Mountmellick Flood Relief Scheme – Natura Impact Statement

Final Report

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Contract
This report describes work commissioned by Laois County Council as part of the Laois County Council Mountmellick Flood Relief Scheme. Michael Coyle and Patricia Byrne of JBA Consulting carried out this work.

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Purpose
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Contents

List of Figures

List of Tables

Abbreviations

AA	Appropriate Assessment
AEP	Annual Exceedance Probability
CIEEM	Chartered Institute of Ecology and Environmental Management
CJEU	Court of Justice of the European Union
CO	Conservation Objectives
DEHLG	Department of Environment, Heritage and Local Government
EC	European Communities
EcOW	Environmental Clerks of Work
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
EU	European Union
FRS	Flood Relief Scheme
GSI	Geological Survey Ireland
IAQM	Institute of Air Quality Management
INNS	Invasive Non-native Species
IROPI	Imperative Reasons of Over-riding Public Interest
LCC	Laois County Council
NBDC	National Biodiversity Data Centre
NIS	Natura Impact Statement
NOx	Nitrogen Oxides
NPWS	National Parks and Wildlife Service
OPR	Office of the Planning Regulator
OPW	Office of Public Works
QI	Qualifying Interest
RBMP	River Basin Management Plan
SAC	Special Area of Conservation
SPA	Special Protection Area
WFD	Water Framework Directive
WWTP	Waste Water Treatment Plant
ZoI	Zone of Influence

1 Introduction

1.1 Background

JBA Consulting Engineers and Scientists Ltd. (hereafter JBA) has been commissioned by Laois County Council to prepare a Natura Impact Statement for the proposed Flood Relief Scheme (FRS) for the Mountmellick area in Co. Laois. The work will primarily be along the Owenass River, with works also proposed along parts of the Clontygar, Pound, and Garroon streams, along with the Carron streams , which is a minor tributary of the Clontygar.. The proposed Flood Relief Scheme includes embankments and flood walls, to minimise the risks currently posed to people, the community, social amenities, the environment, and the landscape.

A Screening for Appropriate Assessment for the development has been carried out (JBA, 2023), and should be read in conjunction with this document. The screening concluded that likely significant effects (LSE) from proposed development could not be excluded for the River Barrow and River Nore SAC, and considered that a Stage 2 Appropriate Assessment (Natura Impact Statement (NIS)) would be required.

This Natura Impact Statement provides the results of the assessment conducted for the proposed development, in accordance with Article 6(3) of the Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora).

1.2 Legislative Context

The Habitats Directive (Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora) aims to maintain or restore the favourable conservation status of habitats and species of community interest across Europe.

The requirements of Articles 6(3) and 6(4) of the Habitats Directive have been transposed into Irish legislation by means of inter alia the European Communities (Birds and Natural Habitats) Regulations 2011-2021 as amended.

Under the Directive a network of sites of nature conservation importance have been identified by each Member State as containing specified habitats or species requiring to be maintained or returned to favourable conservation status. In Ireland the network consists of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), and also candidate sites, which form the Natura 2000 network.

Article 6(3) of the Habitats Directive requires that, in relation to European designated sites (i.e. SACs and SPAs that form the Natura 2000 network), "*any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to* ***appropriate assessment*** *of its implications for the site in view of the site's conservation objectives*".

A competent authority (e.g. Local Authority) can only grant consent to a plan or project after having determined that it will not adversely affect the integrity of any European site, in light of its conservation objectives and best scientific evidence, either alone or in combination with other plans or projects.

Under article 6(4) of the Directive, if adverse impacts are likely, and in the absence of alternative options, a plan or project must nevertheless proceed for imperative reasons of overriding public interest (IROPI), including social or economic reasons, a Member State is required to take all compensatory measures necessary to ensure the overall integrity of the Natura 2000 site.

1.3 Appropriate Assessment Process

Guidance on the Appropriate Assessment (AA) process was produced by the European Commission in 2002, which was subsequently developed into guidance specifically for Ireland by the Department of Environment, Heritage and Local Government (DEHLG) (2010). These guidance documents identify a staged approach to conducting an AA, as shown in Figure 1-1.

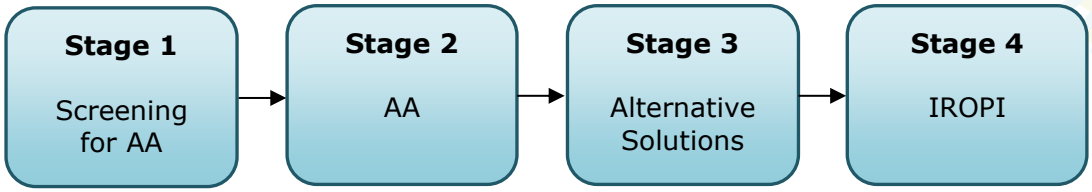


Figure 1-1: The Appropriate Assessment Process (DEHLG, 2010)

1.3.1 Stage 1 - Screening for AA

The initial, screening stage of the Appropriate Assessment is to determine:

- whether the proposed plan or project is directly connected with or necessary for the management of the European designated site for nature conservation
- if it is likely to have a significant effect on the European designated site, either individually or in combination with other plans or projects

For those sites where potential likely significant effects are identified, either alone or in combination with other plans or projects, further assessment is necessary to determine if the proposals will have a likely significant effect on the integrity of a European designated site, in view of the site's conservation objectives (i.e., the process proceeds to Stage 2).

1.3.2 Stage 2 - AA

This stage requires a more in-depth evaluation of the plan or project, and the potential direct and indirect adverse impacts of them on the integrity and interest features of the European designated site(s), alone and in-combination with other plans and projects, taking into account the site's conservation objectives. Where required, mitigation or avoidance measures will be suggested.

The competent authority can only agree to the plan or project after having ascertained that it will not adversely affect the integrity of any European site, in light of its conservation objectives and best scientific evidence, either alone or in combination with other plans or projects, after mitigation measures have been applied, and the mitigation measures are certain and capable of being successfully implemented. If this cannot be determined, then alternative solutions will need to be considered (i.e., the process proceeds to Stage 3).

1.3.3 Stage 3 - Alternative Solutions

Where adverse impacts on the integrity of *European* sites are identified, after mitigation measures have been applied, or the mitigation measures are not certain / capable of being successfully implemented, alternative ways of achieving the objectives of the plan or project that avoid adverse impacts need to be considered. If none can be found, the process proceeds to Stage 4.

1.3.4 Stage 4 - IROPI

Where adverse impacts of a plan or project on the integrity of *European* sites are identified and no alternative solutions exist, the plan will only be allowed to

progress if imperative reasons of overriding public interest (IROPI) can be demonstrated. In this case compensatory measures will be required.

The process only proceeds through each of the four stages for certain plans or projects. For example, for a plan or project, not connected with management of a site, but where no likely significant impacts are identified, the process stops at stage 1. Throughout the process, the precautionary principle must be applied, so that any uncertainties do not result in adverse impacts on a site.

1.3.5 Recent judgements of the Court of Justice of the European Union (CJEU) and how they are used in this assessment

The CJEU issued a ruling on the consideration of avoidance and reduction measures as a result of the case known as People over Wind, Peter Sweetman v Coillte Teoranta (Case C-323/17). This judgement stated that measures intended to reduce or avoid effects on a European site should only be considered within the framework of an AA, and it is not permissible to take into account such measures at the screening stage.

More recently, the decision of the CJEU in case C-721/21 (Eco Advocacy CLG v An Bord Pleanála), delivered in June 2023, found that Article 6(3) of the Habitats Directive must be interpreted as meaning that: "in order to determine whether it is necessary to carry out an appropriate assessment of the implications of a plan or project for a site, account may be taken of the features of that plan or project which involve the removal of contaminants and which therefore may have the effect of reducing the harmful effects of the plan or project on that site, where those features have been incorporated into that plan or project as standard features, inherent in such a plan or project, irrespective of any effect on the site." (Para. 53(3) of the Judgement).

This recent judgement therefore clarifies that features which have been incorporated into a project as standard features, inherent in that project, and irrespective of any effect on any European site may be taken into account for the purposes of a Stage 1 Screening for Appropriate Assessment under Article 6(3) of the directive. The CJEU ruling in the case of Grace & Sweetman [2018] (C-164/17) clarified the difference between avoidance and reduction (mitigation) measures and compensation. Measures intended to compensate for the negative effects of a project cannot be taken into account in the assessment of the implications of a project, and instead are considered under Article 6(4). This means that any project where an effect on the integrity of a European site remains and can only be offset by compensation, would need to proceed under Article 6(4), demonstrating "imperative reasons of overriding public interest".

The CJEU ruling in the case of Holohan v An Bord Pleanála (C-462/17) also clarified the importance in AA of taking into account habitat types and species outside the boundary of the European site, where implications of the impacts on those habitat and species may impact the conservation objectives of the European site. In this assessment functionally linked and supporting habitat for species outside of European site boundaries are assessed where they could potentially impact the conservation objectives of any European sites within the zone of Influence (ZoI).

The CJEU ruling in response to questions referred by the Irish High Court in the Eco Advocacy case (C-721/21) indicated that an applicant for permission in its AA screening report/and a decision maker in undertaking its AA screening can take into account "standard features", i.e. all the constituent elements of that project inherent in it/elements that are incorporated into a projects design not with the aim of reducing its negative effects (even where these have the effect of reducing harmful effects on a European site).

1.4 Structure of this report

To provide the competent authority with the relevant information to determine with confidence their conclusions on the overall impacts of the project to the integrity of the sites concerned, this NIS presents the following:

- Section 2: Details of the methods used in this assessment.
- Section 3: A detailed description of the proposed project.
- Section 4: A summary of the AA Screening and a description of those Natura 2000 sites that are screened in for being at risk for potential adverse impacts from the proposed works.
- Section 5: A detailed description of the baseline conditions with regard for the Qualifying Interests (QIs) of the River Barrow and River Nore SAC.
- Section 6: Other Relevant Plans and Projects in the area, to allow a cumulative assessment to carried out.
- Section 7: Identification of potential sources of impact to the screened in Natura 2000 site and assessment of the potential for adverse impacts on the River Barrow and River Nore SAC.
- Section 8: Mitigation for protection of River Barrow and River Nore SAC at construction and operation phase.
- Section 9: Summary of the impacts and mitigation with overall assessment on the coherence of the Natura 2000 network.

2 Methodology

2.1 Guidance

The Natura Impact Statement has been prepared having regards to the Birds and Habitats Directives, the European Communities (Birds and Natural Habitats) Regulations 2011-21 as amended and relevant jurisprudence of the EU and Irish courts. The following documents have also been used to provide guidance for the assessment:

- DoEHLG (2010) Appropriate Assessment of Plans and Projects in Ireland Guidance for Planning Authorities. Department of the Environment, Heritage and Local Government.
- Office of the Planning Regulator (2021) OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management (OPR 2021).
- European Communities (EC) (2019) Managing Natura 2000 Sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission.
- EC (2021) Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC, Office for Official Publications of the European Communities, Luxembourg. European Commission.
- EC (2022) Guidance document on assessment of plans and projects in relation to Natura 2000 sites. (European Commission. Directorate General for Environment. 2022)
- EC (2021) Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC (European Commission 2021).
- EC (2013) Interpretation Manual of European Union Habitats. Version EUR 28. European Commission.
- Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater and Coastal, Second Ed. (Chartered Institute of Ecology and Environmental Management, (CIEEM) 2018).
- NPWS, 2019a. The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill.
- NPWS, 2019b. The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitats Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill
- NPWS, 2019c. The Status of EU Protected Habitats and Species in Ireland. Volume 3: Species Assessments. Unpublished NPWS report. Edited by: Deirdre Lynn and Fionnuala O'Neill
- CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater and Coastal, Second Ed. (Chartered Institute of Ecology and Environmental), updated 2022.
- European Court Judgement (ECJ) (June 2018) People over Wind and Sweetman [Online] Available at: http://curia.europa.eu/juris/document/document.jsf?docid=200970&doclang=EN.

2.2 Desktop study

A desktop study was conducted of available published and unpublished information, along with a review of data available on the National Parks and Wildlife Service (NPWS) and National Biodiversity Data Centre (NBDC) web-based databases, in order to identify key habitats and species (including legally protected and species of conservation concern) that may be present within ecologically relevant distances from the project as explained below in Table 2-1.

Table 2-1: Zone of Influence for ecological receptors

Source of impact	ZOI Distance	Reasoning for ZOI on ecological receptors
Direct impact to habitats	Footprint/ adjacent	In relation to terrestrial habitats, impacts will be limited to the lands within the boundary of the proposed Scheme, as well as the immediate surrounding environs (e.g., overshading and soil; root compaction and changes to local hydrological regimes).
Hydrological connections	Variable - up to 15km downstream	Hydrological connections (e.g. drainage ditches, wetlands, and rivers) are often the most far-reaching impacts due to their lotic or semi-lotic nature. It becomes increasingly difficult to precisely predict the likely significance of adverse water-borne pollutants as they travel downstream from the pollution point source, given potential dilution and retention factors along the course of the impacted watercourse. Under the precautionary principle any designated sites (the wider extent of the River Barrow and River Nore SAC), protected habitats or species (flora and fauna) located downstream of the watercourse which pass through the footprint of the proposed Scheme, will be considered to be within the hydrological ZoI of this scheme.
Dust/ Air pollution	50 from the boundary of the site 250m from the entrance roadways to the site	In respect to ZoI for air pollution (emissions and dust), Natura 2000 sites within 50m of the boundary of the proposed works and up to 250m from the entrance to the site of works were considered as per the Institute of Air Quality Management (IAQM, 2024). Guidance on the Assessment of Dust from Demolition and Construction, including ex-situ foraging habitats utilised by QI species associated with local Natura 2000 sites.
Mammals – disturbance	100-150 metres	In relation to physical (vibration and clearance works); audible and visual disturbance, faunal species will be considered on a species-by-species basis. A 150m disturbance zone is considered for Otter.

A baseline habitat assessment was performed using satellite imagery of the site. The data sources below (accessed October 2023 to July 2024) were consulted for the desktop study:

- Aerial photography available from www.osi.ie, Google Satellite and ESRI World Imagery.
- NPWS website (www.npws.ie) where Natura 2000 site synopses, data forms and conservation objectives were obtained along with Annex I habitat distribution data and status reports.
- River Basin Management Plans and Catchment data (www.catchments.ie)
- NBDC species data within a custom polygon covering the study area with an additional 10km buffer (Appendix A) maps.biodiversityireland.ie.

- Inland Fisheries Ireland (https://opendata-ifigeo.hub.arcgis.com/datasets/0bbd4ae9a34b47dbb38d7b8a0bb7f52e_0/explore)
- Environmental Protection Agency Maps (https://gis.epa.ie/EPAMaps)
- Geological Survey Ireland (GSI) website (www.gsi.ie)
- GSI - Groundwater data viewer (https://dcenr.maps.arcgis.com)
- Planning Applications (myplan.ie)

2.3 Ecological Site Surveys

Various ecological surveys were performed by JBA Ecologist, William Mulville (BSc (Hons), MSc), Colm O'Leary (BSc Hons), Malin Lundberg (BSc, MSc), Niamh Burke (BSc (Hons) PhD), Mark Desmond (BSc (Hons), MSc), and Michael Coyle (BA (Hons), MSc). In addition to ecological surveys, a series of hydromorphology surveys were conducted by Environmental Scientist and Geomorphologist Emily Rick (BSc (Hons) MSc), and by Kate de Smith (BSc, MSc). Table 2-2 contains further details on survey dates and types of surveys undertaken.

Table 2-2: Ecological surveys undertaken in the study area

Survey	Date	Surveyor
Invasive Non-native Species survey	12th September 2019	Colm O'Leary
Invasive non-native Species survey – incidental during Otter and Habitat surveys	Various (2019 – 2023)	William Mulville Mark Desmond Michael Coyle
Baseline ecological survey	26th September 2019	Malin Lundberg Niamh Burke
Otter and hydromorphology survey	8th January 2020	Hanah Mulcahy
Otter and camera-trap surveys	31st March 2022	William Mulville Mark Desmond
Otter and camera trap surveys Extended ecological baseline survey	28th April 2022	William Mulville Mark Desmond
Extended ecological baseline survey	11th May 2022	William Mulville Michael Coyle
Otter survey	26th January 2023	William Mulville Mark Desmond Michael Coyle
Otter and camera-trap surveys	29th March 2023	William Mulville Michael Coyle
Arborist Survey	10th May 2023	Sub-contractor Michael Gary of Arbor-care Ltd
Habitat survey and incidental invasive	12th June 2023	William Mulville Michael Coyle

Survey	Date	Surveyor
survey		
Otter and eDNA surveys	17th July 2023	William Mulville Mark Desmond
Bat emergence survey (Owenass Bridge)	11th August 2023	William Mulville Michael Coyle
Hydromorphology Survey	07th March 2024	Kate de Smith
Otter and Riparian Bird Surveys	09th May 2025	William Mulville Matt Hosking

2.3.1 Terrestrial Habitat Surveys

Habitat surveys of the terrestrial habitats were conducted on the 26th of September 2019. Following this initial surveying, additional sections were added to the scheme, and these were surveyed on the 28th of April and 11th of May 2022, with further changes to the scheme prompting an additional follow-up survey on the 12th of June 2023.

The ecological walkover survey recorded habitats and protected species, following the methods outlined in Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009).

Aerial photographs and site maps assisted the surveys. All habitats located within the survey area of the proposed Scheme were mapped to level three of the Heritage Council's Fossitt (2000) habitat codes, and in accordance with Best Practice Guidance for Habitat Survey and Mapping (Smith et al. 2011). Floral species present that were either representative of a habitat or considered to be of conservation interest were recorded.

The habitat's extent was mapped onto an aerial photograph within the QField GIS Android application, with GPS points taken where any ecological features of note were observed. Any non-native invasive plant species listed on the Third Schedule of the Birds and Habitats Regulations were also recorded during the habitat surveys. Identification for vascular plants principally follows that given in Webb's An Irish Flora; while contemporary nomenclature is in line with The New Flora of the British Isles 4th Edition (Stace, 2019). Identification of Irish plants generally follows Webb's An Irish Flora (Parnell and Curtis, 2012).

There is one area of wet willow-alder-ash woodland within the scheme boundary. While this habitat type is a potentially linked with the QI Annex I habitat Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-padion, Alnion incanae, Salicion albae) (91E0), this habitat was deemed to not be Annex quality. Additionally, the conservation objectives of the River Barrow and River Nore do not map this QI as being present near to Mountmellick.

2.3.2 Tree Survey

An initial tree survey was conducted by Michael Garry of Arbor-Care Ltd on the 10th of May 2023. An Arboricultural Impact Assessment was written in accordance with BS5837:2012 Trees in relation to design, demolition, and construction (Arbor-Care Ltd., 2023).

2.3.3 Terrestrial Mammals

During all ecological surveys and visits to Mountmellick scheme area, signs for Otter *Lutra lutra*; Badger *Meles meles*; Irish Hare *Lepus timidus hibernicus*; Pine Marten *Martes martes*; Hedgehog *Erinaceus europaeus*; and Pygmy Shrew

Sorex minutus within the surrounding vicinity of the proposed Scheme were searched for. Field signs include scat/ droppings, setts/ dens/ holts, and any mammal tracks.

A series of Otter surveys were completed on the 8th of January 2020, 31st of March 2022, 28th April 2022, 26th of January 2023, 29th of March 2023 17th of July 2023, and 09th of May 2025. During these surveys, potential holts and couches were identified and investigated, one near to the Owenass Bridge in the south-west of the town, and one in the north-east of the town behind the College Avenue housing estate.

Camera traps were deployed on the 31st of March 2022, 28th of April 2022,29th of March 2023 during these Otter surveys. These camera trap surveys included deployment over multiple weeks at the Owenass Bridge and further upstream of the bridge to establish the utilisation of the rivers by Otter, with one camera trap deployment taking place upstream of Convent Bridge.

2.3.4 Riparian Bird Surveys

Along with the Otter Surveys on the dates listed above, the Owenass River was also surveyed for Riparian Birds. On the 09th of May 2025, a Titley Chorus wildlife recorder was deployed in the area of the Owenass Bridge, and was set to record for birdsong at dawn, and was collected on the 15th of May.

2.3.5 Amphibians – Spawn and eDNA surveys

Ecological surveyors examined the proposed Scheme area in spring for the presence of amphibian species Common Frog *Rana temporaria* and Smooth Newt *Lissotriton vulgaris*, as well as suitable waterbodies and wetlands to support breeding amphibian populations. These species are included within the AA Screening as they would offer a feeding resource for Otter that would potentially be in the area of the Scheme. Surveying techniques were in line with those outlined in NRA (2009).

Additionally, an eDNA analysis of the pond south of the town near the garden centre was conducted on the 17th of July 2023 to determine the presence of Smooth Newt. Water samples were collected from this pond area and were sent for testing to SureScreen Scientifics. The collection methodology of samples can be found in: https://www.surescreenscientifics.com/wp-content/uploads/2023/03/Detailed-GCN-Sample-Collection-Guidance-V4-1.pdf, and this methodology can be summarised as:

- Identification of sampling locations
- Collection pond water free of sedimentation in a ladle provided with the eDNA kit
- Transferal of water to a plastic bag provided with the eDNA kit (repeated until 20 ladles of water have been collected)
- Vigorous shaking of the plastic bag
- Pipetting of 15ml of water to two tubes test filled with preservatives that are provided with the eDNA kit
- Vigorous shaking of the test tubes
- Returned to the laboratory for further analysis.

During DNA testing, the filter is incubated to obtain any DNA within the sample. A PCR is preformed to identify the DNA of the targeted species, primers are then used to amplify target DNA, allowing it to be detected.

2.3.6 Incidental Recordings

There were no dedicated surveys for Breeding Birds, Wintering Birds, or Terrestrial Invertebrates. Incidental recordings of bird species encountered during the habitat walkover, or dedicated mammal and bat surveys, and during the deployment of the wildlife audio detectors were recorded.

2.4 Assessment criteria

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of qualifying interest. The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level. Upon the conclusion of the AA, the competent authority may grant consent to the plan or project only after having ascertained that it will not adversely affect the integrity of the Natura 2000 site(s) concerned.

2.4.1 The adverse effect on site integrity test

An assessment of whether there could be an adverse effect on site integrity is done using the source-pathway-receptor model which is used to determine the risk of impact to a site or Qualifying Interests (QIs) (OPR 2021;). Risk is the likelihood or expected frequency of a specified adverse consequence or impact.

Applied to the Scheme, it expresses the likelihood of an adverse impact arising because of the Scheme activities. A hazard presents a risk when it is likely to affect something of value (i.e. the Natura 2000 sites and their QIs). It is the combination of the probability of the hazard occurring and its consequences that is the basis of a risk assessment which an NIS essentially is:

Risk = probability of an event x consequential damage

The source-pathway-receptor model is a useful tool to determine if a risk is present, and to help quantify the risk to see if the threshold of an adverse effect on site integrity is reached. For a risk to be present, all three elements must be present.

Source: The source considered in this NIS is the proposed works or activity that will occur as a result of the Scheme. Key considerations in assessing the source are the nature and scale of the potential impacts that may arise, e.g. type of contaminants that may arise, the contaminant loading and other physical attributes. The point of occurrence is a critical reference point for assessing the attributes of the source of any potential adverse impacts.

Pathway: Pathways are established by surface water, ground water, and land and air connections. The pathway includes everything between the source and the receptor; from point of release of potential adverse impacts, such as contaminants, to the receptor. The location, nature, connectivity and extent of wells, groundwater dependent ecosystems, aquifers and faults can all influence the nature of a pathway. Rivers, streams and drainage ditches could all act as potential pathways for potential waterborne impacts. The pathway includes assessment of surface and groundwater bodies, and WFD status may be reviewed as relevant. Land and air pathways to be considered include those that may transfer direct physical impacts, noise and visual disturbance (vibrations) and dust or other airborne particles.

Receptor: The receptor is the QI features of the relevant Natura 2000 sites, their Conservation Objectives (COs) and the overall integrity of the Natura 2000 sites. To determine the significance of potential adverse impacts on the integrity of the Natura 2000 site, the COs of each site are assessed relative to the

potential impacts that may occur because of the proposed works. The conservation objectives are the fundamental unit on which the assessment is based. If the project were to undermine or make these objective more difficult to achieve, the conservation status of the QI features becomes harder to achieve, and the quality and condition of the site will be reduced, reducing the 'integrity' of the Natura 2000 site. Each Natura 2000 site will either have specific or generic conservation objectives.

The overall aim of COs is to maintain or restore the favourable conservation conditions of the Annex I habitats and/or the Annex II species for which a SAC has been selected, under which the site-specific objectives contain more detailed attributes, measures and targets.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.
- The favourable conservation status of a species is achieved when:
- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

The conservation objectives for SPAs are also to maintain or restore the favourable conservation condition of the bird species listed as QIs for SPAs, which are defined by the following list of attributes and targets:

- Population trend: Measure of percentage change and whether the long-term population trend stable or increasing.
- Distribution: Number, range, timing and intensity of use of areas. There is to be no significant decrease in the range, timing or intensity of use of areas by specific or generic bird species, other than that occurring from natural patterns of variation.
- The conservation objectives for non-breeding birds QIs for SPAs are as follows:
- To maintain the favourable conservation condition of the non-breeding water bird Special Conservation Interest species listed for a SPA.
- To maintain the favourable conservation condition of the wetland habitat for a SPA as a resource for the regularly occurring migratory water birds that utilise it.

Some Natura 2000 sites do not have specific COs for each QI and instead have only the general objectives listed above. Where these sites are screened into the assessment, detailed COs have been derived from other nearby Natura 2000 sites with the same QIs. In these cases, the necessary assumption has been made that the sites have similar characteristics, and the conservation objectives are likely to be similar for the specific habitat or species type in terms of conservation requirements.

Site integrity is assessed on the basis of each conservation objective of each qualifying interest feature. Should any conservation objective be undermined by the proposed work, the site integrity will therefore be adversely affected. Low-impact effects that are too small or short-lived to undermine the achievements of the conservation objectives are therefore not likely to adversely affect the site integrity.

2.4.2 Avoidance and mitigation measures

To ensure that any mitigation measures are sufficient and proven to be successful, they are designed in accordance with the most up to date best practice guidelines and tailored where necessary to the conditions on-site and nature of the relevant receptors.

A comprehensive list of guidance utilised during the avoidance of impact, and the design of mitigation measures is presented in Section 8.

Avoidance and mitigation measures are assessed for evidence of their effectiveness and the certainty with which they can be implemented, as well as certainty with which they will avoid or reduce impacts. This forms a critical part of the assessment of residual effects and whether these could still result in adverse impacts.

2.4.3 In-combination Effects

The in-combination impacts are considered only after the assessment of the project alone. If the project is assessed as having no effect at all on a European site, then no in-combination assessment would be necessary. However, where there is no adverse effect on site integrity, but some adverse effect locally an assessment of this adverse effect in-combination with other plans or projects is carried out. Other plans or projects were searched for using the National Planning Application Database, EIA portal and Myplan.ie databases all accessed online. If no other plans or projects are identified, then the assessment is complete. Where other plans or projects are identified then initially a review is made of its AA screening, or AA, and if the Competent Authority for the plan or project has made a final determination of no effect on the integrity of any European site, either alone or in-combination, this determination is used in this assessment. Where there is not a full AA, or the findings are unclear or out of date, the plan or project documentation is checked for credible evidence of real (not hypothetical) risk to a European site. Where these are identified then a detailed assessment is carried out.

Potential sources of cumulative impacts were identified based on the ecology of valued ecological features (QIs), and only for the features where there is a residual or non-significant impact. Potential sources of cumulative impacts were sought within an area where there is the potential for a significant impact on relevant Natura 2000 sites identified in Section 4.

2.5 Competent Persons

The assessment has been carried out by JBA Ecologists; Michael Coyle BA (Hons) (Plant Science), MSc (Global change: Ecosystem Science and Policy) has been with JBA for 2 years and has undertaken numerous EcIAs and Appropriate Assessments. Principal Ecologist Patricia Byrne BSc (Hons) (Zoology), PhD, MCIEEM, has over 20 years' experience in environmental and ecological research, teaching and reporting; and seven years in ecological consultancy. Patricia is a full Member of the Chartered Institute of Ecological and Environmental Management (CIEEM).

The assessment has been reviewed by Principal Ecologist Steven Heathcote BA (Hons) (Natural Sciences), DPhil, CEcol, CIEEM. Steven is a Chartered Ecologist with a specialism in botany and with extensive experience of undertaking

assessments under the Habitats Directive, including their production and quality assurance.

2.6 Consultations

Consultation is ongoing with a number of key stakeholders in relation to EU Natura 2000 sites which includes, but is not limited to the following:

- Laois County Council - ongoing consultation;
- Office of Public Works;
- National Parks and Wildlife Services - informal consultation with presentation of project formally through the scoping with the Development Applications Unit (DAU) -Online meeting 20/12/2023 where the project's ecological sensitivities and survey efforts were discussed at length, as well as the proposed FRS design. A document with details of ecological surveys carried out was emailed on 27/02/2024; and
- Inland Fisheries Ireland (IFI) – informal consultation with presentation of project at online meeting 08/02/2024. IFI submitted letters of response on 26-02-2024. In-person meeting on site 6/03/2024.

2.7 Limitations and Constraints

The NIS assessment necessarily relies on some assumptions, and it was inevitably subject to some limitations. These would not affect the conclusion, but the following points are recorded in order to ensure the basis of the assessment is clear:

- Information on the works and conditions on site are based on current knowledge at the time of writing. Changes to the site since surveys were undertaken cannot be accounted for, however the site surveys have followed the CIEEM guidance provided on suitable lifespan for surveys (CIEEM (2019) Advice note on the lifespan of ecological reports and surveys);
- This assessment is based on the methodology for proposed works as described in this report. Where changes to methodology occur, an ecologist will need to be consulted to determine if the changes need reassessment;
- Adverse weather can cause delays to the schedule and alter the timing of works. This has been accounted for using a worst-case scenario where necessary;
- The precautionary principle is used at all times when determining potential ecological sensitivity of the site; and
- The NIS addresses issues around European designated sites and does not exempt works from responsibilities related to habitats and species covered under separate national legislation. These are covered in the EIAR.

3 Project Description

3.1 The 'Project'

The proposed Mountmellick FRS project (hereafter referred to as 'the proposed development / works') is not directly connected with, or necessary to the management of any Natura 2000 site and a screening assessment identified Likely Significant Effects upon the Natura 2000 sites identified in Section 4. Therefore, the proposed project is subject to the requirements of the AA process.

3.2 Project Location

The proposed FRS is located in the environs of Mountmellick town (Figure 3-1). Mountmellick is a service town in the north of County Laois and has a role to play in supporting the other notably sized towns locally, namely Portlaoise in County Laois, and Tullamore in County Offaly. The town has a pivotal location along the N80 national route, which extends through to Portlaoise and provides access to Carlow, Waterford and Rosslare to the south, and Tullamore, Mullingar and Athlone to the north. Portarlington is located approximately 10km to the northeast along the R423. Mountmellick is the largest and most important service town in the county, performing vital retail, residential, service, amenity functions and support services to the surrounding hinterland, while supporting the upper tier of the urban hierarchy (LCC, 2018).

Mountmellick has four main local watercourses within its environs, namely the River Triogue, River Barrow, River Owenass and River Pound.

The work will primarily be along the Owenass River, with works also proposed along parts of the Clontygar, Pound, Garroon, and Carron streams. The proposed Flood Relief Scheme includes embankments and flood walls, to minimise the risks currently posed to people, the community, social amenities, the environment, and the landscape.

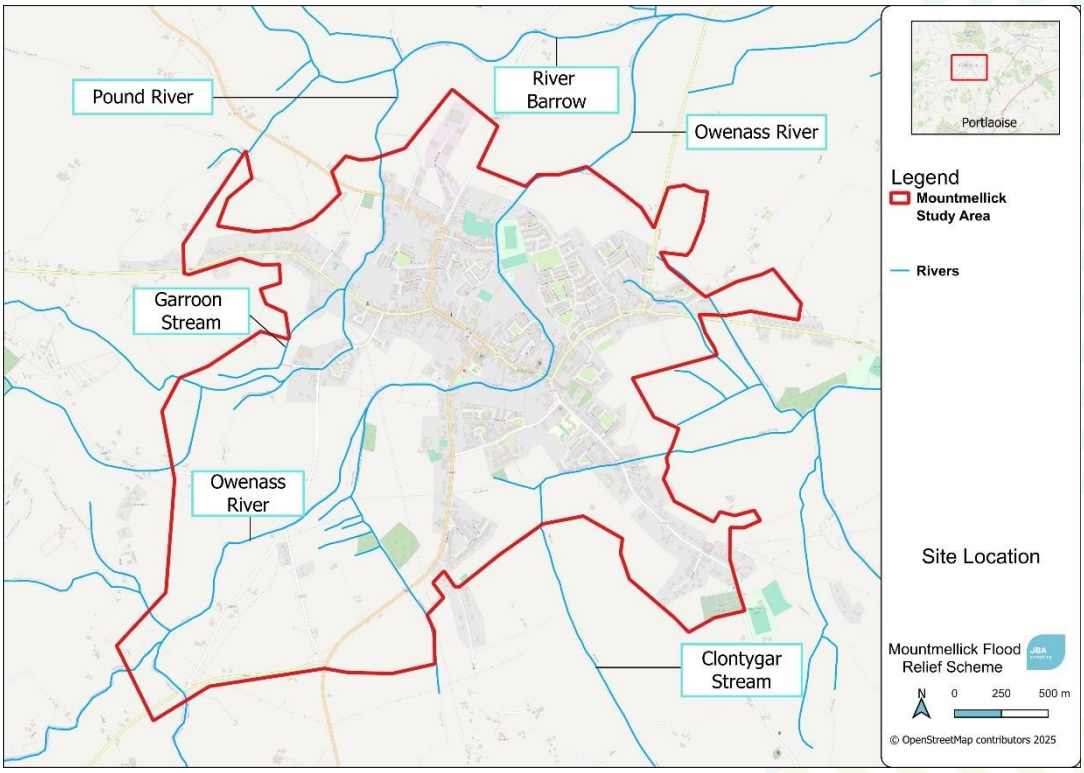


Figure 3-1: Proposed Scheme Location

3.3 Description of Proposed Development

This NIS will remain a live document until after the planning application stage, when the finalised detailed design of the scheme is complete.

Generally, the proposed flood relief scheme comprises 10No. continuous flood defences to defend properties from flooding from the Owenass River, Garroon Stream, Pound River and Clontygar River. The flood defences comprise a series of embankments and walls, one bridge (replacement Owenass Bridge), eighteen culverts under the embankments and one pumping station (subterranean precast storage tank, control panel kiosk and above ground gantry structure). There will be localised upgrades to surface water drainage around the walls, flow control measures on the Pound plus a diversion of the Clontygar Stream into a new stream channel to facilitate the works. A site compound will be set up at all defence locations with temporary haul routes off public roads.

The location and labelling of proposed defences is shown on Figure 3-2, listed in Table 3-1 and illustrated in engineering drawings Dwg 19105-JBB-XX-XX-DR-C-02801 to 19105-JBB-XX-XX-DR-C-02840. The construction sequence and engineering elements are summarised below. The undefended situation and defenced scheme are shown in Figure 3-3 and Figure 3-4.

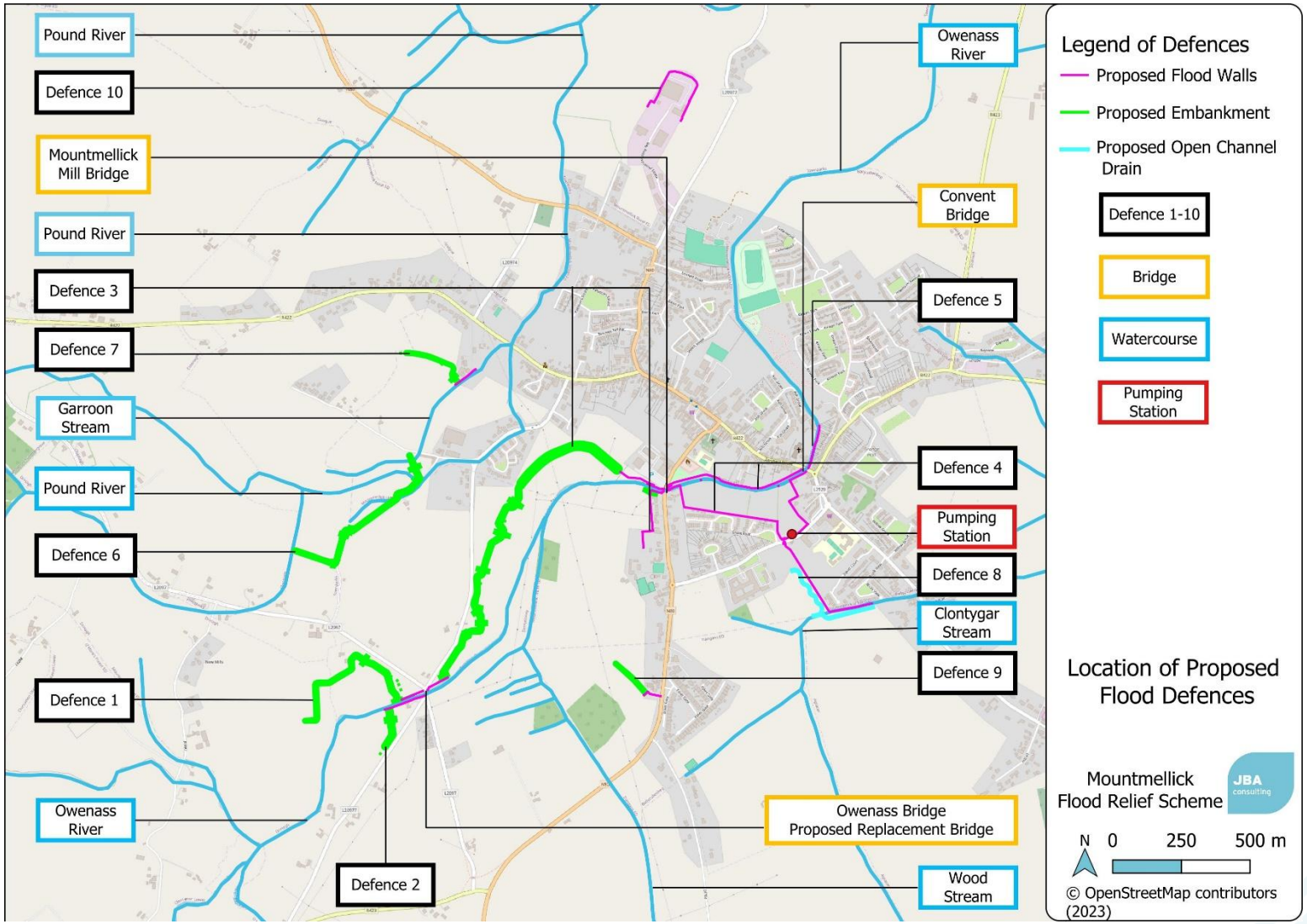


Figure 3-2: Study area; FRS defences, bridges and local watercourses

Flood Embankment Design

Approximately 3,160 linear metres of embankment will be formed. The volume of material required to form the embankment is approximately 105,000m3 of engineering fill, comprising impermeable clay, subsoil landscape fill (class 4) and topsoil. The topsoil will be reused from the excavation of embankment areas.

