designs (e.g. Schwegler-type boxes) suitable for common pipistrelle, soprano pipistrelle, brown long-eared bat and Daubenton's bat.

The final number, type, and precise locations of bat boxes will be confirmed by the appointed ecologist, having regard to:

- The species recorded on site,
- The level of bat activity observed, and

In accordance with best practice, the bat box scheme should be registered with Bat Conservation Ireland to contribute to national bat conservation monitoring and data collection (BCIreland guidance).

11. Cumulative Impacts

As well as singular effects, the potential for cumulative effects also needs to be considered. A cumulative effect arises from incremental changes caused by another past, present or reasonably foreseeable future actions together with the Proposed Development. According to EPA (2022), cumulative effects can be described as ‘the addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects’.

11.1 Plans

With regards to the potential for cumulative or in-combination effects these plans were considered.

- Kerry County Development Plan 2022-2028
- Kerry County Biodiversity Action Plan 2022-2028
- Kenmare municipal District Local Area Plan 2024-2030

These plans include a range of environmental protection policies and objectives relating to biodiversity, water quality, and the protection of designated sites. These safeguards are applicable to the Proposed Development and will guide its implementation.

In this context, and having regard to the nature and scale of the Proposed Development, no significant cumulative impacts are predicted in combination with these plans.

11.2 Permitted and Proposed Developments in the Locality

A review of recent granted and ongoing planning applications within the vicinity of the study area was undertaken for Kenmare and its surrounding area. Relevant developments are presented in Table 15.

The principal potential cumulative effects associated with the Proposed Development, in combination with other permitted or proposed developments, relate to:

- Limited cumulative habitat loss
- Disturbance and displacement of fauna
- Increased artificial lighting
- Potential pressures on water quality and wastewater infrastructure

The Proposed Development will result in the loss of a small area of habitat, primarily disturbed ground and minor patches of scrub of low ecological value. Given the limited extent and low ecological importance of these habitats, no significant cumulative habitat loss is predicted.

With respect to fauna, the site provides limited habitat for breeding, resting or foraging, with most ecological value associated with adjacent habitats such as the woodland boundary and the Keelnagower Stream corridor.

While cumulative disturbance could arise through increased human activity, noise and lighting, the scale of the Proposed Development is relatively small in the context of the wider urban environment.

Artificial lighting represents the most sensitive cumulative pathway, particularly in relation to bats, including lesser horseshoe bat. However, subject to the implementation of the proposed lighting design and mitigation measures, including the retention of dark corridors along the woodland boundary, no significant cumulative effects on bats are predicted.

Potential cumulative disturbance effects on fauna are therefore assessed as Long-term, Slight, Negative effects at the local scale, and are not considered significant.

11.3 EPA Licenced Facilities

A review of the EPA database identified one waste-licensed facility and one Urban Wastewater Treatment Plant (UWWTP) within the wider area of the Proposed Development (refer to **Table 16** and **Table 17**).

Kenmare UWWTP (Licence No. D0184-01) is the receiving facility for foul wastewater generated by the Proposed Development. The plant provides secondary treatment and discharges treated effluent to the Finnihy catchment, which ultimately drains to the Inner Kenmare River and Kenmare River SAC.

The most recent EPA compliance status for the plant is recorded as 'Pass'. It is noted that the plant has experienced capacity pressures; however, upgrade works are currently underway to increase capacity and improve treatment performance.

In this context, and having regard to the scale of the Proposed Development and the ongoing upgrades to the treatment infrastructure, no significant cumulative impacts are predicted arising from interaction between the Proposed Development and EPA licensed facilities.

Table 16: EPA licenced facilities within the vicinity of the study area

Name	Active License Type	Active License No.	Location Relative to the Proposed Development site
Kenmare Transfer Station	Waste	W0086-01	Approx. 3.6 km northwest

Table 17: Urban Wastewater Treatment Plants with active Waste Water Discharge Authorisation (WWDA) licence near by the study area.

Name	Active License No.	Plant Population Equivalent (P.E.) ¹⁶	Location Relative to the Proposed Development site
Kenmare	D0184-01	5176	Approx. 900 m southwest

11.4 Existing Land-use, On-going Activities and Water Quality

The Proposed Development site currently comprises disturbed land following recent vegetation clearance, with limited ecological value and no ongoing land uses generating emissions or discharges.

The surrounding area is characterised by existing residential development and associated infrastructure. Potential cumulative effects may arise from increased human activity, artificial lighting, traffic and noise.

