Mountmellick
FLOOD RELIEF SCHEME

EIAR – Volume 2 Main Report

Final Report

September 2025

Tionscadal Éireann
Project Ireland
2040

I bpáirt leis an bpobal

OPW
Oifig na nOibreacha Poiblí
Office of Public Works

JBA Project Manager

Richard Buck
2/F Lincoln House
Lincoln Lane,
Arran Quay,
Smithfield,
Dublin D07 Y75P

Revision History

Revision Ref/Date	Amendments	Issued to
S3-P01 / Jan 2024	Draft Report (Chapters 1 to 5) not including clients comments	LCC via email
S3-P02 / March 2024	Draft Report (Chapters 6, 8, 9, 11, 12, 13, 14, 15)	LCC via email
S3-P03 / Sept 2024	Draft Chapter 7	LCC via email
S3-P03 / Sept 2024	Draft Chapter 10	LCC via email
S3-P05 / Oct 2024	Draft Report including clients comments for AG1 Approval	LCC via email
S4 / 01-11-2024	Legislation revised to include only Section 175 of the Planning and Development Act. Approximate programme durations added to allow greater flexibility for contractor. Revised construction access for compound K	LCC Sharepoint
S4.02 / 04-12-2024	Schedule of Mitigation (Ch 16) added. Photomontage added into chapter 11.	LCC Sharepoint
S4.03 / 29-05-2025	Site boundary updated.	LCC Sharepoint
S4.04 / 15-08-2025	2025 ecology surveys.	LCC Sharepoint
A3-C01 / 16-09-2025	OPW comments	LCC Sharepoint
A3-C02 / 26-09-2025	OPW comments	LCC Sharepoint

Contract

This report relates to the Mountmellick Flood Relief Scheme commissioned by Laois County Council, on behalf of the Office of Public Works. Conor O'Neill and Bernadette O'Connell of JBA Consulting plus team of specialists in Table 1-1 carried out this work.

Prepared by ..... Conor O'Neill BA (Mod) MSc Adv Dip
Senior Environmental Consultant

Reviewed by ..... Bernadette O'Connell BA MSc CMLI PgCert
Principal Environmental Consultant

Purpose

This document has been prepared as a Final Report for Laois County Council and the Office of Public Works. JBA Consulting accepts no responsibility or liability for any use that is made of this document other than by the Client for the purposes for which it was originally commissioned and prepared. JBA Consulting has no liability regarding the use of this report except to Laois County Council and the Office of Public Work.

Copyright

© JBA Consulting Engineers and Scientists Limited 2025.

Carbon Footprint

A printed copy of the main text in this document will result in a carbon footprint of 305g if 100% post-consumer recycled paper is used and 388g if primary-source paper is used. These figures assume the report is printed in black and white on A4 paper and in duplex. JBA is aiming to reduce its per capita carbon emissions.

Table of Contents

1 Introduction 1
1.1 Context and Project Background 1
1.2 EIA Directive 2
1.3 Scope and Content of the EIAR 3
1.4 Structure of the EIAR 4
1.5 Impact Classification Terminology 4
1.6 EIAR Team 5
1.7 Limitations and Assumptions 9
1.8 Availability of EIAR documentation 9
2 Legislation and Planning Policy 10
2.1 Introduction 10
2.2 European Union (EU) Law and Policy 10
2.3 Planning Legislation and Policy Provisions 10
2.4 Planning History 23
2.5 Conclusion 26
3 Examination of Alternatives 27
3.1 Alternatives Considered 27
3.2 Options Assessment 38
3.3 Preferred Option selection 49
4 Description of Proposed Development 51
4.1 Introduction 51
4.2 Preliminary Engineering Elements 51
4.3 Location of Defences 56
4.4 Construction sequence 67
5 Consultation 69
5.1 Introduction 69
5.2 Statutory Consultation on EIAR Scoping Stage 69
5.3 Public and Local Stakeholder Consultation 79
5.4 Statutory Consultation during the EIAR 81
6 Population and Human Health 89
6.1 Introduction 89
6.2 Methodology 89
6.3 Existing Environment 90
6.4 Demographics 90
6.5 Principal Potential Receptors 92
6.6 Predicted Impacts 93
6.7 Mitigation Measures 94
6.8 Residual Impact 95
6.9 Interactions with other Environmental Effects 96
6.10 Potential Cumulative Impacts 97
7 Biodiversity 98
7.1 Introduction 98
7.2 Methodology 98
7.3 Methodology for the Assessment of Impacts 101
7.4 Ecological Surveys 107
7.5 Ecological Baseline 114
7.6 Assessment of Impacts 159
7.7 Do Nothing Scenario 160

7.8 Predicted Impacts – Construction Phase 160
7.9 Predicted Impacts - Operational Phase 171
7.10 Mitigation Measures - Construction Phase 173
7.11 Mitigations and Remedial Measures for the Operational Phase 185
7.12 Monitoring 187
7.13 Residual Effects 188
7.14 Summary of Assessment of Impacts 189
7.15 Interactions with other Environmental Effects 200
7.16 Cumulative Effects 200

8 Land and Soil 204

8.1 Introduction 204
8.2 Methodology 204
8.3 Receiving Environment 206
8.4 Site Investigation 211
8.5 Characteristics of the Proposed Development 216
8.6 Potential Impact of the Proposed Development 217
8.7 Mitigation Measures 220
8.8 Predicted and Residual Impacts 222
8.9 Monitoring 222
8.10 Interactions 223
8.11 Potential Cumulative Impacts 224

9 Water – Surface and Groundwater 225

9.1 Introduction 225
9.2 Methodology 225
9.3 Existing Environment 227
9.4 Predicted Impacts 237
9.5 Mitigation Measures 248
9.6 Residual Impact 256
9.7 Interactions with other Environmental Effects 256
9.8 Potential Cumulative Impacts 257

10 Cultural Heritage 258

10.1 Introduction 258
10.2 Methodology 258
10.3 Receiving Environment 262
10.4 Characteristics of the Proposed Development 294
10.5 Potential Impact of the Proposed Development 294
10.6 Mitigation Measures 318
10.7 Residual Impacts 322
10.8 Interactions 324
10.9 Potential Cumulative Impacts 324

11 Landscape and Visual Impact Assessment 325

11.1 Introduction 325
11.2 Methodology 325
11.3 Receiving Environment 329
11.4 Characteristics of the Proposed Development 334
11.5 Potential Impact of the Proposed Development 334
11.6 Mitigation Measures 366
11.7 Residual Impacts 366
11.8 Interactions 366
11.9 Potential Cumulative Impacts 367