Imported fill - The total material imports from the scheme will be approximately 105,000m3 which may be reduced to 85,000m3 if the opportunity arises that excavated material can be classified as suitable for reuse as backfill. Detailed site investigated due to be carried out at Stage 3 (Detailed Design Stage) will confirm ground conditions at the location of proposed flood defences and will confirm the suitability for reuse of existing soil. The total embankment material volume includes above-ground infrastructure, below-ground foundations and backfill.

Excavated Fill - The total material to be excavated will be approximately 77,000m3. Most of this material will need to be disposed of at a licenced soil recovery facility. If excavated material can be reused as backfill then the volume of material to be disposed of from site will be in the region of 56,000m3. Seven licenced sites within Co Laois have been sourced that have capacity to received unsuitable material (https://facilityregister.nwcpo.ie/).

The embankment height will be between 1.2m and 3.0m above surrounding ground level. The embankment will be constructed of impermeable clay, with a top width of 3m, typically, with local widening points. The clay will typically slope down at a 1(V):2(H) slope on both sides. Excavation to a depth of up to 2m will be required subject to confirmation of ground conditions from the site investigation, to key the proposed embankment into the existing ground and block seepage below the base of the embankment. Additional landscape fill and topsoil will be placed at a shallower gradient (typically 1(V):1.3(H)) along the slopes of the proposed embankments in order to blend into the surrounding landscape. The embankment will be either grass seeded or sewn with an indigenous wildflower mix to suit the location. Overall, with the total embankment width will range from 5.8 to 14m bottom width and 3m to 6m top width. A temporary haul road varying between 3-5m in width is proposed around both sides of the embankment. Beyond the haul road temporary fencing ('heras' fencing) will be erected to define the limits of construction.

Flood Wall Design

Approximately 3,500 linear metres of wall will be formed. For the purposes of environmental assessment and mitigation, four types of wall construction are proposed for the proposed development, as shown on drawing Dwg 19105-JBB-XX-XX-DR-C-02770-Typical Details, see Appendix B. The final design of walls at each location will be subject to confirmation of ground conditions from site investigation at detailed design stage and construction methodology.

- Type 1 In situ reinforced concrete foundation up to 3m depth below ground, constructed from the bank, and in situ reinforced concrete wall up to 1.9m high.
- Type 2 – Concrete micro piling (instream) (bored mini piles) up to 3m depth below formation, constructed from the bank, in situ reinforced concrete wall or precast wall above ground (clad) up to 1.9m high.
- Type 3 - Sheet piling typically 3m depth below ground or bed level, constructed from the bank or instream, sheet piling wall or in situ reinforced concrete wall above ground (clad) up to 1.9m high.
- Type 4 (instream) – precast concrete wall up to 3m below existing ground level, constructed instream, wall (clad) up to 1.2m high.

The walls will have a masonry finish reusing existing stone where possible, to match existing masonry finish and to provide a similar capping in areas adjacent to public realm, within the Architectural Conservation Areas and adjoining stone clad bridges. Elsewhere the finish will be smooth concrete.

Grove Park Pumping Station on Davitt Road

The low-lying areas of Davitt Road and Irishtown Road in Mountmellick have historically flooded during fluvial events from the nearby Clontygar Stream. The existing situation is compounded by the insufficient and defective surface water drainage networks serving these areas. The introduction of new FRS defences to contain floodwaters will prevent flood waters from the Owenass and the Clontygar from reaching the Davitt Road area but will ultimately lead to an increase in water levels in the Clontygar Stream. If not mitigated against, this has the effect of increasing the flood risk from existing drainage networks as the water level at the outfalls from the drainage networks will be higher. To mitigate against this, it is proposed to install a pumping station on the drainage network to effectively increase the capacity of the network to match that of the pre-scheme condition.

The pumping station will be located just to the north side of Irishtown Road and will be protected from flooding by a flood wall. Access will be provided from the public highway into the compound allowing the safe movement of vehicles required to operate and maintain the pumping station.

The works to construct the pumping station will include the diversion of a length of the existing drainage network adjacent to the point where it outfalls into the Clontygar. The diversion extends through a storm overflow chamber that includes a storm overflow weir that separates the drainage flow from the drainage network and the wet well of the pumping station. The overflow chamber measures approximately 4.5m x 3.8m with a depth of 2.35m and will be formed using reinforced concrete. The storm overflow chamber then connects via an overflow pipe to a wet well chamber which is 6m deep and 5.5m in diameter and formed using concrete rings. The pumps are housed in the wet well chamber along with tilt switches which control the levels at which the pumps are switched on and off. The wet well is then connected to a valve chamber by the rising mains from the pumps. The valve chamber measures approximately 3.5m x 2.8m with a depth of 2m and will be formed using reinforced concrete. From the valve chamber, the 450mm diameter rising main extends to a new reinforced concrete headwall at the Clontygar. The pumping station is shown in Drawings 19105-JBB-XX-XX-DR-C-02860 and 02861.

In addition to the structures above, the pumping station will also include the provision of a steel gantry above the wet well, approximately 5m long and 3m high to allow the pumps to be safely lifted out, and a control kiosk measuring 5m long x 1m wide and 2m high. Security of the site will be maintained by a palisade gate at the access point.

During normal conditions, the existing drainage network will carry the flow, and pumping station will not be required. Only during significant flood events will the water level in the drainage network increase to the point where it will flow over a control side weir within the storm overflow chamber and enter the wet well of the pumping station where it will be pumped via the rising main at a rate of up to 170l/s into the Clontygar.

Clontygar Stream realignment

The existing alignment of the Clontygar to the east of the houses on Davitt Close is a straight line along the boundary between the properties and the field. The proposed scheme requires the construction of a concrete flood wall along the line of the existing Clontygar at this location and so gives the opportunity to realign the stream on a more natural and sinuous route considering the local

topography and ground conditions. The new alignment will help slow down the movement of flow in the Clontygar at this location as well support habitat creation and a naturalisation of the stream at this location over a length of approximately 200m.

3.4 Location of Defences

Table 4.1 describes defence lengths and heights, compound locations and construction access points. These are also shown on Figure 3-5.

3.4.1 Owenass River- Area West of /Upstream of Owenass Bridge

Existing Condition

The land north of the River Owenass (left bank facing downstream) is agricultural, comprising small fields with mature boundary hedgerow, and currently used for pasture and growing arable crops. The L2097 road runs to the northwest of the river and provides access to several residential properties. The river is part of the River Barrow and River Nore SAC, a hedgerow bounds the river on the northern side and west of the Owenass Bridge.

The land south of the River Owenass (right bank facing downstream) is agricultural, comprising small fields with mature boundary hedgerow, and currently used for growing arable crops. The L2097 road runs to the south of and parallel to the river. A residential property is located close to the river edge and is accessed off L2097. The river is part of the River Barrow and River Nore SAC, a hedgerow bounds the river on the southern side and west of the Owenass Bridge.

Defence No.1 (left bank)

Defence No. 1 comprises a river edge wall on left bank/northern side of Owenass River and an embankment connected to the wall located in the adjacent fields also on the western side of the river. The location of the proposed wall and embankment is shown on engineering drawings Dwg 19105-JBB-XX-XX-DR-C-02829, Dwg 19105-JBB-XX-XX-DR-C-02830, Dwg 19105-JBB-XX-XX-DR-C-02831 and Dwg 19105-JBB-XX-XX-DR-C-02832 (sheets 29-32).

Riverbank vegetation, approximately 90m in length will be required to be removed on northern bank for the wall construction. A further five sections of hedgerow in fields north of river will be removed for construction of the embankment.

A flood defence embankment (location 1A on Figure 3-5) (side slope of 1:2) of 630m in length and up to 1.4m in height located in the agricultural lands to the north of the river. The embankment will be 7.2-8.2m in width at ground level with haul roads up to 15m wide on either side, total maximum working width of 38.2m. In order to maintain access to all the areas of the field, three access ramps are proposed to cross the embankment and four culverts.

A new flood defence wall (Type 3- sheet piling will be constructed set back from the top of the bank) (location 1B on Figure 3-5) of 84m in length and up to 1m in height will be constructed on the northern riverbank from the proposed Owenass Bridge replacement works.

Construction compounds (location A and B on Figure 3-5) will be accessed off L2097 road and in the field close to the location for the embankment but set back from the river to provide protection for the SAC.

The preliminary construction methodology includes details of programming, restrictions, temporary works, traffic management and site compounds.

Defence No.2 (right bank)

Defence No.2 comprises a river edge wall on right bank/southern side of Owenass River and an embankment connected to the wall located in the adjacent fields also on the southern side of the river. The location of the proposed wall and embankment is shown on engineering drawings Dwg 19105-JBB-XX-XX-DR-C-02832 and Dwg 19105-JBB-XX-XX-DR-C-02833 (sheets 32 and 33).

Riverbank vegetation will be required to be removed on southern bank for the wall construction. Hedgerow in field south of river will be removed for construction of the embankment.

A flood defence embankment (location 2A on Figure 3-5) (side slope of 1:2) of 148m in length and up to 1.1m in height located in the agricultural lands to the

south of the river. The embankment will be 5.8-11.2m in width at ground level with haul roads up to 15m wide on either side, total maximum working width of 41.2m. In order to maintain access to all the areas of the field, one access ramp is proposed to cross the embankment and one culvert.

A new flood defence wall (Type 3- sheet piling will be constructed set back from the top of the bank) (location 2B on Figure 3-5) of 155m in length and up to 1.1m in height will be constructed on the southern riverbank (adjoining an existing residential property) A temporary haul road in the river (made up sung clean stone and using a coffer dam arrangement) will be constructed to implement the flood wall.

Construction compound (location C and D on Figure 3-5) will be accessed off L2097 road and in the field close to the location for the embankment but set back from the river to provide protection for the SAC. This compound may be used for the bridge replacement works.

The preliminary construction methodology includes details of programming, restrictions, temporary works, traffic management and site compounds.

3.4.2 Replacement Owenass Bridge

Existing Condition

The land either side of the River Owenass bridge is agricultural, comprising small fields with mature boundary hedgerow, and currently used for pasture and growing arable crops. The L2097 road runs to from the south to the northwest of the river passing over the bridge. The L20977 road runs from the southwest to the northeast of the river passing over the bridge. Ten residential properties are within 300m of the bridge. The river and the bank to the northeast of the bridge are part of the River Barrow and River Nore SAC, a hedgerow bounds the river on the northern side and west of the Owenass Bridge. The bridge is of local industrial heritage significance but not sufficiently special to justify inclusion in the Record of Protected Structures (Hammond, 2009).

The land south of the River Owenass (right bank facing downstream) is agricultural, comprising small fields with mature boundary hedgerow, and currently used for growing arable crops. The L2097 road runs to the south of and parallel to the river. A residential property (Riverside Lodge) is located close to the river edge and is accessed off L2097.

Replacement Bridge

Riverbank vegetation on three sides of the existing bridge will be removed for proposed defences. Minor hedgerow clearance on southeastern bank will be required for the proposed bridge wing wall construction.

The proposed bridge is shown on engineering drawing Dwg 9105-JBB-XX-XX-DR_S-02401, see Appendix B. The bridge walls will tie into Defences No.1 and No.2 as shown on engineering drawing Dwg 19105-JBB-XX-XX-DR-S-02828 (sheet 28). The works comprise a replacement for Owenass bridge with a new larger span arch structure which will be 18.1m in width, up to 2.8m in height and 15m in length (the latter is the dimension of the clear span across the river). Reinforced concrete wing walls are also proposed to tie onto the bridge replacement works.

The wing wall from the upstream face of the new Owenass Bridge extends along the riverbank to a point where there is sufficient room for the earth embankment Defence No 1 to be constructed.

The preliminary construction methodology includes details of programming, restrictions, temporary works, traffic management and site compounds.

3.4.3 Owenass River - Owenass Bridge to Mountmellick Mill Bridge

Existing Condition

The land on the left bank of the River Owenass between the Owenass Bridge and Mountmellick Mill Bridge is agricultural, comprising fields with mature boundary hedgerow, and currently used for pasture and growing arable crops. The land is accessed off Manor Road and R422 to the north and is overlooked by residential properties in Manor Grove and Manor Court. The river is part of the River Barrow and River Nore SAC along this section, and intermittent trees and riparian vegetation run along the riverbank.

The land on the right bank is also agricultural, comprising fields with mature boundary hedgerow, and currently used for pasture and growing arable crops. The land is overlooked by residential properties off Pearse Street / N80.

Defence No.3 (left and right bank)

Defence No.3 comprises a river edge wall on the left bank/ tied into the downstream side of the replacement Owenass River, then a long-curved embankment passing through Baker's filed and set back from the river. Defence No.3 finishes with a wall adjacent to the river to pass to the south of the Mountmellick Mill and to connect to the Mill Bridge.

The location of the proposed walls and embankment are shown on engineering drawings Dwg 19105-JBB-XX-XX-DR-C-02817 to 19105-JBB-XX-XX-DR-C-02828 (sheets 17-28).

Sections of hedgerow at seven locations will be required to be removed on left side fields for the wall and embankment construction. A section of scrub within the SAC will also be removed for the embankment.

The proposed flood defence measures between Owenass Bridge and Mill Bridge consist of the following:

A flood defence embankment (location 3A on Figure 3-5) (side slope of 1:2) of 1275m in length and up to 2.5m in height extending from Owenass Bridge to the Mill Bridge. There are five access banks crossing the embankment to maintain access to fields on both sides and three culverts. A section of the embankment passes over the SAC.

Immediately downstream of the Owenass Bridge (left bank) (location 3B on Figure 3-5), a new flood defence wall (Type 3- instream sheet piling) of 87m in length and up to 1.6m in height will be constructed from the proposed bridge replacement works, to its tie-in point with a proposed flood defence embankment.

To the north of the Owenass River and adjoining the MDA, the flood defence measure changes from a flood defence embankment to a wall (location 3C on Figure 3-5) (Wall Type 3 – instream sheet piling). The proposed structure is expected to be 315m in length and up to 2m in height (2m above stream bed level).

There is a public footpath that extends along the riverbank at this location, the route of the footpath will be moved to run within the edge of the MDA site.

To the south of the Owenass River (right bank) and adjoining existing residential properties, a new flood defence wall (location 3D on Figure 3-5) (Wall Type 1 – in situ reinforced concrete or Type 2 Micro piling) of 284m in length and up to 1.9m in height (above stream bed level) will be constructed. The flood wall includes one access bank.

Construction compound (location E on Figure 3-5) will be accessed off Manor Road and located north of embankment. A further compound on higher ground to the west (location K on Figure 3-5) will be used to store soil for forming the embankment.

The preliminary construction methodology includes details of programming, restrictions, temporary works, traffic management and site compounds.

3.4.4 Owenass River - Mountmellick Bridge to Convent Bridge

Existing Condition

The land on the left bank of the River Owenass between the Mountmellick Mill Bridge and Convent Bridge includes the town park playground and amenity space associated with the Mountmellick Arts Centre and on residential properties on Sarsfield Street. The river is part of the River Barrow and River Nore SAC along this section, and intermittent trees and riparian vegetation run along the riverbank.

The land on the right bank (southern bank) includes an informal river walkway and 3 fields beyond which are overlooked by properties on Grove Park and Connolly Street. The SAC extends into the eastern part of the open space and is improved agricultural grass land at this point.

Defence No.4 (left and right bank)

Defence No.4 is shown on engineering drawings Dwg 19105-JBB-XX-XX-DR-C-02807 to Dwg 19105-JBB-XX-XX-DR-C-02813 (sheets 7 - 13).

The proposed flood defence measures between Mill Bridge (Pearse Street) and Convent Bridge (Sarsfield Street) consists of the development of flood defences walls and a formalised floodplain to the south of the Owenass River. This will consist of the following:

Raising height of parapet walls on Mountmellick bridge by 300mm (reinforced concrete). Existing railings to be put back in place on top of raised parapets.

Construction of new flood defence wall (location 4A on Figure 3-5) (Wall Type 1 in situ reinforced concrete or Type 2 Micro piling) 525m length and between 0.6m and 4.0m high along the left bank of the Owenass River between Mill Bridge and Convent Bridge. The wall (left bank) then extends and connects into the upstream face of Convent bridge. There is an existing access ramp down the left bank immediately upstream of Convent bridge and this access will be maintained using an appropriate flood gate.

Removal of parts of the existing stone boundary wall along the right bank of the Owenass River to allow the flood flows to easily enter and leave the floodplain. The existing footpath will be suitably graded to an elevation which will remove the need to have flood gates along the existing pathway. This will be constructed by raising footpaths adjoining the proposed flood walls at the eastern and western extents of the proposed works area.

Construction of new flood defence wall (right bank) (location 4B on Figure 3-5) downstream of Mountmellick Mill Bridge, right side of Owenass River, with a raised footpath. Height up to 1.9m, Length 115m (Wall Type 3 - sheet piling will be constructed set back from the top of the bank)

Construction of new flood defence wall (right bank) (location 4C on Figure 3-5) 965m length and up to 3.1m in height is proposed along the rear of Grove Park properties to the south of Owenass River. (Wall Type 1 – in situ reinforced concrete outside SAC, and Type 4 - precast concrete wall inside the SAC)

Construction of new flood defence wall (right bank) (location 4D on Figure 3-5) 112m length and up to 1.9m in height is proposed upstream of Convent Bridge, to the south of Owenass River. (Wall Type 3- instream sheet piling)

Installation of flow control measures to an existing ditch (located Grove Park to the north of the properties) which discharges to the Clontygar Stream.

Construction compounds (location F and G on Figure 3-5) will be accessed off Sarsfield Road and Irishtown and set back from the river to provide protection for the SAC.

The preliminary construction methodology includes details of programming, restrictions, temporary works, traffic management and site compounds.

3.4.5 Owenass River - North/Downstream of Convent Bridge

Existing Condition

The land on the right side of the Owenass River comprises garages, sheds and amenity space to the rear of residential properties on Lord Edward Street. The river is part of the River Barrow and River Nore SAC along this section, and intermittent trees and riparian vegetation run along the riverbank.

Defence No.5 (right bank)

Defence No.5 is shown on engineering drawings Dwg 19105-JBB-XX-XX-DR-C-02805 to Dwg 19105-JBB-XX-XX-DR-C-02806 (sheets 5-6). The proposed flood defence measure downstream of Convent Bridge consist of a new wall along the right bank 164m in length and up to 1.3m and 3.3m high from existing top of bank and stream levels respectively. Given the access restrictions and uncertainties with Site investigations associated with the proposed works at this location a combination of construction methodologies and proposed flood defence types will be required.

This will consist of the following:

Construction of a new flood defence wall (location 5A on Figure 3-5) (Wall Type 3- instream sheet piling or Wall Type 1 in situ reinforced concrete) 164m in length and up to 1.3m and 3.3m high from existing top of bank and stream levels respectively along the right bank of the Owenass River. The new flood defence wall will be constructed of sheet piling. This foundation has been specifically designed to mitigate any impact the foundations may have on the integrity of the existing riverbank, on existing mature trees and ground water cut-off. The new wall will be clad with stone on both façades and hand railings will be installed as required.

Construction compound (location H on Figure 3-5) will be accessed off R422 Lord Edward Street, Briar Lane, by way of enabling temporary access through the palisade fence via Kirwan Park and set back from the river providing protection for the SAC.

The preliminary construction methodology includes details of programming, restrictions, temporary works, traffic management and site compounds.

3.4.6 Pound River - Manor House and Manor Road

Existing Condition

The land either side of the Pound River is agricultural, comprising small fields with mature boundary hedgerow, and currently used for pasture and growing arable crops. An access road (Sandy Lane) which links Manor Road to L2097 runs parallel to the Pound River.

Defence No.6

Defence No.6 is shown on engineering drawings Dwg 19105-JBB-XX-XX-DR-C-02834 to Dwg 19105-JBB-XX-XX-DR-C-02838 (sheets 34-38). The purpose of this embankment is to provide a storage area to hold flow back from the Pound River.

The proposed flood defence measures along Pound Stream will consist of new hard defence around Manor House and Manor Road. The defences will include the following elements:

Construction of a flood earth embankment (location 6A on Figure 3-5) 705m length and up to 1.4m in height south from Manor House and adjacent to Manor Road. The top of the embankment will be 3.0m wide, with 2/1 slopes, maximum width at the base of approximately 24m and foundation depth of TBC. This

embankment restricts flooding from Garroon Stream flowing from the southwest to northeast direction.

A land drain which flows into the Pound Stream will be cut off with construction of the flood earth embankment (location 6A on Figure 3-5). Installation of a culvert 18m in length and construction of a v-channel 66m in length will provide connection from land drain onto Pound Stream through the proposed flood defence. A flow control measure will be installed at the northeastern end of the culvert to reduce the rate of flow allowed to enter the Pound Stream during the design event and the embankment will retain the flooding upstream. As the event dissipates the attenuated water volume will be released into the Pound River with lands returning to their pre-event condition.

There are four access banks crossing the embankments to maintain access to fields on both sides and four culverts.

Construction compounds (location J and K on Figure 3-5) will be accessed off Manor Road and in the field close to the location for the embankment.

The preliminary construction methodology includes details of programming, restrictions, temporary works, traffic management and site compounds.

3.4.7 Garroon Stream - Houses off Wolf Tone Street

Existing Condition

The land on the left bank of the Garroon Stream is agricultural, comprising small fields with mature boundary hedgerow, and currently used for pasture and growing arable crops and as amenity for the properties off Wolfe Tone Steet R422.

Defence No 7

Defence No.7 is shown on engineering drawing Dwg 19105-JBB-XX-XX-DR-C-02802 to Dwg 19105-JBB-XX-XX-DR-C-02804(sheet 3 and 4). The proposed flood defence measures along the Garroon Stream will consist of new hard defence around eastern side of one property and a flood embankment. The defences will include the following elements:

Construction of a flood earth embankment (location 7A on Figure 3-5) 230m length and up to 1.3m in height, along the southern end of the properties and adjoining fields. This embankment restricts flooding from Garroon Stream flowing from the southwest to northeast direction.

Construction of a reinforced concrete flood defence wall (location 7B on Figure 3-5) (Wall Type 1 - Insitu reinforced concrete) of 92m length and up to 1.3m in height, tying up to the proposed embankments (north and south) restrict flooding onto Manor Road. A new 3m wide flood gate will be installed within the proposed flood defence wall to facilitate continued access to the adjoining agricultural lands.

Construction compound (location L on Figure 3-5) will be accessed off Wolfe Tone Street and in the field close to the location for the embankment

The preliminary construction methodology includes details of programming, restrictions, temporary works, traffic management and site compounds.

3.4.8 Clontygar Stream – South and West of Davitt Road

Existing Condition

The land is agricultural, comprising small fields with mature boundary hedgerow, and currently used for pasture. It is overlooked by properties on Davitt Court and St. Joseph's National School to the east and St Vincent's Community Nursing unit to the west.

Defence No.8

Defence No.8 is shown on engineering drawings Dwg 19105-JBB-XX-XX-DR-C-02812 and Dwg 19105-JBB-XX-XX-DR-C-02814 to Dwg 19105-JBB-XX-XX-DR-C-02816 (sheets 12, 14-16). Starting at Irishtown Road and moving eastwards i.e., upstream along the Clontygar stream.

The proposed flood defence measures associated with the Clontygar Stream consist of the following:

Construction of a new flood defence wall (location 8A on Figure 3-5) (Wall Type 1 – In situ reinforced concrete or Type 2 Micro piling) 475m in length and up to 1.9m height adjoining the existing property boundaries of Davitt Road, Brockview, Davitt Crescent, St. Joseph's National School, and Irishtown Road.

A crossing point is to be included to allow access from the school play area to the area created between the wall and the new alignment of the Clontygar stream.

Diversion of the existing Clontygar stream to allow suitable space to construct the proposed flood defence wall. Construction of a proposed new stream channel of 385m length and an average width of 6m to replace existing stream. One culvert is proposed.

Decommissioning of 350m of the existing Clontygar Stream.

Construction compound (location M on Figure 3-5) will be accessed off Irishtown and will involve removal of hedgerow.

The preliminary construction methodology includes details of programming, restrictions, temporary works, traffic management and site compounds.

3.4.9 The Garden Centre (Irishtown Garden Centre)

Existing Condition

The land is agricultural, comprising small fields with mature boundary hedgerow, and currently used for growing crops. It is overlooked by Irishtown Garden Centre to the east.

Defence No.9

Defence No.9 is shown on engineering drawings Dwg 19105-JBB-XX-XX-DR-C-02839 and Dwg 19105-JBB-XX-XX-DR-C-02840 (sheets 39 and 40). The proposed flood defence measures associated with the Garden centre area consist of the following:

A flood defence embankment (location 9A on Figure 3-5) (side slope of 1:2) of 155m in length and up to 0.8m in height, located in the agricultural lands to south and west of the garden centre.

Construction of a new flood defence wall (location 9B on Figure 3-5) (Wall Type 1 - In situ reinforced concrete or Type 2 Micro piling) of 70m in length and up to 0.8m in height to replace the existing boundary fencing between the agricultural lands and the garden centre to the south and north respectively. The wall will extend to its proposed tie-in point with a proposed flood defence embankment to the west.

Construction compound (location N on Figure 3-5) will be accessed off N80 and will involve removal of hedgerow.

The preliminary construction methodology includes details of programming, restrictions, temporary works, traffic management and site compounds.

3.4.10 Midland Steel

Existing Condition

The land surrounding Midland Steel is agricultural, comprising small fields with mature boundary hedgerow, and currently used for grazing. The Pound River

and River Barrow are to the west and north. The site is overlooked by residential properties on Bay Road to the east and Chapel Drive to the southwest.

Defence No.10

Defence No.10 is shown on engineering drawings Dwg 19105-JBB-XX-XX-DR-C-02801 and Dwg 19105-JBB-XX-XX-DR-C-02802 (sheets 1 and 2). The proposed flood defence measures associated with Midland Steel consist of the following:

Construction of a new reinforced concrete flood wall (location 10A on Figure 3-5 (Wall Type 1 - In situ reinforced concrete or Type 2 Micro piling) along the existing western boundary of the business. The proposed defence will be 428m in length and up to 1.1m height from existing ground level. An existing block boundary wall on the south-western section of the site will be replaced along with the localised upgrades to the surface water drainage. The alignment of the flood defence wall will follow the existing property boundary and to the west of the existing land drain.

The site compound (location P on Figure 3-5) will be located within the Midland Steel site, specifically in the HGV park on the northern part of the site. There is also an additional area available for a potential site compound to be established to the west of Midland Steel. Access for construction traffic to this possible compound will be via Chapel Street (N80).

The preliminary construction methodology includes details of programming, restrictions, temporary works, traffic management and site compounds.

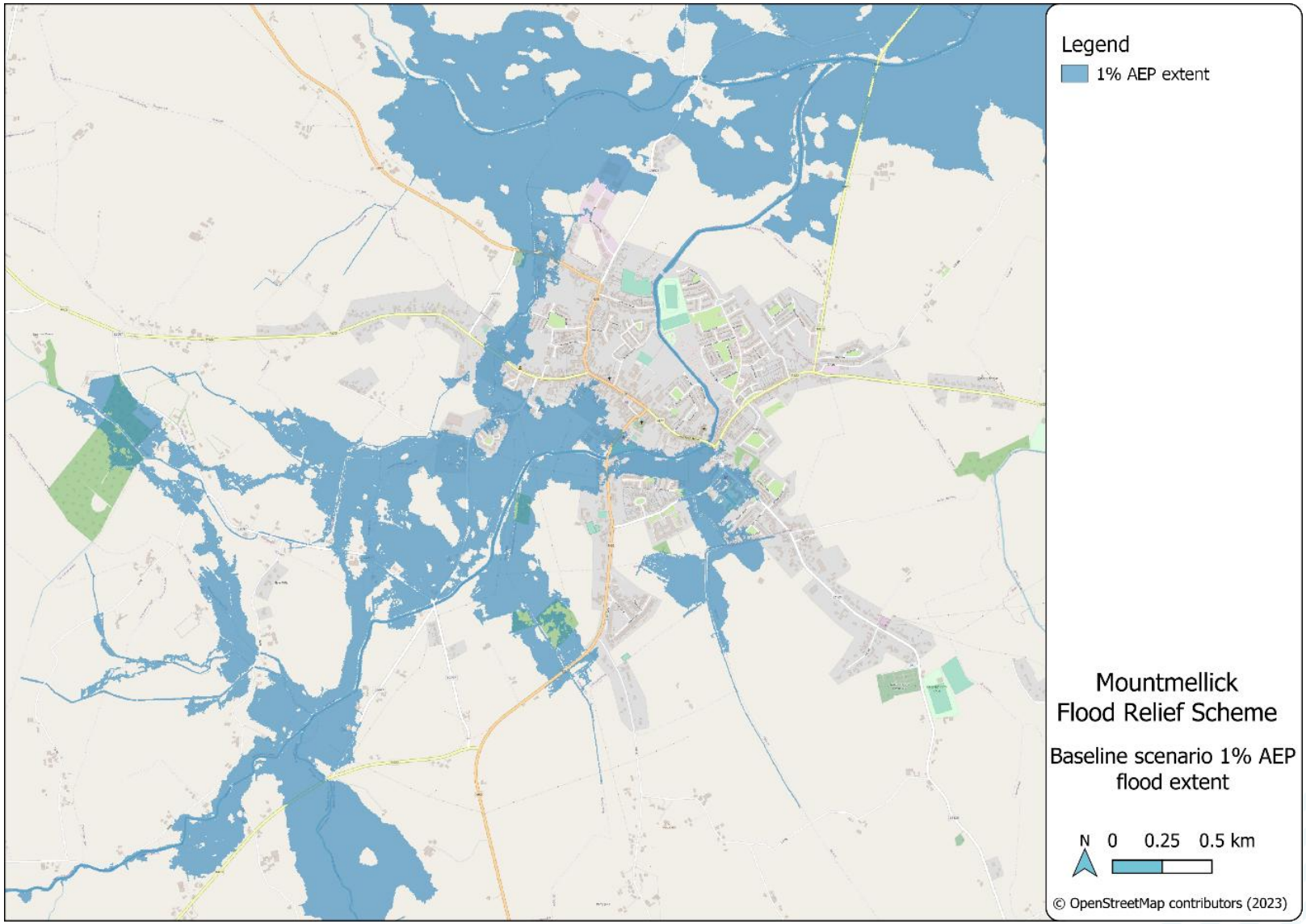


Figure 3-3: Undefended Scheme

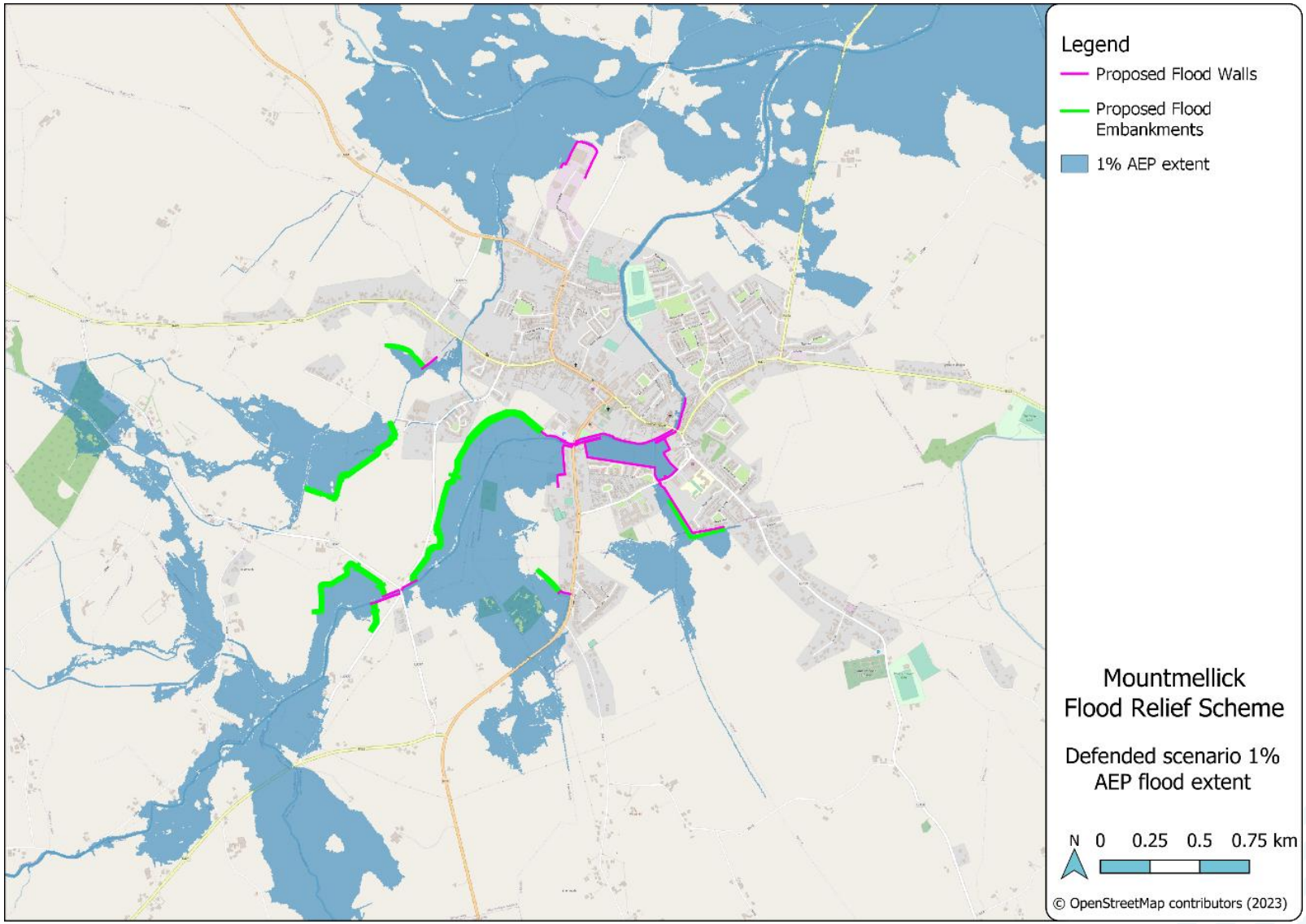


Figure 3-4: Defended Scheme

Table 3-1: Summary of Flood Defences

Flood Defences and Construction Compound Summary				
Water course	**Location on Watercourse**	**Proposed Defence No. (see Figure 3-2) and Engineering Dwg No.**	**Defence position, approx length, height** **Wall Type (see location on Figure 3-5: Construction Defences, Compound Locations and Access points)** **Construction compound and access (see location on Figure 3-5: Construction Defences, Compound Locations and Access points)**	**Wall finish material**
Owenass River	Upstream of Owenass Bridge	Defence No.1 Left Bank Embankment and Wall Engineering Sheets 29, 30, 31, 32 Dwg 19105-JBB-XX-XX-DR-C-02829, 02830, 02831 and 02832	1A - Embankment upstream of Owenass Bridge, on left side of Owenass River, Height up to 1.4m, Length 630m 1B - Wall upstream of Owenass Bridge, on left side of Owenass River, Height up to 1m, Length 84m Wall Type 3- sheet piling will be constructed set back from the top of the bank. Site compound - left side of Owenass River. Note river is Special Area of Conservation (SAC), compound located away from river edge. Construction access off L2097	Concrete, rural location, wall not visible
		Defence No.2 Right Bank Embankment and Wall Engineering Sheets 32, 33 Dwg 19105-JBB-XX-XX-DR-C-02832 and 02833	2A - Embankment upstream of Owenass Bridge, on right side of Owenass River, Height up to 1.1m, Length 148m 2B - Wall upstream of Owenass Bridge, on right side of Owenass River, Height up to 1.1m, Length 155m Wall Type 3- sheet piling will be constructed set back from the top of the bank. Site compound - right side of Owenass River. Note river is SAC, compound located away from river edge. Construction access off L20977	Concrete, rural location, wall not visible
		Replacement Bridge (Bridge walls tie into Defences No.1 and No.2) Engineering Sheets 28 Dwg 19105-JBB-XX-	Replacement of Owenass bridge with a new larger span arch structure, 18.1m in width, up to 2.8m in height and 15m in length. Retaining RC wing walls are also proposed (see Defence No.1, 2 and 3) to tie onto the bridge replacement works. Construction to take place from in-stream for the removal of the existing bridge, and the construction of replacement bridge,	Stone facing to bridge using stone from existing bridge supplemented by new stone,

Flood Defences and Construction Compound Summary				
Water course	**Location on Watercourse**	**Proposed Defence No. (see Figure 3-2) and Engineering Dwg No.**	**Defence position, approx length, height** **Wall Type (see location on Figure 3-5: Construction Defences, Compound Locations and Access points)** **Construction compound and access (see location on Figure 3-5: Construction Defences, Compound Locations and Access points)**	**Wall finish material**
		XX-DR-S-02401 and 02828	Site compound - left side of Owenass River. Note river is SAC, compound located away from river edge. Construction access off L2097	finish to be random rubble
	Owneass Bridge to Mountmellick Mill Bridge	Defence No.3 Embankment and Walls Engineering Sheets 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28 Dwg 19105-JBB-XX-XX-DR-C-02817, 02818, 02819, 02820, 02821, 02822, 02823, 02824, 02825, 02826, 02827 and 02828	3A- Embankment on left side of Owenass River in Bakers field, Height up to 2.5m, Length 1275m 3B- Wall down stream of Owenass Bridge, on left side of Owenass River, Height 1.6m, Length 87m Wall Type 3- sheet piling will be constructed set back from the top of the bank. 3C- Wall upstream of Mountmellick Mill Bridge, on left side of Owenass River along the riverside until a ramp up for the pathway, Height up to 2m, Length 315m Wall Type 3 – 5m of the proposed wall will be instream, remaining 310m of sheet piling will be constructed set back from the top of the bank 3D - Wall upstream of Mountmellick Mill Bridge, on right side of Owenass River, to rear of Pearse St/ M80 Wall Type 1 -in situ reinforced concrete or Type 2 Micro piling Wall 284m in length and up to 1.9m in height (above stream bed level). Walls will be setback from the river and the floodplain will be reconnected. The existing Mill bridge parapet and adjoining wing walls will be raised to meet the required design level. Site compound- Note river is SAC, compound located away from river edge, avoid 2 areas of the SAC which extends into embankment. Soil storage in raised area of land south of Manor Gardens. Construction access off Manor Street	Stone facing to wall adjacent to Mill Bridge on northside of Owneass River.
	Mountmellick Mill Bridge to	Defence No.4 Wall	4A – Wall between Mountmellick Mill Bridge and Convent Bridge, left side of Owenass River, adjacent to playground, Height	Stone facing to playground wall

Flood Defences and Construction Compound Summary				
Water course	**Location on Watercourse**	**Proposed Defence No. (see Figure 3-2) and Engineering Dwg No.**	**Defence position, approx length, height** **Wall Type (see location on Figure 3-5: Construction Defences, Compound Locations and Access points)** **Construction compound and access (see location on Figure 3-5: Construction Defences, Compound Locations and Access points)**	**Wall finish material**
	Convent Bridge	Engineering Sheets 7, 8, 9, 10, 11, 12 and 13 Dwg 19105-JBB-XX-XX-DR-C-02807, 02808, 02809, 02810, 02811, 02812 and 02813	between 0.6m and 4.0m high, Length 525m Wall Type 1 -insitu reinforced concrete or Type 2 Micro piling. Further downstream the walls to be a minimum of 5m from the top of the bank along its entire length to Convent bridge. 4B - Wall downstream of Mountmellick Mill Bridge, right side of Owenass River, Raised footpath and wall. Height up to 1.9m, Length 115m Wall Type 3- sheet piling will be constructed set back from the top of the bank 4C - Wall right side of Owenass River, to rear of properties in Grove Park, wrapping around the green space and to rear of Connolly St, Height up to 3.1m, Length 965m Mix Wall Type 1 -in situ reinforced concrete outside SAC, and Type 4 - precast concrete wall inside SAC 4D - Wall upstream of Convent Bridge, right side of Owenass River, Raised footpath and wall. Height up to 1.9m, Length 112m Wall Type 3- sheet piling, with 20m of the sheet piling occurring instream and the remainder of the sheet piling will be constructed set back from the top of the bank. The works will also include removal of parts of the existing stone boundary wall along the south bank (right side) of the Owenass River to allow the flood flows to easily enter and leave the flood plain. Installation of flow control measures to an existing ditch (located Grove Park to the north of the properties) which discharges to the Clontygar Stream Site compound - in green open space to rear of properties in Grove Park, south of Owenass River. Note middle field/section of open space is SAC and links to river which is SAC. Construction	adjacent to Mill Bridge and Convent bridge and on northside of Owneass.