¹⁶ Population Equivalent (P.E.) is a standard measure for wastewater treatment capacity

Potential cumulative impacts relating to habitat loss, disturbance from lighting and human activity, and water quality have been considered in the preceding sections. The Proposed Development will not result in substantial habitat loss, and ecological receptors within the site are of low sensitivity.

Subject to the implementation of mitigation measures, particularly in relation to lighting control and protection of water quality during construction, no significant cumulative impacts on habitats, fauna or water quality are predicted.

12. Residual Effects

Residual effects are those that remain following the implementation of mitigation measures, or effects that cannot be fully mitigated. The significance of residual effects has been assessed in accordance with EPA (2022) and NRA (2009) guidance.

Table 18 provides a summary of the predicted residual effects for the Important Ecological Features (IEFs) identified within the study area.

Table 18. Summary of predicted residual effects on IEFs

IEFs	Construction phase effects (without mitigation)	Operational phase effects (without mitigation)	Mitigation measures	Residual effects
Hedgehog	Habitat loss: Permanent, Slight, Negative Disturbance/displacement: Temporary to Short-term, Slight, Negative	Disturbance/displacement: Long-term, Slight, Negative	CEMP Compliance with Wildlife Acts Landscaping Hedgehog-friendly fencing	Habitat: Permanent, Not Significant, Negative Disturbance: Long-term, Not Significant, Negative No significant residual effects
Badger	Habitat loss: Permanent, Slight, Negative Disturbance/displacement: Temporary to Short-term, Slight, Negative	Disturbance/displacement: Long-term, Slight, Negative	CEMP Pre-construction checks (if required) Compliance with Wildlife Acts Landscaping	Habitat: Permanent, Not Significant, Negative Disturbance: Long-term, Not Significant, Negative No significant residual effects
Birds	Habitat loss: Permanent, Slight, Negative Disturbance/displacement: Temporary to Short-term, Slight, Negative	Disturbance/displacement: Long-term, Slight, Negative	Timing of vegetation clearance (outside nesting season) CEMP Landscaping Bird boxes	Habitat: Permanent, Not Significant, Negative Disturbance: Long-term, Not Significant, Negative No significant residual effects
Bats (incl. Lesser Horseshoe Bat)	Habitat loss: Permanent, Slight, Negative	Disturbance/displacement: Permanent, Moderate, Negative	Lighting design (dark buffer, directional)	Habitat: Permanent, Not Significant, Negative

IEFs	Construction phase effects (without mitigation)	Operational phase effects (without mitigation)	Mitigation measures	Residual effects
	Disturbance/displacement: Permanent, Moderate, Negative		lighting, no spill to woodland) CEMP Retention of woodland boundary Bat boxes	Disturbance: Permanent, Slight, Negative No significant residual effects
Water Quality	Temporary, Slight, Negative	Temporary, Slight, Negative	CEMP Surface Water Network Design and Controls SuDS Foul Water Network Design and Controls Site Management	Potential water quality effects are assessed as Short-term, Not Significant, Negative effects Residual effect: No significant residual effects

Following the implementation of mitigation measures, including best practice construction management, protection of water quality, and sensitive lighting design to protect adjacent woodland and bat commuting routes, all residual ecological effects are predicted to be Not Significant.

Residual impacts are limited to slight, localised effects on common and widespread species, with no effects on designated sites, no adverse effects on the conservation status of protected species, and no disruption to ecological connectivity within the wider landscape.

In particular, mitigation measures relating to lighting design will ensure that no significant disturbance to lesser horseshoe bat associated with adjacent woodland will occur, and that dark corridors are maintained along key habitat features.

13. Conclusion

Residual effects on biodiversity, including designated sites, habitats, fauna and water quality, are not considered significant, provided that all mitigation and best practice measures are fully implemented during both the construction and operational phases of the Proposed Development.

Where the development is undertaken in accordance with the design parameters and mitigation measures set out in this application, significant adverse effects on Important Ecological Features (IEFs) are not anticipated.

The application of appropriate construction management measures, ecological safeguards and operational lighting controls will ensure that no significant residual ecological impacts, either alone or in combination with other plans or projects, are expected to arise as a result of the Proposed Development.