12 Material Assets 368

12.1 Introduction 368

12.2 Methodology 368
12.3 Existing Environment 368
12.4 Predicted Impacts 372
12.5 Mitigation Measures 376
12.6 Residual Impact 382
12.7 Interactions with other Environmental Effects 382
12.8 Potential Cumulative Impacts 383
13 Construction Impacts: Noise/Vibration, Air/Dust, Climate 384
13.1 Introduction 384
13.2 Air Quality and Dust 385
13.3 Climate 403
13.4 Noise & Vibration 408
14 Interactions 419
14.1 Introduction 419
14.2 Population and Human Health – Water 421
14.3 Population and Human Health – Material assets 421
14.4 Population and Human Health - Air quality Dust, Noise and Vibration 421
14.5 Land and Soil - Water 421
14.6 Land and Soil - Biodiversity 422
14.7 Land and Soil - Material Assets 422
14.8 Land and Soil - Climate 422
14.9 Water – Biodiversity 422
14.10 Landscape and Visual Amenity – Biodiversity 422
14.11 Landscape and Visual Amenity - Cultural Heritage 423
14.12 Material Assets – Water 423
14.13 Air Quality and Dust – Biodiversity 423
15 Cumulative Impacts 424
15.1 Introduction 424
15.2 Air Quality and Dust 428
15.3 Climate 428
15.4 Noise and Vibration 428
15.5 Population and Human Health 428
15.6 Biodiversity 429
15.7 Land and Soil 429
15.8 Water 429
15.9 Material Assets 429
15.10 Cultural Heritage 430
15.11 Landscape and Visual Impact 430
15.12 Summary 430
16 Schedule of Mitigation 431

List of Figures

Figure 1-1: Site Location 2
Figure 2-1: Mountmellick Flood Risk Extents as indicated in the SFRA 17
Figure 2-2: Mountmellick Land use zoning Objectives as per County Development Plan 18
Figure 3-1: Option 1 - Overview 32
Figure 3-2: Option 2A - Overview 33
Figure 3-3: Option 2B - Overview – Original Proposal that was developed as detailed in Section 4 34
Figure 4-1: Flood defences, watercourses and bridges 52
Figure 4-2: Typical flood wall details 55
Figure 4-3: Defences 1 and 2 including site compound locations 58
Figure 4-4: Defences 3, 5 and 6 including site compound locations 62
Figure 4-5: Defences 6, 7 and 10 including site compound locations 64
Figure 4-6: Defences 8 and 9 including site compound locations 66
Figure 4-7: Construction defences, compound locations and access points 68
Figure 7-1: Chart showing the typical classifications of the significance of effects (EPA, 2022) 104
Figure 7-2: Groundwater bodies in the vicinity of site (OSM, 2023) 112
Figure 7-3: Aquifer vulnerability of the study area (OSM, 2023) 113
Figure 7-4: Statutory designated sites within the ZoI of the proposed Scheme (OSM, 2023) 115
Figure 7-5: Surface water bodies within the vicinity of the proposed Scheme 122
Figure 7-6: Habitat map of the northern study area 126
Figure 7-7: Habitat map of the southern study area 127
Figure 7-8: Locations of the static bat detector's deployment 142
Figure 7-9: River Owenass JBA hydromorphology survey and IFI survey results through Mountmellick 150
Figure 7-10: River Pound JBA hydromorphology survey and IFI survey results 151
Figure 7-11: River Owenass Bridge IFI survey results 152
Figure 7-12: Garroon Stream JBA hydromorphology survey - River Substrates 153
Figure 7-13: Invasive non-native species recorded within the site 155
Figure 7-14: The location of proposed defences and site compounds for the Scheme 159
Figure 8-1: Bedrock geology of Mountmellick 208
Figure 8-2: Subsoil of Mountmellick 209
Figure 8-3: Topsoil of Mountmellick 210
Figure 9-1: Surface watercourses in the area 228
Figure 9-2: Sub-basins in the catchment 229
Figure 9-3: River network in the Flood Relief Scheme Area 230
Figure 9-4: Mountmellick Flood Zone A and B 232
Figure 9-5: Sampling Point pictures: A (SW-L1), B(SW-L2), C (SW-L3), D(SW-L4), E(SW-L5) 233
Figure 9-6: GSI Groundwater Aquifers within the Mountmellick FRS (GSI, 2023) 234
Figure 9-7: GSI Groundwater Vulnerability within the Mountmellick FRS (GSI, 2023) 235
Figure 9-8: Delineation of river reaches for the hydromorphology assessment of the proposed scheme 236
Figure 9-9: Location of model nodes used to extract modelled velocity data 246
Figure 10-1: Cotton Augustus map of Leix and Offaly, c. 1563 266
Figure 10-2: Down Survey County map, c. 1656-1658 267
Figure 10-3: Down Survey map, Barony of Tinahinch c. 1656-1658 268
Figure 10-4: Down Survey map, Barony Map of Portnahinch c. 1656-1658 269
Figure 10-5: Longfield Map of c.1770-1840 270
Figure 10-6: Ireland Grand Jury Map (Daniel Cahill, 1805) 271
Figure 10-7: Bog Commissioner's Map (Richard Griffith, 1810) 272
Figure 10-8: First edition OS Map 1838-41 273
Figure 10-9: Revised from 1906-8 OS edition 274
Figure 10-10: RMP / SMR sites in study area and the location of the FRS Measures 277

Figure 10-11: Proposed Mountmellick ACA (after McLoughlin 2013) and adjacent proposed flood relief measures 279
Figure 10-12: RPS and NIAH Sites within 100m of an FRS Measure and the ACA 281
Figure 10-13: Industrial Heritage Sites and the FRS measures 283
Figure 10-14: Cultural heritage sites impacted by the flood relief measures 286
Figure 10-15: UAIA Survey Locations 287
Figure 10-16: Geophysical Survey (GS) Areas 1 –7 (red shows the areas that were surveyed) 290
Figure 10-17: GS1- sub-circular ring and the Manor Road FRS Measure 291
Figure 10-18: GS3 and the Upstream of Owenass Measure 292
Figure 10-19: GS2 and the Clontygar Stream Measure 293
Figure 10-20: Cultural heritage features Upstream of Owenass Bridge 295
Figure 10-21: Cultural heritage features from Owenass Bridge to Mountmellick Bridge 300
Figure 10-22: Cultural heritage features from Mill Bridge to Convent Bridge 303
Figure 10-23: Location of the proposed demountable barrier at Convent Bridge 306
Figure 10-24: Cultural heritage features Downstream of Convent Bridge 307
Figure 10-25: Cultural heritage features at Manor Road and Manor Court 309
Figure 10-26: Cultural heritage features at Garroon Stream 311
Figure 10-27: Cultural heritage features at Clontygar Stream 313
Figure 10-28: Cultural heritage features at Irishtown Garden Centre 314
Figure 10-29: Cultural heritage features at Midland Steel 315
Figure 11-1: Landscape Character in Mountmellick 332
Figure 11-2: Zone of Theoretical Visibility of the proposed development 333
Figure 11-3: Visual Receptor Plan 339
Figure 11-4: Photomontage View 1, proposed view from Convent Bridge looking north and east 354
Figure 11-5: Photomontage View 2, proposed view from Convent Bridge looking south and west 355
Figure 11-6: Photomontage View 3, proposed view from riverwalk looking southwest 356
Figure 11-7: Photomontage View 4, proposed view from riverwalk looking southwest towards playground 357
Figure 11-8: Photomontage View 5, proposed view from riverwalk looking west southwest towards playground 358
Figure 11-9: Photomontage View 6, proposed view from Mountmellick Bridge looking east southeast towards playground, ramp and field to the east 359
Figure 11-10: Photomontage View 7, proposed view from footpath looking south towards the playground 360
Figure 11-11: Photomontage View 8, proposed view from Mountmellick Bridge looking west towards picnic table area 361
Figure 11-12: Photomontage View 9, proposed view from entrance to shopping centre looking west northwest 362
Figure 11-13: Photomontage View 10, proposed view from Irishtown Street looking south southeast towards caravan park 363
Figure 11-14: Photomontage View 11, proposed view from Owenass Bridge looking north northwest 364
Figure 11-15: Photomontage View 12, proposed view from Manor Street looking south 365
Figure 12-1: Transport network in the area 369
Figure 12-2: Rivers surrounding Mountmellick and Waste Water Treatment Plant location 372
Figure 12-3: Diversion routes during the Owenass Bridge Replacement 379
Figure 13-1: River Barrow and River Nore SAC 396
Figure 13-2: National Total Greenhouse Gas Emissions (Excluding LULUCF) 1990-2022 406
Figure 13-3: Noise Monitoring Locations (NML) 412
Figure 14-1: Key to show interactions and significance of residual adverse impacts between environmental aspects 421
Figure 15-1: Other projects considered 424