Flood Defences and Construction Compound Summary				
Water course	**Location on Watercourse**	**Proposed Defence No. (see Figure 3-2) and Engineering Dwg No.**	**Defence position, approx length, height** **Wall Type (see location on Figure 3-5: Construction Defences, Compound Locations and Access points)** **Construction compound and access (see location on Figure 3-5: Construction Defences, Compound Locations and Access points)**	**Wall finish material**
			access off Irishtown Road	
	North of Convent Bridge	Defence No.5 Wall Engineering Sheet 5, 6 Dwg 19105-JBB-XX-XX-DR-C-02805 and 02806	5A - Wall downstream of Convent Bridge, right side of Owenass River, Height 1.0m, Length 164m Wall Type 3- instream sheet piling or Wall Type 1 in situ reinforced concrete Site compound - north of Briar Lane. Note river is SAC. Access of Lord Edward St R422	Stone facing with handrailing
Pound River	Near Manor House and Manor Road	Defence No.6 Embankment Engineering Sheets 34, 35, 36, 37, 38 Dwg 19105-JBB-XX-XX-DR-C-02834, 02835, 02836, 02837 and 02838	6A - Embankment on right side of Pound River, Height up to 1.4m, Length 705m Site compound - southwest of Manor House. Access via gates along Manor Road.	N/A
Garroon Stream	Houses off Wolf Tone Street	Defence No.7 Embankment and Wall Engineering Sheet 3, 4 Dwg 19105-JBB-XX-XX-DR-C-02803 and 02804	7A - Embankment on western side of Garroon Stream, Height 1.3m, Length 230m 7B - Wall left side of Garroon Stream, 92m length and up to 1.3m in height Wall Type 1 - Insitu reinforced concrete, set back from the bank Site compound - north of flood defence. Access off R422	Concrete, rural location, wall not visible

Flood Defences and Construction Compound Summary				
Water course	**Location on Watercourse**	**Proposed Defence No. (see Figure 3-2) and Engineering Dwg No.**	**Defence position, approx length, height** **Wall Type (see location on Figure 3-5: Construction Defences, Compound Locations and Access points)** **Construction compound and access (see location on Figure 3-5: Construction Defences, Compound Locations and Access points)**	**Wall finish material**
Clontygar River	South and west of Davitt Court	Defence No.8 Wall Engineering Sheets 12, 14, 15, 16 Dwg 19105-JBB-XX-XX-DR-C-02812, 02814, 02815, 02816	8A - Wall left side of Clontygar River, Height 1.9m, Length 475m Wall Type 1 - Insitu reinforced concrete or Type 2 Micro piling Diverted stream, new channel 385m in length. Site compound - adjacent to propose channel, west of Davitt Court. Access via Irishtown or Davitt Court	Concrete, wall not visible
Wood Stream	Irish town Garden Centre	Defence No.9 Embankment and Wall Engineering Sheet 39, 40 Dwg 19105-JBB-XX-XX-DR-C-02839 and 02840	9A - Embankment right side of Wood Stream Height 0.8m, Length 155m 9B - Wall south of Garden Centre Height 0.8m, Length 70m Wall Type 1 -In situ reinforced concrete or Type 2 Micro piling Site compound - south of flood defence, south of Garden centre. Access off N80	Concrete, wall not visible
Pound /Barrow River	Midland Steel	Defence No.10 Wall Engineering Sheet 1, 2 Dwg 19105-JBB-XX-XX-DR-C-02801 and 02802	10A - Wall around western, northern and eastern side of factory, Height 1.1m, Length 428m high Wall Type 1 -In situ reinforced concrete or Type 2 Micro piling Site compound - in rear HGV parking area on northern side of site, agreed with owner. Access via Bay Road into Industrial Estate on southern side.	Concrete, wall not visible

3.5 Construction Sequence

The proposed flood relief measures will be implemented in four phases and in the following sequence, from downstream to upstream on the Owenass River. The sequence is to ensure that flood defences downstream are commissioned prior to works upstream commencing:

Phase 1 on the eastern side of the town

Starting with works downstream of Convent bridge, (Defence No. 5);

The new pumping station at Davitt Road, adjoining Grove Park; and

The proposed flood defence measures between Mill Bridge & Convent Bridge (Defence No. 4) and to the Clontygar Stream (Defence No. 8).

Phase 2 on the northern, western and southern side of the town

Proposed works at the Garroon Stream (Defence No. 7) followed by flood defences at Manor Road (Defence No. 6);

Works at Midland Steel (Defence No. 10); and

Works at Irish town garden Centre (Defence No. 9).

Phase 3 on the southwestern side of the town

Owenass Bridge to downstream of Convent Bridge. (Defence No. 3)

Phase 4 on the southwestern side of the town

Replacement Owenass Bridge; and

Followed by works upstream of Owenass Bridge (Defences 1 and 2)

Each phase of construction will be approximately 12-18 months duration. This is to ensure that construction activity can be managed to avoid traffic congestion, dust and noise within the town centre.

3.5.1 Construction Compounds

Several compound areas will be established during the construction phase, for use in different geographical areas of the scheme. Construction defences (Walls and Embankments), Compound locations (A to P) and access points are shown in Figure 3-5 below.

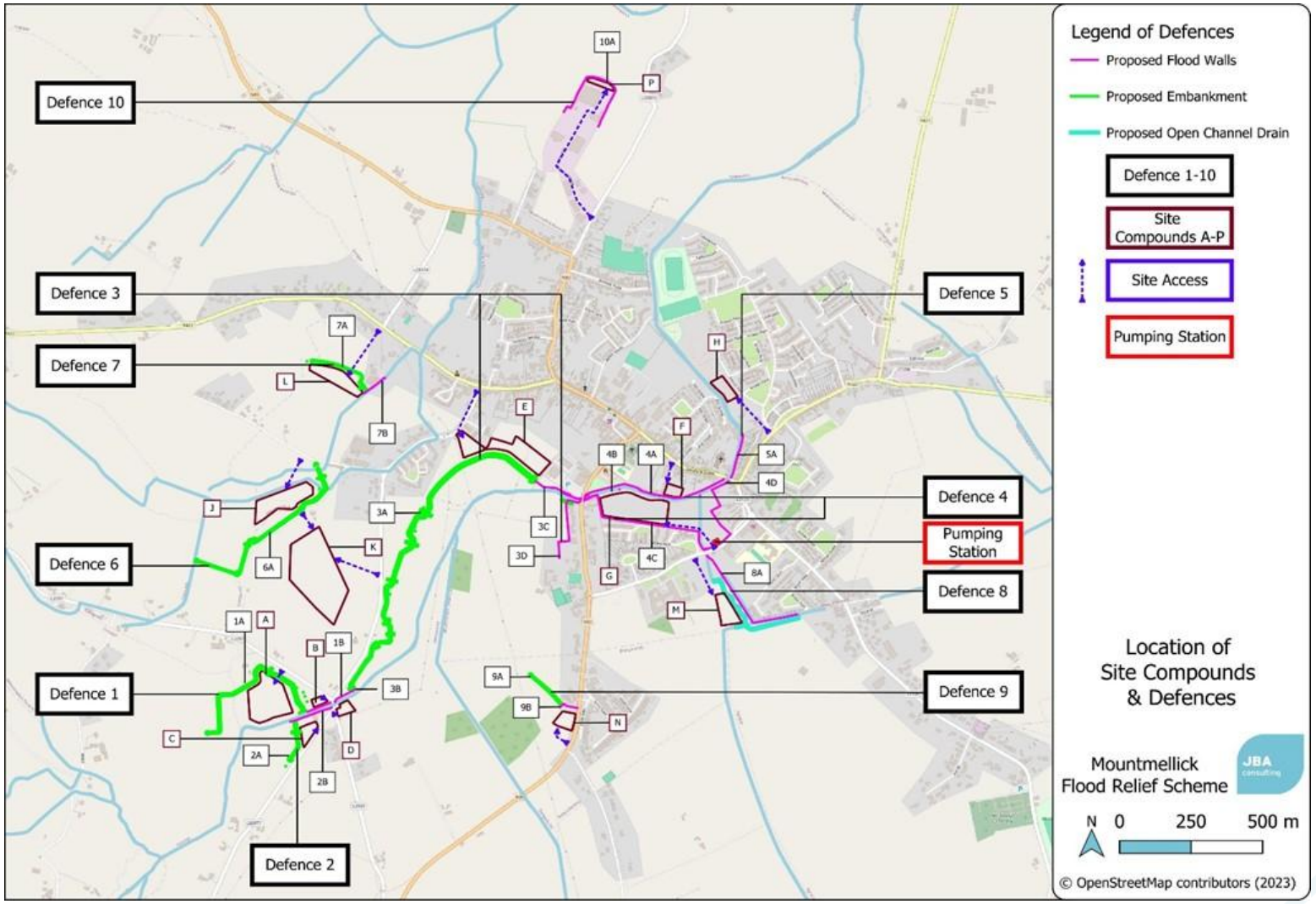


Figure 3-5: Construction Defences, Compound Locations and Access points

Establishment of Site compounds will include the following:

- Site office
- Site facilities (canteen, toilets, drying rooms, etc.).
- Secure compound for the storage of all on-site machinery and materials.
- Temporary car parking facilities.
- Temporary fencing.
- Site Security to restrict unauthorized entry.
- Bunded storage of fuels and refuelling area. Bunds will be 110% capacity of the largest vessel contained within the bunded area.
- A separate container will be located in the Contractors compound to store absorbents used to contain spillages of hazardous materials. The container will be clearly labelled, and the contents of the container will be disposed of by a licenced waste contractor at a licenced site. Records will be maintained of material taken off site for disposal.
- A maintenance programme for the bunded areas will be managed by the site environmental manager. The removal of rainwater from the bunded areas will be their responsibility. Records will be maintained of materials taken off site for disposal.
- The site environmental manger will be responsible for maintaining all training records.
- The contents of any tank will be clearly marked on the tank, and a notice displayed requiring that valves and trigger guns be locked when not in use.
- Drainage collection system for washing area to prevent run-off into surface water system; and
- All refuelling of vehicles will be carried out at the fuel stores within the main site compound and only ADR trained personnel will be permitted to operate fuel bowsers.

3.5.2 Groundwater Pumping

Groundwater pumping will be required where the water table is encountered during excavations.

The possibility of groundwater pumping interventions in relation to the construction of walls and embankments strictly depends on their seasonality. An increase in the river level corresponds to an increase in the groundwater level, this will make the groundwater pumping work necessary.

Groundwater pumping will be required at the proposed wall on the Owenass Bridge, Mountmellick Bridge, Convent Bridge, Davitt Court, Irish town Garden Centre, and Midland Steel. This has the potential to temporarily alter the groundwater level locally and affect the water quality.

3.5.3 Instream works

Instream works are scheduled to take place as part of five of the measures outlined within the scheme. The measures associated with instream works are outlined in Table 3-2 below.

Table 3-2: Instream works along the River Owenass

Water course	Location on Watercourse	Proposed Defence No. (see Figure 3-5) and Engineering Dwg No.	Instream works
Owenass River	Owenass Bridge	Replacement Bridge (Bridge walls tie into Defences No.1 and No.2) Engineering Sheets 28 Dwg 19105-JBB-XX-XX-DR-S-02401 and 02828	*The proposed flood defence scheme will include the removal of an existing masonry bridge which forms part of the Derrycloney Road and traverses the Owenass River to the south of Mountmellick. The existing bridge structure is intended to be removed as part of the flood defence scheme and replaced with a new clear span structure to improve conveyance and alleviate the risk of scour.* *Replacement of Owenass bridge with a new larger span arch structure, 18.1m in width, up to 2.8m in height and 15m in length. Retaining RC wing walls are also proposed (see Defence No.1, 2 and 3) to tie onto the bridge replacement works. Construction from bank.* *Instream works will be necessary for the demolition of the existing bridge, the excavations and construction of foundations and wing walls. Note the foundations will be constructed out of the stream on the riverbank however some temporary works may be required instream to prevent flows interacting with the works area. The preliminary construction methodology lists the sequence in which work is expected. Measures "iv" to measure "xiv "are involved in instream works. These include* *iv. Install instream temporary works to support the bridge arch during demolition. This may consist of an arch structure built of plywood and/or steel under the existing bridge arch and a cushion material between both arches to mitigate the impact of falling debris over the temporary structure.* *vi. Strip the bituminous surfaces from the bridge top and all the layers underneath to the deck level.* *vii. Dismantle the bridge arch, commencing by breaking down the top of the arch first and moving towards the sides, ensuring that any*

Water course	Location on Watercourse	Proposed Defence No. (see Figure 3-5) and Engineering Dwg No.	Instream works
			falling debris is retained by the temporary structure. *viii. Install temporary works (cofferdam sheet pile) on a stage basis to segregate the works area from the river to facilitate demolition (i.e. rock breaking) of the existing bridge abutments.* *ix. Demolish the existing bridge abutments with the dry working space and excavate to the required formation level/foundation depth for the new abutments. The final excavation depth is dependent on the depth of the suitable in-situ bearing stratum.* *x. Install new bridge abutments (cast in situ concrete) in accordance with the detailed design including any steel fixing. The recess connection for the precast bridge sections will be cast into the top of the foundation structure. A mammal pass will be accommodated during this task.* *xi. Once the concrete has cured to the required strength (verified with cube tests) for both sections, the precast bridge arches can be lifted into place. A temporary working platform will be established to the north and south of the river to accommodate the precast sections for the arch being lifted into place by crane/ excavator (depends on machinery capabilities and contractor's proposed methodology). The precast arch is expected to arrive onsite in two sections for logistical purposes.* *xiii. The precast elements of the arch will be installed according to the manufacturer's specifications and the contractor's methodology. If the contractor determines that instream works are required to guide the installation of these elements, then this will need to be accommodated.* *xiv. The proposed bridge parapets and wingwalls will then be installed. These are likely to be cast in situ concrete sections with a masonry finish to match the existing bridge structure. The use of precast sections as a construction alternative will be evaluated and considered at detailed design stage and may be dependent on the contractor's preferred approach. Some temporary works will be*

Water course	Location on Watercourse	Proposed Defence No. (see Figure 3-5) and Engineering Dwg No.	Instream works
			required instream to facilitate these works. *A cofferdam or similar temporary works will be required to accommodate a safe working dry space for construction works associated with the bridge abutments/ foundations. This will mitigate flows from the river channel spilling into the adjoining works area.*
	Owneass Bridge to Mountmellick Mill Bridge	Defence No.3 Embankment and Walls Engineering Sheets 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28 Dwg 19105-JBB-XX-XX-DR-C-02817, 02818, 02819, 02820, 02821, 02822, 02823, 02824, 02825, 02826, 02827 and 02828	3C- Wall upstream of Mountmellick Mill Bridge, on left side of Owenass River, Height up to 2m, Length 315m Wall Type 3 - instream sheet piling *Instream works will be necessary for the construction of culvert crossings at land drain and stream locations traversing the proposed flood defence embankment. New flow control measures will be installed as part of the culvert works.* *It is expected that due to restricted space available for constructing a flood defence wall adjacent to Mill bridge, that some temporary works may be required within the stream (approx. 5m of proposed wall in stream, butting up against existing wall), however this is dependent on construction methodology. Pre-condition structural surveys of the Mill Bridge and Owenass bridge will be undertaken.*
	Mountmellick Mill Bridge to Convent Bridge	Defence No.4 Wall Engineering Sheets 7, 8, 9, 10, 11, 12, 13 Dwg 19105-JBB-XX-XX-DR-C-02807, 02808, 02809, 02810, 02811, 02812 and 02813	*4D - Wall upstream of Convent Bridge, right side of Owenass River, Raised footpath and wall. Height up to 1.9m, Length 112m Wall Type 3- instream sheet piling* *The works will also include removal of parts of the existing stone boundary wall along the south bank (right side) of the Owenass River to allow the flood flows to easily enter and leave the flood plain. Installation of flow control measures to an existing ditch (located Grove Park to the north of the properties) which discharges to the Clontygar Stream* *Preliminary Construction Methodology*

Water course	Location on Watercourse	Proposed Defence No. (see Figure 3-5) and Engineering Dwg No.	Instream works
			Where works are expected to take place instream, a cofferdam sheet pile will be used to create a temporary dry working area within the existing river. Excess water will be over pumped from the dry cell until works can be complete. The limited working space inhibits the required working space for construction vehicles. Therefore, it is envisaged temporary construction access roads at localised areas will need to be constructed instream to facilitate the works. *A series of existing land drains which flow towards the Clontygar Stream & eventually discharge into the Owenass River will need to be protected during the works.* *A cofferdam or similar temporary works will be required to accommodate a safe working dry space for instream construction works. This will create a temporary restriction of the existing channel width.* *Continual over pumping of groundwater will be required to maintain the safe working space.* *These dry cell structures will permit safe access from the storage / compound area to the immediate works area. In addition, instream works will be necessary for the installation of new flow control devices and reinstatement of existing surface water connections affected by the works.* *It is expected that due to the limited available working space for constructing the proposed flood defence walls within this area that instream works will be required. As noted above temporary works will be required to create a dry working space for operatives. A cofferdam or similar structure with pumped overflows will be required to avoid interaction with existing river flows whilst the excavation takes place for riverbank works. Furthermore, these dry cell structures will permit safe access from the storage / compound area to the immediate works*

Water course	Location on Watercourse	Proposed Defence No. (see Figure 3-5) and Engineering Dwg No.	Instream works
			area. In addition, instream works will be necessary for the installation of new flow control devices and reinstatement of existing surface water connections affected by the works.
	North of Convent Bridge	Defence No.5 Wall Engineering Sheet 5, 6 Dwg 19105-JBB-XX-XX-DR-C-02805 and 02806	5A - Wall downstream of Convent Bridge, right side of Owenass River, Height 1.0m, Length 164m Wall Type 3- instream sheet piling or Wall Type 1 in situ reinforced concrete 5.2 v. *Where works are expected to take place instream, a cofferdam sheet pile may be used to create a temporary dry working area within the existing river. Excess water will be over pumped from the dry cell until works can be complete. The limited working space inhibits the required working space for construction vehicles. Therefore, it is envisaged temporary construction access roads will need to be constructed instream to facilitate the works.* *5.3* *Trench supports or other temporary works may be required to accommodate a safe working space for construction of the flood defence embankments. Continual over pumping of water will be required to maintain the safe working space.* *Instream works and works within the riparian corridor will be necessary for the construction of flood defence wall along the riverbanks on the Owenass River as outlined in methodologies above. It is expected that due to the restricted space available for constructing the flood defence walls on the riverbanks that some temporary works may be required within the river.*

3.6 Operation

A Maintenance Plan will be put in place whereby Laois County Council will conduct annual inspections of the embankments, together with investigations of its performance after each flood event. Monitoring of seepage will be recommended. Inspection of entire scheme will follow a flood event.

The following section demonstrates the changes in flow rate due to the scheme, these are deemed to be insignificant (

Table 3-3) and the operational impacts are not anticipated to impact QIs of the River Nore and River Barrow SAC within the Scheme boundary or downstream.

3.7 Embedded mitigation

Extension of flood plains have been incorporated within the design of the project at the farmland between Owenass Bridge and Mill Bridge, also referred to as Baker's Field (Defence 3) and between Mill Bridge and Convent Bridge (Defence 4), while a realignment of the Clontygar Stream will take place around the planned embankment of Defence 8.

The area of the extended floodplain adjacent to the river at Baker's field will include some mitigation measures, such as shallow scraping of soil to allow development of small areas of wetland, which will enhance overall riparian habitat.

Prior to the realignment of the Clontygar Stream, investigations to establish the prevailing bed and bank material will be conducted to inform the need for the proposed clay and geotextile linings. This includes:

- Visual survey of the existing riverbed and bank material, and
- Ground investigation (e.g. augering) along the bank of the existing stream to just below bed level. This aims to identify prevailing sediment type underneath and alongside the channel and the connectivity of the river to groundwater.

Along the proposed realignment, the same ground investigation will be conducted.

Sediment types along the lengths of the affected and proposed channel should be compared to evaluate whether there is a substantial difference e.g. a low permeability layer under the existing channel that is not present under the proposed realignment. Survey should be conducted by a geomorphologist and/or hydrogeologist and expert judgement must be considered during detailed design. The default position should be that no clay lining is applied unless proven necessary. Survey should be conducted in summer months as normal flow conditions will be most susceptible to the impacts of surface-groundwater disconnection.

The alignment of the stream will have a diverse plane form and a channel cross section with lateral connectivity to the bankside and floodplain habitats. The realigned stream will be re-naturalised, possessing a sinuous form, be shallow, and have an active lateral connection to adjacent lands.

The embedded mitigation measures related to the alignment of the Clontygar Stream and the development of the wetlands at Baker's filed will overall improve both the water quality and the river and riparian ecology of the River Owenass and Clontygar Stream and benefit local aquatic fauna, within the context of the project. These measures are repeated within Section 8.

Overall the Scheme will not have an impact on water course velocities of the River Owenass, with very little difference between undefended (baseline) and defended (design) velocities at 50% Annual Exceedance Probability (AEP) event peak velocities (m/s) and 20% AEP event peak velocities (m/s) (Table 3-3).

Table 3-3: 50% AEP event peak velocities (m/s) and 20% AEP event peak velocities (m/s) of the River Owenass

	50% AEP event peak velocities (m/s)		
Node	undefended velocity	defended velocity	Difference
14OWEN00444	1.25	1.6	0.35
14OWEN00435	1.85	1.77	-0.08
14OWEN00370	1.38	1.38	0
14OWEN00320	1.42	1.42	0
14OWEN00292	1.18	1.18	0
14OWEN00262	1.4	1.42	0.02
14OWEN00247	1.61	1.62	0.01
14CARO00009	0.43	0.15	-0.28
14GARR00065	0.38	0.78	0.4
14GARR00027	0.55	0.67	0.12
14CLOT00148	0.14	0.12	-0.02

	20% AEP event peak velocities (m/s)		
Node	undefended velocity	defended velocity	Difference
14OWEN00444	1.25	1.61	0.36
14OWEN00435	1.86	1.79	-0.07
14OWEN00370	1.39	1.39	0
14OWEN00320	1.42	1.42	0
14OWEN00292	1.18	1.18	0
14OWEN00262	1.41	1.43	0.02
14OWEN00247	1.62	1.63	0.01
14CARO00009	0.43	0.15	-0.28
14GARR00065	0.38	0.78	0.4
14GARR00027	0.55	0.67	0.12
14CLOT00148	0.14	0.13	-0.01

3.8 Project Zone of Influence (ZoI)

An examination of the construction methods or project description allows sources of impact to be determined. This also allows a zone of influence for the project to be generated based on the size, scale and nature of the works involved. Using the source-pathway-receptor model the pathways for impact are also analysed to see if a functional pathway for impact is present. This report analyses three pathways: surface water, groundwater, and land and air.

As the works are confined to Mountmellick village and environs and will largely use existing infrastructure the project will primarily impact the area within its site boundary, but a wider zone of influence is used for impacts relating to surface water, groundwater, land and air source-receptor-impact pathways.

As the scale of proposed works are considered of 'Project' status, Natura 2000 sites within the wider 10km range of the proposed development were examined initially in relation to surface water and groundwater / ground-to-surface water pathways (i.e., local surface water sub-catchments and groundwater bodies / aquifers), with an extended 15km range for those with a downstream hydrological connection. However, the range of was then refined to include only the Natura 2000 sites with connections via the source-pathway-receptor model.

In respect to ZoI for air pollution (emissions and dust), Natura 2000 sites within a 50m buffer zone of the development were considered as per the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2024).

Furthermore, a 300m disturbance buffer from boundaries of the proposed development has been incorporated into the ZoI in order to account for QI species potentially foraging within ex-situ habitats.

4 Natura 2000 Sites within Zone of Influence

An Appropriate Assessment Screening Report (JBA, 2025) identified the potential for significant effects on one Natura 2000 Site River Barrow and River Nore SAC. The assessment of the risk of adverse impacts and the design of mitigation on this Natura 2000 site will be the focus of this report.

4.1 Summary of the Screening for Appropriate Assessment Report

Due to the nature of the works and the location of the proposed development within the boundaries of the River Barrow and River Nore SAC, the proposed development is anticipated to have a likely significant effect via surface water, groundwater-to-surface water; air (visual and audible disturbance) pathways, air (dust settlement) and air-to-surface water (dust settlement) pathways to its QI species and habitats.

Significant effects on the River Barrow and River Nore SAC are likely in the form of disruption to the following Annex habitats and QI species**:**

- Water courses of plain to montane levels with the *Ranunculion fluitanis* and *Callitricho-Batrachion* vegetation [3260]
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]
- Otter *Lutra lutra* [1355]
- Brook Lamprey *Lampetra planeri* [1096]
- River Lamprey *Lampetra fluviatilis* [1099]
- Atlantic Salmon *Salmo salar* [1106]
- White-clawed Crayfish *Austropotamobius pallipes* [1092]

4.1.1 River Barrow and River Nore SAC

This section provides baseline information on the one Natura 2000 site, River Barrow and River Nore SAC, occurring within the Zone of Influence of the proposed works that is also anticipated to be significantly affected by the Scheme.

The River Barrow and River Nore SAC is identified as occurring within the Zone of Influence of the proposed development as listed below in Table 4-1 and displayed in Figure 4-1. Site briefs of the Qualifying Interests; their relevant threats / pressures and their impacts and sources to the Natura 2000 sites within the ZoI are given in Table 4-2, derived from NPWS, 2016; NPWS, 2011, European Environment Agency, 2020. A full description of River Barrow and River Nore SAC and QI are given in Appendix C. Not all qualifying interests are located within the Zone of Influence.

Table 4-1: Distances to Natura 2000 sites within the project's ZoI

Natura 2000 site	Site Code	Approximate Distance from Site	Hydrological Distance from Site
River Barrow and River Nore SAC	[002162]	Within Site	Within Site

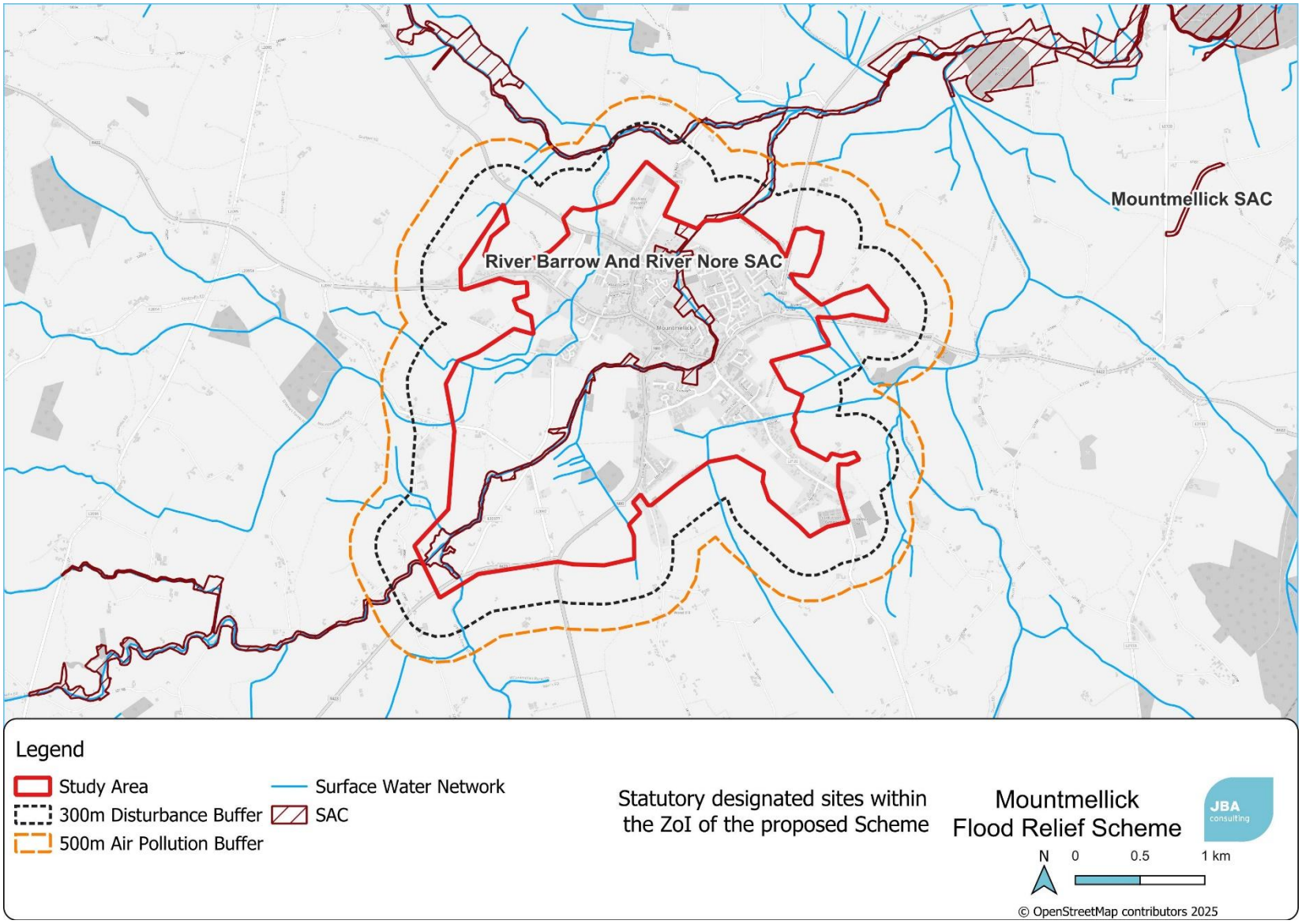


Figure 4-1: Natura 2000 sites within the immediate Mountmellick area (OSM, 2025)

Table 4-2: Site briefs; Qualifying Interests; and relevant threats / pressures and their impacts and sources to the Natura 2000 sites of note (Source NPWS, 2016a; NPWS, 2011, European Environment Agency, 2020)

Site Name	Brief	Qualifying Interests **that could be potentially impacted are listed below**	**Project-relevant Threats / Pressures: Impact (Source) +**
River Barrow and River Nore SAC	This site includes the Barrow and Nore River Catchments all the way from Slieve Bloom Mountains in the north to Creadun Head in Waterford in the south. The upper parts of the Barrow run through limestone, while the middle reaches and many of the eastern tributaries runs through Leinster Granite. Within the site are several locations with alluvial forest, which is a priority Annex 1 habitat. Accessioned with the alluvial forests are eutrophic tall herb vegetation and elsewhere where the flood plain of the river is intact. Petrifying springs is another priority Annex 1 habitat found within this SAC along the Nore River. Old oak woodlands are found both along the Nore and the Barrow. Floating river vegetation is well represented in the Barrow and in the many tributaries of the site. The water quality of the Barrow has improved since the vegetation survey was carried out in 1996. In pockets along the steep valleys of the rivers habitats of dry heath are occurring and is especially prominent in the Barrow Valley and along the tributaries at the foothills of the Blackstairs Mountains. The dry heath generally grades into wet woodland or swamp vegetation closer to the riverbank. The southernmost area of the SAC is characterised by coastal habitats such as estuaries, mudflats and salt meadows. The site is important for the presence of a number of E.U. Habitats Directive Annex II species, including Freshwater Pearl Mussel Margaritifera margaritifera and M. m. durrovensis, White-clawed Crayfish Austropotamobius pallipes,	- Floating River Vegetation [3260] - Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] - Otter *Lutra lutra* [1355] - Brook Lamprey *Lampetra planeri* [1096] - River Lamprey *Lampetra fluviatilis* [1099] - Atlantic Salmon *Salmo salar* [1106] - Sea Lamprey *Petromyzon marinus* [1095] (ZoI) - - White-clawed Crayfish *Austropotamobius pallipes* [1092] (NPWS, 2011)	Pollution to surface waters: High impact (source of threat both inside and outside SAC boundary) Modifying structures of inland water courses: High (Inside) Embankment and flooding defense walls in inland water systems: High (Inside) Erosion: High (Inside) Removal of Hedges and Copses or Scrub: High (Inside) Human induced changes in hydraulic conditions: Moderate (source

Site Name	Brief	Qualifying Interests that could be potentially impacted are listed below	Project-relevant Threats / Pressures: Impact (Source) +
	Salmon Salmo salar, Twaite Shad Alosa fallax fallax, three lamprey species – Sea Lamprey Petromyzon marinus, Brook Lamprey Lampetra planeri and River Lamprey Lampetra fluviatilis, the whorl snail Vertigo moulinsiana and Otter Lutra lutra. (NPWS, 2016a)		of threat both inside and outside SAC boundary) Reduction in migration/migration barriers: Moderate (Inside) (European Environment Agency, 2020)

4.1.2 Conservation Objectives

The conservation objectives for River Barrow and River Nore SAC below are taken from the NPWS Conservation Objectives Document (NPWS, 2011).

'To maintain or restore the favourable conservation condition of the Annex I habitat(s) and/or the Annex II species for which the SAC has been selected'.

The conservation objectives document outlines specific objectives (Table 4-3) for the individual QIs within the ZoI and their respective attributes, measure and target aspects.

Table 4-3: Conservation objectives for screened-in River Barrow and River Nore SAC QIs within the ZoI (NPWS, 2011).

Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation [3260]		
To maintain the favourable conservation condition of Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat distribution	Occurrence	No decline, subject to natural processes
Habitat area	Kilometres	Area stable or increasing, subject to natural processes
Hydrological regime: river flow	Metres per second	Maintain appropriate hydrological regime
Hydrological regime: groundwater discharge	Metres per second	This attribute refers to sub-types with tufa formations. The groundwater flow to the habitat should be permanent and sufficient to maintain tufa formation
Substratum composition: Particle size range	Millimetre	This attribute refers to sub-types with tufa formations. The substratum should be dominated by large particles and free from fine sediments
Water chemistry: minerals	Milligrammes per litre	(re tufa) The groundwater and surface water should have sufficient concentrations of minerals to allow deposition and persistence of tufa deposits
Water quality: suspended sediment	Milligrammes per litre	(re tufa) The concentration of suspended solids in the water column should be sufficiently low to prevent excessive deposition of fine sediments
Water quality: nutrients	Milligrammes per litre	(re tufa) The concentration of nutrients in the water column should be sufficiently low to prevent changes in species composition or habitat condition
Vegetation composition: typical species	Occurrence	(re tufa) Typical species of the relevant habitat sub-type should be present and in good condition
Floodplain connectivity	Area	(re tufa) The area of active floodplain at and upstream of the habitat should be maintained

Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]		
To maintain the favourable conservation condition of Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Habitat distribution	Occurrence	No decline, subject to natural processes
Habitat area	Kilometres	Area stable or increasing, subject to natural processes
Hydrological regime: Flooding depth/height of water table	Metres	Maintain appropriate hydrological regime
Vegetation structure: sward height	Centimetres	30-70% of sward is between 40 and 150cm in height
Vegetation composition: broadleaf herb: grass ratio	Percentage	Broadleaf herb component of vegetation between 40 and 90%
Vegetation composition: typical species	Number	At least 5 positive indicator species present
Vegetation composition: negative indicator species	Occurrence	Negative indicator species, particularly non-native invasive species, absent or under control- NB Indian Balsam *Impatiens glandulifera*, Monkeyflower *Mimulus guttatus*, Japanese Knotweed *Reynoutria japonica* and Giant Hogweed *Heracleum mantegazzianum*

Otter [1355]		
To restore the favourable conservation condition of Otter in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Distribution	Percentage positive survey sites	No significant decline
Extent of terrestrial habitats	Hectares	No significant decline. Area mapped and calculated as 122.ha above high water mark (HWM)' 1136.0ha along river banks/around ponds
Extent of marine habitats	Hectares	No significant decline. Area mapped and calculated as 857.7ha
Extent of freshwater (river) habitats	Kilometres	No significant decline. Length mapped and calculated as 616.6km
Extent of freshwater (lake) habitats	Hectares	No significant decline. Area mapped and calculated as 2.6ha

Otter [1355]		
Couching sites and holts	Number	No significant decline
Fish biomass available	Kilograms	No significant decline

Brook lamprey [1096]		
To restore the favourable conservation condition of Brook lamprey in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Distribution	% of river accessible	Access to all watercourses down to first order streams
Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present
Juvenile density in fine sediment	Juveniles/m^2	Mean catchment of juvenile density of brook/river lamprey at least 2/m^2
Extent and distribution of spawning habitat	m^2 and occurrence	No decline in extent and distribution of spawning beds
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive

River Lamprey [1099]		
To restore the favourable conservation condition of River lamprey in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Distribution	% of river accessible	Greater than 75% of main stem and major tributaries down to second order accessible from estuary
Population structure of juveniles	Number of age/size groups	At least three age/size groups of brook/river lamprey present
Juvenile density in fine sediment	Juveniles/m^2	Mean catchment of juvenile density of brook/river lamprey at least 2/m^2
Extent and distribution of spawning habitat	m^2 and occurrence	No decline in extent and distribution of spawning beds
Availability of juvenile habitat	Number of positive sites in 2nd order channels (and greater), downstream of spawning areas	More than 50% of sample sites positive

Atlantic Salmon (only in fresh water) [1106]		
To restore the favourable conservation condition of Salmon in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Distribution: extent of anadromy	% of river accessible	100% of river channels down to second order accessible from estuary
Adult spawning fish	Number	Conservation Limit (CL) for each system consistently exceeded
Salmon fry abundance	Number of fry/5mins electrofishing	Maintain or exceed 0+ fry mean catchment-wide abundance threshold value. Currently set at 17 salmon fry/5min sampling
Out-migrating smolt abundance	Number	No significant decline
Number and distribution of redds	Number and occurrence	No decline in number and distribution of spawning redds due to anthropogenic causes
Water quality	EPA Q value	At least Q4 at all sites sampled by EPA

White-clawed Crayfish [1092]		
To maintain the favourable conservation condition of White-clawed crayfish in the River Barrow and River Nore SAC, which is defined by the following list of attributes and targets:		
Attribute	**Measure**	**Target**
Distribution	Occurrence	No reduction from baseline.
Population structure: recruitment	Percentage occurrence of juveniles and females with eggs	Juveniles and/or females with eggs in at least 50% of positive samples
Negative indicator species	Occurrence	No alien crayfish species
Disease	Occurrence	No instances of disease
Water quality	EPA Q value	At least Q3-4 at all sites sampled by EPA
Habitat quality: heterogeneity	Occurrence of positive habitat features	No decline in heterogeneity or habitat quality

A summary of project elements relevant to ecology of the Natura 2000 site River Barrow and River Nore SAC is given below in Table 4-4.

Table 4-4: AA Screening Summary of project elements relevant to ecology of the Natura 2000 sites (JBA 2024)

Project Elements	Comment	
Size and scale	The proposed FRS development involves the construction of new bankside walls along with the alteration of existing walls, the creation of embankments, the deconstruction and reconstruction of the Owenass Bridge, realignment of local streams and ditches, the addition of crossing points and the removal of vegetation to allow for the creation of managed flood areas.	
Land-take	There will be low level direct land take from any Natura 2000 sites through the removal of scrubland and the construction of embankments and walls.	
Distance from Natura 2000 site or key features of the site	River Barrow and River Nore SAC Mountmellick SAC	Within site 2.2km
Resource requirements (water abstraction etc.)	There will be no water abstraction requirement.	
Emissions (disposal to land, water or air)	**Construction Phase:** **Water** The proposed site contains direct hydrological links with the River Barrow and Nore. Surface water-based emissions to the local freshwater systems flowing into the Natura 2000 sites is anticipated, while the implementation of a dry cell during instream works will temporarily alter of the flow and structure of the River Barrow during construction is also anticipated, which may disrupt local QI wildlife. Given the size of the project, groundwater-based pollutants are also anticipated to impact on the QI species of the River Barrow and River Nore SAC. **Air** During construction cement-based pollutants have the potential to settle in the foraging grounds (supporting ex-situ habitats) of the QI species including Otter and fish species, leading to the degradation of the flora and fauna consumed and utilised by these protected species. Furthermore, cement-based	

Project Elements	Comment
	pollution has the potential to settle within the local watercourses within the ZoI, transporting these contaminants to Annex habitats potential present downstream. **Operation phase:** **Water** The integration of the flood plains of Baker's Field and the section of the SAC in the centre of Mountmellick town within the study area into the flood relief scheme. The nature of this operational impact is mixed, as the flood defences will prevent flood waters entering major urbanised areas, reducing urban-based pollutants entering surface water network during flood events; however, the redirected flood waters will instead enter agricultural lands (Baker's Field), which are likely to be nutrient enriched, which may in turn lead to increased nutrient levels within the local surface water network.
Excavation requirements	Construction will require the excavation of foundations for flood walls, embankments and the abutments of the new Owenass Bridge.
Transportation requirements	**Temporary Impacts:** Levels of traffic to the site during the construction phase will increase traffic to the area but will be temporary in nature. All access to the site will be on pre-existing roads and transportation requirements will not affect Natura sites. **Permanent Impacts:** Given the size, scale and location of the proposed project, transportation requirements during operation will not affect Natura 2000 sites.
Duration of construction, operation, decommissioning etc.	Works are anticipated to take 36 months, plus any additional time due to unforeseen delays
Other	None

Table 4-5. Description of likely changes to the Natura 2000 sites

Potential Effect	Comments
Reduction of habitat area	There will be slight reduction in habitat area for the River Barrow and River Nore SAC.
Disturbance to key species	**Temporary Effects:** The construction works will temporarily increase the noise level and disturbance locally, which will temporarily disrupt the foraging and activities of local species of Otter or local QI fish species. Significant effects are likely to key species given scale and temporary nature of the construction phase and distance from the Natura 2000 sites. **Permanent Effects:** Disturbance to key QI species is not anticipated during operation of the development; FRS is not anticipated to disturb local fish species and there will be in-built mitigation for the protection of local Otter. .
Habitat or species fragmentation	There will be temporary habitat fragmentation within the River Barrow and River Nore SAC during the utilisation of a dry cell within the River Owenass.
Reduction in species density	There will be no temporary or permanent reduction in species density within any of the Natura 2000 sites, or any QIs of these sites.
Changes in key indicators of conservation value (water quality etc.)	**Temporary Effects:** The construction works have the potential to temporarily increase the pollutants generated in the vicinity of the River Owenass River Pound and Clontygar Stream, which will impact on the overall water quality in both the area and downstream and will lead to temporary changes in key indicators of conservation value (surface water, groundwater and air quality). This will include the distribution and location of indicator species that are vital to the SAC .
Climate change	N/A

Table 4-6. Description of likely impacts on the Natura 2000 sites as a whole

Potential Impact	Comments
Interference with the key relationships that define the structure of the site	Interference with the key relationships that define the structure of the site (i.e. river) are anticipated, i.e., extending the functionality of Baker's field and the removal of barriers to the other flood plain within the centre of Mountmellick as a floodplain, disturbance of fish breeding environments.

Table 4-7. Provide indicators of significance as a result of the identification of effects set out above in terms of:

Potential Impact	Comments
Loss (Estimated percentage of lost area of habitat)	Small scale temporary loss of vegetation during construction.
Fragmentation	Fragmentation of habitat and/or species is anticipated through the utilisation of a dry cell during instream works.
Disruption & disturbance	Disruption and/ or disturbance of the following species are anticipated from the proposed project: Otter [1355]; White-clawed Crayfish [1092]; Brook Lamprey [1096]; River Lamprey [1099]; and Atlantic Salmon [1106].
Change to key elements of the site (e.g., water quality)	Potential temporary changes to key elements (i.e. water quality) of the site are anticipated due to pollution of the local watercourses.

5 Existing Environment – QI Habitats and Species

5.1 Baseline conditions

The proposed development area is comprised of a wide range of habitats, including artificial urban landscapes, amenity grasslands, dry meadows, parkland, woodland, treelines / hedgerows, scrub, drainage ditches and rivers.

This section will summarise the baseline information pertaining to Annex Habitats and Species listed in the EU habitats directive which are QI features of the screened in River Barrow and River Nore SAC.

Details of ecological surveys undertaken within the study area are described in Table 2-2.

5.2 Habitats

A list of habitats recorded during the ecological habitat survey is listed in Table 5-1 below and are presented in detail in the following sub-sections. In this NIS, habitats associated with the River Barrow and River Nore SAC and Qualifying Interests are assessed only, all other habitats are assessed in the AA Screening and the Biodiversity Chapter of the EIAR that accompanies this report.

The table below also contains QI species associated with Natura 2000 sites within the ZoI. These QI species have been recently recorded by Inland Fisheries Ireland (IFI) or JBA Ecologists within specific habitats. Habitat maps of are also provided within Figure 5-1 and Figure 5-2.

Table 5-1: Habitats recorded during site visit

Habitat Type	Fossitt Code	Considered in	Linked Annex Habitats and Species
Arable crops	BC1	AASR	-
Stone walls and other stonework	BL1	AASR/EIAR	-
Buildings and artificial surfaces	BL3	AASR/EIAR	-
Other artificial lakes and ponds	FL8	**This report**	Otter *Lutra lutra* [1355]
Depositing / lowland rivers	FW2	**This report**	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] Otter *Lutra lutra* [1355] Atlantic Salmon *Salmo salar* [1106] River Lamprey *Lampetra fluviatilis* [1099] Brook Lamprey *Lampetra planeri* [1096] White-clawed Crayfish

Habitat Type	Fossitt Code	Considered in	Linked Annex Habitats and Species
			Austropotamobius pallipes [1092]
Drainage ditches	FW4	**This report**	-
Improved agricultural grassland	GA1	AASR	-
Mosaic: Improved agricultural grassland / Scrub	GA1 / WS1	AASR/EIAR	-
Amenity grassland (improved)	GA2	AASR	-
Dry meadows and grassy verges	GS2	AASR/EIAR	-
Mosaic: Dry meadows and grassy verges / Scrub	GS2 / WS1	AASR/EIAR	-
Mosaic: Wet grassland / Improved agricultural grassland	GS4 / GA1	AASR/EIAR	-
(Mixed) broadleaved woodland	WD1	AASR/EIAR	-
Mixed broadleaved / conifer woodland	WD2	AASR/EIAR	-
Hedgerows	WL1	**This report**	Otter *Lutra lutra* [1355]
Mosaic: Hedgerows / Scrub	WL1 / WS1	**This report**	Otter *Lutra lutra* [1355]
Treelines	WL2	**This report**	Otter *Lutra lutra* [1355]
Wet willow-alder-ash woodland	WN6	**This report**	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) [91E0]
Scrub	WS1	**This report**	Otter *Lutra lutra* [1355]

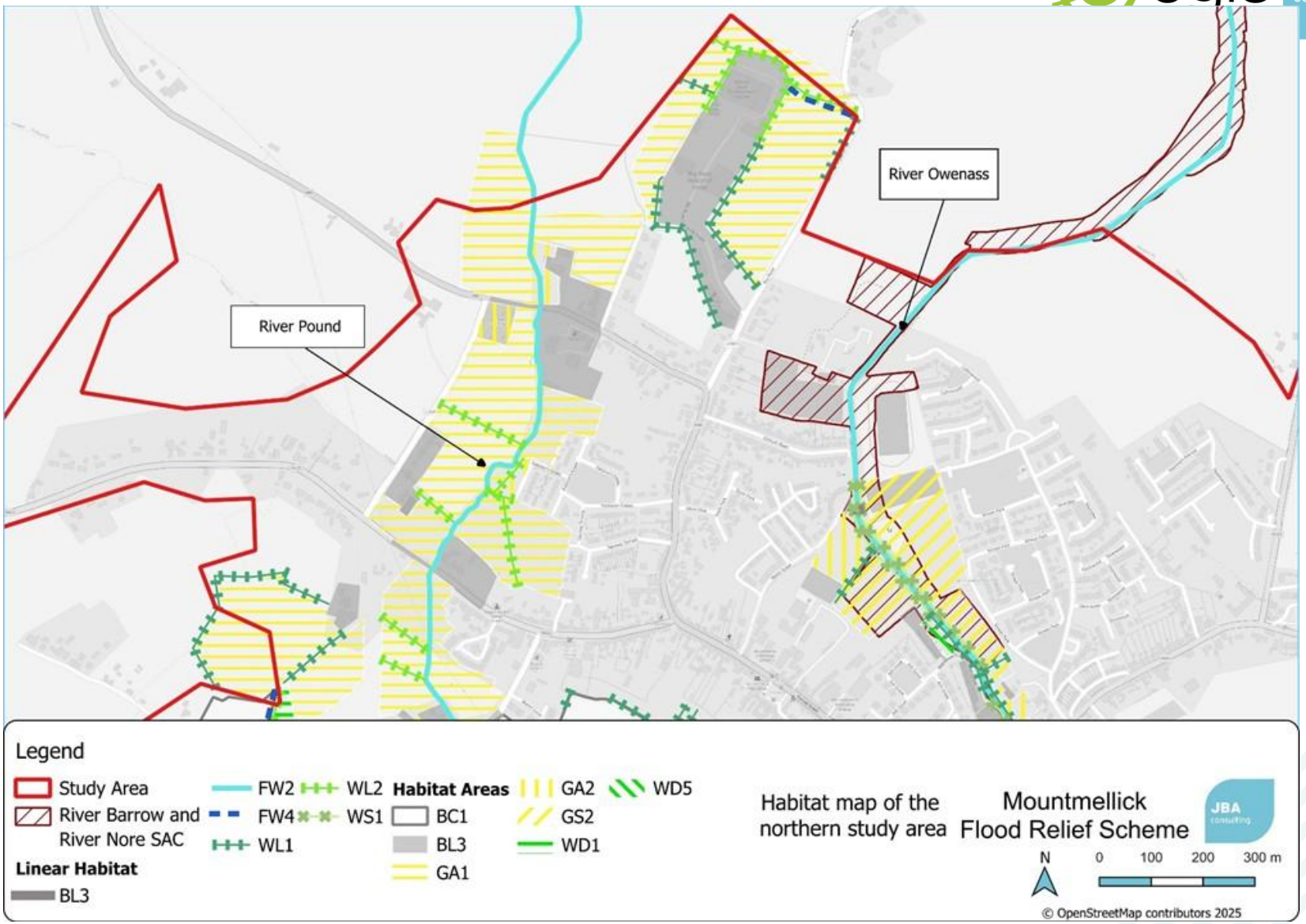


Figure 5-1: Habitat map of the northern study area

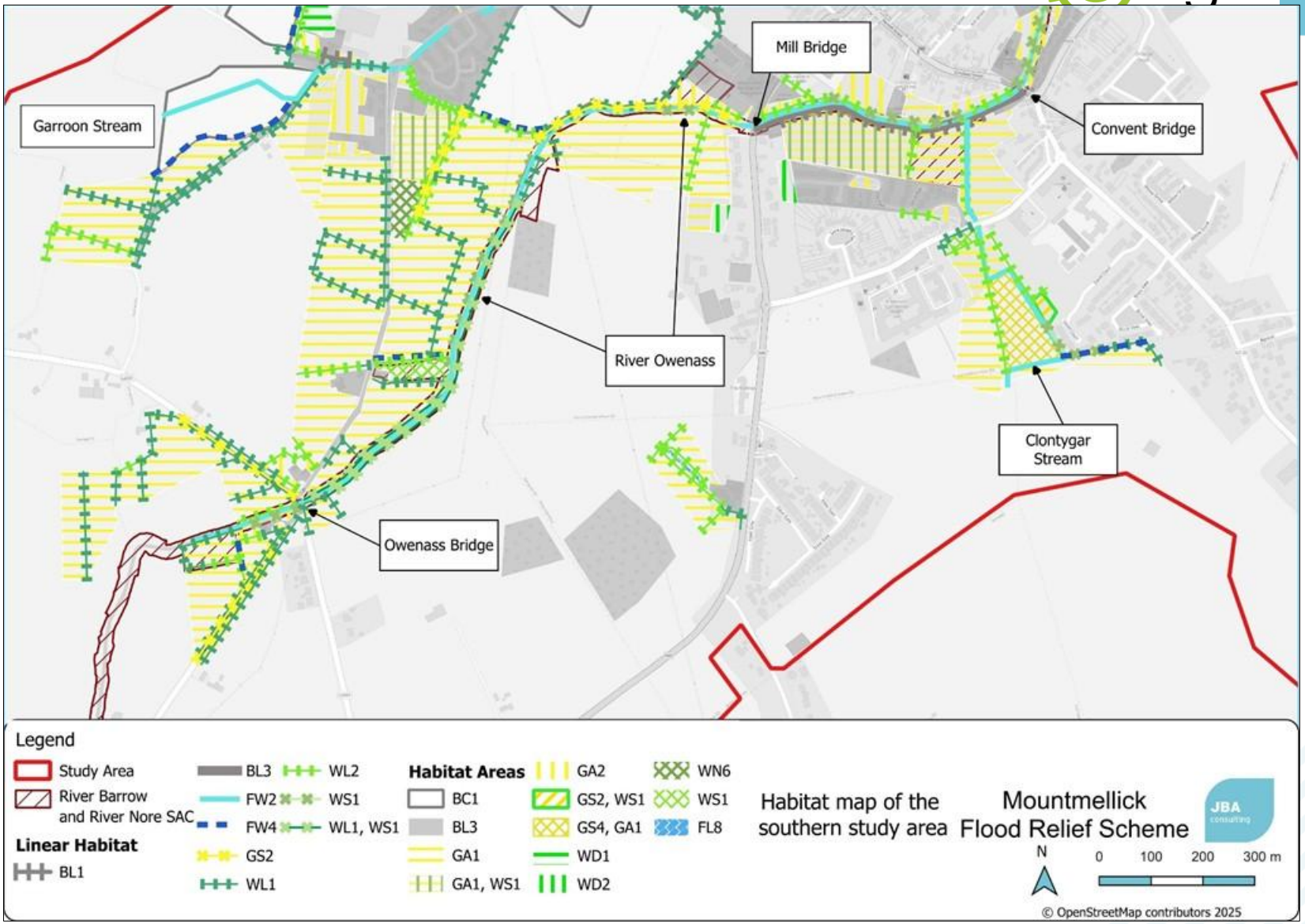


Figure 5-2: Habitat map of the southern study area

5.2.1 Other artificial lakes and ponds FL8

There is a pond located between two treelines just west of the Irishtown Garden Centre, along the N80. The pond was dominated by Duckweed *Lemna* spp., with the pond's banks fringed with Nettle *Urtica dioica*; Bramble; Cow Parsley *Anthriscus sylvestris*; Hogweed *Heracleum sphondylium*; and Willow *Salix* spp. saplings (Figure 5-3). An eDNA analysis of the pond confirmed the presence of Smooth Newt *Lissotriton vulgaris*.

Figure 5-3: A small linear pond enclosed by two bordering treelines

5.2.2 Depositing / lowland rivers (FW2)

The River Owenass displays a mixture of eroding and deposition characteristics within the study area. The instream physical characteristics vary along the river with areas of riffles and small rock weirs with gravel substrate and pool areas with slow flowing water and sandy/silty substrate. There is sparse instream vegetation (Figure 5-4, Figure 5-5).

Herbs and grasses present on the riverbanks include Hedge Bindweed *Calystegia sepium*; Vetches *Vicia* spp.; Bramble; Herb Robert; Ribwort Plantain *Plantago lanceolata*; Hogweed; Butterbur *Petasites hybridus*; Great Willowherb *Epilobium hirsutum*; Nettle, Field Horsetail; Common Knapweed *Centaurea nigra*; Creeping Cinquefoil; Figwort *Scrophularia* spp.; Yarrow *Achillea millefolium;* Ragwort; Thistles *Cirsium* spp.; Meadowsweet *Filipendula ulmaria*; Reed Sweet-grass *Glyceria maxima*; Docks *Rumex* spp.; and the invasive non-native species Montbretia *Crocosmia x crocosmiiflora*; Snowberry *Symphoricarpos albus*; and Traveler's-joy *Clematis vitalba.*

Tree species occur along the river banks include Willow *Salix* spp., Sycamore *Acer pseudoplatanus,* Ash *Fraxinus excelsior,* Black Poplar *Populus nigra*, and Alder *Alnus glutinosa*.

Figure 5-4: The River Owenass upstream of Owenass Bridge

Figure 5-5: The River Owenass upstream of Mill Bridge

The River Pound is a low-energy, relatively small, lowland river which is partly culverted in the built-up area of Mountmellick. The substrate is a mixture of silt, sand and gravel (Figure 5-6). Instream vegetation is abundant and include Fool's Watercress *Apium nodiflorum*, Duckweed spp. and Starwort *Callitriche* spp. Riverbank vegetation comprises Docks; Nettle; Cock's-foot; Meadowsweet; Great Willowherb; Bramble; False Oat-grass; Thistles, Ribwort Plantain; and Yarrow. Hawthorn trees are also sparsely present along the banks of the River Pound.

Figure 5-6: The River Pound south of Manor Road

5.2.3 Depositing / lowland rivers / Drainage ditches (FW2 / FW4)

The Clontygar Stream passes through a mixture of agricultural and wet grasslands in lands south of Mountmellick town, before flowing north into the River Owenass. This stream had been notably channelised / widened resulting in a low energy watercourse; and while its width and substrate would suggest it is a lowland stream, sections of this stream display stagnant water characteristics, resulting in it functioning more like a large drainage ditch system in regard to ecology (Figure 5-7).

Instream vegetation within the Clontygar Stream includes Starworts and Common Reed *Phragmites australis*; with frequent algal matts; while bank vegetation consisted of Cuckoo-flower *Cardamine pratensis*; Marsh Marigold *Caltha palustris* and Common Reed; Yellow Iris *Iris pseudacorus*; Dog-rose *Rosa canina*; Bramble; Horse-Chestnut *Aesculus hippocastanum*; Ash and Hawthorn.

Figure 5-7: The low-energy, channelised section of the Clontygar Stream

5.2.4 Hedgerows (WL1)

Hedgerows occur along roadsides, riverbanks, and field boundaries throughout much of the study area (Figure 5-8). Floral species recorded in this habitat include Hawthorn; Ivy; Ash Elm *Ulmus* spp.; Silverweed; Cotoneaster *Cotoneaster* spp.; Honeysuckle; Nettle; Elder; Holly *Ilex aquifolium*; Field Maple; Privet *Ligustrum* sp.; Bramble; Meadowsweet; Blackthorn; Cleavers; Hogweed; Bush Vetch; and the invasive Sycamore and Snowberry.

Figure 5-8: One of the roadside hedgerows, which will run parallel to one of the proposed western embankments

5.2.5 Mosaic: Hedgerows / Scrub (WL1 / WS1)

Mixed hedgerow and linear scrub section were common along the riverbanks within the study area. Floral species recorded within this habitat included Dog-rose; Bramble; Bush Vetch; Ivy; Ash; Hawthorn; Hogweed; Willow spp.; Field Speedwell; Creeping Cinquefoil; Holly; Meadowsweet; Harts-tongue Fern *Asplenium scolopendrium*; Nettle; Cleavers; Lesser Celandine *Ficaria verna* subsp. *Verna*; Dandelions; Cow Parsley; Docks; Meadow Foxtail; Perennial Ryegrass; Cock's-foot; Snowberry; Sorrel *Rumex acetosa*; Hazel *Corylus avellana*; Meadow Buttercup; Creeping Buttercup; False Oat-grass; Yorkshire Fog; Creeping Thistle; Alpine Rose *Rosa penduline*; Sycamore; Soft Shield-fern *Polystichum setiferum;* Great Willowherb; and Hedge Speedwell *Veronica chamaedrys*.

5.2.6 Treelines (WL2)

Treelines appear mainly along field boundaries (Figure 5-9) and sections of the River Owenass and River Pound. Across these linear treeline habitats JBA Ecologists recorded a range flora, including Grey Willow *Salix cinerea*; Hawthorn; Ash; Crab Apple *Malus sylvestris*; Alder; Beech; English Elm *Ulmus procera*; Larch *Larix* sp.; Sycamore; Bramble; Dog-rose; Elder; Nettle; Great Willowherb; Ragwort; Horse Chestnut; Creeping Thistle; Docks; Ivy; Hogweed; Downy Birch *Betula pubescens*; Meadowsweet; Marsh Marigold; Common Reed; Blackthorn; Cherry *Prunus* sp.; Cow Parsley; Holly; White Willow *Salix alba*; Snowberry; Wood Anemone *Anemone nemorosa*; Field Maple; Male-fern *Dryopteris filix-mas*; Bush Vetch; Cleavers; Yarrow; Scots Pine; and Herb-Robert.

Figure 5-9: One of a number of treelines that border the agricultural grasslands

5.2.7 Scrub (WS1)

Scrub habitat most commonly occurs in small patches or linearly within the study. Floral species present within this habitat type includes Bramble; Elder; Gorse; Yarrow; Bush Vetch; Nettles; Hedge Bindweed; Hogweed; Creeping Thistle; Dock spp., and saplings of Ash; Sycamore and Willows, as well as the invasive Butterfly-bush *Buddleia davidii*; Montbretia; and Snowberry.

5.2.8 Annex I habitats of River Barrow and River Nore SAC

While the riverine habitats within the Scheme contained species of Starwort, which is an indicator of the Annex I habitats "Water courses of plain to montane levels with the Ranunculion fluitanis and Callitricho-Batrachion vegetation" and "Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels", these Annex I habitats were considered to be within the area of the FRS during the ecological surveys due to the overall low presence of Starwort and a lack of overall definition of these habitats. These Annex I habitats however, are known to occur downstream of the site and in the River Barrow. The full distribution of this habitat and its sub-types in this site is currently unknown. The basis of the selection of the SAC for the habitat is the presence of an excellent example of the vegetation community (nutrient-rich type) associated with extensive tufa deposits on the river bed in the Kings tributary of the Nore, both of which were absent from the rivers within the Scheme at the time of surveying. Other examples of this or other sub-types may be present within the SAC (NPWS, 2011)

5.2.9 Protected Fauna

During the ecological surveys, a range of protected fauna were recorded via visual sighting of individuals or observation of scat / spraint / prey remains or recorded birdsong. These species are protected under the Wildlife Act, 1976 and its amendments, and/or Annexes of the EU Habitats Directive and EU Birds Directive. However, only one of these species, namely Otter and Atlantic Salmon, are QIs of the Natura 2000 sites within the development's ZoI. These two species will be examined in greater detail in the below sub-section along

with supporting desktop data. Other QI species (River Lamprey, Brook Lamprey and White-clawed Crayfish) present within the study area as confirmed by existing desktop data and communication with NPWS and IFI, will also be examined further in the below sub-sections. The remaining protected species (Badger *Meles meles*, other smaller mammals, breeding and riparian birds, and European Eel Anguilla Anguilla etc.) will be addressed in the accompanying EIAR's Biodiversity Chapter; and will be examined with regard to potential impacts and mitigations measures.

5.2.10 QI Mammals: Otter

Suspected Otter holts were recorded along River Owenass along the section between Mill Bridge and Convent Bridge. Two of the suspected hosts were located on the left bank side (looking downstream), one next to the children's playground and the other approximately 170m downstream. Upon further inspection, these areas were too shallow to facilitate Otter, however the area was confirmed to be used as a latrine, with fresh spraint recorded at the time of surveying.

Additional potential holts and couches were investigated, one near to the Owenass Bridge in the south-west of the town, and one in the north-east of the town behind the College Avenue housing estate, however, neither of these locations were shown to be Otter holts or couches, though they were occasionally visited and used as latrines (Figure 5-10).

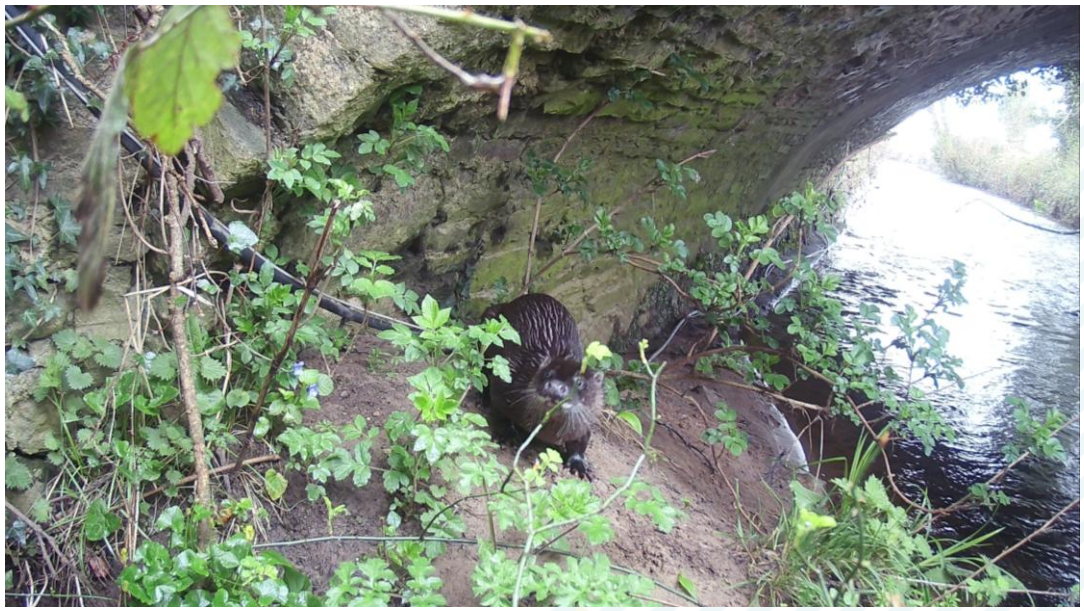


Figure 5-10: Otter using a latrine under the River Owenass Bridge

5.2.11 QI Fish: Atlantic Salmon, River Lamprey and Brook Lamprey

A dedicated fish survey was not conducted by JBA ecologist. During the Otter surveys, the atlas bone of Atlantic Salmon was present within some Otter spraint, indicating the presence of Salmon within the River Owenass. However, the JBA hydromorphology report highlights many key aspects of the river's structure and its provision of habitats for many fish species. Brown Trout *Salmo trutta* was recorded within the River Pound during this survey.

The Garroon Stream was noted to have a bed of sand and gravel. The Owenass was split into seven different areas, containing sand and gravel beds, gravel bar deposits, boulder, cobble gravel and sand near to the walls, riffle pool sequences, sand bars and a larger series of riffle pools near to Owenass Bridge.

The River Pound was identified to have bedding mixture of boulder, sand, cobble, and gravel, with areas of silt deposition and shallow riffle sections, and sand deposits inside of the river bends.

Large materials such as boulders and bars lead to the creation of complex structures and pockets of slower river's flow that allow for rest locations of local fish and additionally lead to the creation of riffle pools and bedding of finer sediments including sand and gravel. These finer materials from sand to silt are utilized by ammocoetes (lamprey). While no fishery survey was taken place, the geomorphology survey highlighted plenty of available habitat for spawning.

Fishery surveys have been conducted by IFI (IFI 2017, IFI 2019, IFI 2021). These surveys recorded Salmon, Brown Trout and lamprey species within the area of the FRS as well as European Eel downstream of the site. The JBA hydromorphological findings listed above have been mapped together with the IFI data and are shown below in Figure 5-11, Figure 5-12, Figure 5-13, and Figure 5-14.

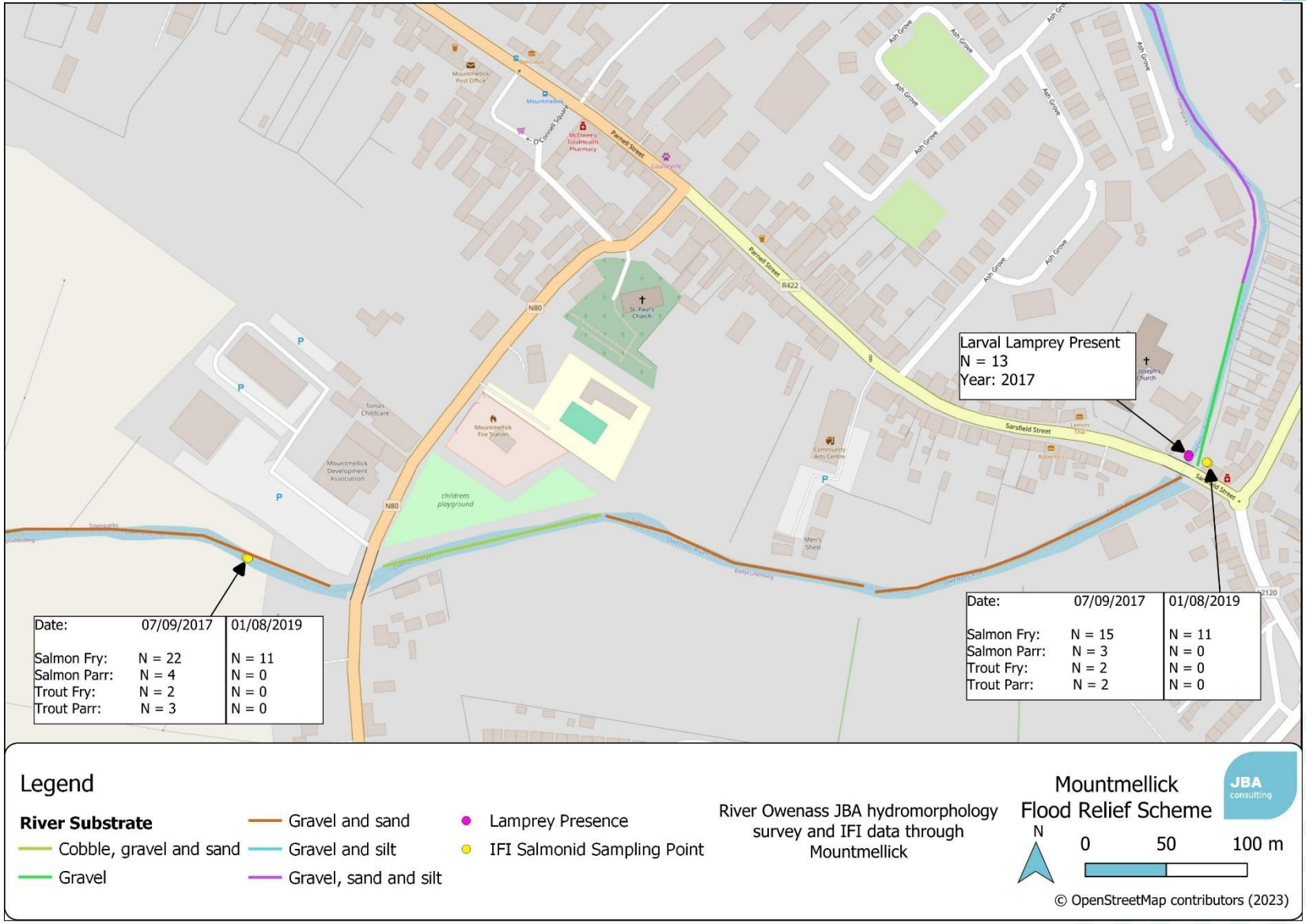


Figure 5-11: River Owenass JBA hydromorphology survey and IFI survey results through Mountmellick

Figure 5-12:River Pound JBA hydromorphology survey and IFI survey results

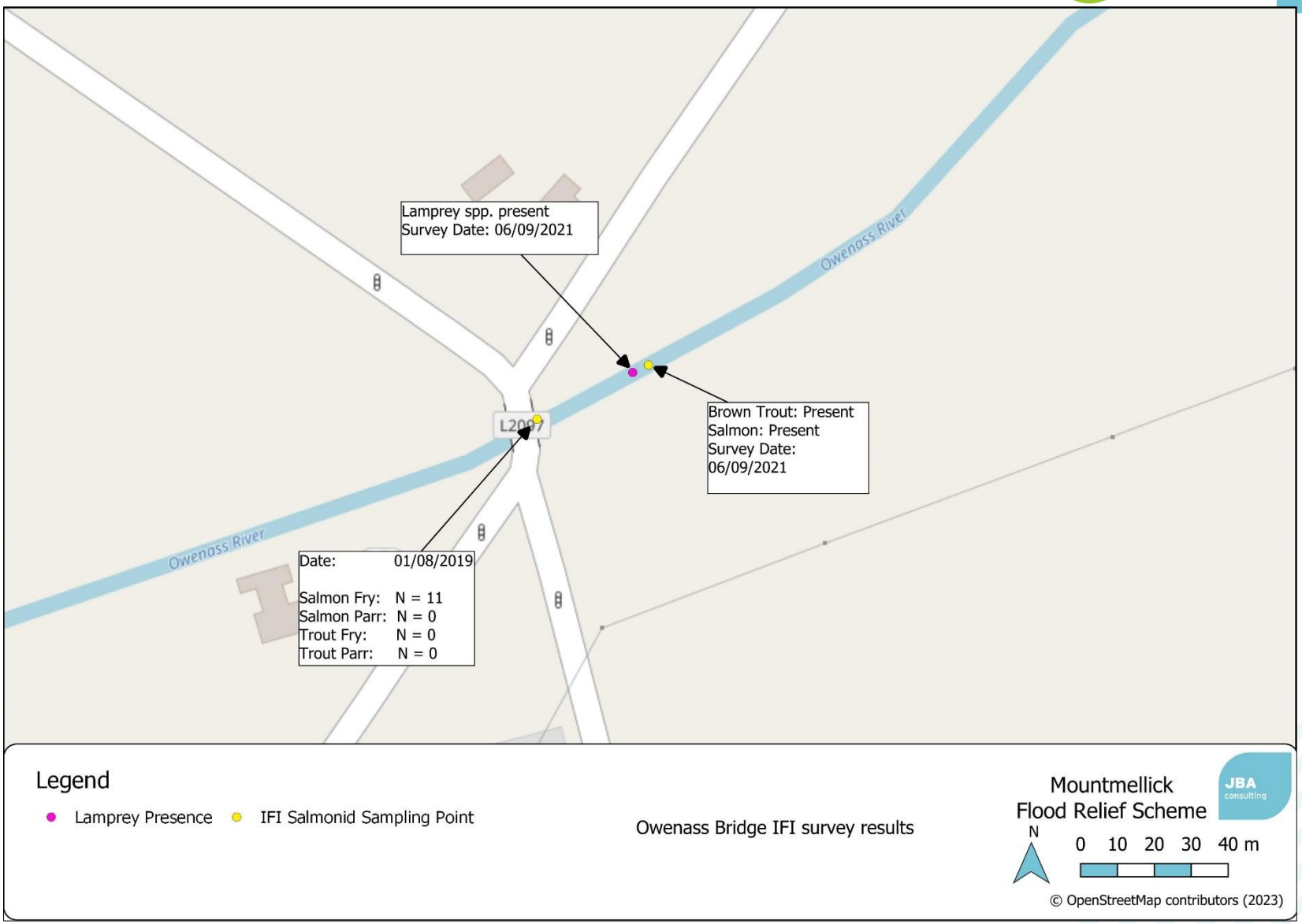


Figure 5-13: River Owenass Bridge IFI survey results

Figure 5-14: Areas of the Garroon Stream with suitable river substrate habitats

A desktop review was carried out to identify the areas of importance for fish within the study area and ZOI. An electro-fishing survey took place in 2021 upstream of Mountmellick, near the Owenass Bridge (IFI, 2022) Fish within the river that were noted during the survey include Brown trout; Dace; Lamprey sp.; Salmon; Stone loach. An additional survey was conducted downstream of Mountmellick, in the River Barrow, which contained the species Lamprey spp.; Minnow and Stone loach.