14. References

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Appendix 1

NRA Ecological Evaluation Table

Ecological valuation: Examples

International Importance:

- ☐ 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation.
- ☐ Proposed Special Protection Area (pSPA).
- ☐ Site that fulfills the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended).
- ☐ Features essential to maintaining the coherence of the Natura 2000 Network.⁴
- ☐ Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.
- ☐ Resident or regularly occurring populations (assessed to be important at the national level)⁵ of the following:
 - ☐ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or
 - ☐ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive.
- ☐ Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).
- ☐ World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).
- ☐ Biosphere Reserve (UNESCO Man & The Biosphere Programme).
- ☐ Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).
- ☐ Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).
- ☐ Biogenetic Reserve under the Council of Europe.
- ☐ European Diploma Site under the Council of Europe.
- ☐ Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).⁶

National Importance:

- ☐ Site designated or proposed as a Natural Heritage Area (NHA).
- ☐ Statutory Nature Reserve.
- ☐ Refuge for Fauna and Flora protected under the Wildlife Acts.
- ☐ National Park.
- ☐ Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
- ☐ Resident or regularly occurring populations (assessed to be important at the national level)⁷ of the following:
 - ☐ Species protected under the Wildlife Acts; and/or
 - ☐ Species listed on the relevant Red Data list.
- ☐ Site containing 'viable areas'⁸ of the habitat types listed in Annex I of the Habitats Directive.

Appendix 2

Bat Report

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 Sustainance 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