List of Tables

Table 1-1: EIAR team 6
Table 1-2: Description of Effects (EPA, 2022)[7] 8
Table 2-1: Land Use Zoning Objectives as per County Development Plan 19
Table 2-2: RPS and NIAH structures within 100m of a flood measure (measured from RPS point data) 21
Table 2-3: RMP sites in the study area 22
Table 2-4: FRS Planning History 24
Table 3-1: Options assessment process summary 35
Table 3-2: Summary of the measures for the three Options for Mountmellick FRS 39
Table 3-3: Colour coded system representing the expected level of impacts 46
Table 3-4: Summary of the impact assessment of each Option 47
Table 3-5: Summary of MCA scores for each Option 49
Table 5-1: List of responses received from EIAR Scoping Consultation 70
Table 5-2: Detailed summary of EIAR Scoping Responses 71
Table 5-3: Mountmellick FRS Communication and Consultation Approaches 79
Table 5-4: Consultation during EIAR 2023-2024 81
Table 6-1: Population Trends between 2016 and 2022 90
Table 6-2 Age range demographics of Mountmellick 90
Table 6-3: Average Household Size (persons per household) 91
Table 6-4: Employment Figures for Laois and Mountmellick 91
Table 6-5: Distribution of employment by broad industrial group in Laois and Mountmellick (Number of persons aged 15 and over) 2022 91
Table 6-6: Educational facilities in the area 92
Table 6-7: Health, Social, and Community Facilities in Mountmellick 93
Table 7-1: Examples of criteria used to define the value of ecological features (NRA, 2009) 102
Table 7-2: Examples of criteria used to define the value of ecological features of local importance 102
Table 7-3: Significance of Effects matrix 105
Table 7-4: Ecological surveys undertaken in the study area 108
Table 7-5: Natura 2000 sites located within the Zone of Influence (ZoI) 115
Table 7-6: pNHAs within 15km of the site and requirement for further assessment 117
Table 7-7: WFD status and risk of local watercourses 124
Table 7-8: Habitats recorded during site visit 125
Table 7-9: Bat Static Passes at the field area downstream of Convent Bridge 144
Table 7-10: Bat Static Passes at the Owenass Bridge (July) 144
Table 7-11: Bat Static Passes at the Owenass Bridge (August) 145
Table 7-12: Bat Static Passes at Mill Bridge 145
Table 7-13: INNS recorded within or immediately adjacent to study area 155
Table 7-14: Summary of ecological receptors and the screening assessment 156
Table 7-15: Summary of assessment of effects to local ecological receptors resulting from the construction phase 168
Table 7-16: Summary of impacts to local ecological receptors during the operation phase 172
Table 7-17: Significance of effects after mitigation is applied during Construction and Operational phases of the Scheme 189
Table 7-18: Other projects within the locality which may have a cumulative effect on the development of the project 201
Table 8-1: Criteria for Rating Site Attributes: Estimation of Importance of Soil and Geological Attributes (NRA,2009) 205
Table 8-2: Site Features Identified and Ranked by Importance 206
Table 8-3: Summary of topsoil within the study area 207
Table 8-4: Ground Model One 213
Table 8-5: Ground Model Two 214
Table 8-6: Ground Model Three 215

Table 9-1: Criteria for Rating Impact Significance of Hydrological Attributes (NRA, 2009) 226
Table 9-2: Criteria for Rating Impact Significance of Hydrogeological Attributes (NRA, 2009) 226
Table 9-3: Q values of water samples in Mountmellick 233
Table 9-4: Summary of the activities during construction works, their location and potential impacts and their magnitude 239
Table 9-5: Hydromorphology assessment of proposed flood relief measures - 243 -
Table 9-6: Peak velocities without and with the proposed scheme under normal flow conditions 247
Table 9-7: Peak velocities without and with the proposed scheme under approximately bankfull conditions (50% AEP) 247
Table 9-8: Peak velocities without and with the proposed scheme under the design flow (1% AEP) 247
Table 9-9: Recommended monitoring to mitigate potential impacts on the water environment during construction and operation of the scheme 253
Table 10-1: Townlands and their meanings within the study area 275
Table 10-2: RMP sites in the study area 276
Table 10-3: RPS and NIAH structures within 100m of a flood measure (measured from RPS point data) 280
Table 10-4: Industrial heritage sites within study area and within 100m of proposed flood defences 282
Table 10-5: Areas of Archaeological Potential 284
Table 10-6: Undesignated Cultural Heritage Sites 285
Table 10-7: Possible Archaeological Sites identified in the Geophysical Survey 293
Table 10-8: Potential effects to cultural heritage receptors – pre-mitigation 316
Table 10-9: Predicted impacts to cultural heritage receptors – post-mitigation 323
Table 11-1: Significance of Landscape and Visual effects based on Magnitude and Sensitivity 327
Table 11-2: Landscape Impact Assessment 337
Table 11-3: Visual Impact Assessment 340
Table 12-1: Road classification in Ireland 368
Table 12-2: Embankment Volumes and Truck Movements 373
Table 13-1: Annual Average Nitrogen Dioxide (NO_2), Ozone (O_3), Sulphur Dioxide (SO_2), Carbon Monoxide (CO) and Particulate Matter (PM_{10} and $PM_{2.5}$) concentrations at Portlaoise and Emo, Co Laois (1st January 2023 – 31st December 2023) 388
Table 13-2: Criteria Used in the Determination of Dust Emission Class 391
Table 13-3: Criteria for Determining Sensitivity of Receivers 393
Table 13-4: Sensitivity of the Area to Dust Soiling Effects on People and Property 393
Table 13-5: Sensitivity of the Area to Human Health Impacts 393
Table 13-6: Sensitivity of the Area to Ecological Impacts 394
Table 13-7: Cumulative number of sensitive receivers within 20m, 50m, 100m and 250m of the site 395
Table 13-8: Outcome of Defining the Sensitivity of the Area 397
Table 13-9: Summary Dust Risk to Define Site-specific Mitigation 397
Table 13-10: Summary of Significance of Impact including Site-specific Mitigation 401
Table 13-11: CAP23 and CAP24 Actions relating to flood risk 406
Table 13-12: Total Greenhouse Gas Emissions (tonnes CO2 equivalent) due to the construction phase of the proposed development 407
Table 13-13: Construction noise threshold levels based on the BS 5228 'ABC' method 409
Table 13-14: Maximum permissible noise levels at the façade of dwellings during construction 410
Table 13-15: Baseline Noise Levels 411
Table 13-16: Typical Noise Levels from Construction Works likely to take place during the construction of proposed development 413
Table 13-17: Predicted worst-case 1-hour construction noise levels at receiver locations within 50m and 100m in proximity to short-term construction works 414
Table 14-1: Interactions between environmental aspects and significance of impacts 420
Table 15-1: List of projects considered for Cumulative Effects 425
Table 16-1: Summary of mitigation measures 432