A fish stock survey was carried out during summer 2015 in the River Barrow catchment, including the sub-catchments Owenass and Triogue (Delanty et al., 2017). Species present in the River Owenass include Brown Trout, Atlantic Salmon, Three-spined Stickleback *Gasterosteus aculeatus*, Dace *Leuciscus leuciscus*, Stone Loach *Barbatula barbatula* and Minnow *Phoxinus phoxinus*. The Fish Ecological Status is classified as **Moderate** and **Poor** at the two survey locations in the river. Owenass was identified as key sub-catchment for Brown Trout spawning and also an important nursery site.

Species present in the River Triogue include the same species as in Owenass and in addition European Eel *Anguilla anguilla* and Gudgeon *Gobio gobio* were recorded. All species found in relatively low densities apart from the Dace which was found in reasonable densities in the two lower sample sites. The Fish Ecological Status in River Triogue is Moderate and Poor. Species present in River Barrow include all the above mentioned and in addition Roach *Rutilus rutilus*, Perch *Perca fluvialtilis*, Pike *Esox lucius* and Flounder *Platicthys flesus* were recorded.

Fisheries Surveys were conducted by Inland Fisheries Ireland in 2019 at the Derrycloney Bridge, located upstream of Mountmellick. Brown trout; Dace *Leuciscus leucisus*; Lamprey sp.; Salmon and Stone loach *Barbatula barbatula* were recorded. It is expected that each of these species are found throughout the scheme area.

A baseline biodiversity survey of the River Owenass located from Convent Bridge and downstream towards the area along its confluence with the River Barrow was performed by WS Atkins Ireland Ltd (2019). During this survey, both nursery and spawning habitats for Lamprey spp were recorded towards the confluence with the River Barrow, while there were also large numbers of adult and juvenile salmon recorded downstream of Convent Bridge, which are all QI species of the River Barrow and River Nore SAC.

5.2.12 QI Aquatic Invertebrates – White-clawed Crayfish

No signs of burrows or no incidental records of White-clawed Crayfish were seen during the surveys, even though suitable habitat was present. A dedicated, White-clawed Crayfish survey was not conducted by JBA ecologist, however, during a hydromorphology survey highlighting key aspects of the river's structure, it was noted that the River Owenass and River Pound both exhibited areas of boulder presence within the water, with boulders being a feature of interest for White-clawed Crayfish as refuge. Additionally, during four Otter surveys, while suitable refuge (boulders and banksides present) there was no incidental recorded White-clawed Crayfish present, nor were there any evidence of White-clawed Crayfish present within the Otter spraint over the span of two years.

A desk-based assessment of White-clawed Crayfish was conducted which came up with records present approximately 4.8km downstream of Mountmellick (NBDC, 2023), while it has also been recorded in River Barrow and River Owenass (NPWS, 2011). The upper stretches of River Barrow and particularly the River Owenass are very important for spawning Salmon (NPWS, 2016).

White-clawed crayfish surveys were conducted in River Owenass in 2003, approximately 5km upstream of Mountmellick. These surveys indicated presence

of White clawed crayfish with a population abundance grade of Moderate (Gammell et al, 2021). White-clawed crayfish were also recorded in 2020 at this same location however Crayfish Plague was also recorded. In 2021, the following year, White-clawed crayfish were no longer recorded at this location. The presence of crayfish plague has likely significantly reduced the White Clawed Crayfish population within the river. (Swords and Griffin, 2022).

The White-clawed Crayfish is on the IUCN Red List as 'Endangered' at a global level (Füreder et al., 2010) protected in Annex II and V of the E.U. Habitats Directive (Nelson, B et al., 2019). White-clawed Crayfish are listed on Annex II and Annex V of the Habitats Directive and the species is protected in Ireland under the Wildlife Acts and is also a QI species for the River Barrow and River Nore SAC.

5.3 Invasive Non-native Species (INNS)

Table 5-2 below provides a list of other invasive non-native species recorded during the ecological surveys on the 12/09/2019, 26/09/2019 and on 11/05/2022, Figure 5-15 displays where they were located. It includes species, their level of impact, and whether they are listed on the Third Schedule of the EC (Birds and Natural Habitats) Regulations 2011 S.I. No. 477/2011. Two species are listed on the Third Schedule; Japanese Knotweed *Reynoutria japonica* and Three-cornered Garlic *Allium triquetrum*. It is important to note that the Japanese Knotweed recorded during the initial 2019 ecological invasive species surveys, has since been treated and while it is no longer seen as a major conservation concern, All About Trees Ltd. & NM Ecology Ltd. (2023) have recommended further treatment to ensure the remaining plants are eradicated. This invasive management plan highlighted that should the works be begun prior to 2024, it was recommended that the remaining Japanese Knotweed within the footprint is excavated and sent off-site and that this would will require a derogation license. Japanese Knotweed it is the most likely invasive species to be accidentally spread downstream, posing a risk to bank stability and biodiversity.

There should be no spread of Third Schedule non-native species within or from the vicinity of the proposed scheme.

Table 5-2: INNS recorded within or immediately adjacent to study area

Invasive Non-Native Species	Impact	Regulation S.I. 477/2011
Japanese Knotweed *Reynoutria japonica*	High	Yes
Cherry Laurel *Prunus laurocerasus*	High	No
Sycamore *Acer pseudoplatanus*	Medium	No
Butterfly-bush *Buddleja davidii*	Medium	No
Traveller's-Joy *Clematis vitalba*	Medium	No
Three-cornered Garlic *Allium triquetrum*	Medium	Yes
Snowberry *Symphoricarpos albus*	Low	No
Montbretia *Crocosmia x crocosmiiflora*	Low	No

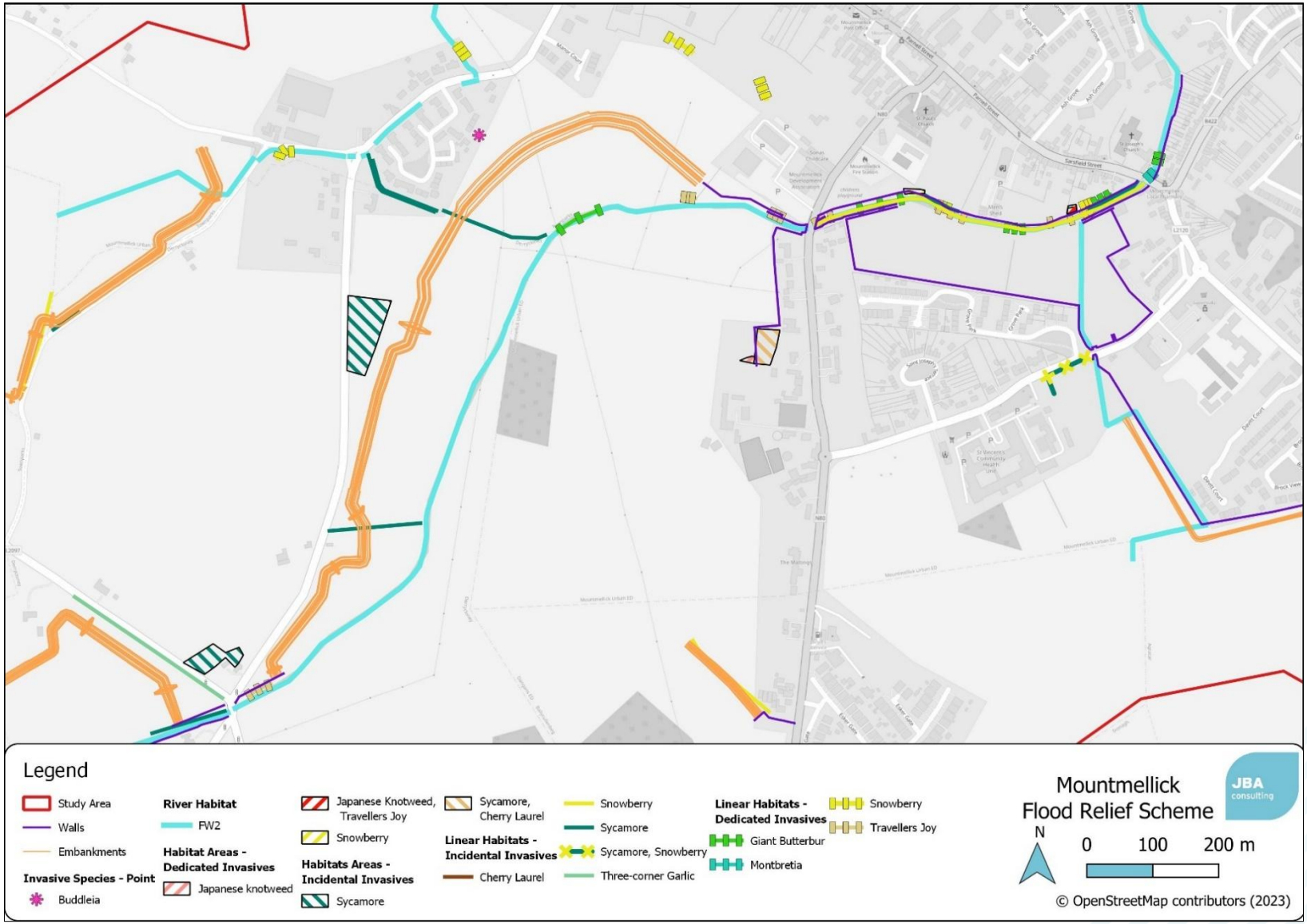


Figure 5-15: Invasive non-native species recorded within the scheme

5.4 Waterbodies within the Vicinity of the Proposed Site

The entirety of the proposed project is located within the Water Framework Directive (WFD) Barrow catchment and is split between the Barrow_SC_010 and Barrow_SC_020 sub-catchments (EPA, 2023). The proposed flood relief scheme will primarily be restricted to River Owenass (Owenass_020 waterbody), while the River Pound (Barrow_040 waterbody) and the Clontygar Stream (Triogue_040 waterbody) will also be affected by the development. All three of these rivers drain into the main body of the River Barrow (Figure 5-16).

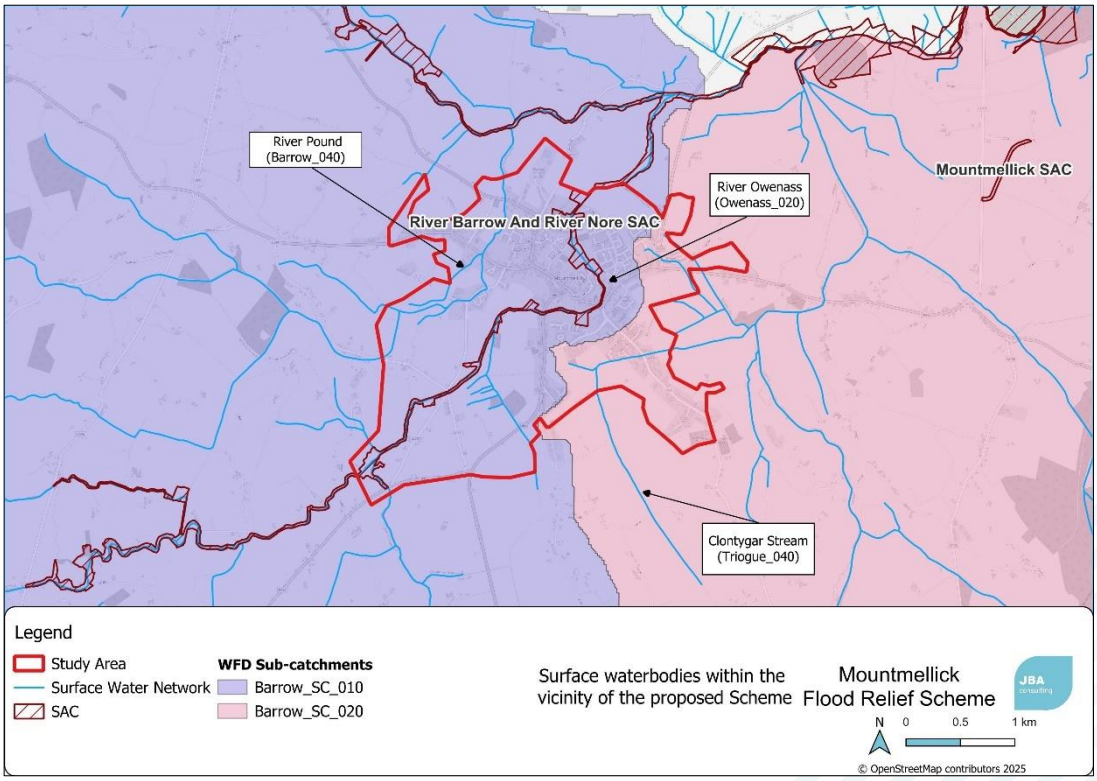


Figure 5-16: Surface waterbodies in the vicinity of site (OSM, 2025)

Other waterbodies that are located within vicinity of the plan's site includes additional segments of the River Barrow (including Barrow_040 through to Barrow_060), and the River Blackwater (Blackwater (Laois)_010), which joins the River Owenass at the southern end of the scheme boundary.

All of these waterbodies, along with their WFD status (2016-2021) and current risk are listed in Table 5 3.

Table 5-3: WFD status and risk of local watercourses

WFD Sub-Catchment	WFD Watercourse	WFD Status	WFD Risk	Approx. Distance from Site
Barrow_SC_010	Barrow_040	Moderate	At Risk	Within site
	Owenass_020	Moderate	At Risk	Within site
	Blackwater (Laois)_010	Good	Not at Risk	A small portion Within site
Barrow_SC_020	Triogue_040	Poor	At Risk	Within site
Barrow_SC_020 / Barrow_SC_030	Barrow_050	Moderate	At Risk	0.5km
	Barrow_060	Moderate	Review	2.4km

5.5 Groundwater

The majority of the site is located within the Portlaoise groundwater body, with a small section within the Rosenallis Gravels groundwater body (Figure 5-17). Both of these groundwater bodies currently hold a 'Good' WFD status (2016-2021); and are considered to be 'Not At Risk' (EPA, 2023).

The underlying bedrock of the site is dominated by dark muddy limestone and shale of the Ballysteen Formation. and the soil is derived of sections of Made Ground, till derived chiefly from limestone, and alluvial soils deposited along the banks of the river waterbodies, while the areas around the town consisting of cut peat. The permeability of the majority of the town's area is classified as moderate, with the north reaches of the town having a high permeability, which can be seen within the vulnerability of the groundwater being moderate for the majority of the town, and a high vulnerability in the north (Figure 5-18). The townland has a largely varied recharge capacity, with the peatland sections having a low recharge capacity of 4%, the areas within the centre of the townland having a low recharge of 20-25%, and the areas of alluvial soil having the highest recharge capacity of 60%.

The aquifer within the underlying bedrock of the entirety of the townland is considered to be Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones. In the context of this site, this means that water that enters the local aquifer will have a low storage and low flow path, and will rapidly discharge to nearby watercourses.

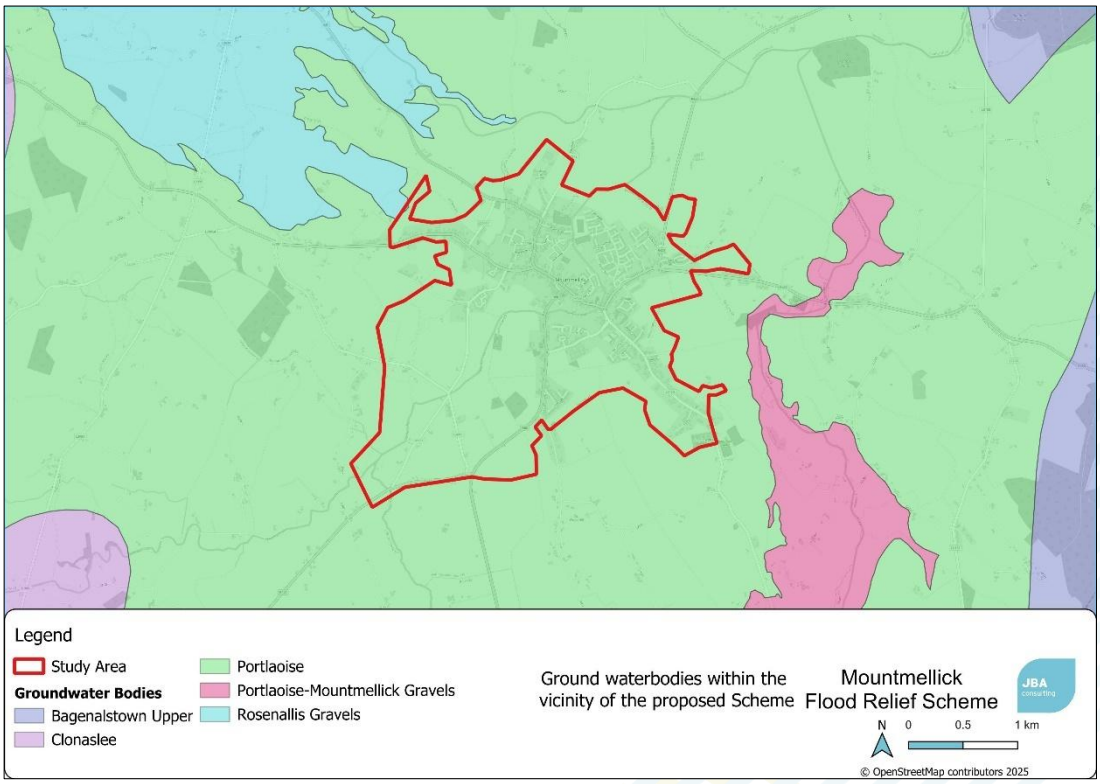


Figure 5-17: Groundwater bodies in the vicinity of site (OSM, 2025)

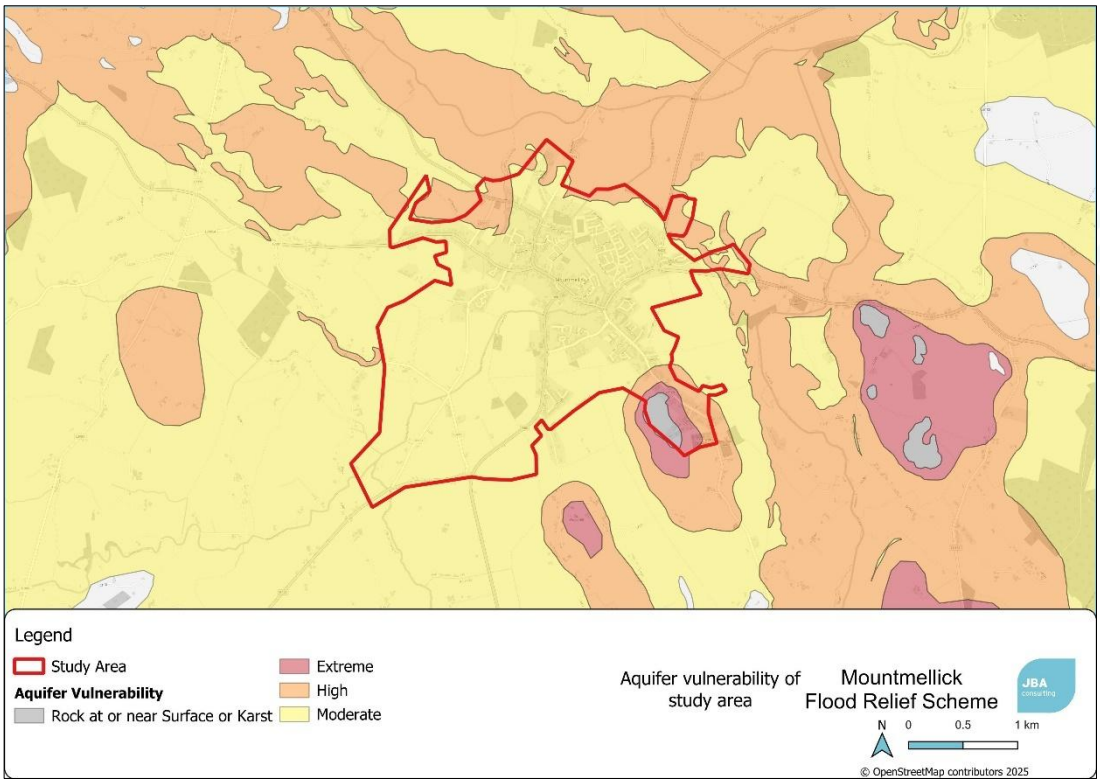


Figure 5-18: Aquifer vulnerability of the study area (OSM, 2025)

6 Other Relevant Plans and Projects

6.1 Cumulative Effects

As part of the Screening for an Appropriate Assessment, in addition to the proposed works, other relevant projects and plans in the region that may induce cumulative effects must also be considered at this stage.

The following projects or plans were identified as potential sources of cumulative effects:

- Laois County Development Plan 2021-2027;
- Third Cycle River Basin Management Plan for Ireland 2022-2027; and
- Planning Applications (retrieved from Data.gov.ie - Planning Application Sites, September 2025).

6.2 Plans

6.2.1 Laois County Development Plan 2021-2027

The purpose of the Plan is to enhance the quality of life for the current and future population of Laois and manage the county in the interests of the common good. Laois County will develop in line with the availability and integration of services, transport, infrastructure and economic activity whilst also preserving its natural environment and amenities (LCC, 2022).

Mountmellick is predicted to have a strong growth during the period of this Plan and will as such act as a base for strong and sustained growth of both settlement and enterprise due to stability and coordination. An Appropriate Assessment Conclusion Statement has been conducted, taking into account Laois County Development Plan 2017-2023, the Strategic Environmental Report and the Natura Impact Report (CAAS Ltd, 2022). The development plan has no provisions for fire management or mowing and grazing regimes, and so there are no sources for effects relating to these impacts.

It has been determined that threats associated with the development plan that may have an impact on the River Barrow and River Nore SAC include: industrial or commercial areas, agricultural intensification, dykes and flooding defence in inland water systems, removal of hedges and coppices or scrub, fishing and harvesting aquatic resources, Sand and gravel quarries, reduction in migration or migration barriers, forestry activities not referred to above, invasive non-native species, peat extraction, netting, forest replanting (native trees), human induced changes in hydraulic conditions, port areas, changes in abiotic conditions, modifying structures of inland water courses, leisure fishing, pollution to surface waters (limnic and terrestrial; marine and brackish), forest and plantation management & use, intensive cattle grazing, dredging or removal of limnic sediments, water abstractions from surface waters, use of fertilizers (forestry), intensive fish farming, intensification, erosion.

Of these impacts, a series of policy objectives have been incorporated to mitigate these potential effects. The objectives and policies have been outlined below. None of these objectives or policies have been determined to have potential interaction with the Mountmellick FRS.

Policies and objectives concerned with direct land take include:

- BNH 1: Protect, conserve, and seek to enhance the county's biodiversity and ecological connectivity.
- BNH 2: Conserve and protect habitats and species listed in the Annexes of the EU Habitats Directive (92/43/EEC) (as amended) and the Birds Directive (2009/147/EC), the Wildlife Acts 1976 and 2010 (as amended) and the Flora Protection Orders.

- BNH 3: Support and co-operate with statutory authorities and others in support of measures taken to manage proposed or designated sites in order to achieve their conservation objectives and maintain the favourable conservation status and conservation value of Sites under National and European legislation and International Agreements and maintain and /develop linkages between them where feasible.
- BNH 4: Protect and maintain the conservation value of all existing and future Natural Heritage Areas, Nature Reserves, Ramsar Sites, Wildfowl Sanctuaries and Biogenetic Reserves in the county.
- BNH 5: Projects giving rise to significant cumulative, direct, indirect or secondary impacts on Natura 2000 sites arising from their size or scale, land take, proximity, resource requirements, emissions (disposal to land, water or air), transportation requirements, duration of construction, operation, decommissioning or from any other effects will not be permitted on the basis of this Plan (either individually or in combination with other plans or projects). Screening for AAs and AAs undertaken shall take into account invasive species as relevant.

Processes involving the removal of hedgerows or coppicing will be managed in according with policy objectives:

- BNH 19: Specific to areas of Green Infrastructure are identified, protected, enhanced, managed and created to provide a wide range of environmental, social and economic benefits to communities.
- BNH 20: Develop and implement a Green Infrastructure Strategy for Laois in partnership with key stakeholders and the public which reflects a long-term perspective, including the need to adapt to climate change. Ensure the Green Infrastructure Strategy for Laois protects existing Green Infrastructure resources and plans for future Green Infrastructure provision.
- BNH 21: Require all Local Area Plans and Master Plans to protect, enhance, provide and manage Green Infrastructure in an integrated and coherent manner. Set targets for the provision of Green Infrastructure elements such as trees and green roofs as part of the preparation of Local Area Plans.
- BNH 22: Promote a network of paths and cycle tracks to enhance accessibility to the Green Infrastructure network, while ensuring that the design and operation of the routes respect and where possible enhances the ecological potential of each site.
- BNH 23: Encourage, pursuant to Article 10 of the Habitats Directive, the management of features of the landscape, such as traditional field boundaries and laneways, important for the ecological coherence of the Natura 2000 network and essential for the migration, dispersal and genetic exchange of wild species.
- BNH 24: To identify and map Green Infrastructure assets and sites of local biodiversity value over the lifetime of the Plan.
- BNH 25: Undertake a study within the lifetime of the Plan and for all Local Area Plans to document and map significant trees and groups of trees that require preservation and prepare Tree Preservation Orders for individual trees, groups of trees or woodland areas where expedient and in the interests of visual amenity, biodiversity and the environment.

- BNH 26: Protect individual trees, groups of trees and woodland in the interests of landscape conservation (including townscapes) and nature conservation as part of the development management process.
- BNH 27: Protect existing hedgerows, particularly of historical and archaeological importance of townland boundaries, from unnecessary removal in order to preserve the rural character of the countryside ad promote biodiversity.
- BNH 28: Ensure that hedgerow removal to facilitate development is kept to an absolute minimum and, where unavoidable, a requirement for mitigation planting will be required comprising a hedge of similar length and species composition to the original, established as close as is practicable to the original and where possible linking in to existing adjacent hedges. Native plants of a local provenance should be used for any such planting.
- BNH 29: Promote and develop urban forests in parkland and street trees in urban settlements to enhance public realm and increase tree canopy coverage and diversity.
- BNH 30: Ensure that hedgerow and mature tree removal to facilitate development is kept to an absolute minimum and, where unavoidable, a requirement for mitigation planting will be required comprising a hedge of similar length and species composition to the original, established as close as is practicable to the original and where possible linking in to existing adjacent hedges. Native plants of a local provenance should be used for any such planting.

Habitat connectivity will be maintained through the policy objectives of:

- BNH 15: In dealing with applications for new developments, the Planning Authority will have regard to the inclusion of swift nesting opportunities in new buildings through use of swift brick or swift nest boxes where appropriate.
- LCA 17: Maintain the rivers throughout the county whilst ensuring that all works are carried out subject to appropriate environmental assessment in accordance with Article 6 of the Habitats Directive, in respect of any proposed development likely to have an impact on a designated natural heritage site, site proposed to be designated and any additional sites that may be designated during the period of this Plan.
- LCA 18: Preserve riverside historic features and their landscape settings and Conserve valuable habitats focused on and around river corridors and estuaries including European and national designations.
- LCA 19: Recognise the potential constraints on development created by river flood plains and the value of these flood plains as increasingly rare habitats.
- LCA 25: Support the identification of projects that have the potential to achieve commercial value such as industrial developments, renewable energy, tourism developments etc. while at the same time promoting high environmental standards and supporting Biodiversity objectives.

Surface and groundwater are not to receive adverse effects due to the correct implementation of the objectives:

- ABT 6: Promote and investigate the feasibility of, subject to compliance with the habitats and Birds Directives, sustainable developing and improving of facilities and infrastructure supporting water based tourism activities, (including shore side interpretive centres and jetties). Development proposals outside settlement centres will be required to demonstrate a need to locate in the area and will be required to ensure that the ecological integrity and water quality of the river or lake, including lakeshore and riparian habitats, is not adversely affected by the development.
- WS 3: Protect both ground and surface water resources and to work with Irish Water to develop and roll-out Drinking Water Safety Plans across all water schemes to protect sources of public water supply and their contributing catchments and to ensure that good water quality is sustained in all public water supplies.
- WS 21: Continue to draw up and implement annual programmes for the monitoring of water quality in Group Water Schemes in accordance with the European Union (Drinking Water) Regulations 2014, as amended and as approved by the EPA.
- ES 17: Implement the provisions of water pollution abatement measures in accordance with National and EU Directives and other legislative requirements in conjunction with other agencies as appropriate.
- ES 18: Maintain and improve the water quality in rivers and other water courses in the county, including ground waters. The Council will have cognizance of, where relevant, the EU's Common Implementation Strategy Guidance Document No. 20 and 36 which provide guidance on exemptions to the environmental objectives of the Water Framework Directive.
- ES 19: Minimise the impact on groundwater of discharges from domestic wastewater treatment systems and other potentially polluting sources. The Council will comply with the Environmental Protection Agency's 'Code of Practice: Wastewater Treatment and Disposal Systems Serving Single Houses' (2009) and the Environmental Protection Agency's 'Code for Treatment Systems for Small Communities, Business, Leisure Centres and Hotels'.
- ES 20: Assist and support with the Blue Dots Catchment Programme which been established under the current River Basin Management Plan specifically for the protection and restoration of high ecological status water bodies.
- ES 21: Ensure the protection of all High Status Water Bodies in the county by complying with the requirements of the Local Government (Water Pollution) Act 1977, (as amended), the Nitrates Directive (91/676/EEC), the European Communities Environmental Objectives (Surface Waters) Regulations 2009, the European Communities (Groundwater) Regulations 2010 which standards and objectives are included in the River Basin Management Plans, and other relevant Regulations.
- WS 22: Ensure where private wastewater treatment systems are permitted by virtue of their remoteness from Public Wastewater Schemes to serve commercial and business developments, e.g. Motorway Service Stations, Tourism and the Hospitality Sector etc, that their performance is monitored and audited so that they are operated in compliance with their wastewater discharge license, in order to protect water quality.

- ES 23: Ensure, through the implementation of the relevant River Basin Management Plan and their associated Programmes of Measures and any other associated legislation, the protection and improvement of all drinking water, surface water and ground waters throughout the county.
- ES 24: Protect and develop, in a sustainable manner, the existing groundwater sources and aquifers in the County and control development in a manner consistent with the proper management of these resources, in accordance with the County Water Source Protection Zones.
- ES 25: Assist and co-operate with the EPA, LAWPRO and IW in the Continued implementation of the EU Water Framework Directive.
- ES 26: Minimise the impact on groundwater of discharges from septic tanks and other potentially polluting sources through compliance with the Environmental Protection Agency's 'Code of Practice: Wastewater Treatment and Disposal Systems Serving Single Houses' (2009).
- ES 27: Ensure the protection of groundwater dependant Natura 2000 sites which rely on the continued supply of groundwater resources to secure the key environmental conditions that support the integrity of the site and through the protection of groundwater standards as defined by the National River Basin Management Plan 2018 – 2021 (and any subsequent Plan). Where no detailed Plan for protection of a specific source is available wastewater discharge will not be permitted within a radius of 200 metres of that source.
- ES 28: Ensure that Source Protection Areas are identified for any public and group scheme water supplies or multiple unit housing developments with private water supplies.
- ES 29: Continue efforts to improve water quality under the Local Government (Water Pollution) Act 1977, (as amended) and by implementing the measures outlined under the Nitrates Directive (91/676/EEC) and complying with the requirements of the Surface Water Legislation Environmental Objectives (Surface Waters) Regulations 2009, the European Communities (Groundwater) Regulations 2010; which standards and objectives are included in the River Basin Management Plans, and other relevant Regulations.
- ES 30: Ensure that all industrial development is appropriately located, to seek effluent reduction and 'clean production' where feasible, and require that waste water treatment facilities are adequate, and that effluents are treated and discharged in a satisfactory manner.
- ES 31: New developments which include on-site wastewater treatment in an Extreme Vulnerability Inner Source Protection Area shall be restricted to the following categories:
    - a. A dwelling for a full-time farmer;
    - b. An existing inhabited dwelling in need of replacement;
    - c. A second family dwelling on a farm where this is required for management of the farm.
- Permission may be granted in the above instances subject to the following stipulations:
    - a. That an alternative site outside the Extreme vulnerability Inner Protection Area is not available;

- b. The existing water quality of the source is not subject to any significant nitrate and /or microbiological contamination; and
- c. The existing water quality of the groundwater source is in compliance with the environmental objectives set out in relevant River Basin District Management Plan.

- ES 32: Control intensive agriculture development e.g. intensive pig unit productions in order to minimise their impact on soil and ground water quality. Developments involving intensive pig units shall be required to show compliance with the following requirements:
  - a. The developer shall demonstrate that all lands available are suitable for land spreading of manures and have satisfactory Nutrient Management Plans for such lands;
  - b. Satisfactory arrangement for storage, management and spreading of slurries are provided.
- ES 33: Encourage the use of catchment-sensitive farming practices, in order to meet Water Framework Directive targets, European Union (Good Agricultural Practice for Protection of Waters) Regulations 2017, as amended and comply with the relevant River Basin Management Plan.
- ES 34: Consult as necessary with other competent authorities with responsibility for environmental management.
- ES 35: To work in co-operation with relevant organisations and major stakeholders, to ensure a co-ordinated approach to the protection and improvement of the county's water resources.
- ES 36: Ensure that developments that may adversely affect water quality will not proceed unless mitigation measures are employed, such as settlements ponds, interceptors etc.
- ES 37: Promote public awareness of water quality issues and the measures required to protect both surface water and groundwater bodies.

While there are no provisions for mowing or grazing regimes, there will be the promotion of agricultural activities, however these agricultural activities will be managed and appropriately mitigated through the implementation of policy objectives:

- ES 32 and ES 33, as mentioned above.

There are policies in place to handle the management of peatlands, including:

- LCA 23: Recognise the importance of peatlands for ecology, history, culture and for alternative energy production.
- LCA 24: Conserve valuable habitats including any European and national designations.
- LCA 25: Support the identification of projects that have the potential to achieve commercial value such as industrial developments, renewable energy, tourism developments etc. while at the same time promoting high environmental standards and supporting Biodiversity objectives.
- LCA 26: Support the restoration of peatlands on suitable sites.
- LCA 27: Recognise that intact boglands are critical natural resources for ecological and environmental reasons and recognise that cutaway and cut-over boglands represent degraded landscapes and/or

brownfield sites and thus are potentially robust to absorb a variety of appropriate developments.

- BNH 31: Protect waterbodies and watercourses from inappropriate development, to ensure they are retained for their biodiversity and flood protection values and to conserve and enhance where possible, the wildlife habitats of the County's rivers and riparian zones, lakes, canals and streams which occur outside of designated areas to provide a network of habitats and biodiversity corridors throughout the county.
- BNH 32; Promote and develop the Barrow Blueway initiative and work with State Agencies, landowners, local communities and other relevant groups to protect and manage inland waters, river corridors and their floodplains from degradation and damage, and to recognise and promote them as natural assets of the urban and rural environment.
- BNH 33: Promote and Facilitate the development of the Grand Canal for cycling, walking and nature study in conjunction with the relevant bodies including Waterways Ireland to enhance its amenity. Investigate the possibility of developing long distance walking routes/Greenway, within the lifetime of the Plan, along the disused Mountmellick Grand Canal Line.
- BNH 34: Protect riparian corridors by reserving land along their banks for ecological corridors and maintain them free from inappropriate development. Where developments are proposed adjacent to waterways in previously undeveloped areas, the Planning Authority will require a general setback distance of a minimum of 10 metres from the waterways edge, subject to site-specific characteristics and the nature and design of the development. In previously developed areas, for example, within town centres, this general setback distance is likely to be reduced and should be part of any pre-planning consultations with the Council.
- BNH 35: Require that development along rivers set aside lands for pedestrian routes and cycleways that could link to the broader area and established settlements in the area.
- BNH 36: Provide for public access to waterways where feasible and appropriate, in partnership with the National Parks and Wildlife Service (NPWS), Waterways Ireland and other relevant stakeholders, whilst maintaining them free from inappropriate development, subject to Ecological Impact Assessment and Appropriate Assessment, as appropriate.
- BNH 37: Protect the Nore Pearl Mussel through the measures set out in the Freshwater Pearl Mussel Nore Sub-Basin Management Plan (2009).
- BNH 6.

Overarching developmental Policies including DM HS 19 and Objective BHM 5 will require the developments within residential areas will require a landscape plan and Screening for AA or NIS to both account for invasive species.

It has been determined that the risk of impact on any QIs and conservation objectives of all European Sites have been addressed by the inclusion of mitigation measures within the County Development Plan. Avoidance of effects is prioritised, and mitigation implemented where it cannot be avoided. In addition, any lower level plans and projects arising through the implementation

of the Plan will themselves be subject to relevant stages of Appropriate Assessment when further details of design and location are known.

Therefore, the Laoise County Development Plan 2021-2027 is not anticipated to contribute to cumulative or on-combination effects.

6.2.2 Third Cycle River Basin Management Plan for Ireland 2022-2027 (DoHPLG, 2022)

The first cycle of River Basin Management Plans included the Eastern River Basin District - River Basin Management Plan (ERBDMP) 2009 – 2015 (WFD (2010). The plans summarised the waterbodies that may not meet the environmental objectives of the WFD by 2015 and identified which pressures are contributing to the environmental objectives not being achieved. The plans described the classification results and identified measures that can be introduced in order to safeguard waters and meet the environmental objectives of the WFD.