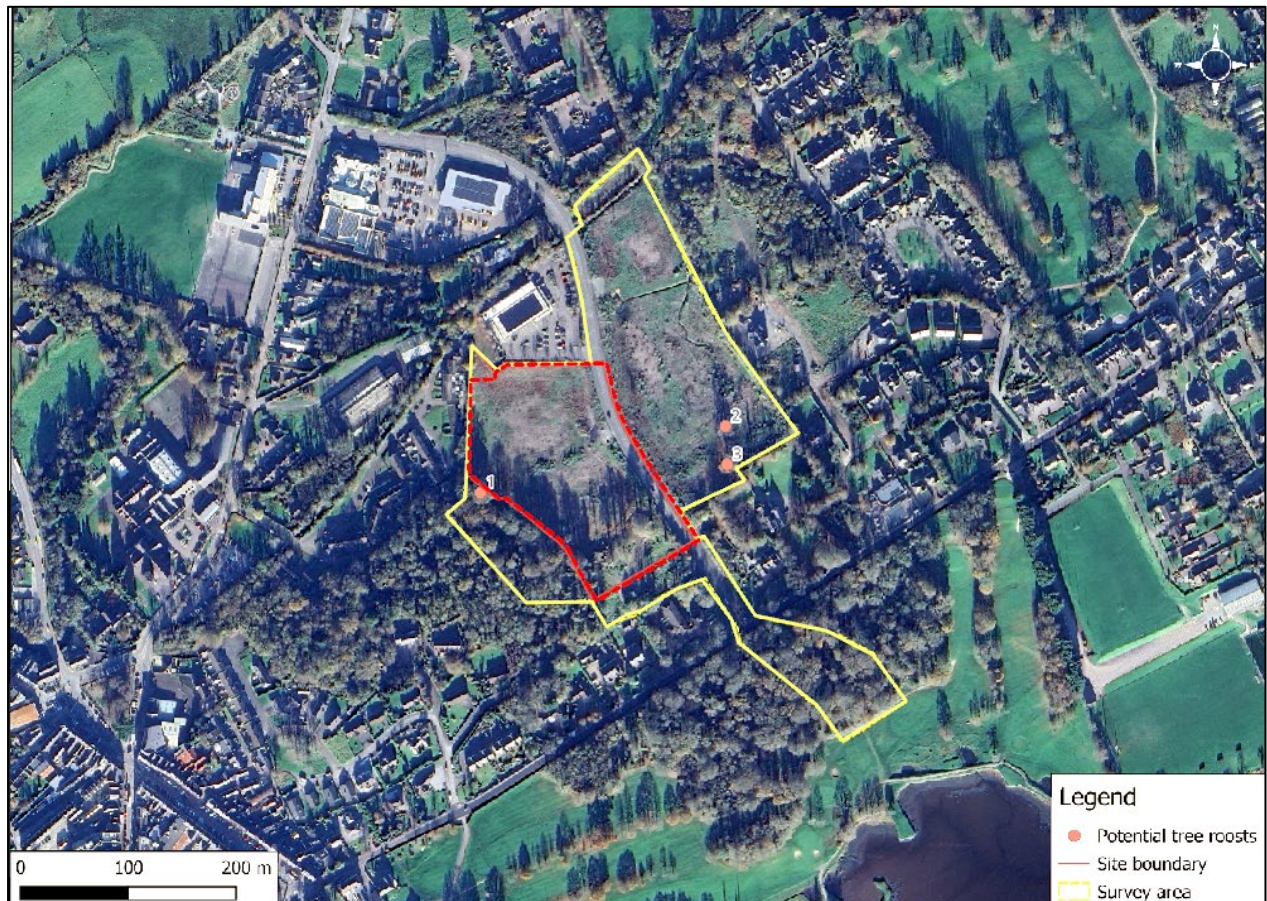


Figure 3-2: Kenmare Residential Development Study Area- location of potential tree roosts

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.

Appendix 3

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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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

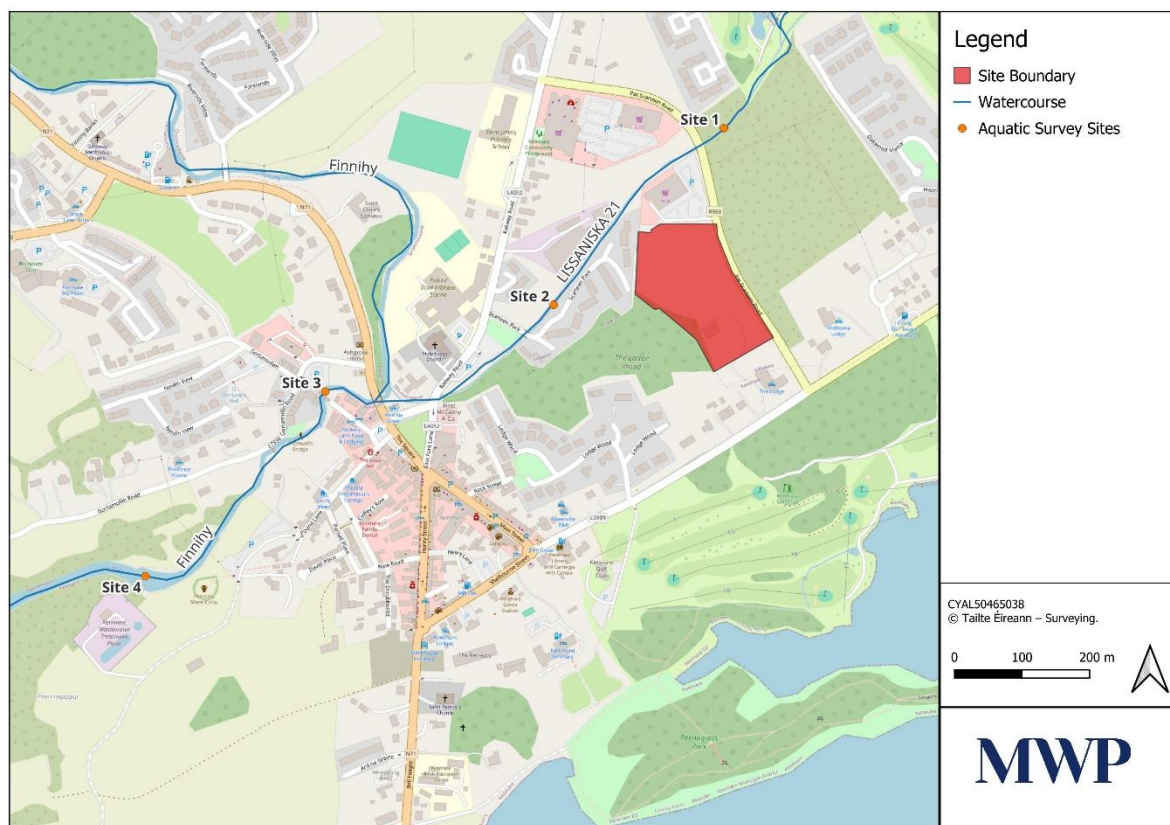


Figure 1. MWP aquatic survey site locations within the Kenmare town environs.