Abbreviations

AA	Appropriate Assessment
AEP	Annual Exceedance Probability
CEMP	Construction Environmental Management Plan
CFRAM	Catchment Flood Risk Assessment and Management
DHLGH	Department of Housing, Local Government and Heritage
ECoW	Environmental Clerk of Works
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
FRS	Flood Relief Scheme
GIS	Geographic Information System
GSI	Geological Survey Ireland
IFI	Inland Fisheries Ireland
INNS	Invasive and Non-Native Species
LCC	Laois County Council
MCA	Multi-Criteria Assessment
NBHS	National Built Heritage Section
NHA	Natural Heritage Area
NIS	Natura Impact Statement
NMS	National Monument Service
NIAH	National Inventory of Architectural Heritage
NPWS	National Parks and Wildlife Service
OPW	Office of Public Works
PCD	Public Consultation Day
pNHA	Proposed Natural Heritage Area
QI	Qualifying Interest
SAC	Special Areas of Conservation
SFRA	Strategic Flood Risk Assessment
SPA	Special Protection Areas
WFD	Water Framework Directive
WWTP	Wastewater Treatment Plant
ZoI	Zone of Influence

1 Introduction

1.1 Context and Project Background

This Environmental Impact Assessment Report (EIAR) has been prepared on behalf of Laois County Council (LCC) and the Office of Public Works (OPW) in relation to a proposed Flood Relief Scheme (FRS) in Mountmellick, Co. Laois. The study area for the proposed Flood Relief Scheme covers the Area for Further Assessment (AFA) that was the core of the Catchment Flood Risk Assessment and Management (CFRAM) and is outlined in Figure 1-1 and described in the text below.

Laois County Council (LCC) intends to apply for planning permission for a Flood Relief Scheme for Mountmellick along the rivers Owenass, Pound and Clontygar. The proposed work consists of the development of a flood relief scheme, including embankments, flood walls, a replacement bridge over the Owenass Rover and a pumping station at Irishtown Road. These are required to minimize the risks currently posed to people, the community, social amenities, the environment, and the landscape.

There are five stages in the project:

- Stage I - Development of a number of flood defence options and the identification of a preferred Scheme
- Stage II - Planning
- Stage III - Detailed Design and Tender
- Stage IV -Construction
- Stage V - Project Close-Out (Handover to Client)

This Environmental Impact Assessment Report (EIAR) is produced during Stage I of the project and finalised in Stage II. It should be read in conjunction with the earlier Constraints Study[1], Options Report[2] and the EIAR Screening and Scoping Report[3] and the Natura Impact Statement (NIS)[4].

The Owenass River flows through Mountmellick, this river is a major tributary to the upper section of the River Barrow. This river is a part of the River Barrow and River Nore Special Area of Conservation (SAC), which is a designated Natura 2000 site under the European Union Habitats Directive.

The River Barrow, downstream from Mountmellick, is 192 kilometres long and Ireland's second-longest river after the River Shannon. Before the River Nore joins it approximately 20 kilometres from its mouth, the catchment area of the River Barrow is 3,067 km^2. The River Owenass is the primary source of flood flows at Mountmellick with Owenass Bridge, Mountmellick Mill Bridge and Convent Bridge exerting considerable influence. The Owenass Bridge is an arched masonry bridge which carries a minor road over the Owenass River, Mountmellick Mill Bridge is a single-span flat concrete deck bridge which carries the M80 traffic and Convent Bridge is a three-span arch bridge which carries the main road over the Owenass River.

[1] JBA Consulting and JB Barry & Partners for Laois County Council (V3 May 2020), *Constraints Study for Mountmellick Flood Relief Scheme*, unpublished.
[2] JBA Consulting and JB Barry & Partners for Laois County Council (V1 April 2023), *Options Assessment* Report for Mountmellick Flood Relief Scheme, unpublished.
[3] JBA Consulting and JB Barry & Partners for Laois County Council (V2 November 2023), *EIAR Screening and Scoping Report for Mountmellick Flood Relief Scheme*, unpublished.
[4] JBA Consulting and JB Barry & Partners for Laois County Council (V3 November 2023), Natura Impact Statement for *Mountmellick Flood Relief Scheme*, unpublished.

The town of Mountmellick and the contiguous area were severely flooded during the winter of 2017 due to flood waters from the Owenass River and its tributaries. Further flooding events took place in 2005 and 2008.