- Prevent deterioration of water body status.
- Restore good status to water bodies.
- Achieve protected areas objectives.
- Reduce chemical pollution of water bodies.

The 2nd cycle River Basin Management Plan (RBMP) for Ireland 2018-2021 sets out the actions that Ireland will take to improve water quality and achieve 'good' ecological status in water bodies (rivers, lakes, estuaries and coastal waters) by 2021 (DoHPLG, 2018a). Changes from previous River Basin Management Plans is that all River Basin Districts are merged as one national River Basin District. The Plan provides a more coordinated framework for improving the quality of our waters — to protect public health, the environment, water amenities and to sustain water-intensive industries, including agri-food and tourism, particularly in rural Ireland.

The 3rd and current cycle aims to build on the initiatives of the second cycle, particularly the governance and implementation structures, and to improve the establishment of Irish Water, An Forum Uisce, the Local Authority Waters Programme and the Agricultural Sustainability Support and Advisory Programme.

The 3rd cycle draft Catchment Report for Barrow Catchment (EPA, 2021) identified that between Cycles 2 and 3 there has been an overall slight decline in the catchment's status. The overall change in quality between Cycles 2 and 3 include three waterbodies achieving a High Status, which is an increase one, 91 which are achieving a Good Status which is a decrease by six between Cycles, 51 achieving a Moderate Status which is an increase by two waterbodies, 24 achieving a Poor Status which is an increase by five waterbodies between Cycles, and the number of waterbodies achieving a Bad Status remains unchanged.

Given the nature of the Third-Cycle River Basin Management Plan for Ireland it is not anticipated to contribute to cumulative or on-combination effects in respect to the proposed development.

6.3 Other Projects

Other projects dating back three years, which are not retention applications, home extensions and/or internal alterations (except where they are taking place adjacent to or in close proximity to the proposed defences) that have potential overlapping construction (i.e., 2025 onwards) and short-term residual effect phases with the proposed development are listed in Table 6-1and shown in Figure 6-1.

Table 6-1: Other projects within the locality which may have an accumulative effect on the development of the project

Planning Reference	Location	Description	Application Status	Rationale
22568	Davitt Road, Mountmellick, Co. Laois.	A) demolish existing building, B) build 32 two bedroom apartments, in four, two storey blocks, C) bin bays and cycle shelters, D) 61 parking spaces, E) site entrance and all associated site works. The planning application may be inspected, or purchased at a fee not exceeding the reasonable cost of making a copy, at the offices of the planning authority during its public opening hours. Note: a Natura impact statement will be submitted to the planning authority with the application and the natura impact statement will be available for inspection or purchase at a fee not exceeding the reasonable cost of making a copy during office hours at the office of the relevant planning authority.	Permission granted (conditional) 23/8/2023	**Potential impacts from this development include contaminated sewage and surface water discharges to the River Owenass, contamination of infill material into the spread of Japanese Knotweed. Mitigation measures including the eradication of Japanese Knotweed, separation of the combined sewer system into a separate surface and sewer water system, and the utilisation of a silt interceptor prior to the attenuation of runoff. The implementation of these measures will prevent any effect on any Natura 200 sites**
19558	Cullenbeg Park, Ballycullenbeg, Mountmellick	construct 70 no. 2-storey houses and associated site development works. The houses proposed will consist of 2 no. 4-bedroom end-of-terrace houses, 41 no. 3-bedroom terraced houses and 27 no. 2-bedroom terraced houses in 16 no. 2-storey blocks. A Natura Impact Statement has been prepared in respect of this application	Permission granted 05/10/2020. Expires 04/10/2025	**Potential impacts from the development include the contamination and pollution of the River Owenass due to concrete and cement. Suspended solid or, hydrocarbons and chemicals entering the local waterbody and impacting on local flora and fauna.** **Mitigation measures in place include concrete and cement management protocol, the addition of a silt fence and stockpiling of materials, and scheduled fuelling to occur in the furthest point away from the River Owenass. The implementation of these**

Planning Reference	Location	Description	Application Status	Rationale
				measures will prevent any effect on Natura 2000 sites
20208	St Vincent's Hospital, Ballycullenbeg, Mountmellick	construct a new build 50 bed unit for the replacement of existing beds including support services, associated site works, reconfiguration/ upgrade landscaping works and associated minor works	Permission granted 12/10/2020. Expires 11/10/2025	**Project is located in an urban environment will be subject to having mitigations in place to reduce dust, noise and water pollutants which will prevent any in-combination impacts**
21204	Townparks, Mountmellick, Co. Laois	construct a dwelling house, detached domestic garage / shed, waste water treatment system and all associated site works	Permission granted 24/06/2021. Expires 23/06/2026	**Lack of connection between the Plan and Natura 2000 site QIs and no in-combination impacts are anticipated**
19428	Patrick Street, Mountmellick, Co. Laois	construct a 62 bedroom two-storey nursing home, 8 two storey step down apartment units, landscaped gardens, parking area, service yard, refuse areas, esb transformer room, new service connections and all ancillary work	Permission granted 09/10/2020. Expires 06/07/2026.	**Project is located in an urban environment will be subject to having mitigations in place to reduce dust, noise and water pollutants which will prevent any in-combination impacts**
16536	Acragar, Mountmellick, County Laois	erect a 4.2MVA solar farm comprising photovoltaic panels on ground mounted frames, four single storey inverter/transformer stations, one single storey terminal station, one single storey electrical switchroom, security fencing, CCTV and all associated ancillary development works	Permission granted 30/01/2017. Expires 29/01/2027	**Lack of connection between the Plan and Natura 2000 site QIs and no in-combination impacts are anticipated**
16505	Sronagh, Mountmellick, Co. Laois	construct for 10 years a Solar PV Energy Development comprising installation of photovoltaic panels on ground mounted frames/ support structures; underground cabling and ducting; 3 no. inverter/ transformer stations with 2 no. HV cabins; 1 no. communications and storage structure; 2 no. substations; perimeter (stock proof) security fencing (2m high, c. 13.91 hectares); CCTV security cameras; site access road; landscaping and all associated ancillary site development works. Temporary works will also include a construction compound and passing-bay adjoining the existing access road	Approved 20/07/2017. Expires 19/07/2027	**Lack of connection between the Plan and Natura 2000 site QIs and no in-combination impacts are anticipated**
216	Ballycullenbeg, off Harbour Street, Mountmellick	develop 54 dwelling units comprising of the following: 1. 48No. dwellings in terraces of 4 dwellings, comprising of 22No. 3 bedroom 2 storey end-terrace units, 14 No. 3 bedroom 2 storey mid-terrace units, 8No. 2 bedroom 2 storey mid-terrace units, 2No, 2 bedroom bungalow end-terrace units & 2No, 2 bedroom bungalow mid-terrace units, and 6No. semi-detached 3 bedroom 2 storey dwellings. 2. Remove part of existing boundary screen wall and create new entrance road, vehicular entrances	Approved 25/01/2022. Expires 15/12/2027	**Project will have mitigations in place to reduce dust, noise and water pollutants which will prevent any in-combination impacts**

Planning Reference	Location	Description	Application Status	Rationale
		and footpaths onto Grange Hall. Continue the existing entrance wall facing onto Harbour street to No. 1 Harbour Street and returning alongside No. 1 Harbour Street. 3. Installation of all necessary and associated site works to include foul drains connecting onto Harbour Street and surface water drains with underground attenuation connecting to existing watercourse, telecommunications, water and service ducts, roadways, footpaths, green spaces, landscaping, public lighting, ESB and communications mini-pillars, car parking, signage, bin storage areas etc.		
22439	Townparks, Mountmellick, Co.Laois	construct 49 dwelling units consisting of 23 no. House Type A (3 bedroom semi-detached house), 4 no. House Type B (3 bedroom semi-detached house), 8 no. House Type C Duplex units (1 bed dwelling), 10 no. House Type D (2 bedroom semi-detached house), 2 no. House Type H (2 bedroom single storey semi-detached house), 1 no. House Type F (2 bedroom two storey semi-detached house), 1 no. House Type G (3 bedroom two storey semi-detached house), 1 no. communal refuse storage pavilion, bicycle storage, provision of internal roads and footpaths, surface level car parking, entrance point to adjoining public roads, pedestrian links, public lighting, landscaping, public open space, boundary treatments, provision of foul and surface water disposal, upgrade works and traffic calming to surrounding road network and all associated site works - A Natura Impact Statement (NIS) has been prepared in respect of the proposed development and accompanies this application	Approved 08/05/2023. Expires 07/05/2028.	**Potential impacts from the development include the contamination and pollution of the River Owenass through the release of uncured concrete, hydrocarbons and infiltration of runoff.** **Mitigation measures in place include the adoption of a water control protocol following best practices and the reseeding of the banks as soon as possible to allow for early stabilisation of the banks, along with the inclusion of a silt fence and daily inspections, the storage of materials, equipment, materials and the preparation works for construction (fuelling, cement mixing) will take place away from the River. The implementation of these measures will prevent any effect on Natura 2000 sites.**
2078	Townlands of Dernacart Forest Upper & Forest Lower, Co. Laois	construct up to 8 no. wind turbines with a tip height of up to 185 metres and all associated foundations and hardstanding areas; 1 no. on-site electrical substation; 1 no. temporary construction compound; all associated underground electrical and communications cabling connecting the turbines to the proposed on-site electrical substation; provision of new site access tracks and upgrading of existing access	Permission refused 30/04/2021. Approved by ABP 03/01/2024. Expires	**Lack of connection between the Plan and Natura 2000 site QIs and no in-combination impacts are anticipated**

Planning Reference	Location	Description	Application Status	Rationale
		tracks and associated drainage; erection of 1 no. permanent meteorological mast of up to 110m in heights; works to facilitate the delivery of turbines adjacent to the N80 within the townlands of Dernacart and Forest Upper to include the laying of temporary surfacing; tree felling; and all associated site development works, ancillary works and equipment. Permission is sought for a period of 10 years and an operational life of 30 years from the date of commissioning of the entire wind farm. An Environmental Impact Assessment Report (EIAR) and a Natura Impact Statement (NIS) have been prepared in respect of the proposed development.	02/01/2024.	
2460542	Townparks and Smiths Field, Ballycullenbeg, Mountmellick, Co. Laois	Carry out development which will consist of the replacement of the existing grass pitch by a new Astro turf playing surface, new perimeter fencing to pitch, new footpaths and public lighting, new footbridge over the River Owenass linking Townparks and Ballycullenbeg, including all services and associated site works. The site is located within a Natura 2000 designated area, a Natura Impact Statement (NIS) will be submitted to the Planning Authority with the application.	More information required as of 11/11/2024.	**Potential impacts from the development include the contamination and pollution of the River Owenass due to concrete and cement. Suspended solid or, hydrocarbons and chemicals entering the local waterbody and impacting on local flora and fauna.** **Mitigation measures in place include concrete and cement management protocol, the addition of a silt fence and stockpiling of materials, and scheduled fuelling to occur in the furthest point away from the River Owenass. The implementation of these measures will prevent any effect on Natura 2000 sites**
321064	Townlands Barranaghs, Garryhinch, Annamore in County Offaly and Forest Lower, Coolnavarnoga , Coolaghy, Kilbride, Ballymorris,	1No. 110kV substation with associated compound, including Two (2) single storey control and operational buildings & 10.85km of 110kV underground electrical cabling from the proposed 110kV substation to the consented Bracklone 110kV substation	Application lodged 11/10/2024. Currently no decision date given.	**Potential impacts from the development include the contamination and pollution of the River Barrow through the release of uncured concrete, hydrocarbons and infiltration of runoff.** **Mitigation measures in place include the adoption of a**

Planning Reference	Location	Description	Application Status	Rationale
	Cooltederry and Bracklone Co. Laois.			**water control protocol following best practices and the reseeding of the banks as soon as possible to allow for early stabilisation of the banks, along with the inclusion of a silt fence and daily inspections, the storage of materials, equipment, materials and the preparation works for construction (fuelling, cement mixing) will take place away from the River Barrow. The implementation of these measures will prevent any effect on Natura 2000 sites.**
2460542	**Townparks and Smiths Field, Ballycullenbeg, Mountmellick, Co. Laois**	**Replace the existing grass pitch with a new Astro turf playing surface, new perimeter fencing to pitch, new footpaths and public lighting, new footbridge over the River Owenass linking Townparks and Ballycullenbeg, including all services and associated site works. This site is located with a Natura 2000 designated area. A Natura Impact Statement (NIS) has been submitted with this application.**	**Permission granted 03/03/2025 Expires 06/04/2030**	**Potential impacts from the development include the contamination and pollution of the River Owenass through the release of excavated silt, the release of contaminants into the surface water, hydrocarbons and infiltration of runoff.** **Mitigations include the application of interceptors and silt fences, appropriate use of bunding, and limiting of work to dry weather conditions.**

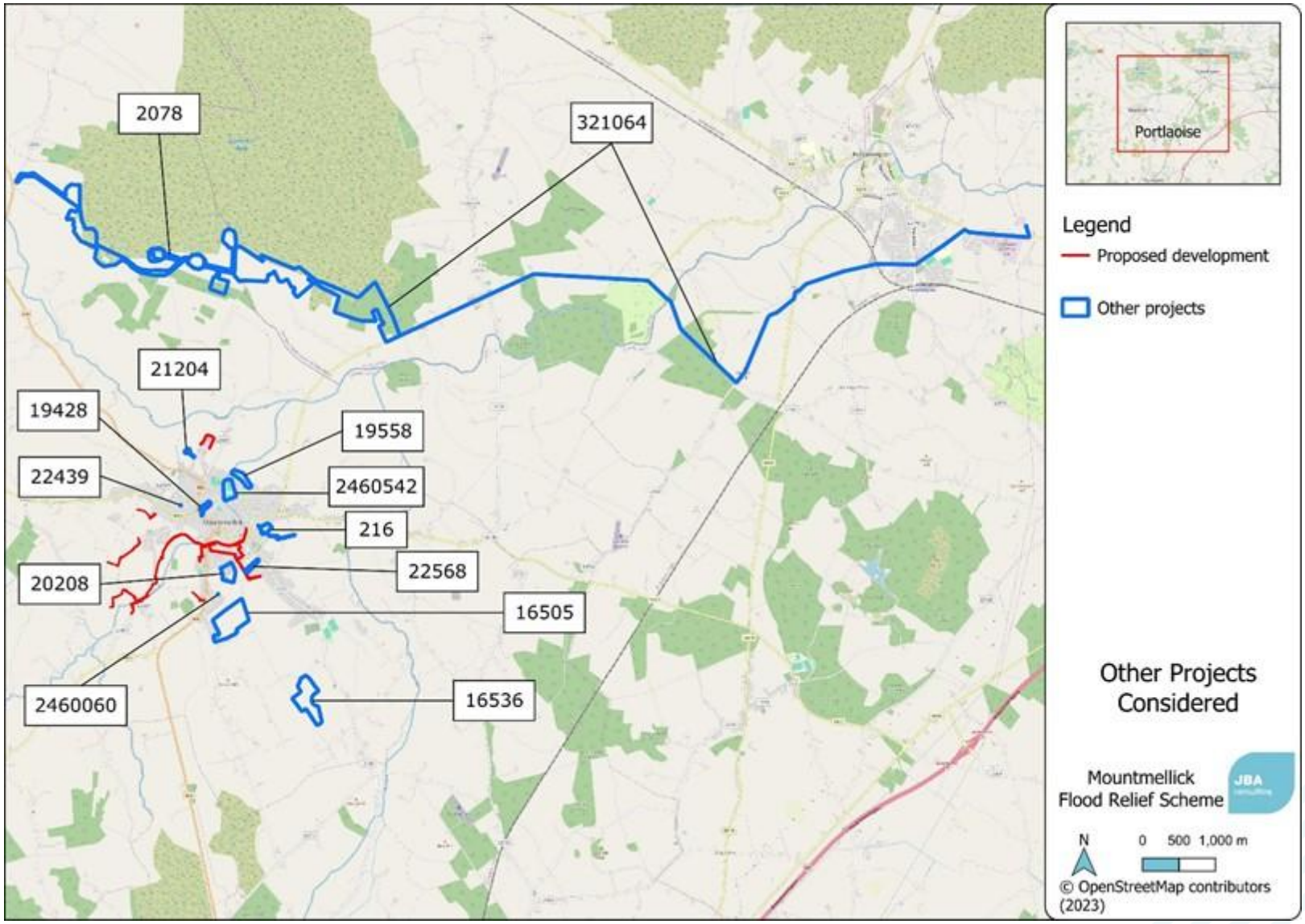


Figure 6-1: Other projects considered for cumulative effect

6.4 Summary

The developments permitted above have the potential to have overlapping construction phases with the proposed development and therefore, in the absence of mitigation measures, may result in potential in-combination or cumulative impacts on Natura 2000 sites.

7 Stage 2 Appropriate Assessment

7.1 Introduction

As identified in the Stage 1 AA Screening report (JBA, 2025) and screening summary of this report, it was considered that the proposed scheme could result in likely significant effects on the following Natura 2000 Site:

- River Barrow and River Nore SAC;

The screening report identified surface water; groundwater-to-surface water; land/air (disturbance); and air (dust)-to-surface water pathways as the potential pathways that may result in likely significant effects on QIs of the Natura 2000 sites within the ZoI.

From the baseline and desktop surveys, the QI habitats and species present in the immediate surrounds of the proposed FRS, and therefore those likely to be impacted by the works are listed below:

- Water courses of plain to montane levels with the *Ranunculion fluitanis* and *Callitricho-Batrachion* vegetation [3260]
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]
- Otter *Lutra lutra* [1355]
- Brook Lamprey *Lampetra planeri* [1096]
- River Lamprey *Lampetra fluviatilis* [1099]
- Atlantic Salmon *Salmo salar* [1106]
- White-clawed Crayfish *Austropotamobius pallipes* [1092]

Section 7.2 assesses the screened-in Natura 2000 sites in more detail and examines where potentially adverse impacts may arise from the sources of impact identified (i.e., surface water, land and air, or groundwater pathways). Where potentially adverse impacts are identified, avoidance and mitigation measures are proposed. These are discussed in Section 8

7.2 Potential Sources of Impact

The AA screening report produced by JBA (2024) reported that pathways of impact existed between the proposed site and the relevant Natura 2000 site. This section further examines the source > pathway > receptor chains that could potentially result in significant adverse effects arising within the following Natura 2000 site listed above in sub-section 7.1. Habitats and species, and their attributes, likely to be affected are listed in

Table 7-2.

7.2.1 Construction Phase - Direct and indirect impacts

This section will assess all impacts in relation to the entire scheme and to specific locations of each section of the Flood Relief Scheme. The potential impacts upon each QI will be assessed as follows:

- Impacts not location specific e.g., disturbance impacts, emissions, invasive species etc.
- Impacts at Owenass Bridge
- Impacts between Owenass Bridge and Mountmellick Mill Bridge (Defence No. 3)
- Impacts between Mountmellick Bridge and Convent Bridge (Defence No. 4)

- Impacts north of Convent Bridge (Defence No. 5)
- Impacts from the diversion of the Clontygar Stream (Defence No. 8)
- Impacts at Irish town Garden Centre (Defence 9)

7.2.2 Impacts over entire scheme

Some impacts will not be location specific and will potentially impact upon certain QIs throughout the construction phase.

This mainly is related to release of suspended solids/pollution, disturbance and noise impacts, introduction and spread of invasive species, and release of dust and emissions during construction.

7.2.2.1 Release of suspended solids

This is most likely to occur as a result of sediment being released into the watercourses during the works. It may come from erosion of exposed areas of embankment, poorly stored excavation material and bare ground created by vehicle movements. This has the potential to impact instream Annex I habitats Water courses of plain to montane levels with the *Ranunculion fluitanis* and *Callitricho-Batrachion* vegetation and Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels, as well as fish species, with indirect effect on Otter as predator.

7.2.3 Release or changes in nutrient levels

This is most likely to occur as a result of the nutrients currently trapped in sediment being released in the manner described for suspended solids. Any attempt to fertilise the embankment to encourage vegetation establishment would also lead to nutrient release. It can impact on surface water dependent habitats indirectly through eutrophication and reducing water quality.

7.2.4 Release of pollutants

The proposed development's construction activities may lead to the introduction of pollutants, such as hydrocarbons and concrete, to the local surface water and groundwater networks. Potential direct impacts include the degradation of the vegetation of Annex I habitats via hydrocarbon pollution. Additionally, hydrocarbon pollutants can degrade the scales and furs of QI fish and mammal species, respectively. Additionally, temporary, or permanent reductions in area and/or overall health may be experienced by Annex habitats within the ZoI as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water pathways.

Additionally, the consumption of food items containing polluting elements may impact the health of QI mammal and fish populations.

7.2.5 Dust & emissions

A separate Air Quality report has been carried out for the EIAR (Construction Impacts Chapter 13). The volume of deposition due to demolition, earthworks, construction and track-out has the potential to affect sensitive habitats, plant communities and species.

Typically dust emissions are divided into settleable dust, respirable dust and PM10's and PM2.5 (10 um and 2.5 um respectively). Settleable dust will, depending on its size and weather conditions, settle out close to the source. The respirable fraction can travel a little further but typically settles out close to production. The lighter smaller PM_{10} and $PM_{2.5}$ fraction can travel further distances. The distance and direction of travel is dependent upon wind speed and direction. Assessments should include any ecological receptor within 50m of

the boundary of the site or 50m of the routes used by construction vehicles on the public highway up to 250m (IAQM 2024)

The main air quality impacts potentially arising during construction are considered to be:

- Dust deposition, resulting in the soiling of surfaces;
- Visible dust plumes, which are evidence of dust emissions;
- Elevated PM_{10} concentrations, as a result of dust generating activities on the site; and
- An increase in concentrations of airborne particles (and NO_2) due to vehicles and equipment used on site and vehicles accessing the Site.

Release of dust from machinery on route to site: The Institute of Air Quality Management indicate that receptors within 50m of the route of the machinery to site and 250m of the site entrance should be considered (IAQM 2024). As the sensitive receptors are within 50m of many of the areas of work, some impacts may be anticipated to occur without mitigation.

Release of dust and on-site construction emissions: Direct impacts may occur on vegetation or aquatic ecosystems. For example, dust coating plant foliage during long dry periods may adversely affect photosynthesis and other biological functions. Subsequent rainfall removing the deposited dust can rapidly leach chemicals into the soil. Indirect impacts may occur on fauna (e.g. deterioration of habitats). For example, cement dust deposited on leaves can increase the surface alkalinity, which in turn can hydrolyse lipid and wax components, penetrate the cuticle, and denature proteins, finally causing the leaf to wilt. These types of damage over a long period have the potential to change plant community structure and function. Noticeable effects include the increase in ruderal and pioneer plant communities.

Given the length of the programme of works of approximately 36 months and the proximity of the SAC and sensitive receptors, some impacts may be anticipated to occur without mitigation.

Dust may indirectly impact the food chain which the QI species Otter and fish of River Barrow and River Nore SAC depend upon.

Once operational, no air and climate impacts are expected for this Scheme.

7.2.6 Creation of Embankments

The creation of embankments in areas throughout the Scheme will involve the stripping of topsoil excavations. The creation of the embankment and associated risk of damage to local ecological features through mechanical impacts of damage from machinery access, and spillage of excavated material. Due to the proximity of the woodland to the proposed embankment in the area, nearby trees and vegetation are at a risk of mechanical limb damage due to the movement of machinery during the works to create the embankment in the area.

7.2.7 Realignment of the Clontygar Stream

The Clontygar Stream is to be realigned to accommodate the as part of the construction phase of this project, in order to accommodate the creation of the embankment within the area of Defence 8. Improper realignment of the stream, in the form of an unsuitable river bedding, the lack of any intricacies, or an unfavourable form to the river will reduce the habitat's suitability for local QI fish species.

7.2.8 Spread of invasive species

The unintended disruption and spread of invasive species, such as Three-cornered Garlic, from the proposed development site into the River Barrow and River Nore SAC may lead to a series of adverse effects on the Annex habitats within this Natura 2000 site. Their potential establishment within the embankment habitats would result in the displacement of native species via shading impacts and higher rates of colonisation in areas of open and/or disturbed ground.

7.2.9 In-stream works in the River Owenass

There are four main sections of in-stream construction that could impact on the River Barrow and River Nore SAC, which occur in the order of:

1 Downstream of Convent Bridge

Instream works and works within the riparian corridor will be necessary for the construction of flood defence wall along the riverbanks on the Owenass River as outlined in methodologies above. It is expected that due to the restricted space available for constructing the flood defence walls on the riverbanks that some temporary works may be required within the river.

2 Mill Bridge to Convent Bridge

It is expected that due to the limited available working space for constructing the proposed flood defence walls within this area that instream works will be required. As noted temporary works will be required to create a dry working space for operatives. A cofferdam or similar structure with pumped overflows will be required to avoid interaction with existing river flows whilst the excavation takes place for riverbank works. Furthermore, these dry cell structures will permit safe access from the storage / compound area to the immediate works area. In addition, instream works will be necessary for the installation of new flow control devices and reinstatement of existing surface water connections affected by the works.

3 Owenass Bridge to Mill Bridge

Instream works will be necessary for the construction of culvert crossings at land drain and stream locations traversing the proposed flood defence embankment. New flow control measures will be installed as part of the culvert works.

4 Owenass Bridge

Instream works will be necessary for the demolition of the existing bridge, the excavations, construction of foundations and wing walls.

7.2.10 Disturbance to species

The construction works also have the potential to visually and audibly disturb QI species, such as Otter and fish species, which may be engaging in foraging, commuting and spawning (daytime /short-term) activities within or adjacent to the proposed development site.

7.2.10.1 Disturbance impacts to Otter (*Lutra lutra*) [1355]

Construction works adjacent to the River Barrow and River Nore SAC and the connecting tributary streams and ditches will generate noise and disturbance as a result of machinery operation and workforce movement during the approximate 36-month construction phase of the project.

Field signs of Otter, a QI of the River Barrow and River Nore SAC, have been recorded along the banks of the main channel of the River Owenass within the site boundary. Surveys were carried out to assess use of potential holts and couches observed between the Mill Bridge and Convent Bridge, near to the Owenass Bridge in the south-west of the town, and in the north-east of the town behind the College Avenue housing estate. However, no holts or couches were recorded, with Otter only visiting these areas and using them as latrines.

Otter that are feeding and commuting up and down the River Owenass at Mountmellick and similarly making use of connecting streams/ditches, may be disturbed by machinery noise and increased presence of humans and machinery during the construction phase. This may lower their preference to hunt and move past areas of construction.

The Owenass River is approximately 10m-15m wide with generally high vegetation cover along the banks and Otter can use opposite banks to move through the water and on land. It is not expected the construction works will prevent Otter accessing any suitable habitat and/or moving/commuting to and from any watercourses.

However, there are some areas of the FRS where walls are being built on both sides of the watercourses (Upstream of the Owenass Bridge, and from Mill Bridge Convent Bridge), and where the Owenass bridge is being deconstructed and reconstructed across the river. It would be important that the walls would not be constructed at the same time, and that there is continuing passage for Otter during the Owenass Bridge upgrade. Mitigation in regard to this is seen in Section 8.

7.2.10.2 Noise and vibrations impact on fish (QIs Brook Lamprey [1096], River Lamprey [1099] and Salmon [1106]).

A number of flood defence measures will be constructed in close proximity to the watercourses. Piling will be the most intensive construction methodology in relation to noise output.

Piling has the potential to disturb fish species through intense vibrations and can even result in injury/mortality where vibration levels are high, and barotrauma occurs. There are varying degrees of sensitivity to sound in different fish species dependent on fish physiology. Fish species with swim bladders are sensitive to barotraumatic stress. Where the swim bladder is connected to/close proximity to the inner ear, high levels of sensitivity to barotraumatic stress is observed and a lower threshold to disturbance is observed.

Lamprey do not have a swim bladder and have a rudimentary method of hearing which is not particularly sensitive to vibrations. Salmonids (and other species such as cyprinids and Eel) have more complex hearing, these species also possess a swim bladder, although it is not directly connected to the inner ear. Popper et al., 2014 consider species like Salmon as a medium sensitivity species while Lamprey are considered a low sensitivity species.

The impact of sound on fish species in summarised in a technical assessment published by AECOM (2021), which reviews guidelines published by American National Standards Institute (ANSI) (Popper et al. 2014).

For impulsive sound, the injury thresholds are expressed as dual criteria including a single strike peak sound pressure level (SPL) and the cumulative energy over a period of impulses, called the sound exposure level (SELcum). The thresholds cover physical injury as mortality/mortal injury, recoverable injury and auditory injury which is called temporary threshold shift (TTS) and is an elevation in hearing threshold resulting in a temporary reduction in hearing sensitivity.

Behavioural impact criteria are provided in terms of a relative risk (high, moderate, low) at a distance from the impulsive sound source defined in relative terms as 'near' (N), 'intermediate' (I), and 'far' (F) (Table 6-1). Whilst absolute values cannot be ascribed to these categories, near can be defined to be in the range of tens of metres from the source, intermediate in the hundreds of metres, and far in the thousands of metres.

Table 7-1: Underwater sound impact thresholds for fish in relation to impulsive sound sources (AECOM, 2021)

Fish Hearing Sensitivity	Mortality/mortal injury	Recoverable Injury	Temporary Threshold Shift (TTS)	Behaviour
Low e.g., Lamprey	**213dBpeak 219dB SELcum**	**213dBpeak 216dB SELcum**	186dB SELcum	**(N) High (I) Moderate (F) Low**
Medium e.g., Atlantic Salmon	**207dBpeak 210dB SELcum**	**207dBpeak 203dB SELcum**	186dB SELcum	**(N) High (I) Moderate (F) Low**
Eggs and Larvae	**207dBpeak 210dB SELcum**	**-**	**-**	**(N) Moderate (I) Low (F) Low**

Pile driving will occur infrequently over a short period of time where required, and sound levels are not expected to reach more than 88dB for the pile driving, and 95dB for hand-held pneumatic work and 80dB for hydraulic breaking within the construction area of the scheme (details from survey Chapter 13 EIAR Construction Impacts: Noise/Vibration, Air/Dust, Climate). These sound levels are not exceptionally high and will be temporary in nature. Therefore, no adverse impacts on the QI Atlantic Salmon or the two QI lamprey species are expected from noise or vibration.

The potential impacts from the construction activities of the proposed development on the QIs of the River Barrow and River Nore SAC are outlined in Table 7-2.

Table 7-2: Potential direct and indirect impacts on the attributes of the designated QIs of the River Barrow and River Nore SAC

Qualifying Interest	Attribute	Measure	Potential Impacts
Water courses of plain to montane levels with the *Ranunculion fluitanis* and *Callitricho-Batrachion* vegetation	Habitat distribution	Occurrence	Habitat not confirmed within the zone of influence due to the lack of the typical example of the vegetation community (nutrient-rich type) associated with extensive tufa deposits on the river bed in the Kings tributary of the Nore, but potentially present downstream of the site. However, potential pollution events could temporarily disrupt the suitability of the River Owenass for the habitat to colonise

Qualifying Interest	Attribute	Measure	Potential Impacts
[3260]	Habitat area	Kilometres	Habitat not confirmed within the zone of influence due to the lack of the typical example of the vegetation community (nutrient-rich type) associated with extensive tufa deposits on the river bed in the Kings tributary of the Nore, but potentially present downstream of the site However, potential pollution events could temporarily disrupt the suitability of the River Owenass for the habitat to colonise
	Hydrological regime: river flow	Metres per second	Habitat not confirmed within the zone of influence due to the lack of the typical example of the vegetation community (nutrient-rich type) associated with extensive tufa deposits on the river bed in the Kings tributary of the Nore, but potentially present downstream of the site Overall the Scheme will not have an impact on water course velocities of the River Owenass, with very little difference between undefended (baseline) and defended (design) velocities at 50% Annual Exceedance Probability (AEP) event peak velocities (m/s) and 20% AEP event peak velocities (m/s). No impact is anticipated on this QI.
	Hydrological regime: groundwater discharge	Metres per second	n/a. This attribute refers to sub-types with tufa formations in River Nore part of SAC. Scheme not anticipated to influence the groundwater of regime of the SAC
	Substratum composition: Particle size range	Millimetre	n/a This attribute refers to sub-types with tufa formations in River Nore part of SAC.
	Water chemistry: minerals	Milligrammes per litre	n/a This attribute refers to sub-types with tufa formations in River Nore part of SAC. The scheme is no anticipated to influence the water chemistry of the River Owenass
	Water quality: suspended sediment	Milligrammes per litre	n/a This attribute refers to sub-types with tufa formations in River Nore part of SAC. The changes to water quality are not anticipated to be substantial enough to significantly alter species composition or habitat condition
	Water quality: nutrients	Milligrammes per litre	n/a This attribute refers to sub-types with tufa formations in River Nore part of SAC. The changes to water quality are not anticipated to be substantial enough to significantly alter species

Qualifying Interest	Attribute	Measure	Potential Impacts
			composition or habitat condition
	Vegetation composition: typical species	Occurrence	n/a This attribute refers to sub-types with tufa formations in River Nore part of SAC. No typical species of the habitat were present within the scheme and the ZoI, and the scheme is not anticipated to change that
	Floodplain connectivity	Area	The scheme anticipates to increase floodplain connectivity within the area of Mountmellick
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]	Habitat distribution	Occurrence	Habitat not present within the zone of influence but potentially present downstream of the site However, pollution events will temporarily disrupt the suitability of the River Owenass for the habitat to colonise
	Habitat area	Kilometres	Habitat not present within the zone of influence but potentially present downstream of the site However, pollution events will temporarily disrupt the suitability of the River Owenass for the habitat to colonise
	Hydrological regime: Flooding depth/height of water table	Metres	Habitat not present within the zone of influence but potentially present downstream of the site However, pollution events will temporarily disrupt the suitability of the River Owenass for the habitat to colonise
	Vegetation structure:sward height	Centimetres	Habitat not present within the zone of influence but potentially present downstream of the site However, pollution events will temporarily disrupt the suitability of the River Owenass for the habitat to colonise
	Vegetation composition: broadleaf herb: grass ratio	Percentage	Habitat not present within the zone of influence but potentially present downstream of the site However, pollution events will temporarily disrupt the suitability of the River Owenass for the habitat to colonise
	Vegetation composition: typical species	Number	Habitat not present within the zone of influence but potentially present downstream of the site However, pollution events will temporarily disrupt the suitability of the River Owenass for the habitat to colonise
	Vegetation composition:	Occurrence	Spread of invasive species, including Cherry Laurel or Three-cornered Garlic,

Qualifying Interest	Attribute	Measure	Potential Impacts
	negative indicator species		which disrupt local ecology.
Otter [1355]	Distribution	Percentage positive survey sites	A temporary reduction in the species distribution as a result of pollutant substances entering the habitat via surface water, groundwater-to-surface water and air-to-surface water pathways, and disturbance and/or entrapment during construction.
	Extent of terrestrial habitats	Hectares	A temporary reduction in the terrestrial habitats due to the construction of dry cell coffer dams, de-vegetation of areas of bank, embankment, flood walls and alterations to existing flood regime.
	Extent of marine habitats	Hectares	No marine habitat present within the scheme
	Extent of freshwater (river) habitats	Kilometres	A temporary reduction in suitability of the riverine habitat as a result of deleterious substances entering the habitat via surface water, groundwater-to-surface water and air-to-surface water pathways.
	Extent of freshwater (lake) habitats	Hectares	No lake habitats located within the scheme
	Couching sites and holts	Number	Surveys indicate scheme is not impacting any couches or holts. However using precautionary principle, sections of the Scheme may have Otter present in the future.
	Fish biomass available	Kilograms	A temporary or permanent reduction in fish stock available as a result of deleterious substances entering the habitat via surface water, groundwater-to-surface water and air-to-surface water pathways, and disturbance to spawning beds during instream works.
Brook Lamprey [1096] River Lamprey [1099]	Distribution: extent of anadromy	% of river accessible	Scheme is not increasing artificial barriers and will not restrict access to spawning areas
	Population structure of juveniles	Number of age/size groups	A temporary reduction in population structure of juveniles as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water, and air-to-surface water pathways. Disturbance to the ammocoetes of spawning species.
	Juvenile density in fine sediment	Juveniles/m^2	A temporary reduction in available juvenile density as a result of deleterious substances entering the habitat via surface water and

Qualifying Interest	Attribute	Measure	Potential Impacts
			groundwater-to-surface water, and air-to-surface water pathways, and disturbance caused by instream works
	Extent and distribution of spawning habitat	m^2 and occurrence	A temporary reduction in available spawning habitat as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water, and air-to-surface water pathways, and of the disruption of spawning habitats as a result of the implementation of dry cell areas.
	Availability of juvenile habitat	Number of positive sites in	A temporary reduction in available juvenile habitat as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water, and air-to-surface water pathways, and disturbance caused by instream works
Atlantic Salmon (only in fresh water) [1106]	Distribution: extent of anadromy	% of river accessible	Scheme is not increasing artificial barriers and will not restrict access to spawning areas
	Adult spawning fish	Number	A temporary reduction in spawning fish as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water, and air-to-surface water pathways.
	Salmon fry abundance	Number of fry/5mins electrofishing	A temporary reduction in available juvenile habitat as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water, and air-to-surface water pathways. Reduction in spawning ground due to instream activities (dry cell areas)
	Out-migrating smolt abundance	Number	A temporary reduction in smolt abundance as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water, and air-to-surface water pathways.
	Number and distribution of redds	Number and occurrence	A temporary reduction in available redd habitat as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water, and air-to-surface water pathways, and of the disruption of redd habitats as a result of the implementation of dry cell areas.