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

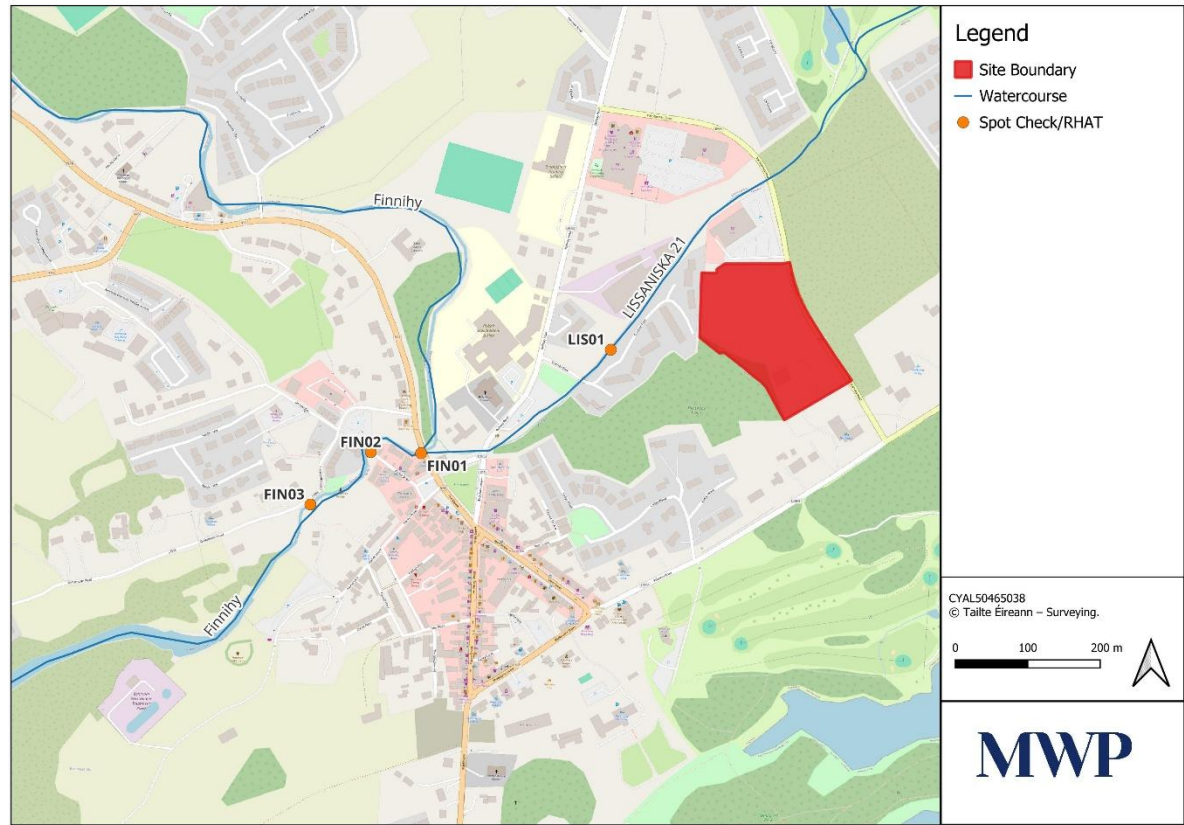


Figure 2. RHAT and Spot Check survey locations within the Kenmare environs of the Proposed Development