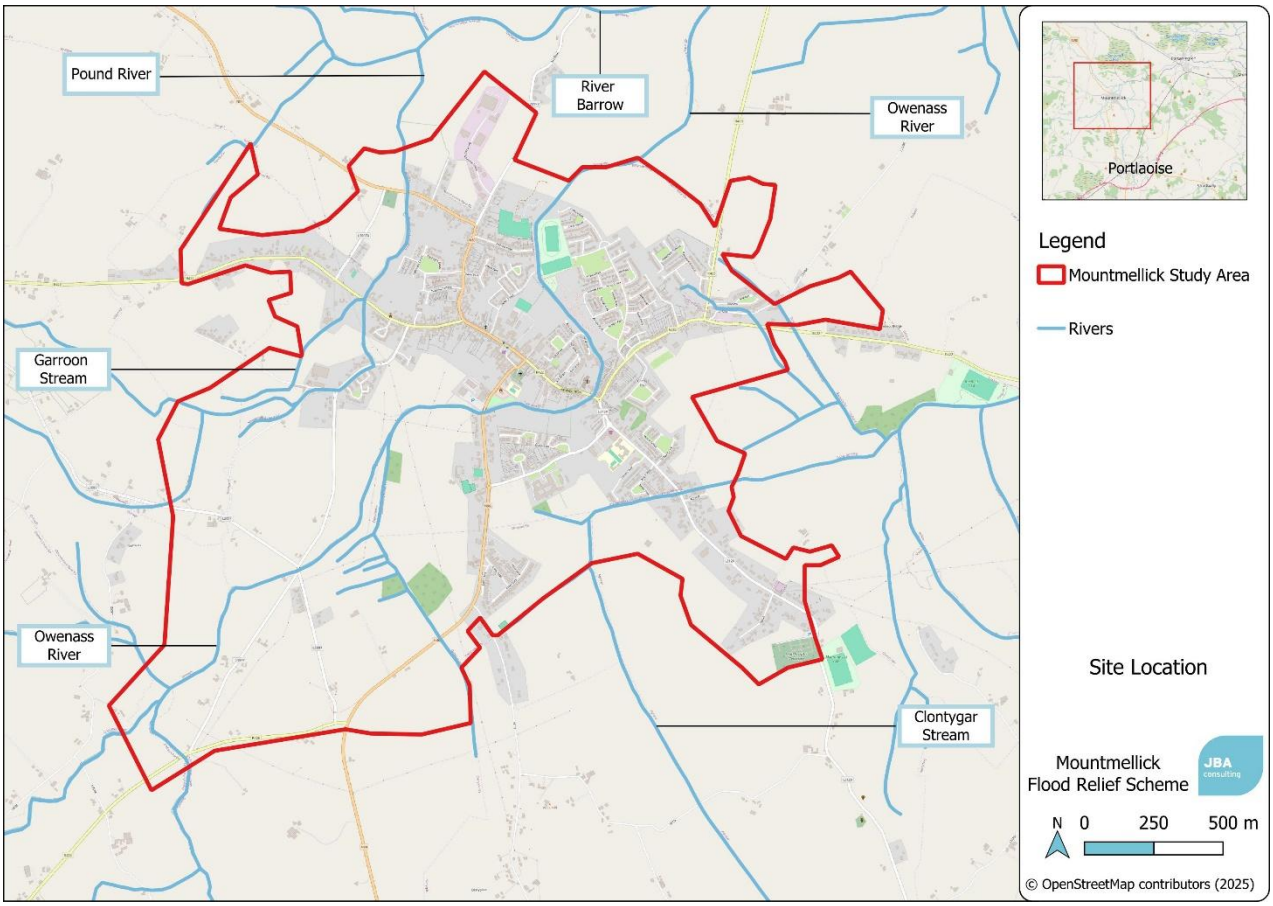


Figure 1-1: Site Location

1.2 EIA Directive

The Environmental Impact Assessment Directive (Directive 2011/92/EU, amended by Directive 2014/52/EU, hereafter the 'EIA Directive') requires that, before development consent is given, projects likely to have effects on the environment by virtue of their nature, size or location are made subject to a requirement for development consent and an assessment of their effects on the environment. This is referred to as an 'Environmental Impact Assessment' (EIA).

In order to determine if an EIA was needed for the proposed development a screening assessment was carried out in October 2023 and is reported in the EIAR Screening and Scoping Report[3]. A summary of the screening assessment is described below.

Schedule 5 of the Planning and Development Regulations 2001 (as amended, hereafter the '2001 Regulations') set out a wide range of development categories with associated thresholds for which an EIA is required.

Part 2 of Schedule 5 of the Planning and Development Regulations 2001, as amended, includes:

10. Infrastructure projects

(f) (ii) Canalisation and flood relief works, where the immediate contributing sub-catchment of the proposed works (i.e., the difference between the contributing catchments at the upper

and lower extent of the works) would exceed 100 hectares or where more than 2 hectares of wetland would be affected or where the length of river channel on which works are proposed would be greater than 2 kilometres.

This category contains three thresholds; if any of these thresholds are exceeded, the proposed development must undergo a mandatory EIAR. As such, they will be addressed in turn.

> "where the immediate contributing sub-catchment of the proposed works (i.e., the difference between the contributing catchments at the upper and lower extent of the works) would exceed 100 hectares".

The immediate contributing sub-catchment of the proposed works was calculated to be c. 175 hectares. The scheme therefore exceeds the 100-hectare threshold.

> "where more than 2 hectares of wetland would be affected"

JBA ecologists have undertaken a Fossitt habitat survey of the scheme area and defined the habitats in the areas to be affected. The survey results (detailed further in Section 5.3.1) note that 1.5 hectares of wetland are likely to be impacted during construction. The scheme is therefore under the 2-hectare wetland threshold.

> "where the length of river channel on which works are proposed would be greater than 2 kilometres"

Works are proposed on a section of the River Owenass at Mountmellick, from Owenass Bridge in the south to Kirwan Park in the north. The total length of the affected river channel is 2.61km, which exceeds the 2-kilometre threshold.

The proposed flood relief scheme is above the first part and third parts of the threshold, i.e., the immediate contributing sub-catchment of the proposed works is above 100 hectares, and the length of river channel on which works are proposed is greater than 2km. Therefore, an EIAR has been automatically triggered for this proposed development.

1.3 Scope and Content of the EIAR

The purpose of scoping is to identify what information should be contained in an EIAR and what methods should be used to gather and assess that information. It should provide focus for the EIAR and ensure that all relevant issues are identified and addressed in the EIAR.

The document 'Environmental Impact Assessment of Projects Guidance on Scoping'[5] (European Commission, 2017) outlines that although scoping can be considered as a discrete stage in the EIA process, one which ends with the issuing of the terms of reference for the EIA Report, the activity of scoping should continue throughout, so that the scope of work can be amended in light of new issues and new information. The scope of an EIA Report must be flexible enough to allow new issues, which may emerge either during the process or as a result of design changes or through consultations, to be incorporated.

A Scoping Report was prepared in November 2023 for the proposed scheme and was shared with a list of statutory and non-statutory consultees for comment. The Scoping Report outlined the proposed

[5] European Commission (April 2014) *EC Directive 2014/52/EU of 6 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment*, Official Journal of the European Union No. L 124/1, 25/04/2014. .

methodology of each chapter of the EIAR, provided a preliminary description of the baseline environment, and the potential impacts for each chapter.

1.4 Structure of the EIAR

This EIAR comprises 3 volumes as follows:

- Volume 1, Non-Technical Summary;
- Volume 2, Environmental Impact Assessment Report (this volume); and
- Volume 3, Environmental Impact Assessment Report Appendices.