Qualifying Interest	Attribute	Measure	Potential Impacts
White-clawed [Crayfish 1092]	Distribution	Occurrence	A temporary reduction in the species distribution as a result of deleterious substances entering the habitat via surface water, groundwater-to-surface water and air-to-surface water pathways. The in-stream works and the creation of dry-cells will temporarily reduce the habitat suitability along sections of the River Owenass for White-clawed Crayfish
	Population structure: recruitment	Percentage occurrence of juveniles and females with eggs	A temporary reduction in the juvenile recruitment as a result of deleterious substances entering the habitat via surface water, groundwater-to-surface water and air-to-surface water pathways.
	Negative indicator species	Occurrence	Scheme not anticipated to introduce alien crayfish species
	Disease	Occurrence	The introduction and facilitated spread of Crayfish Plague through sections of the River Owenass through contaminated equipment.
	Water quality	EPA Q value	A temporary or permanent reduction in the water quality as a result of deleterious substances entering the habitat via surface water, groundwater-to-surface water and air-to-surface water pathways.
	Habitat quality: heterogeneity	Occurrence of positive habitat features	Scheme not anticipated to disrupt the habitat heterogeneity of the local rivers or their in-stream banks

7.3 Operational Impacts

Surface water operational impacts not anticipated on the Natura 2000 sites' QIs given the ongoing required maintenance of the scheme are anticipated to be minimal and will not impact take place within the boundary of the SAC. There are no anticipated impacts on the SAC due to a change in flow, as there are very little difference between undefended (baseline) and defended (design) velocities at 50% Annual Exceedance Probability (AEP) event peak velocities (m/s) and 20% AEP event peak velocities (m/s).

As part of the built-in design, the new bridge over the River Owenass has been designed with the allowance of a built-in mammal pass, consisting of a 600mm diameter circular mammal pass located 150mm above the anticipated 1 in 5-year flood level, reducing the restrictions of Otter traversal of the area. There are no anticipated impacts on Otter during the operational phase.

7.4 Do Nothing Impact

The nature of the development is to protect homes and businesses from flooding, as floods have been known to cause significant damage in Mountmellick in the past, with combined flood and sewer water occurring on occasion.

If the proposed development does not go ahead, flooding is likely to continue impacting Mountmellick population and properties in the future. Flooding events will keep occurring within the residential and road/access areas of the village, resulting in re-occurring and long-term socio-economic pressures on the local community. This could result in the requirement for emergency works or ad-hoc remedial measures in the future, which may negatively affect the River Owenass and its tributaries, and the protected species and habitats supported by the river.

7.5 In Combination Effects

The high-level strategic plans outlined in Section 6, and listed below, including their policies and objectives were examined for potential in-combination effects with respect to the proposed development.

- Laois County Development Plan 2021-2027
- Third Cycle River Basin Management Plan for Ireland 2022-2027

There is no potential for the above plans to generate adverse cumulative impacts on the Natura 2000 site within the vicinity of the Scheme, given that these plans, and that any future projects brought about as a result of these plans would be subjected to their own respective Appropriate Assessment process, including mitigation measures that would ensure no adverse residual impacts; thus, eliminating the possibility for these plans to act in-combination with the proposed development.

Of the locally permitted project, or those under review, three projects presented as the most likely to act in a cumulative manner towards the disruption of the QIs of the River Nore and River Barrow Naura 2000 site. These projects are the construction of 32 two-bedroom apartments on Davitt Road [22568], the construction of 70 no. two-storey houses at Cullenhen Park [19558] and the construction of 49 dwelling units in Townparks [22439].

7.5.1 Apartments at Davitt Road [22568]

The proposed construction of 32 two-bedroom apartments on Davitt Road is located in the area of Defence 8 and is adjacent to the embankments along the Clontygar. The project's NIS addresses the issues of impact to the River Barrow and River Nore SAC through the connection of mains water to prevent abstraction of potable water from surface or groundwater sources, the piping of wastewater to the public sewer, a robust localised flood relief plan in place to prevent silt runoff and contaminants being washed into the Clontygar, the eradication of Japanese Knotweed from the site prior to work and the discharge of surface water to a surface water pipeline and not to a combined surface-foul water sewer. Construction will be confined to the north of the site, away from the Clontygar Stream, there will be no pouring of concrete adjacent to the stream, and there will be a headwall installed at the confluence of the drain along the eastern boundary and along the Clontygar Stream to prevent deterioration of the watercourse.

Therefore, the proposed construction of the apartment blocks does not have the capacity to act in-combination with the proposed development to generate cumulative impacts on the River Barrow and River Nore SAC and its QIs.

7.5.2 Housing at Cullenhen Park [19558]

The proposed construction of the 70 no. two-storey houses at Cullenhen Park is located in north area of Mountmellick town along the eastern banks of the River Owenass. The project's NIS addresses the issues impacts to the River Barrow and River Nore SAC from concrete and cement through the preparation mixing of concrete occurring in the south-east of the site (the furthest point away from

the River Owenass), the cleaning of vehicles occurring off site, with the cleaning of on-site tools occurring in the south-east of the site (the furthest point away from the River Owenass), the limitation of the pouring and mixing of concrete to only take place in dry weather conditions. The project's NIS addresses the issues impacts to the River Barrow and River Nore SAC from suspended sediments infiltrating the River Owenass through the limitation of excavation works to dry weather, the installation of a silt fence, the retention and treatment of any sediment-contaminated water in a settlement tank and discharged to a soakaway in the south-east of the site, the storage of excavated materials will be restricted to the south-east of the site, and dust suppression measures will be outlined. Any water extraction from the Owenass will be done so with a screen or filter to avoid the removal of White-clawed Crayfish or fish. The project's NIS addresses the issues impacts to the River Barrow and River Nore SAC from hydrocarbons and chemicals through the storage of fuels or chemicals in the south-east of the site, the safe locking and management of vehicles overnight, any on-site fuelling required to occur in the south-east of the site, the utilisation of drip trays to catch leaks and the presence of a spill kit located on site at all times for the event of a spillage.

Therefore, the proposed construction of the housing does not have the capacity to act in-combination with the proposed development to generate cumulative impacts on the River Barrow and River Nore SAC and its QIs.

7.5.3 Dwelling units in Townparks [22439]

The proposed construction of 49 dwelling units is located in the centre of Mountmellick town, to the east of the Pound River. The project's NIS addresses the issues of impact to the River Barrow and River Nore SAC through the limitation of vegetation clearance and the reseeding of to minimise the window of exposed soil , the inclusion of silt fences to minimise run off, the pumping of the local ditch to include the presence of a filter to prevent the entrapment of aquatic fauna, the storage of spoil in a designated spoil area (which will be covered), the movement of materials and the excavation of soils to occur during dry weather, the settlement and filtration of waters found during excavation in tanks, regular inspection of machinery and storage equipment, the presence of spill kits, toolbox training talks for staff to manage the accidental spillage events.

Therefore, the proposed construction of the housing does not have the capacity to act in-combination with the proposed development to generate cumulative impacts on the River Barrow and River Nore SAC and its QIs.

7.5.4 Other Projects

The remainder of the permitted projects within the locality of the proposed development would have all been in compliance with all applicable planning and environmental approval requirements and be in accordance with the objectives and policies of their respective county / city council development plans. These permitted developments were subject to planning consent, including Appropriate Assessment process, where necessary. By granting permission for these proposed developments, the relevant competent authorities determined that these developments would not lead to adverse temporary or residual impacts on the integrity of any Natura 2000 site, either alone or in-combination with other proposed developments within the locality. Therefore, there is no potential for these permitted projects and the proposed development to generate adverse cumulative impacts on the Natura 2000 sites within the ZoI, given that mitigation measures that will be in place for the proposed development will ensure no adverse temporary or residual impacts on these designated sites.

8 Mitigation

This section describes the avoidance and mitigation measures required to prevent or reduce impacts generated during the construction and operation of the proposed development on the following Natura 2000 site, and its respective QIs:

- River Barrow and River Nore SAC

All prescribed mitigation measures will be strictly adhered throughout the length of the construction and operational phases.

A site-specific Construction and Environment Management Plan (CEMP) and Construction Method Statement (CMS) will be submitted to the competent authority for agreement prior to site works commencing. These will be updated and finalised by the appointed contractor prior to construction commencing. The CEMP will incorporate the mitigation measures listed here. The proposed development's principal contractor, as well as all other construction contractors, will comply with all the mitigation measures set out in this NIS and included in the CEMP.

The CEMP is a working document and will be finalised by the contractor following appointment and prior to commencing works on site. All of the content provided in this CEMP will be implemented in full by the appointed contractor and its finalisation by the appointed contractor will not affect the robustness and adequacy of the information presented and relied upon in this NIS.

The mitigation measures set out in this NIS and that are included in the CEMP are measures that can be implemented with a high degree of confidence. The oversight of the specified measures by an ecologist provides a high degree of confidence that they can be implemented successfully.

All of the works and mitigation measures will be monitored by a suitably qualified ecologist that is appointed by the contractor (an Environmental Clerk of Works (EnvOW)) during the construction period. Findings from the contractor's ECoW will report any findings to the competent authority's appointed ecologist.

8.1 Construction Phase Mitigations

The construction phase mitigation sub-sections below will be divided into:

- Standard Environmental Best Practice;
- Compound environmental management;
- General mitigation measures ensuring the protection of surface water, groundwater and air quality throughout the proposed development site; and
- Specific area-based mitigations measures which address localised sensitive ecological elements, i.e., surface water pathways connecting the site to the local Natura 2000, and associated habitats further downstream.

8.1.1 Standard Environmental Best Practice

The activities required for the proposed development's construction phase will remain within the boundary of the proposed site, bar select compound areas, which will be located in adjacent lands for mitigation control reasons. The CEMP strictly adheres to best practice environmental guidance including but not limited to the following:

- CIRIA Guidance C532: Control of water pollution from construction sites. Guidance for consultants and contractors. (CIRIA, 2019 - www.ciria.org);

- CIRIA Guidance C741: Environmental good practice on site guide (Charles & Edwards, 2015; CIRIA, 2019 - www.ciria.org);
- CIRIA Guidance C750D: Groundwater control: design and practice (Preene et al., 2016; CIRIA, 2019 - www.ciria.org);
- CIRIA (C512): Environmental Handbook for Building and Civil Engineering Projects (CIRIA, 2000);
- CIRIA (C649) Control of water pollution from linear construction projects: Site guide (CIRIA 2006a);
- CIRIA (C848): Control of water pollution from linear construction projects: Technical guidance (CIRIA, 2006b);
- Inland Fisheries Ireland: Guidance on Protection of Fisheries During Construction Works In and Adjacent to Waters (IFI, 2016);
- Inland Fisheries Ireland; Planning for watercourses in the urban environment (2020);
- Inland Fisheries Ireland: A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning (IFI, 2020)
- Series of Ecological Assessment on Arterial Drainage Maintenance No 13: Environmental Guidance: Drainage Maintenance and Construction (Gilligan. N., & Bew, T., 2019)

8.1.2 Environmental Management of Site Compounds

The principal contractor will be required to ensure good environmental management within the site compounds set along the length of the proposed development (see Figure 3-5 for 11 locations). The below list of measures will be incorporated into site compound environmental management:

- Only plant and materials necessary for the construction of the works will be permitted to be stored at the compound location.
- Site establishment by the Contractor will include the following:
  - Site offices.
  - Site facilities (such as canteen, toilets, drying rooms, etc.), at appropriate locations.
  - Office for construction management team.
  - Secure compound for the storage of all on-site machinery and materials.
  - Temporary car parking facilities.
  - Temporary fencing.
- Site Security to restrict unauthorized entry.
- All sub-contractors will be given induction toolbox talk so that they are aware of material storage arrangements.
- Construction materials within a compound will be stored in a designated area in an organised manner so as to protect them from accidental damage and deterioration as a result of exposure.
- Bunded storage of fuels and refuelling area. Bunds will be minimum 110% capacity of the largest vessel contained within the bunded area.

- A separate container will be located in the contractors compound to store absorbents used to contain spillages of hazardous materials. The container will be clearly labelled, and the contents of the container will be disposed of by a licenced waste contractor at a licenced site. Records will be maintained of material taken off site for disposal.
- A maintenance programme for the bunded areas will be managed by the site environmental manager. The removal of rainwater from the bunded areas will be their responsibility. Records will be maintained of hazardous materials taken off site for disposal.
- The principal contractor will be responsible for maintaining all training records and weekly environmental inspections.
- Drainage collection system for washing area to prevent run-off into surface water system will be agreed with Project Ecologist and monitored by ECoW.
- Stockpiling of spoil and spoil-like materials will be appropriately located within the temporary works areas to minimise exposure to prevailing winds.
- All refuelling of vehicles will be carried out at the fuel stores within the main site compound and only personnel trained for the transport of dangerous goods (ADR Trained) will be permitted to operate fuel bowsers.

8.1.3 Protection of Surface Water, Groundwater and Air Quality

In order to protect surface water, groundwater and air quality throughout the proposed development site, the principal contractor will ensure full implementation of the Surface Water Management Plan, Pollution Control Plan and Dust Management Plan, as mentioned within the CEMP. The minimally required list of mitigations measures outlined below will be incorporated into these plans.

8.1.3.1 Surface Water Management Plan

In order to safeguard the local surface water network, and in turn the local groundwater network, from surface water-based pollution events, the following must be strictly adhered to:

- The principal contractor will ensure compliance with environmental quality standards specified in the relevant legislation, namely:
  - European Communities (Environmental Objectives (Surface Waters)) Regulations, 2009 (S.I. No. 272 of 2009 and amendments), and
  - European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988).

The thresholds within these legislations apply to the surface waters such as the River Owenass or River Pound and not strictly to waters undergoing treatment within the confines of areas used to treat water. Quality of water emitted from works areas and released to the surface waterbodies. must comply with the regulations. This legislation will be adhered to through ongoing monthly water quality monitoring for parameters such as total suspended solids, ph, dissolved oxygen, temperature, electrical conductivity, total dissolved solids and turbidity, as outlined in the CEMP.

- At no point during the construction phase will treated water be discharged to local surface water network without the water quality meeting the statutory limits as set under the environmental quality standards specified in Schedule 5 and 6 of the Surface Water Regulations, 2009, and Schedule 2 of the Quality of Salmonid Waters Regulations, 1988.
- Oil booms and oil soakage pads should be maintained on-site to enable a rapid and effective response to any accidental spillage or discharge. These will be disposed of correctly and records will be maintained by the environmental manager of the used booms and pads taken off site for disposal.
- Management of silt-laden water on-site, including procedures for accidental leaks / spills to ground, as well as water quality monitoring to ensure compliance with environmental quality standards specified above.
- Fail-safe site drainage and bunding through drip trays on plant and machinery will be provided to prevent discharge of chemical spillage from the sites to surface water.
- To prevent the spread of any accidental discharge into the surface water network, oil booms will be on hand when construction activities are located beside aquatic habitats in order to control and minimise the spread of the spill.
- Washout of concrete plant will occur at a designated area with waste control facilities with an impermeable lining.
- Concrete delivery, concrete pours and related construction methodologies will be part of the procedure agreed between the Project Ecologist and Contractor to mitigate any possibility of spillage or contamination of the local environment. Particular attention will be paid during the pouring process in order to avoid leakages or spills of concrete. The Project Ecologist will be present to oversee pours within the SAC and adjacent to the watercourses that flow into the SAC.
- Temporary stockpiles will be monitored for leachate generation. These stockpiles will be placed within designated areas and not located less than 50m of the vicinity of watercourses, flood plains, or artificial surface water drainage features.
- Excavated contaminated soils will be segregated and securely stored in a designated area where the possibility of runoff generation or infiltration to ground or surface water drainage has been eliminated through bunding and imperviable geotextile linings. The suspected contaminated soils should be WAC Tested and be classified as clean, inert, non-hazardous, or hazardous in accordance with the EC Council Decision 2003/33/EC before being transferred to the appropriate licenced waste facility. Furthermore, the contractor will ensure that no cross-contamination with clean soils happens elsewhere throughout the development site. All waste arisings from excavation
- Silt fencing will be installed along the edges of watercourses prior to the commencement of any construction works in order to prevent silt runoff from these areas and the protecting these identified water features. Shallow interceptor trenches will be installed in front of these silt fences where possible. The Project Ecologist will be present during the installation of these protective measures to ensure that they are installed to best practice standard and correctly located in

their assigned areas. The following sub-section will provide greater detail on specific locations of these silt fence / trench sections.

- Silt fences will be repaired and/or replaced as necessary by the principal contractor as part of the on-going environmental monitoring programme.

8.1.3.2 Pollution Control Plan

In the event of a spill the principal contractor will ensure that the following procedure are in place:

- Emergency response awareness training will be carried out for all site-based staff.
- All hydrocarbons to be utilised during construction are to be appropriately handled, stored, and disposed of in accordance with the TII document 'Guidelines for the crossing of watercourses during the construction of National Road Schemes' (NRA, 2008).
- Potentially contaminated run off from plant and machinery maintenance areas will be managed within the site compound surface water collection system.

8.1.3.3 Dust Management Plan

Breaking of topsoil and earth stripping will be minimised during dry and windy weather where possible. Where works are being conducted under these conditions, the following measures will be implemented to prevent excavation- and cement-based dusts entering the local surface water network and QI supporting ex-situ habitats:

- The contractor will wash wheels of vehicles leaving the site, cover all fine dry loads, or spray of loads prior to exiting the site and regular clean of all public roads in the vicinity of the entrance. The utilisation of pre-cast concrete features will minimise the generation of the concrete-based dusts throughout the development site.
- Stockpiling of spoil and spoil-like materials will be appropriately located and covered and/or sprayed where possible to minimise exposure to prevailing winds, which will in turn minimise the generation of dust within the site.

8.1.3.4 Concrete Management Procedures

The following measures will be implemented to prevent liquid concrete/cement-based dust entering the adjacent habitats of ecological value.

Pre-cast concrete features will be utilised to minimise the risk of a concrete-based pollution event.

Concrete delivery, concrete pours and related construction methodologies will be part of the procedure agreed with the contractor to mitigate any possibility of spillage or contamination of the local environment. Particular attention will be paid to both the pouring process in order to avoid leakages or spills of concrete, and to the schedule concrete pouring in order to plan the activity around optimal weather conditions to avoid heavy points of rain.

Washout of concrete plant will occur at concrete washout areas in compounds or off site at a designated impermeable area with waste control facilities.

Raw, uncured, or waste concrete will be stored appropriately prior to disposal by licenced contractor.

The contractor's construction methodology will require the use of precast elements where practical; the use of secondary protection shuttering for concrete pours; all pours to be carried out in suitable dry weather conditions; and that all trucks be cleaned prior to leaving respective depots.

The contractor will be required to use experienced operators for the work; provide an appropriate level of continuous monitoring during any concrete pours by experienced management; and have method statements approved by the client prior to commencing works. Works will be carried out using recommendations from current guidance and relevant codes of practise as outlined in EA (2011) - Managing concrete wash waters on construction sites: good practice and temporary discharges to ground or to surface waters.

8.1.4 Construction of the Walls

8.1.4.1 Within the SAC terrestrial footprint

There is one area within the bounds of the SAC (Defence No. 4C (Mountmellick Mill Bridge to Convent Bridge)), where pre-cast concrete wall features will be utilised to minimise the risk of a concrete-based pollution event within the SAC. Other works also occurring directly within the boundary of the SAC are detailed within the following sections, including works along the banks of the River Owenass, and instream works.

8.1.4.2 Bankside Construction

There are proposed walls running along sections of either bank of the River Owenass, or on lands setback from the banks. These sections include within stretches of the SAC. Standard trenched silt fencing is not feasible in some of these locations due to the presence of trees nearby. Construction works will take place as follows:

If demolition of an existing wall takes place first, a light silt fence with shallow stakes will be placed between the existing wall and the adjacent habitats (woodlands or rivers) in advance of deconstruction. This light silt fence will be lined with terram/geotextile material which will be held down with geotextile sandbags, the fence itself can also be reinforced with geotextile sandbags to the rear. This light weight silt fence will sit on the surface of adjacent habitats and can be manoeuvred around vegetation, limiting damage to trees and particularly their roots. This method will be used instead of normal silt fencing which requires a shallow trench to be dug. The silt fence will prevent any silt or debris created during the deconstruction of the wall from entering the adjacent habitats.

After the wall is demolished/disassembled, excavations for the new wall foundations can be constructed. Once this work is complete, any sand and silt build up in the silt fencing will be removed in the direction away from the adjacent habitats. Any silt will be carefully disposed away from watercourses.

Protection of water from cement leachate: It is expected that the flood wall and foundations will be constructed in-situ using poured concrete however, there may be scope to propose pre-cast concrete units following the detailed design site investigations. The newly excavated space to facilitate the wall foundations will be lined with an impermeable geotextile to create a sealed working space with a fenced buffer between any works involving concrete or cement. Once this area is lined the foundation and wall can be constructed.

Once the wall is constructed the silt fencing will be carefully removed so as to not introduce any trapped pollutants into any adjacent habitat. This will be completed by hand with silt fencing transported out of the area by wheelbarrow. Alternatively, the silt fencing can be placed in a suitable container and lifted over the wall using machinery placed on the opposite site of vulnerable habitats.

8.1.4.3 Instream Wall Construction

There will be scheduled instream works along the River Owenass, impacting the river habitat's health, and the species within it. Ther River Owenass is a structural component of the River Barrow and River Nore SAC and is a suitable habitat for QI species such as Salmon, Lamprey and Otter, and non-QI species, such as Eel. As such, the following measures will be incorporated within both, this NIS and the accompanying EIAR and will be incorporated into a final CEMP for the project which is required in advance of works after detailed design of the proposed infrastructure is complete. This CEMP should inform the Construction Methodology document. All instream works will be approved by IFI and overseen by the Project Ecologist for its duration. All instream works will follow the guidance in:

- Guidelines on protection of fisheries during the construction works in and adjacent to waters (IFI, 2016)

In order to facilitate instream works, water must be diverted from the works area. This must be achieved through a stream diversion and not overtop pumping in order to retain habitat connectivity for the duration of the works, and these will be required during the removal and replacement of Owenass Bridge, upstream of Mill Bridge (Def. 3C), upstream of Convent Bridge (Def. 4D), downstream of Convent Bridge (Def. 5A), both immediately at the bridge and approximately 80m downstream of it).

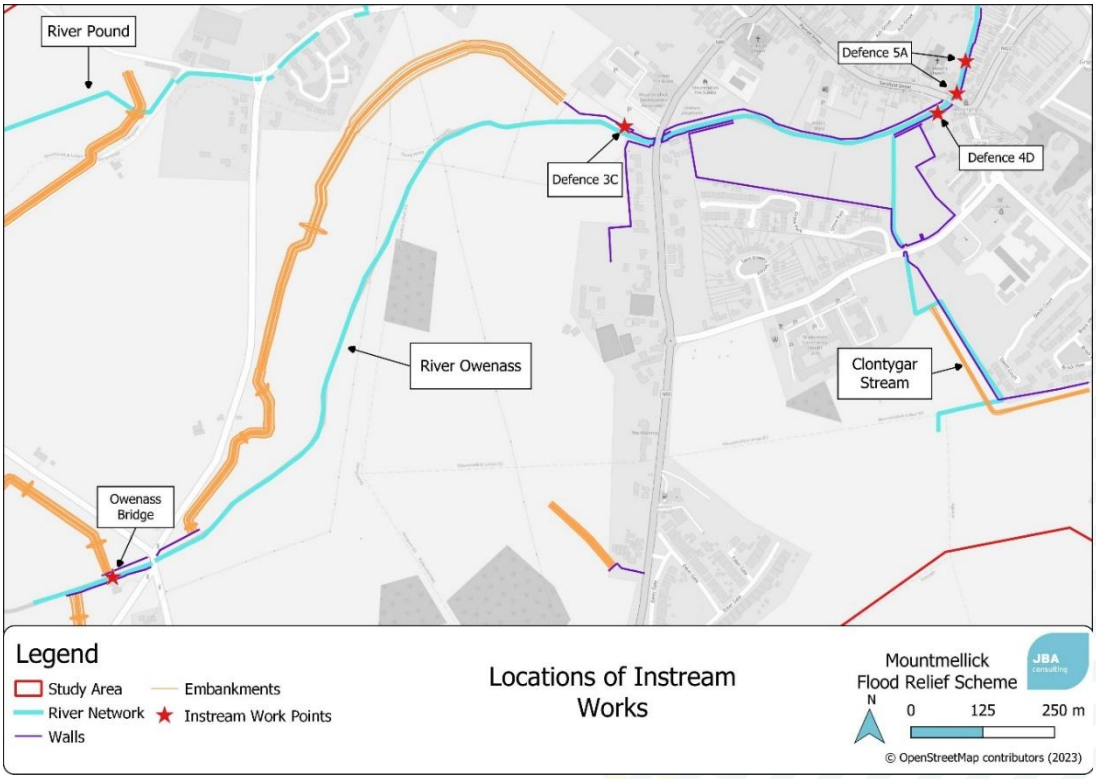


Figure 8-1: Areas of instream works (OSM, 2023)

River Diversions

These recommendations as well as any other recommendations that come as a result of consultation with IFI will be detailed in the CEMP and referred to in the Construction Methodology report prior to any works commencing.

All stages of the river diversion will be overseen by the Project Ecologist who will monitor all stages of instream works, with regular reporting to IFI and the Laois Heritage Officer.

Wherever possible, habitat connectivity must be retained during the proposed works. The use of a three-side coffer dam to facilitate works should be considered as a favoured methodology in order to maintain flow within the natural course of the river. If instream works require dry celling of sections of the stream width to create a dry bed for construction works, river connectivity will be maintained be maintained and water pumping avoided.

Requirement for electrofishing will be assessed by IFI in association with the Project Ecologist. Electrofishing will require licensing (obtained by the electrofishing specialist) and AA Screening (produced by the Project Ecologist). A full description of the river diversion/dry cell works will be set out in the CEMP and a construction methodology submitted to IFI, NPWS and Laois County Council.

Coffer Dam -Installation of Sheet Piling; Cement Pours

In order to ensure the safeguarding of the River Owenass as well as downstream habitats which support a variety of protected species; the presence of the Project Ecologist will be required during the installation of the sheet piling within the stream. Sheet piling is to be conducted in a "ramping up" method, where the piling is begun at lower magnitudes to start and gradually increasing. giving fauna opportunity to distance themselves from source of vibration The precise location of these temporary dry cell areas (coffer dam) should be set out in the CEMP following detailed design.

Dewatering of the proposed coffer dam and/or dry cell area will require installation of sheet pilings between the bank and the area of works. Water will be introduced back into the river only after suspended sediment has settled and/or filtered from the water. The methodology for this water reintroduction will follow best practice guidance as set out by the contractor in the final CEMP, and will be approved by IFI, NPWS and Laois County Council and monitored by the Project Ecologist. One approved method involves pumping water into a created settling pond more than 30m from the river, before slowly spilling the water through silt bag traps into a discharge point located on the edge of the local river, or into an adjacent greenfield site, to allow for percolation into the groundwater body if allowed. The discharge point will consist of a circle of triple silt fences surrounding a circle of straw bales wrapped in Terram geotextile. All waters pumped from the dry cell area will first settle within the settling pond and then filter through a silt bag, straw bales, and silt fences before diffusely discharging back into the river. The discharge points will be constructed prior to commencement of construction works and will be monitored on a daily basis when in use to ensure that the release of any polluting material is mitigated. These works will need to be scheduled for a dry weather period, as heavy rains during these works will compromise the absorption ability of the discharge point. Should any aquatic fauna such as fish or crayfish enter the dewatering system or become trapped in the dry cell area, the Project Ecologist will be there to secure them and ensure their safe return to the River Owenass.

The Project Ecologist will be present during any phase of the project which involves the pouring of concrete within 10m of all waterbodies in order to safeguard the river during the proposed works by identifying any arising ecological issues during these works. The Project Ecologist will recommend works cease if they are not satisfied the appropriate mitigation measures have been put in place.

All instream works should be conducted between July and September inclusive as per IFI recommendations.

8.1.5 Deconstruction and Reconstruction of Owenass Bridge

The deconstruction and reconstruction of the Owenass Bridge is to occur outside of the main fish spawning season and are to follow the guidelines outlined in the 'Guidelines on Protection of Fisheries During Works in and Adjacent to Waters (IFI, 2016)'. It is assumed that juvenile Lamprey spp occur within the soft substrates prior to the initiation of the works. Given the salmonid spawning located downstream of the bridge the dewatering of the channel is to be done in halves, with one half of the channel dewatered at a time, while the other half is allowed to flow naturally.

The deconstruction of the bridge is as follows;

1. Install instream temporary works to support the bridge arch during demolition. This may consist of an arch structure built of plywood and/or steel under the existing bridge arch and a cushion material between both arches to mitigate the impact of falling debris over the temporary structure.
2. Scaffolding will then be introduced to the river bed to support the bridge during works.
3. Install temporary works (cofferdam sheet pile) on a stage basis to segregate the works area from the river to facilitate demolition (i.e. rock breaking) of the existing bridge abutments.
4. Electrofishing will be carried out during the dewatering process for coffer dams. Electrofishing will require licensing and AA Screening. Only after dewatering has taken place can demolition of the existing bridge abutments take place.
5. Dismantle the bridge arch, commencing by breaking down the top of the arch first and moving towards the sides, ensuring that any falling debris is retained by the temporary structure.
6. Demolition of the existing bridge abutments will take place within the dry working space.

The dry cell will be removed and the river will be allowed to flow again, **before** steps 1-6 are to be repeated for the demolition of the second half of the bridge.

Following this, the construction elements of the bridge can begin. Construction of the bridge will require similar mitigations for the protection of the river habitat and local QI fish/crayfish, including the instatement of cofferdam and dry cells. Construction of the new bridge will commence by installation of new bridge abutments along the banks of the river. The bridge itself will consist of 2 pre-cast concrete arches. Instream works may be required to guide the installation of the concrete arches.

As noted within IFI (2016), the operation of machinery for the steps listed above should be kept to an absolute minimum. All required machinery should be steam cleaned and checked for leaks prior to commencement of in-stream works.

8.1.6 Fish – Lamprey spp. and Salmon

Fish salvage and translocation works will be undertaken by the electrofishing specialist both immediately before the works, and again in advance of dewatering.

Fish in the area will likely leave through disturbance, however, if any become entrapped, they will be removed by the Project Ecologist. Mitigation for Lamprey in the fine sediment along the banks will require translocation.

Translocation efforts will follow guidelines for standard electrofishing surveys as set out in Harvey and Cowx (2003). To successfully translocate fish (and lamprey ammocoetes), this work will be carried out following the criteria below:

This work is to be conducted by an electrofishing team which is led by a qualified aquatic ecologist and/or ECoW under license - Section 14 of the Fisheries (Consolidation) Act, 1959 as substituted by Section 4 of the Fisheries (Amendment) Act, 1962.

- The precise location of the proposed piling must be communicated with the Electrofishing lead who will conduct the translocation work in tandem with the piling efforts. Stop nets reaching to the river bottom will be erected around affected areas.
- The electrofishing lead will assess the substrate conditions to determine if appropriate habitat is present before fishing the areas using a zigzag pulse and draw manner with a minimum effort of 1 minute's fishing per sq. m.
- Captured fish will be quickly removed using a dip net (not the electrofishing anode) and placed in a storage tank with aeration system. Lamprey will be spread out across appropriate habitat at a density of <10 sq. m.
- If adult salmon/trout and other coarse fish are trapped and subsequently recovered, they will be returned to the river as soon as they are caught. Fish that may be caught during fishing efforts should be moved to an aeration system before being transported to a section of the River Owenass with appropriate habitat. Fish should not be kept within the aeration system for more than 2 hours.
- Fishing efforts should continue until there is successive efforts with no catch return.
- Works should not take place if the water temperature exceeds 20°C to avoid thermal stress in fish. Dissolved oxygen levels should also be kept to 90% or above. If there is a significant reduction in oxygen level or if significant stress/mortality is observed fishing efforts should be suspended.
- Fishing efforts will be described in detail within the Construction Methodology and project CEMP. This methodology will be approved by IFI in advance of works.

8.1.7 Culvert and Headwall design

As outlined in Project description Section 3.3, eighteen culverts will be installed under embankments, with two headwalls either end of culvert connecting land drain to River Pound, and new culvert and headwall on the upstream section of the channel diversion at the Clontygar Stream, along with temporary culverting of land drain at Midland Steel site. Construction of these culverts should follow best practice guidance outlined in:

- OPW (2021) 'Design guidance For Fish Passage On Small Barriers'.

The OPW document is the preferred best practice document for engineering reference however a concise description of preferred culvert and headwall design is also described in the TII, IFI and Loughs Agency Documents:

- TII (2015) Design of Outfall and Culvert Details
- IFI (2016) - Guidelines on protection of fisheries during construction works in and adjacent to waters which includes
- Loughs Agency (2011) - Guidelines for Fisheries Protection during Development Works (Foyle and Carlingford areas)

Mitigation must be put in place to ensure its positioning and length is not an obstacle to fish passage. The culvert must meet the following criteria:

- A gradient of 5% must never be exceeded, with 3% being the preferred upper limit
- Be positioned such that both the upstream and downstream invert will be 500mm below the upstream and downstream riverbed invert levels respectively.
- Piped culverts should be avoided wherever possible, with inverted U shape or box culverts over the existing stream bed being the preferred option. If a piped culvert is the only option at detailed design, IFI must be consulted in advance of works, and the piped culvert must be buried deeper than bed level so that the natural bed material can be retained. This is to maintain natural roughness throughout the culvert.
- Pools will be formed at each end of the culvert to provide transition from the shape of the opening to the shape of the river downstream. Pools will, ideally, be built in natural rock and be designed to provide take-off conditions for upstream migrants entering/ leaving the culvert.
- The areas around the inlet and outlet should be planted with transitional planting (Willow or Alder) so that there is not a stark difference in lighting between the open channel and culvert.
- Flow velocity should be as slow as possible with water depth through the culvert kept as deep as possible. Maximum flow velocities during standard flow should not exceed 1.2m/sec. Power densities should not exceed 150Wm3.
- Head drops must be avoided during detailed design, but if absolutely required a maximum head drop of 0.1m can be permitted.
- If trash screens are required, they must be adequately spaced to approximately 230mm to allow for fish passage. Mesh screens must be avoided.

The construction and improvement of integrated precast headwalls at the upstream end of the Clontygar diversion must take environmental considerations into place, which would include the allowance of lighting to pass into the culverts (TII, 2015).

8.1.8 Realignment of the Clontygar Stream

Along any existing stream where realignment is proposed, investigations to establish the prevailing bed and bank material must be conducted to inform the need for the proposed clay and geotextile linings. This includes:

- Visual survey of the existing riverbed and bank material, and
- Ground investigation (e.g. augering) along the bank of the existing stream to just below bed level. This aims to identify prevailing sediment type underneath and alongside the channel and the connectivity of the river to groundwater.

Investigations must be conducted along the proposed stream realignment.

Sediment types along the lengths of the affected and proposed channel must be compared to evaluate whether there is a substantial difference e.g. a low permeability layer under the existing channel that is not present under the proposed realignment. Survey must be conducted by a geomorphologist and/or hydrogeologist and expert judgement must be considered during detailed design. The default position must be that no clay lining is applied unless proven

necessary. Surveys must be conducted in summer months as normal flow conditions will be most susceptible to the impacts of surface-groundwater disconnection.

The alignment of the stream must follow the guidelines listed within IFI (2016, 2020 and) to be designed to replicate an existing natural watercourse which includes measures such as have a diverse plane form and a channel cross section with lateral connectivity to the bankside and floodplain habitats. The realigned stream must be re-naturalised, possessing a sinuous form, be shallow, and have an active lateral connection to adjacent lands. Diversion of water to the permanent channel should only take place from March to September, with a member of IFI present on site when the watercourse is initially diverted.

8.1.9 Construction of Embankments

In areas where works are anticipated to be adjacent to trees, scrub and hedges of the SAC, but not directly involving their removal (such as works along the banks of the River Owenass), there are a set of mitigations within the accompanying Arboricultural Impact Assessment which outline the methodology required to protect local trees. These will be enacted with the presence of an arborical consultant, and are summarised as follows:

Preparation Works

- Ground protection to protect tree roots will be introduced into the area prior to introduction of equipment and machinery into areas of trees. The installation of ground protection will be performed in a stepwise manner, where the protection begins along the edge of root protection zones, and gradually progresses through the rooting area. By doing this, the process of installing ground protection itself, will occur on previously laid ground protection.
- Initially, once all ground protection has been laid, only materials required for raising the crown will be allowed within these areas.
- Once any necessary crown raising has been completed, fencing within root protection zones will be installed in areas shown on the Tree Protection Plan.
- Holes for this fencing will be a minimum of 50cm away from tree stems, manually excavated with hand tools, and the position of the hole will be altered to avoid tree roots with a diameter of 25mm. If this is not possible, the roots will be protected with flexible plastic pipes and retained within the pit. Tree roots with a diameter of less than 25mm may be pruned where necessary.
- Only after these precautions, may the installation of defence measures be performed. No alteration of the tree protection measures will take place without prior notification and consent with the on-site arboricultural consultant.

Enaction of Works

- Excavation or piling works in the vicinity of trees scheduled for retention are to be supervised by a qualified arborist, in order to monitor the level of root severance if at the time of works. A schedule for removal of vegetation is outlined within the accompanying EIAR biodiversity chapter, as this section pertains to local birds and bats, and does not relate to any QI species of the River Barrow and River Nore SAC
- If it is determined by the arborist that the level of impact is too great and that the stability of these trees and tree loss is unavoidable

works must be stopped, a full assessment of trees to be removed will be required as well as an assessment on the bank stability, looking specifically at the link between the tree roots and how they support the bank.

- Any of the works that cause accidental damage to local trees that has not already been planned and scheduled, will be reported to the local arboricultural consultant immediately.

8.1.10 Otter

In addition to the works regarding the construction of the site's walls and embankments, there are general mitigations measures that are required to safeguard the activities of local Otter. These include:

- Limit the hours of working to daylight hours, to limit disturbance to nocturnal and crepuscular animals.
- Contractors must ensure that no harm comes to wildlife by maintaining the site efficiently and clearing away materials which are not in use, such as wire or bags in which animals can become entangled; and
- Any pipes must be capped when not in use (especially at night) to prevent local fauna becoming trapped. Any excavations must be covered overnight to prevent animals from falling and getting trapped. If that is not possible, a strategically placed plank (at an angle no greater than 45 degrees) should be placed to allow animals to escape.

8.1.11 Biosecurity Mitigations

The adherence to a set of biosecurity measures, including fencing off/demarcating invasive species, communicating the location, risk and hazards associated with invasive species to construction personnel, identifying dedicated access points into and out of fenced-off areas, the installation of designated decontamination facilities (where appropriate), protocols around the storage of infested soils, and the checking of boots, tyres and tracks before they enter the works site.

8.1.11.1 Invasive Flora

Prior to where clearance of vegetation is necessary to form access routes and work areas, the invasive non-native species Three-cornered Garlic should be appropriately removed and disposed of to avoid further dispersal of the species.