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

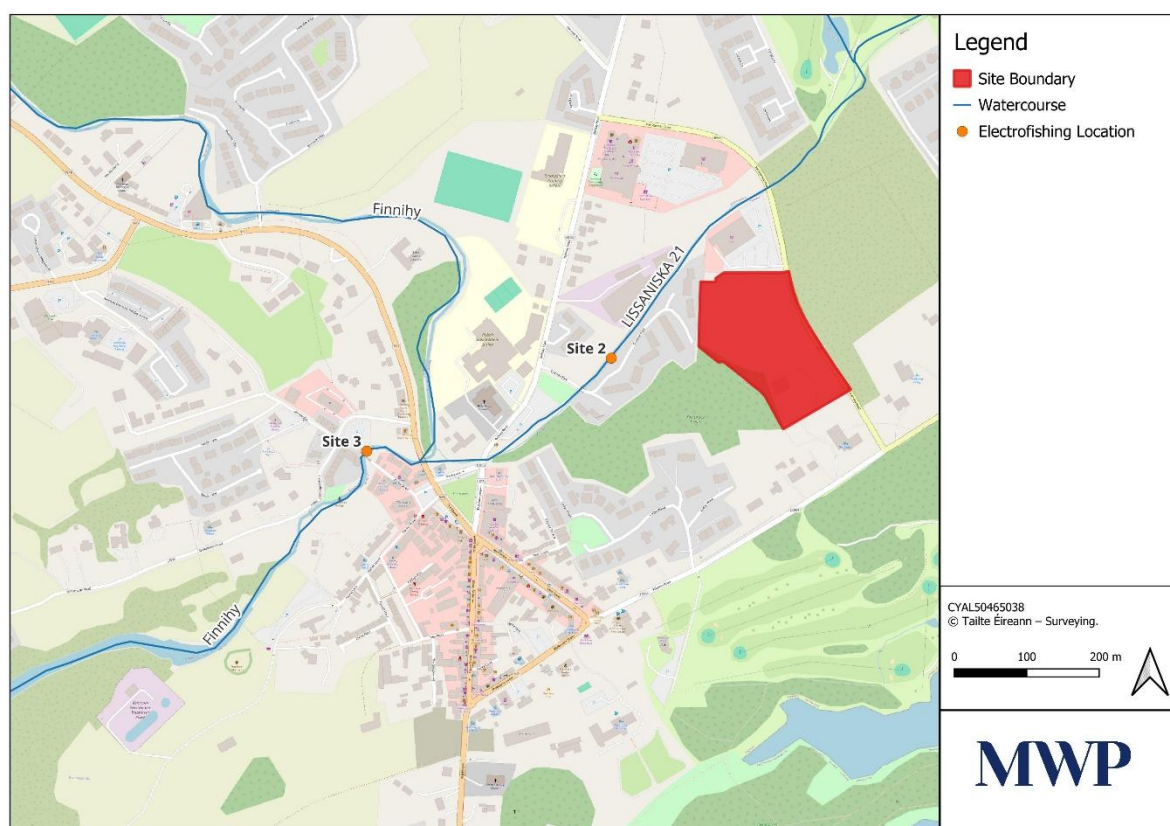


Figure 3. Electrofishing locations downstream of the Proposed Development site on the Lissiniska Stream and Finnihey River.

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 substates 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.

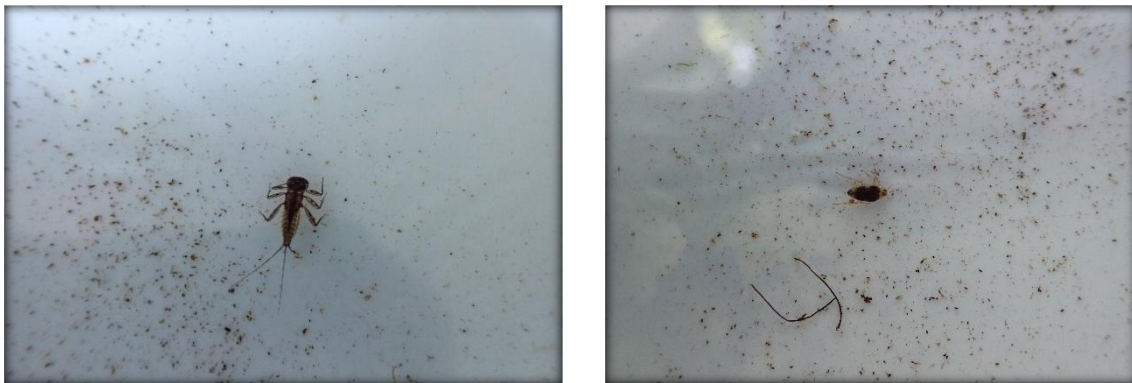


Plate 10: Flatheaded mayfly, *Rhitrogena* sp. (left) and crawling water beetle *Haliphus* sp (right) recorded at Site 2 on Lissaniska Stream.