This EIAR comprises the presentation of an extensive range of information and analysis from the EIAR Team. The EIAR is split into the following Chapters:

- Chapter 1 – Introduction
- Chapter 2 – Legislation and Planning Policy
- Chapter 3 – Examination of Alternatives
- Chapter 4 – Description of Proposed Development
- Chapter 5 – Consultation
- Chapter 6 – Population and Human Health
- Chapter 7 – Biodiversity
- Chapter 8 – Land and Soil
- Chapter 9 – Water – Surface and Groundwater
- Chapter 10 – Cultural Heritage
- Chapter 11 – Landscape and Visual Impact Assessment
- Chapter 12 – Material Assets
- Chapter 13 – Construction Impacts – Air Quality, Noise and Vibration, and Climate
- Chapter 14 – Interactions
- Chapter 15 – Cumulative Effects

Each competent expert has prepared their relevant chapters which are primarily set out in the following format:

- Methodology;
- Receiving Environment
- Potential Impact of the Proposed Development;
- Mitigation Measures;
- Residual Impacts;
- Interactions and
- Potential Cumulative Impacts.

1.5 Impact Classification Terminology

This EIAR follows the guidance set out in the Environmental Protection Agency's (EPA) *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (2022)[6] in relation to describing accurately the full range of likely significant effects. Table 1-2 Description of Effects, is taken from the EPA's

[6] Environmental Protection Agency (May 2022) *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.* Environmental Protection Agency, Ireland

EIAR Guidelines (2022) and provides a classification of significance of effects (or impacts). The quality of effects can be described as positive, neutral or Adverse, with varying degrees of significance.

The EPA Guidelines (2022) outline that the probability of effects can be described as likely or unlikely and the duration of effects can range from momentary, brief, temporary, short-term, medium-term, long-term, permanent, or reversible while the frequency describes how often the effects will occur.

1.6 EIAR Team

The EPA Guidelines[6] require that "the introduction to the EIAR should include a list of the experts who have contributed to an EIAR, showing which parts of the EIAR they have worked on, their qualifications, experience and any other relevant credentials". The EIAR has been prepared by a multi-disciplinary team of environmental specialists as set out in Table 1-1 overleaf.

Table 1-1: EIAR team

Chapter	Author	Company	
Introduction	**Bernadette O'Connell** BA MSc CMLI PgCert	JBA Consulting	**Bernadette** is a principal environmental consultant with 35 years' experience in engineering and environmental consulting. She has project managed EIAR's for a range of strategic infrastructure projects including King's Island, Kilkee and Castleconnell FRS's and has acted as an Expert Witness at seven oral hearings.
Legislation and Planning Policy	**Aiden O'Neill** BSc (Hons) PG Dip MIPI	Coakley O'Neill Town Planning Ltd	**Aiden** is a planning consultant with over twenty-eight years of post-qualification experience in the UK (8) and Ireland (20). Aiden set up Coakley O'Neill Town Planning with Dave Coakley in 2010 and have since been particularly involved in advising on residential, commercial, retail and industrial developments, airport infrastructure, services infrastructure and waste infrastructure, across the full range of planning services.
Examination of Alternatives	**Ana Tomori** BSc MSc CIWEM	JBA Consulting	**Ana** has over 10 years of international experience in engineering and environmental consulting. She has been involved in EIA for several flood relief schemes in Ireland including Kilkee, Castleconnell, Carrickmines/ Shanganagh FRS, specifically the Examination of Alternatives chapters and Water chapters.
Description of Proposed Development	**Bernadette O'Connell** BA MSc CMLI PgCert	JBA Consulting	As above
Consultation	**Conor O'Neill** BA (Mod) MSc Adv Dip	JBA Consulting	**Conor** is an environmental scientist with an Advanced Diploma in Planning and Environmental Law, he has 5 years of consultancy experience. He has been involved in all aspects of the Mountmellick EIAR, from Screening and Scoping to EIAR co-ordination, and he has contributed to various chapters for four FRS projects including the Kilkee, Castleconnell, Carrickmines-Shanganagh River and Bantry Flood Relief Schemes
Construction Impacts	**Mervyn Keegan** BSc Dip Env Sc MSc Env Sc Pg Dip **Olivia Maguire** BSc MSc Env Sc BSc	AONA Environmental Consulting Ltd	**Mervyn** has 25 years of environmental consultancy experience, has appeared as an Expert Witness at oral hearings, public inquiries and legal hearings and prepares in excess of 50 Noise & Vibration and Air Quality & Climate impact assessments annually. **Olivia** is a Senior Consultant with over 17 years' experience in environmental consulting. Olivia is a Member of Institute of Environmental Management & Assessment and a Member of Occupational Hygiene Society of Ireland with a B.Sc. Occupational Safety and Health, M.Sc. Environmental Science, B.Sc. (Hons) Geography, and is a qualified ISO 14001: Lead Environmental Auditor.
Population and Human Health	**Conor O'Neill** BA (Mod) MSc Adv Dip	JBA Consulting	As above
Biodiversity	**Patricia Byrne** BSc (Hons) PhD MCIEEM	JBA Consulting	**Patricia** is a principal ecologist with over 24 years in environmental consulting. is a full member of the Chartered Institute of Ecological and Environmental Management (CIEEM). Patricia has extensive experience of conducting and reviewing Preliminary Ecological Assessments (PEA), Appropriate Assessment stage 1 screenings and stage 2 Natura Impact Statement (NIS) assessments, Ecological Impact Assessments (EcIA) and EIA Biodiversity chapters for transport and coastal infrastructure,

			residential and commercial development, Local Authority led development and enhancement projects, and OPW drainage maintenance and flood relief schemes across Ireland.
Land and Soil	**David Casey** BSc MSc MCIWEM	JBA Consulting	**David** has 13 years of experience preparing and reviewing Flood Risk Assessments and Environmental Impact Statements, notable the Soils & Geology and Hydrology & Hydrogeology chapters, as well as Strategic Flood Risk Assessments (SFRA's) on behalf of county councils and has aided in the development of the OPW Western CFRAM Study.
Water – Surface and Groundwater	**David Casey** BSc MSc MCIWEM **Kate de Smeth** BSc Grad Dip MSc	JBA Consulting	**David** as above **Kate** is an applied scientist with 7 years' experience in the public and private sectors across Australia, the United Kingdom, and Ireland. She is a qualified hydrologist with applied experience in fluvial geomorphology. She provides river condition assessments including fluvial audit fieldwork, environmental impact assessments particularly in relation to the Water Framework Directive, and has experience in the optioneering, design, modelling, and construction planning for river restoration schemes.
Material Assets	**Conor O'Neill** BA (Mod) MSc Adv Dip	JBA Consulting	As above
Cultural Heritage	**Yolande O'Brien** BA (Hons) PhD MIAI **Siobhan Deery** BA MA HDip (Ed.) Dip Planning & Env. Law MIAI Licence Eligible Archaeologist	Courtney Deery	**Yolande** has 6 years of cultural heritage consultancy experience, and prior to this participated in research surveys and excavations for research projects in Ireland and France. She has produced and contributed to EIARs, route selection studies, and research and desk studies on archaeology, cultural heritage, and architecture for a range of residential, commercial, and infrastructural developments and flood relief schemes. **Siobhan** is a co-director of Courtney Deery Heritage Consultancy. She has 23 years of experience as a cultural heritage consultant, specialising in surveying and evaluating archaeological monuments, historic buildings, sites, and landscapes for conservation, environmental impact assessment, management, and development control. She is also a licence-eligible archaeologist, and has carried out numerous archaeological testing, monitoring and excavations on a range of site types, settings and periods in both rural and urban contexts. She has managed cultural heritage EIARs for large-scale infrastructural projects and smaller schemes from the scoping stage to research, fieldwork, statement of impacts and mitigation measures for the EIAR process through to the oral hearing stage including consultation with design teams, stakeholders and statutory consultees.
Landscape and Visual Impact	**Christos Papachristou** MSc MA CMLI	JBA Consulting	**Christos** is a principal landscape architect with 12 years of landscape architectural experience undertaking LVIAs for large private developments and including flood relief schemes including Castleconnell FRS, Kilkee FRS and Carrickmines/ Shanganagh FRS. He is a chartered landscape architect in the UK and a corporate member of the Irish Landscape Institute
Interactions	**Conor O'Neill** BA (Mod) MSc Adv Dip	JBA Consulting	As above
Cumulative Impacts			