Removal of Three-cornered Garlic can be done by either physical control or chemical control and it is recommended that this is done either through digging up the root network, or the application of herbicide. Three-cornered Garlic is found within the grassy verges that are within the farmer tracks between fields, and it is recommended that, and as such uprooting the patches is the preferred option to prevent its spread.

8.1.11.2 Crayfish Plague

Prior to the entry and exit of the areas of instream works, the equipment used must undergo the Check, Clean and Dry protocol.

- All wet gear will be checked for potentially contaminated materials such as silt, mud, animals or plants, and these materials should be removed and left on site.
- It then must be thoroughly cleaned with disinfectant or hot water (over 60^{0}C).

- Equipment will then undergo a 48hr drying period. If complete drying is not possible, the equipment must be soaked, sprayed or wiped down with a disinfect and such as Virkon Aquatic Virasure tablets.

8.2 Operational Phase Mitigations

8.2.1 Flood Plain of the Owenass: Baker's Field

The FRS will enable the floodplain to extend into Baker's Field on the left bank of the River Owenass, between Owenass Bridge and Mill Bridge, and in central floodplain section. This will allow natural development and recovery of floodplain and riparian habitats.

IFI have indicated (see Table 5-2 in EIAR Section 5.2.5.) that provision of riverbed features would improve spawning opportunities; in particular the provision of gravel banks on the inside of bend in the Owenass River opposite Baker's Field. This could include boulders/barriers to create deflection features in the bed, limited to 2 or 3 areas of gravel bank..

9 Project summary and Conclusion

9.1 Construction Phase

9.1.1 Impact on Water courses of plain to montane levels with the Ranunculion fluitanis and Callitricho-Batrachion vegetation [3260]

9.1.1.1 In-stream works

While there is no evidence of Water courses of plain to montane levels with the Ranunculion fluitanis and Callitricho-Batrachion vegetation habitat being present on site, potential pollution events could temporarily disrupt the suitability of the River Owenass for the habitat to colonise.

No adverse impact on this QI is anticipated from the construction works as the following protective measures will apply:

- The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.6 and 8.1.8 in regards to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction of embankments.

9.1.1.2 Baker's Field and central Mountmellick Floodplain

While there is no evidence of this habitat present on site, the increase of floodplain connectivity of the River Owenass at both Baker's Field and the central floodplain section within the townland will enhance the potential for this habitat along the River Owenass.

9.1.2 Impact on Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]

9.1.2.1 In-stream works

While there is no evidence of Hydrophilous tall herb fringe communities habitat being present on site, pollution events will temporarily disrupt the suitability of the River Owenass for the habitat to colonise.

No adverse impact on this QI is anticipated from the construction works as the following protective measures will apply:

- The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.6 and 8.1.8 in regards to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction of embankments.

9.1.2.2 Spreading of negative indicator species

While this QI habitat Hydrophilous tall herb fringe communities is not present on site, the spread of non-native invasive species (Cherry Laurel, Three-corner Garlic, Japanese Knotweed) will negatively impact the suitability for this QI to establish itself within the SAC boundary.

No adverse impact on this QI is anticipated from the construction works as the following protective measures will apply:

- The mitigations outlined in Section 8.1.11.1 in regards to the treatment of invasive flora

9.1.3 Impact on Otter [1355]

9.1.3.1 Disturbance and/or entrapment during construction

During construction the noise, visual disturbance, removal of habitat and accidental entrapment of wildlife may impact the health and foraging of Otter within the Scheme.

No adverse impact on this QI is anticipated from the construction works as the following protective measures will apply:

- The mitigations outlined in Section 8.1.9 in regards to the prevention of disturbance and/or entrapment of local Otter

9.1.3.2 Removal of vegetation along the embankments

Due to the small scale removal of vegetation (hedgerows, treelines and scrub) from the bankside during the construction of the embankments, Otter may lose commuting and settling habitats.

No adverse impact on this QI is anticipated from the construction works as the following protective measures will apply:

- The mitigations outlined in sections 8.1.4, 8.1.5, and 8.1.8 in regards to the methodologies for the construction of bankside and instream walls, deconstruction and replacement of Owenass Bridge and construction of embankments, ensuring the protection of bankside vegetation

9.1.3.3 In-stream works

The in-stream works and the creation of a dry-cells will limit the access of Otter to the River Owenass and will temporarily restrict their movement, foraging and territorial behaviour.

- The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.6 and 8.1.8 in regards to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction of embankments.
- The mitigations outlined in section 8.1.7 ensuring the correct realignment of Clontygar Stream

9.1.3.4 Reduction of fish stock

Impacts from other sources (outlined in following sections) that remove the fish stock of Otter from within the local rivers will reduce the foraging and feeding potential for Otter and reduce the overall suitability of the site

No adverse impact on this QI is anticipated from the construction works as the protective measures include:

- The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.6 and 8.1.8 in regards to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction
- The mitigations outlined in section 8.1.7 ensuring the correct realignment of Clontygar Stream
- The mitigations outlined in section 8.1.10 ensuring the correct procedure of translocating entrapped fish

9.1.4 Impact on Brook Lamprey [1096] and River Lamprey [1099]

9.1.4.1 In-stream works

The in-stream works and the creation of a dry-cells will limit the access of lamprey along the River Owenass and will temporarily restrict their movement, spawning and juvenile habitat availability.

No adverse impact on this QI is anticipated from the construction works as the protective measures including:

- The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.6 and 8.1.8 in regards to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction
- The mitigations outlined in section 8.1.10 ensuring the correct procedure of translocating entrapped fish

9.1.5 Impact on Atlantic Salmon (only in fresh water) [1106]

9.1.5.1 In-stream works

The in-stream works and the creation of a dry-cells will limit the access of Salmon along the River Owenass and will temporarily restrict their movement, spawning and juvenile habitat availability, while also any in-stream works has the potential for causing mortality in adult Salmon and reducing the overall population.

No adverse impact on this QI is anticipated from the construction works as the protective measures including:

- The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.6 and 8.1.8 in regards to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction
- The mitigations outlined in section 8.1.10 ensuring the correct procedure of translocating entrapped fish

9.1.6 Impact on White-clawed Crayfish [1092]

9.1.6.1 Instream works and removal of habitat

While not present during the surveys, the in-stream works and the creation of dry-cells will temporarily reduce the habitat suitability along sections of the River Owenass for White-clawed Crayfish.

No adverse impact on this QI is anticipated from the construction works as the protective measures including:

- The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.6 and 8.1.8 in regards to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction.

9.1.6.2 Crayfish Plague

While there was no evidence of Crayfish within the River Owenass, the River Barrow has been confirmed to have Crayfish Plague present in it. It is important to adhere to a biosecurity protocol to prevent the spread of the plague within and outside of the SAC.

No adverse impact on this QI is anticipated from the construction works as the protective measures include:

- The mitigations outlined in Section 8.1.11.2 in regards to the treatment of equipment after being in river waters.

9.2 Operational Impacts

The proposed development will not generate any residual impacts as a result of its operation, given the appropriately designed flood alleviation zones featured within the development. Following best practise, the scheme includes a built-in

mammal pass within the creation of the Owenass Bridge with a small scale sediment deposition to allow for continued passage of Otter and the allowance for Otter to use the location as a latrine.

9.3 Impacts on Site Integrity

All impacts on the River Nore and River Barrow SAC are predicted to be short-term due to construction best practice and mitigation measures to avoid detrimental effects and confined to the construction period of the project.

Following mitigations in regards to the management of on-site pollutants, no appreciable effect on the River Nore and River Barrow SAC via a hydrological pathways, instream works and air pollutants pathway are expected.

9.3.1 General Impacts

There are general impacts across the scheme that will disrupt each of the QIs listed below, both present within the scheme or potentially present downstream of the scheme. These include the infiltration of pollutants (dust, hydrocarbons, silt) into the local watercourses, which would reduce the suitability for QI habitats to establish themselves within the scheme boundary, and reduce the foraging/feeding/breeding suitability for the QI fauna within the scheme.

No adverse effect on any of the QIs is anticipated from general construction works as the following protective measures will apply:

- The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill

The nature of the project means that impacts will be confined to the construction period and no ongoing operational impact is anticipated.

With the mitigations in place short-term impacts are predicted, which will be confined to the construction period. No medium or long-term negative effects of the work are predicted. The works are not expected to have any adverse impacts on the QIs of the nearby River Nore and River Barrow SAC (Table 9-1)

These mitigation measures will ensure that no adverse impacts will occur which could affect the integrity of the River Nore and River Barrow SAC.

Similarly, no adverse impacts are predicted against the conservation objectives of the QIs for which the SAC is designated.

Table 9-1: Pathways of impact on the attributes of the designated features of River Barrow and River Nore SAC

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Residual Impact
Water courses of plain to montane levels with the *Ranunculion fluitanis* and *Callitricho-Batrachion* vegetation [3260]	Habitat distribution	Occurrence	Habitat not present within the zone of influence but potentially present downstream of the site. However, pollution events will temporarily disrupt the suitability of the River Owenass for the habitat to colonise.	The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill	No adverse effects
	Habitat area	Kilometres	Habitat not present within the zone of influence but potentially present downstream of the site. However, pollution events will temporarily disrupt the suitability of the River Owenass for the habitat to colonise	The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill	No adverse effects
	Hydrological regime: river flow	Metres per second	Overall the Scheme will not have an impact on water course velocities of the River Owenass, with very little difference between undefended (baseline) and defended (design) velocities at 50% Annual Exceedance Probability (AEP) event peak velocities (m/s) and 20% AEP event peak velocities (m/s)	None required	No adverse effects
	Hydrological regime: groundwater discharge	Metres per second	n/a Relates to tufa in River Nore. Habitat is not present within the area of the scheme's ZoI.	n/a	n/a
	Substratum composition: Particle size	Millimetre	n/a Relates to tufa in River Nore. Habitat is not present within the area of the scheme's ZoI.	n/a	n/a

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Residual Impact
	range				
	Water chemistry: minerals	Milligrammes per litre	n/a Relates to tufa in River Nore. Habitat is not present within the area of the scheme's ZoI.	n/a	n/a
	Water quality: suspended sediment	Milligrammes per litre	n/a Relates to tufa in River Nore. Habitat is not present within the area of the scheme's ZoI.	n/a	n/a
	Water quality: nutrients	Milligrammes per litre	n/a Relates to tufa in River Nore. Habitat is not present within the area of the scheme's ZoI.	n/a	n/a
	Vegetation composition: typical species	Occurrence	n/a Relates to tufa in River Nore. Habitat is not present within the area of the scheme's ZoI.	n/a	n/a
Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]	Habitat distribution	Occurrence	Habitat not present within the zone of influence but potentially present downstream of the site However, pollution events will temporarily disrupt the suitability of the River Owenass for the habitat to colonise	The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill	No adverse effects, following mitigation.
	Habitat area	Kilometres	Habitat not present within the zone of influence but potentially present downstream of the site However, pollution events will temporarily disrupt the suitability of the River Owenass for the habitat to colonise	The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill	No adverse effects, following mitigation.
	Hydrological	Metres	Habitat not present within the zone	The mitigations	No adverse effects,

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Residual Impact
	regime: Flooding depth/height of water table		of influence but potentially present downstream of the site However, pollution events will temporarily disrupt the suitability of the River Owenass for the habitat to colonise	outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill	following mitigation.
	Vegetation structure: sward height	Centimetres	Habitat not present within the zone of influence but potentially present downstream of the site However, pollution events will temporarily disrupt the suitability of the River Owenass for the habitat to colonise	The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill	No adverse effects, following mitigation.
	Vegetation composition: broadleaf herb: grass ratio	Percentage	Habitat not present within the zone of influence but potentially present downstream of the site However, pollution events will temporarily disrupt the suitability of the River Owenass for the habitat to colonise	The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill	No adverse effects, following mitigation.
	Vegetation composition: typical species	Number	Habitat not present within the zone of influence but potentially present downstream of the site However, pollution events will temporarily disrupt the suitability of the River Owenass for the habitat to colonise	The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill	No adverse effects, following mitigation.
	Vegetation composition:	Occurrence	Spread of invasive species, including Japanese Knotweed or Three-corner	Strict adherence to:	No adverse effects, following

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Residual Impact
	negative indicator species		Garlic, which disrupt local ecology.	- The mitigations outlined in Section 8.1.11.1-++++ in regards to the treatment of invasive flora	mitigation.
Otter [1355]	Distribution	Percentage positive survey sites	A temporary reduction in the species distribution as a result of deleterious substances entering the habitat via surface water, groundwater-to-surface water and air-to-surface water pathways.	Strict adherence to: - The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill. - The mitigations outlined in Section 8.1.10 in regards to relation to the prevention of disturbance and/or entrapment of local Otter	No adverse effects, following mitigation.
	Extent of terrestrial habitats	Hectares	A temporary reduction in the terrestrial habitats (hedgerows, scrub and treelines) due to the construction of embankment and alterations existing flood regime.	Strict adherence to - The mitigations outlined in sections 8.1.4, 8.1.5, and 8.1.8 in regards to the methodologies for the construction	No adverse effects, following mitigation

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Residual Impact
				of bankside and instream walls, deconstruction and replacement of Owenass Bridge and construction of embankments, ensuring the protection of bankside vegetation	
	Extent of marine habitats	Hectares	n/a No marine habitat present within the scheme	n/a	n/a
	Extent of freshwater (river) habitats	Kilometres	A temporary reduction in suitability of the riverine habitat as a result of deleterious substances entering the habitat via surface water, groundwater-to-surface water and air-to-surface water pathways.	Strict adherence to: - - The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.6 and 8.1.7 in regards to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction of embankments - The mitigations outlined in section 8.1.8 ensuring the	No adverse effects, following mitigation.

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Residual Impact
				correct realignment of Clontygar Stream	
	Extent of freshwater (lake) habitats	Hectares	n/a No lake habitats located within the scheme	n/a	n/a
	Couching sites and holts	Number	n/a Surveys indicate scheme is not impacting any couches or holts. However using precautionary principle, sections of the Scheme may have Otter present in the future.	n/a	n/a
	Fish biomass available	Kilograms	A temporary reduction in fish stock available as a result of deleterious substances entering the habitat via surface water, groundwater-to-surface water and air-to-surface water pathways.	Strict adherence to: - The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill. - The mitigations outlined in sections 8.1.4, 8.1.5, and 8.1.7 in regards to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and	No adverse effects, following mitigation.

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Residual Impact
				construction - The mitigations outlined in section 8.1.8 ensuring the correct realignment of Clontygar Stream - The mitigations outlined in section 8.1.6 ensuring the correct procedure of translocating entrapped fish	
Brook Lamprey [1096]	Distribution: extent of anadromy	% of river accessible	n/a Scheme is not increasing artificial barriers and will not restrict access to spawning areas	n/a	n/a
River Lamprey [1099]	Population structure of juveniles	Number of age/size groups	A temporary reduction in available river accessibility as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water, and air-to-surface water pathways. Entrapment in dry cell works	Strict adherence to: - The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill. - The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.7 and in regards to the methodologies for the construction of bankside and	No adverse effects, following mitigation.

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Residual Impact
				instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction - The mitigations outlined in section 8.1.6 ensuring the correct procedure of translocating entrapped fish	
	Juvenile density in fine sediment	Juveniles/m^2	A temporary reduction in available juvenile density as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water, and air-to-surface water pathways.	Strict adherence to: - The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill. - The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.7 and in regards to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and	No adverse effects, following mitigation.

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Residual Impact
				construction - The mitigations outlined in section 8.1.6 ensuring the correct procedure of translocating entrapped fish	
	Extent and distribution of spawning habitat	m^2 and occurrence	A temporary reduction in available spawning habitat as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water, and air-to-surface water pathways.	Strict adherence to: - The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill. - The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.7 and in regards to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction - The mitigations outlined in section	No adverse effects, following mitigation.

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Residual Impact
				8.1.6 ensuring the correct procedure of translocating entrapped fish	
	Availability of juvenile habitat	Number of positive sites in	A temporary reduction in available juvenile habitat as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water, and air-to-surface water pathways.	Strict adherence to: - The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill. - The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.7 and in regards to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction - The mitigations outlined in section 8.1.6 ensuring the correct procedure of translocating entrapped fish	No adverse effects

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Residual Impact
Atlantic Salmon (only in fresh water) [1106]	Distribution: extent of anadromy	% of river accessible	n/a Scheme is not increasing artificial barriers and will not restrict access to spawning areas	n/a	n/a
	Adult spawning fish	Number	A temporary reduction in spawning fish as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water, and air-to-surface water pathways. Entrapment in dry cell works	Strict adherence to: - The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill. - The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.7 and in regards to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction	No adverse effects
	Salmon fry abundance	Number of fry/5mins electrofishing	A temporary reduction in available juvenile habitat as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water, and air-to-surface water pathways.	Strict adherence to: - The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the	No adverse effects

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Residual Impact
				protection of local aquatic habitats from dust, concrete and pollutant spill. - The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.7 and in regards to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction The mitigations outlined in section 8.1.6 ensuring the correct procedure of translocating entrapped fish	
	Out-migrating smolt abundance	Number	A temporary reduction in smolt abundance as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water, and air-to-surface water pathways. Entrapment in dry cell works	Strict adherence to: - The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill.	No adverse effects

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Residual Impact
				- The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.7 and in regards to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction The mitigations outlined in section 8.1.6 ensuring the correct procedure of translocating entrapped fish	
	Number and distribution of redds	Number and occurrence	A temporary reduction in available redd habitat as a result of deleterious substances entering the habitat via surface water and groundwater-to-surface water, and air-to-surface water pathways, and of the disruption of redd habitats as a result of the implementation of dry cell areas. Entrapment in dry cell works	Strict adherence to: - The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill. - The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.7 and in regards to the methodologies for the construction of	n/a

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Residual Impact
				bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction The mitigations outlined in section 8.1.6 ensuring the correct procedure of translocating entrapped fish	
White-clawed Crayfish 1092	Distribution	Occurrence	A temporary reduction in the species distribution as a result of deleterious substances entering the habitat via surface water, groundwater-to-surface water and air-to-surface water pathways. While not present during the surveys, the in-stream works and the creation of dry-cells will temporarily reduce the habitat suitability along sections of the River Owenass for White-clawed Crayfish.	Strict adherence to: - The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.7 and 8.1.8 in regard to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction, ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill.	No adverse effects

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Residual Impact
				The mitigations outlined in section 8.1.6 ensuring the correct procedure of translocating entrapped fish	
	Population structure: recruitment	Percentage occurrence of juveniles and females with eggs	A temporary reduction in the juvenile recruitment as a result of deleterious substances entering the habitat via surface water, groundwater-to-surface water and air-to-surface water pathways.	Strict adherence to: - The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill. - The mitigations outlined in sections 8.1.4, 8.1.5, 8.1.7 and in regards to the methodologies for the construction of bankside and instream walls, culverts, deconstruction and replacement of Owenass Bridge and construction	No adverse effects
	Negative indicator species	Occurrence	n/a Scheme not anticipated to introduce alien crayfish species	n/a	n/a
	Disease	Occurrence	The introduction and facilitated	Strict adherence to:	No adverse effects

Qualifying Interest	Attribute	Measure	Potential Impacts	Mitigation Measures	Residual Impact
			spread of Crayfish Plague through sections of the River Owenass through contaminated equipment.	- The mitigations outlined in Section 8.1.11.2 in regards to the treatment of equipment after being in river waters	
	Water quality	EPA Q value	A temporary reduction in the water quality as a result of deleterious substances entering the habitat via surface water, groundwater-to-surface water and air-to-surface water pathways.	Strict adherence to: - The mitigations outlined in Sections 8.1.1, 8.1.2, 8.1.3 (and its subsections) ensuring the protection of local aquatic habitats from dust, concrete and pollutant spill.	No adverse effects
	Habitat quality: heterogeneity	Occurrence of positive habitat features		v - The realignment of the Clontygar Stream will create additional heterogenous habitat features in this water course.	No adverse effects

9.4 In-combination Assessment

Following mitigation measures described in this NIS, and when applying best construction practices, no significant adverse impact is expected on the River Nore and River Barrow SAC from this project. Therefore, no in-combination adverse impacts are anticipated.

9.5 Conclusion

JBA Consulting Engineers and Scientists Ltd. (hereafter JBA) has been commissioned by Laois County Council to prepare a Natura Impact Statement for the proposed Flood Relief Scheme (FRS) for the Mountmellick area in Co. Laois.

The following Natura 2000 site was identified as potentially being impacted using a source pathway receptor model:

- River Barrow and River Nore SAC

The proposed FRS is located along the River Owenass (surface water, groundwater-to-surface, air-to-surface water, and direct water influence), including sections of the River Barrow and River Nore SAC Natura 2000 site, while the Mountmellick SAC Natura 2000 site is not connected to the FRS via any means so was screened out from further assessment.

The QIs within the ZoI and screened into this assessment are:

- Water courses of plain to montane levels with the *Ranunculion fluitanis* and *Callitricho-Batrachion* vegetation [3260]
- Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430]
- Otter *Lutra lutra* [1355]
- Brook Lamprey *Lampetra planeri* [1096]
- River Lamprey *Lampetra fluviatilis* [1099]
- Atlantic Salmon *Salmo salar* [1106]
- White-clawed Crayfish *Austropotamobius pallipes* [1092]

This NIS has examined and analysed, in light of the best scientific knowledge, with respect to the European site within the zone of influence of Mountmellick FRS, the potential impact, sources and pathways, the manner in which these could potentially impact on the European site's qualifying interest habitats and species, and whether the predicted impacts would adversely affect the integrity of River Barrow and River Nore SAC. The possibility of significant effects on any other European site can be excluded.

Avoidance, design requirements and mitigation measures are set out within this NIS (and its appendices) and the effective implementation of these mitigation measures will ensure that any impacts on the conservation objectives of River Barrow and River Nore SAC will be avoided during the construction and operation of Mountmellick FRS such that there will be no adverse effects on any European sites.

Mitigation for protection of water quality, and thus the protection of the River Nore and River Barrow SAC via hydrological pathways, obstruction during instream works and air pollutants include but are not limited to:

- Control measures for: Surface Water, Dust, Concrete and Pollution Spill

- Restriction measures for the construction of the walls and within terrestrial habitats of the SAC, aquatic habitats of the SAC and within habitats near to the SAC's boundary
- Measures for during the construction and reconstruction of the Owenass Bridge
- Species – specific mitigations for QI Salmon, lamprey spp. and Otter
- Biosecurity measures
- Presence of a Project Ecologist to oversee works and manage ecological matters

It has been objectively concluded by JBA Consulting, following an examination, analysis and evaluation of the relevant information, including in particular the nature of the predicted impacts from Mountmellick FRS and the effective implementation of the mitigation measures proposed, that Mountmellick FRS will not adversely affect (either directly or indirectly) the integrity of any European site in view of the site's conservation objectives, either alone or in combination with other plans or projects, and there is no reasonable scientific doubt in relation to this conclusion.

To confirm this conclusion, a checklist on methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC from (European Commission 2021) has been completed with regards to conservation objectives in Table 9-1.

Table 9-1 Assessing the effects on the integrity of the Natura 2000 site.

Does the plan or project have the potential to:	Yes/No
Hamper or cause delays in progress towards achieving the site's conservation objectives?	No - Following mitigation, no significant adverse impacts have been identified that will prevent achievement of the conservation objectives of the assessed site
Reduce the area, or quality, of protected habitat types or habitats of protected species present on the site?	No - Following mitigation adverse residual impacts have been identified that will reduce the area, or quality of protected habitat types or habitats of protected species on the site
Reduce the population of the protected species significantly present on the site?	No - Potential impacts to key species of the River Barrow and River Nore SAC are not expected, as impacts can be avoided by implementing the mitigation measures detailed
Result in disturbance that could affect the population size or density or the balance between species?	No - Potential impacts to key species for which the River Barrow and River Nore SAC are designated are not expected, as impacts can be avoided by implementing the mitigation measures detailed
Cause the displacement of protected species significantly present on the site and thus reduce the distribution area of those species in the site?	No – Potential impacts resulting in displacement of species or habitats are not expected as impacts can be avoided by implementing the mitigation measures detailed

Does the plan or project have the potential to:	Yes/No
Result in a fragmentation of Annex I habitats or habitats of species?	No – Potential impacts resulting in fragmentation of species or habitats are not expected as impacts can be avoided by implementing the mitigation measures detailed
Result in a loss or reduction of key features, natural processes or resources that are essential for the maintenance or restoration of relevant habitats and species in the site (e.g. tree cover, tidal exposure, annual flooding, prey, food resources)?	No - Following mitigation, no significant adverse residual impacts have been identified that will result in a loss of key features of natural processes or resources.
Disrupt the factors that help maintain the favourable conditions of the site or that are needed to restore these to a favourable condition within the site?	No - Following mitigation, no significant adverse residual impacts have been identified that will disrupt the factors that maintain favourable conditions or that are needed to restore favourable conditions
Interfere with the balance, distribution and density of species that are the indicators of the favourable conditions of the site?	No - Following mitigation, no significant adverse residual impacts have been identified that will interfere with the balance, distribution and density of indicator species of favourable conditions of the site

Note : The Project Ecologist should be involved at detailed design stage to review any changes to design which may lead to additional ecological impacts, and to ensure that any revisions to mitigation are included in the CEMP for construction.

Appendices

A National Biodiversity Data Centre Records

A.1 Recent records (within 10 years) of protected species within 10km of the site with connections to Natura 2000 Sites

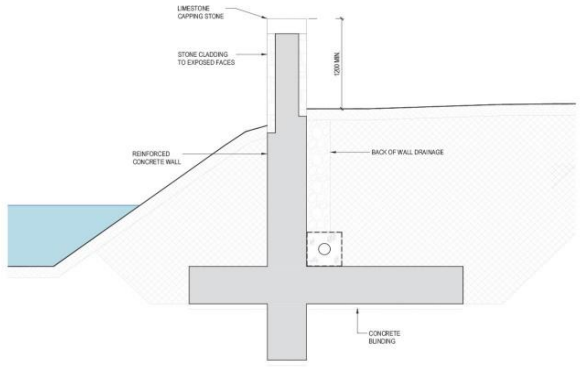
Species Name	Date of Last Record	Designation
Amphibians		
Common Frog *Rana temporaria*	08/05/2020	EU Habitats Directive >> Annex V Protected Species: Wildlife Acts
Smooth Newt *Lissotriton vulgaris*	08/05/2020	Protected Species: Wildlife Acts
Aquatic Invertebrates		
Freshwater White-clawed Crayfish *Austropotamobius pallipes*	27/06/2018	EU Habitats Directive >> Annex II & Annex V Protected Species: Wildlife Acts
Mammals		
European Otter *Lutra lutra*	30/08/2016	EU Habitats Directive >> Annex II & Annex IV Protected Species: Wildlife Acts

A.2 Recent records (within 10 years) of invasive species within 10km of the site that pose a threat to connected Natura 2000 sites

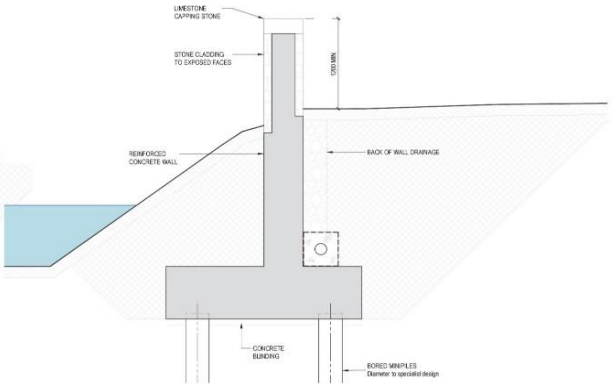
Species Name	Date of Last Record	Designation
Flora		
Butterfly-bush *Buddleja davidii*	13/08/2021	Medium Impact Invasive Species
Canadian Fleabane *Conyza canadensis*	30/05/2019	Medium Impact Invasive Species

Species Name	Date of Last Record	Designation
Indian Balsam *Impatiens glandulifera*	20/07/2021	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Japanese Knotweed *Fallopia japonica*	23/06/2021	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Narrow-leaved Ragwort *Senecio inaequidens*	07/08/2020	Medium Impact Invasive Species
Rhododendron ponticum	31/05/2020	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Spanish Bluebell *Hyacinthoides hispanica*	23/05/2016	Low Impact Invasive Species Regulation S.I. 477 (Ireland)
Sycamore *Acer pseudoplatanus*	17/03/2014	Medium Impact Invasive Species
Traveller's-joy *Clematis vitalba*	02/09/2018	Medium Impact Invasive Species
Reptile		
Red-eared Terrapin *Trachemys scripta*	16/06/2020	Medium Impact Invasive Species EU Regulation No. 1143/2014
Mammal		
American Mink *Mustela vison*	23/01/2015	High Impact Invasive Species Regulation S.I. 477 (Ireland)
Bank Vole *Myodes glareolus*	23/12/2022	Medium Impact Invasive Species
Brown Rat *Rattus norvegicus*	02/10/2013	High Impact Invasive Species Regulation S.I. 477 (Ireland)

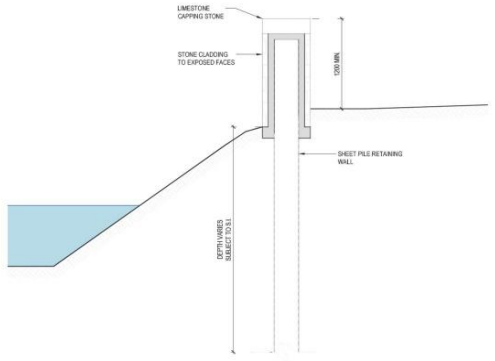
B Selected Scheme Drawings



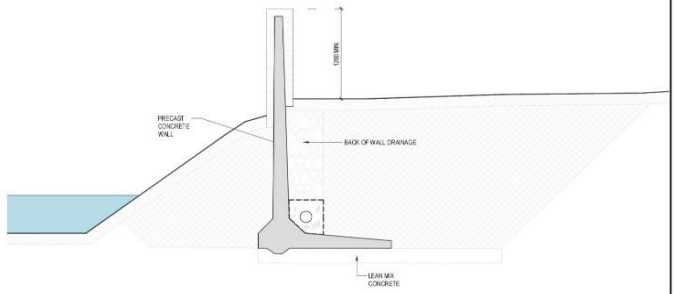
Typical Detail 1:
In situ reinforced concrete foundation up to 3m (TBC) depth below ground, constructed from the bank, and in situ reinforced concrete wall up to 1.9m (TBC) high



Typical Detail 2:
Concrete micro piling (instream) (bored mini piles) up to 3m (TBC) depth below formation, constructed from the bank, in situ reinforced concrete wall or precast wall above ground (clad) up to 1.9m (TBC) high.



Typical Detail 3:
Sheet piling typically 3m (TBC) depth below ground or bed level, constructed from the bank or instream, sheet piling wall or in situ reinforced concrete wall above ground (clad) up to 1.9m (TBC) high.



Typical Detail 4:
(instream) – Precast Concrete Wall up to 3m below existing ground level (TBC), constructed instream, wall (clad) up to 1.2m (TBC) high.

Typical Flood Wall Details

Mountmellick Flood Relief Scheme

Not to Scale

Figure B-1: Engineer detailed drawings of the walls

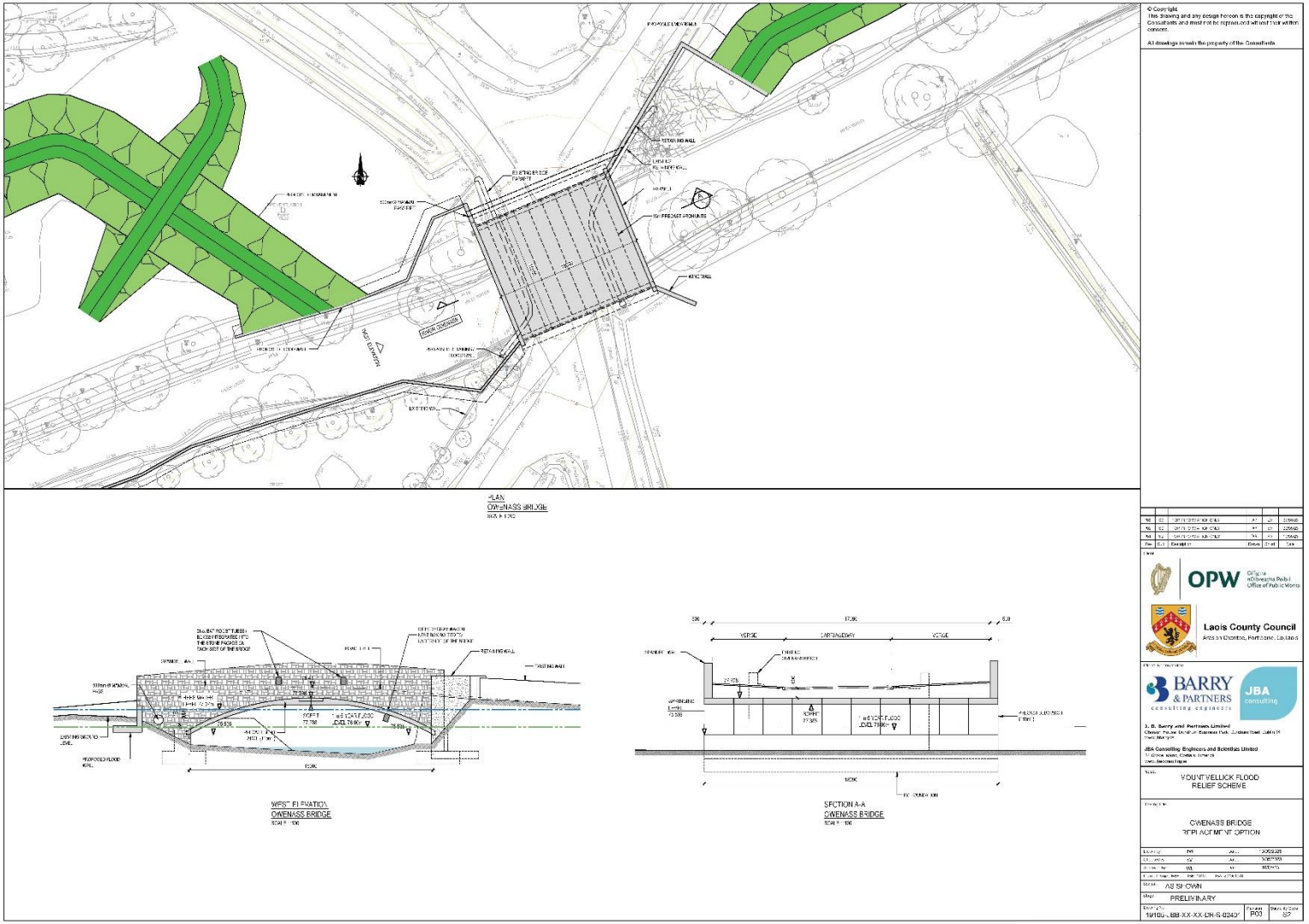


Figure B-2: Engineer drawings of the proposed bridge

C Natura 2000 QIs

Site Name	Brief	Qualifying Interests within the Screened In Zone of Influence	Project-relevant Threats / Pressures: Impact (Source) +
River Barrow and River Nore SAC	This site includes the Barrow and Nore River Catchments all the way from Slieve Bloom Mountains in the north to Creadun Head in Waterford in the south. The upper parts of the Barrow run through limestone, while the middle reaches and many of the eastern tributaries runs through Leinster Granite. Within the site are several locations with alluvial forest, which is a priority Annex 1 habitat. Accessioned with the alluvial forests are eutrophic tall herb vegetation and elsewhere where the flood plain of the river is intact. Petrifying springs is another priority Annex 1 habitat found within this SAC along the Nore River. Old oak woodlands are found both along the Nore and the Barrow. Floating river vegetation is well represented in the Barrow and in the many tributaries of the site. The water quality of the Barrow has improved since the vegetation survey was carried out in 1996. In pockets along the steep valleys of the rivers habitats of dry heath are occurring and is especially prominent in the Barrow Valley and along the tributaries at the foothills of the Blackstairs Mountains. The dry heath generally grades into wet woodland or swamp vegetation closer to the riverbank. The southernmost area of the SAC is characterised by coastal habitats such as estuaries, mudflats and salt meadows. The site is important for the presence of a number of E.U. Habitats Directive Annex II species, including Freshwater Pearl Mussel Margaritifera margaritifera and M. m. durrovensis, White-	- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) * [91E0] - Brook Lamprey *Lampetra planeri* [1096] - Floating River Vegetation [3260] - Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] - Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] - Otter *Lutra lutra* [1355] - River Lamprey *Lampetra fluviatilis* [1099] - Atlantic Salmon *Salmo salar* [1106] - White-clawed Crayfish *Austropotamobius pallipes* [1092] (NPWS, 2011)	Pollution to surface waters: High impact (Both) Modifying structures of inland water courses: High (Inside) Dykes and flooding defence in inland water systems: High (Inside) Erosion: High (Inside) Removal of Hedges and Copses or Scrub: High (Inside) Human induced changes in hydraulic conditions: Moderate (Both) Reduction in migration/ migration barriers:

Site Name	Brief	Qualifying Interests within the Screened In Zone of Influence	Project-relevant Threats / Pressures: Impact (Source) +
	clawed Crayfish Austropotamobius pallipes, Salmon Salmo salar, Twaite Shad Alosa fallax fallax, three lamprey species – Sea Lamprey Petromyzon marinus, Brook Lamprey Lampetra planeri and River Lamprey Lampetra fluviatilis, the whorl snail Vertigo moulinsiana and Otter Lutra lutra. (NPWS, 2016a)		Moderate (Inside) (European Environment Agency, 2020)
Mountmellick SAC	This site comprises a disused stretch of the Grand Canal between Dangan's Bridge and Skeagh Bridge, approximately 3 km east of Mountmellick in Co. Laois. The habitat at this site is composed largely of fen-type vegetation, including Bulrush (Typha latifolia), Reed Sweet-grass (Glyceria maxima) and Yellow Iris (Iris pseudacorus). The area west of the bridge has been drained extensively and is now grassland. The site is a Special Area of Conservation for the whorl snail Vertigo moulinsiana, which is a glacial relict with a disjunct European population that is considered Vulnerable due to loss of habitat, caused in particular by drainage of wetlands. Vertigo moulinsiana was formerly more widespread in the canal area but has disappeared from most of its recorded sites with the dredging and reopening of canal navigation channels. (NPWS, 2013b)	- Desmoulin's Whorl Snail *Vertigo moulinsiana* [1016] (NPWS, 2021)	No relevant threats/pressures (European Environment Agency , 2018)

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