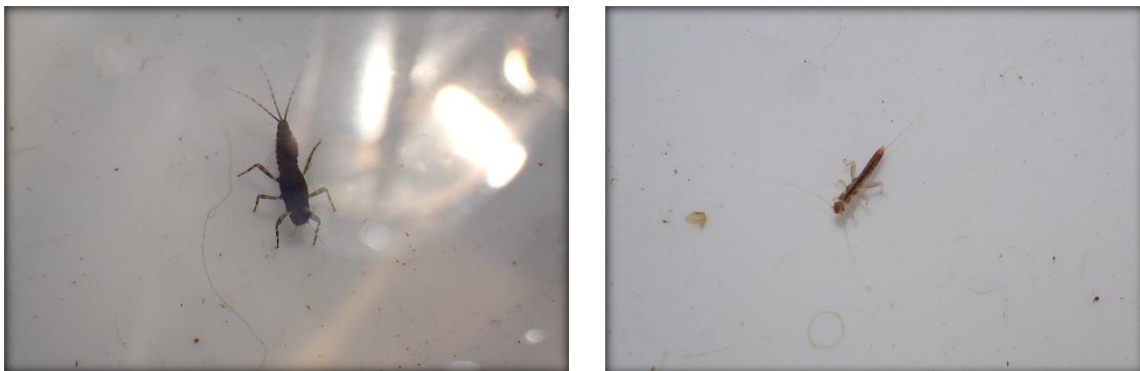


Plate 11: Mayfly, *Seratella* sp. (left) and stonefly, *Luctra* sp. (right) observed at Site 3 on Finnihy River.



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

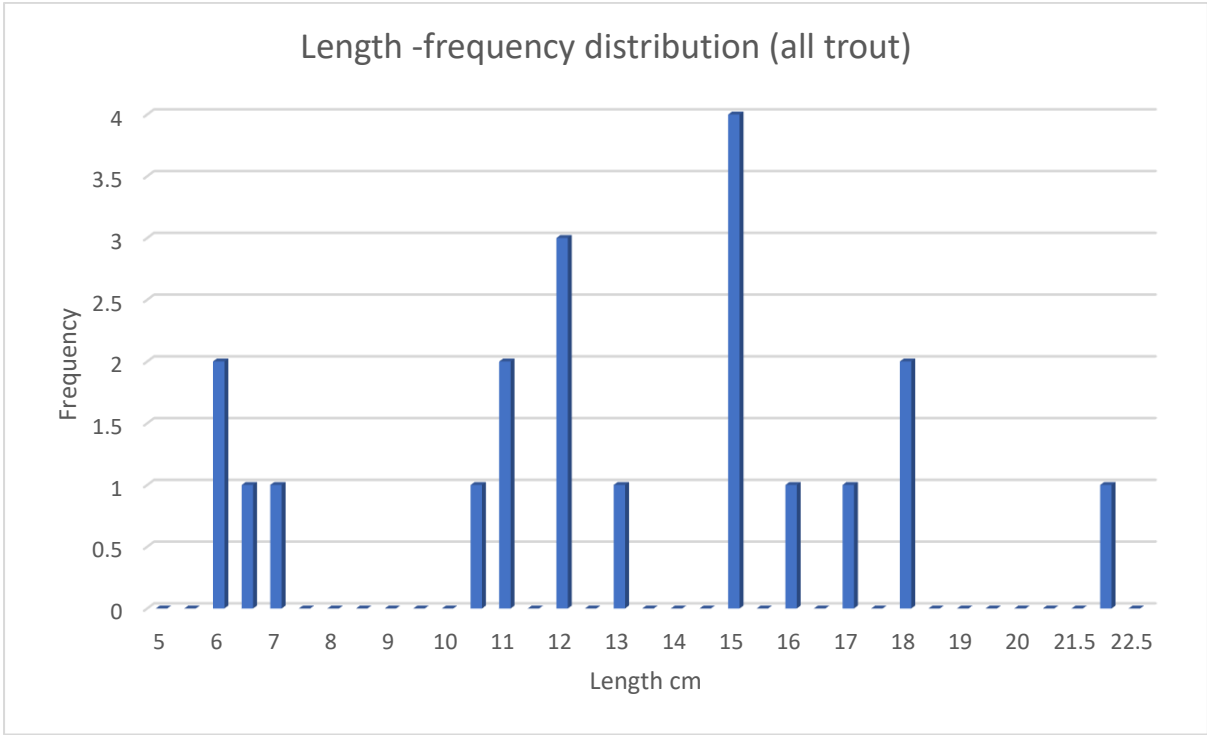


Figure 4: Length-frequency distribution for all trout captured during the electrofishing surveys.