Table 1-2: Description of Effects (EPA, 2022)[7]

Quality of Effects	**Positive Effects** - A change which improves the quality of the environment
	Neutral Effects - No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/Adverse Effects - A change which reduces the quality of the environment.
Describing the Significance of Effects	**Imperceptible** - An effect capable of measurement but without significant consequences.
	Not Significant - An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight Effects - An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects - An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects - An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
	Very Significant - An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
	Profound Effects - An effect which obliterates sensitive characteristics.
Describing the Extent and Context of Effects	**Extent** - Describe the size of the area, the number of sites and the proportion of a population affected by an effect.
	Context - Describe whether the extent, duration or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)
Describing the Probability of Effects	**Likely Effects** - The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects - The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing the Duration and Frequency of Effects	**Momentary Effects** - Effects lasting from seconds to minutes.
	Brief Effects - Effects lasting less than a day.
	Temporary Effects - Effects lasting less than a year.
	Short-term Effects - Effects lasting one to seven years.
	Medium-term Effects - Effects lasting seven to fifteen years.
	Long-term Effects - Effects lasting fifteen to sixty years.
	Permanent Effects - Effects lasting over sixty years.
	Reversible Effects - Effects that can be undone, for example through remediation or restoration.
	Frequency of Effects - Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).
Describing the Types of Effects	**Indirect Effects** - Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative Effects - The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.
	'Do-nothing Effects' - The environment as it would be in the future should the subject project not be carried out.
	'Worst-case' Effects - The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable Effects - When the full consequences of a change in the environment cannot be described.
	Irreversible Effects - When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects - The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects - Where the resultant effect is of greater significance than the sum of its constituents (e.g. combination of SOx and NOx to produce smog).

[7] Environmental Protection Agency (May 2022) *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.* Environmental Protection Agency, Ireland

1.7 Limitations and Assumptions

The limitations and assumptions related to the proposed FRS are as follows:

1.7.1 Construction Material

During the construction phase of the project, fill material will be imported into the site for the construction of the flood embankments. Approximately 3,160 linear metres of embankment will be formed.

Imported fill - The total material imports from the scheme will be approximately 105,000m^3 which may be reduced to 85,000m^3 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 77,000m^3. 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 56,000m^3. Seven licenced sites within Co. Laois have been sourced that have capacity to receive unsuitable material (https://facilityregister.nwcpo.ie/).

The EIAR has not specified the source of the imported fill material. Nationally there is a shortfall in licenced waste capacity, indicating a surplus of waste material including soil and Construction and Demolition (C&D) waste. It is therefore assumed that sourcing suitable material will not be problematic prior to commencement of construction process scheduled for 2026/27. The nearest source of the fill material will be from a licenced soil recovery facility within County Laois.

1.8 Availability of EIAR documentation

This EIAR will be available in printed form from the offices of Laois County Council and An Bord Pleanála, 64 Marlborough St, Rotunda, Dublin 1, D01 V902.

Additionally, prior to lodging this application, the required information has been issued to the Department of Housing, Local Government and Heritage EIA Portal.

The EIAR will also be available to view electronically at the following website: https://www.mountmellickfrs.ie/project-info/documents/

2 Legislation and Planning Policy

2.1 Introduction

This section of the Environmental Impact Assessment Report considers the proposed development in the context of national, regional, and local planning policy, and the legislation governing the proposed works. This chapter should be read in conjunction with Chapter 1 Introduction and Chapter 4 Description of Proposed Development.

2.2 European Union (EU) Law and Policy

2.2.1 EU 'Floods' Directive 2007

The EU Floods Directive[7] on the assessment and management of flood risk, often referred to as the 'Floods Directive', came into force in 2007 and works in tandem with the Water Framework Directive for the protection of water quality.

The requirements of the EU 'Floods' Directive, have been implemented in Ireland as the assessment and management of floods through the Catchment Flood Risk Assessment and Management (CFRAM) Programme. Under CFRAM the Office of Public Works has published a series of documents and policies and plans that set out measures flood risk and the most at-risk communities. CFRAM recommends a proactive approach to flood risk and protection.

In terms of major Flood Relief Schemes, works are typically designed and built to a standard that protects against the 1 in 100-year flood event, and for coastal areas the 1 in 200-year flood event. As the areas subject of this EIAR are highly susceptible to fluvial flooding, the 1 in 100-year standard is considered appropriate for these works. Consistent with the Directive, the proposed development is defined to provide protection to properties in the study area from the 1 in 100-year fluvial flood event.

Mountmellick is detailed within the Flood Risk Management Plan for the River Barrow, which is set out in detail in Section 2.3.3. The plan sets out specific details in relation to flood risk management for the southwest region to meet Ireland's obligations under the 2007 EU 'Floods' Directive.

2.3 Planning Legislation and Policy Provisions

This section sets out the relevant guidance and policy objectives that have been considered in relation to the proposed flood defence works at Mountmellick. Firstly, this section considers the legislation governing the Irish planning system, specifically as it relates to flood management works, then moving on to discuss the broad level national strategic objectives, guidelines and policies adopted by the Irish Government in relation to spatial development, physical infrastructure and climate change agreements. Secondly, this section provides an overview of the regional context of the proposed works and lastly will consider local objectives and development standards as indicated within the Laois County Development Plan (CDP) 2021-2027.

[7] The European Union (October 2007), *European Union Floods Directive 2007/60/EC*

2.3.1 The Planning and Development Act 2000 (as amended), and the Planning and Development Regulations 2001, as amended

The Planning and Development Act 2000[8] (as amended) forms the basis of the Irish planning system, setting out the detail of for planning guidelines, obtaining planning permission and the process for Environmental Impact Assessment.

Laois County Council wishes to prepare a Planning Application to An Bord Pleanála, under Section 175 of the Planning and Development Act, 2000 (as amended), for the construction of a Flood Relief Scheme for Mountmellick, County Laois.