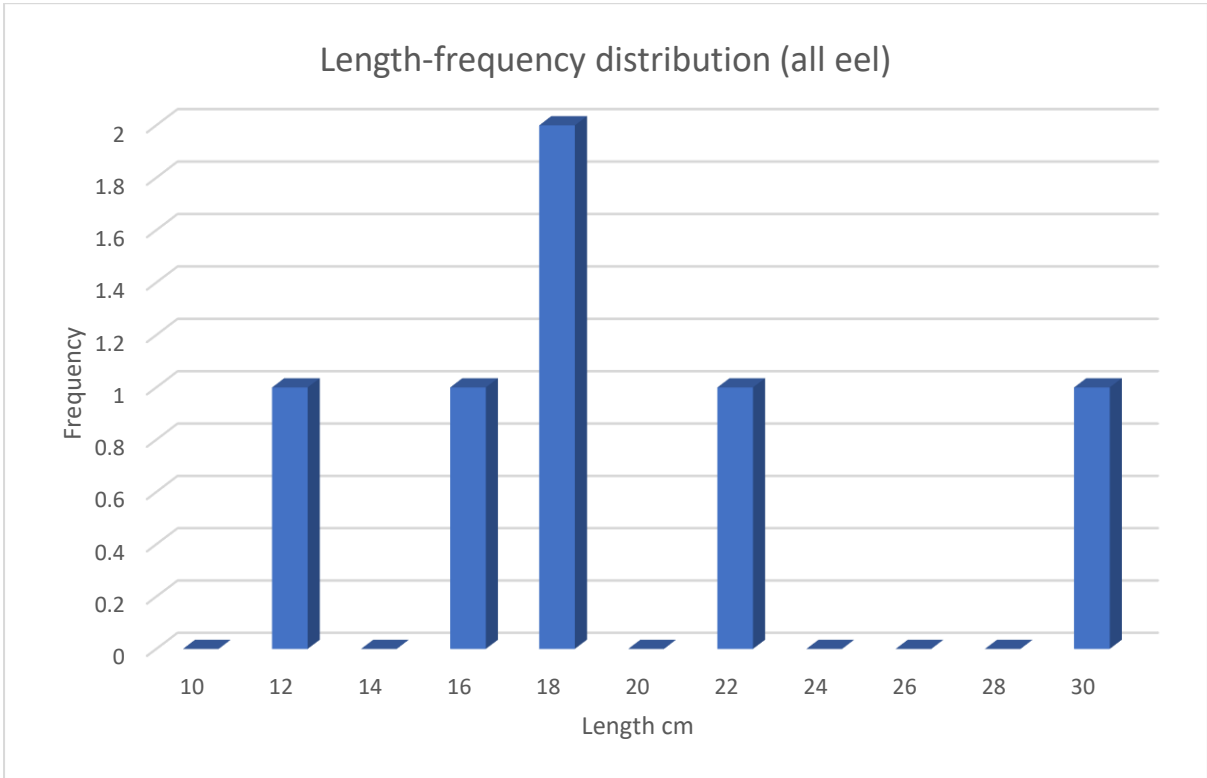


Figure 5: Length-frequency distribution for all eel captured during the electrofishing surveys.

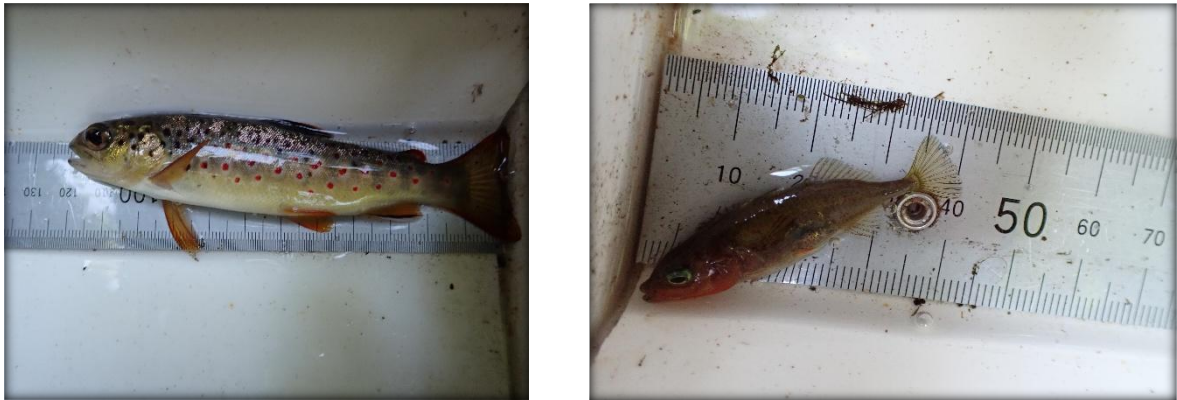


Plate 13: Juvenile brown trout (left) and three-spined stickleback (right) captured during the electrofishing at Site 2 on Lissaniska Stream.



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>Amelans 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 (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, <i>Chironomus</i> , <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