The prescribed classes of development and thresholds that trigger a mandatory Environmental Impact Assessment (EIA) are set out in Schedule 5 of the Planning and Development Regulations, 2001[9], as amended. The most relevant criterion is Class 10 of Part 2 of Schedule 5 which states:

> *10. Infrastructure projects*
>
> *(f) (ii) Canalisation and flood relief works, where the immediate contributing sub-catchment of the proposed works (i.e. the difference between the contributing catchments at the upper and lower extent of the works) would exceed 100 hectares or where more than 2 hectares of wetland would be affected or where the length of river channel on which works are proposed would be greater than 2 kilometres (S.I. No.600/2001- Planning and Development Regulations 2001).*

The requirements in respect of Environmental Impact Assessment are contained within the Planning Act and these are described in detail in Chapter 1. The proposed flood relief scheme is above the first part and third part of the threshold, i.e., the immediate contributing sub-catchment of the proposed works is above 100 hectares, and the length of river channel on which works are proposed is greater than 2km. Therefore, an EIAR has been automatically triggered for this proposed development.

2.3.2 National Policy

National Planning Framework (NPF)

The NPF sets out a framework of policy objectives to help Ireland achieve its long-term sustainable goals. The strategic plan focuses on integrating Ireland's economic development, spatial planning, infrastructure planning and social considerations. It promotes environmentally focused planning at local level to tackle climate change and the implementation of appropriate measures to mitigate existing issues.

The plan aims to align itself with the UN Sustainable Development Goals, by ensuring that the decision process will safeguard the needs of future generations. These objectives are integrated as part of the National Strategic Outcomes [NSOs] in areas such as climate action, sustainable cities and innovation and infrastructure.

National Strategic Outcome 9 outlines the urgency of upgrading and investing in water management and environmental resources, and states;

[8] Planning and Development Act 2000, *S.I. No. 30/2000*

[9] Planning and Development Regulations 2001, *S.I. No.600/2001*

Coordinate EU Flood Directive and Water Framework Directive implementation and statutory plans across the planning hierarchy, including national guidance on the relationship between the planning system and river basin management. Local authorities, DHPLG, OPW and other relevant Departments and agencies working together to implement the recommendations of the CFRAM programme will ensure that flood risk management policies and infrastructure are progressively implemented.

Flood relief measures are further highlighted under Section 9 of the NPF, titled *Realising our Sustainable Future*. It is envisioned that planning will play a vital role in mitigating development in inappropriate or vulnerable areas and will aid the delivery and design of necessary infrastructure in our towns and cities.

Section 9.3 of the NPF, Protecting, Conserving and Enhancing our Natural Capital further empathises the role the planning process plays in the management of our watercourses and flood risk management, with a view to improving the understanding of flood-risk and ensure flood risk management in accordance with best practice. This is in keeping with National Strategic Outcome (NSO) 9.

National Strategic Outcome 9: Sustainable Management of Water and other Environmental Resources

Strategic Outcome 9 seeks to ensure investment in water infrastructure nationally while also ensuring the protection of our watercourses. With regard to flooding and flood risk management NSO 9 seeks to *'coordinate EU Flood Directive and Water Framework Directive implementation and statutory plans across the planning hierarchy, including national guidance on the relationship between the planning system and river basin management. Local authorities, DHPLG, OPW and other relevant Department and agencies working together to implement the recommendations of the CFRAM programme will ensure that flood risk management policies and infrastructure are progressively implemented'.*

The proposed development will deliver flood defence works to protect Mountmellick from flood events, the proposed works have been developed in a manner which is consistent with objective NSO 9 of the NPF.

The Planning System and Flood Risk Management 2009

The Office of Public Works (OPW) in conjunction with the Department of Environment, Heritage and Local Government (DEHLG) published a set of guidelines[10] in relation to flood risk management. Subject to which the plan advocates a proactive approach to prevent flooding from occurring. This includes, for example, adopting general policies for protection, improve or restore floodplains and the upgrading of flood barriers. Under these guidelines Planning Authorities have a key role in the delivery of effective measures, policies and infrastructure to minimise the risk of flooding.

In this regard, the proposed development by Laois County Council acknowledges the key role of the Council in minimising flood risk.

Climate Change Sectoral Adaptation Plan for Flood Risk Management, 2015

[10] Department of Housing, Local Government and Heritage (November 2009), *The Planning System and Flood Risk Management - Guidelines for Planning Authorities*

The Climate Change Sectoral Adaptation Plan for Flood Risk Management, 2015[11], sets out the policy on climate change adaptation of the OPW, the lead agency for flood risk management in Ireland, based on a current understanding of the potential consequences of climate change for flooding and flood risk in Ireland, and the adaptation actions to be implemented by the OPW and other responsible Departments and agencies in the flood risk management sector.

Our Sustainable Future: Framework for Sustainable Development

The Our Sustainable Future: Framework for Sustainable Development[12] paper sets out the national vision to enhance Ireland's sustainable future, sets out the challenges and targets to be adhered to. In terms of flood management and flood risk assessment, the framework acknowledges this as one of the largest challenges to be addressed in the coming years. As most cities and towns on the island have developed along rivers and coastal areas, the majority of urban centres are exposed to flood risk. As national economic prosperity is heavily reliant on the success of cities, and towns, the adoption of flood relief and protection is vital for future growth and will require the integration of comprehensive infrastructure as part of the built environment.

The proposed development, which will provide flood relief in Mountmellick, is aligned with this policy.

Climate Action Plan 2023

Annually, the Climate Action Plan[13] is published by the Government of Ireland which sets out carbon budgets and sectoral emissions ceilings and sets a roadmap for taking decisive action to halve our emissions by 2030. The Climate Action Plan 2023 identifies the role flood risk mitigation can play in how Ireland adapts as a result of climate change and in mitigating the implications of such. The Plan sets out the Office of Public works will seek to support the development of appropriate flood mitigation and adaption schemes.

2.3.3 Regional Policy

Regional Spatial and Economic Spatial Strategy, Eastern and Midland Regional Assembly

The Regional Spatial and Economic Strategy (RSES) for the Eastern and Midland Region[14] was adopted in 2019. The plan provides a long-term regional level strategic plan for physical growth, economic investment and social development for the Eastern and Midland Regions and seeks to align national goals set out in the NPF with local considerations.

The RSES identifies that the region has experienced a number of severe flooding events in recent years and that such events are increasing due to more extreme weather events which are linked to climate change. The RSES outlines that the long-term land use planning for the region will need to consider the likelihood of future flooding events.

[11] The Office of Public Works (January 2017), *Climate Change Sectoral Adaptation Plan*

[12] Department of Environment, Community and Local Government (2012), *Our Sustainable Future: A Framework for Sustainable Development in Ireland.*

[13] Department of the Environment, Climate and Communications (December 2022), *Climate Action Plan 2023.*

[14] Eastern and Midland Regional Assembly (June 2019), *Regional Spatial & Economic Strategy for the Eastern and Midland Region*.

The RSES outlines that Climate Action is one of three key principles which guides the objectives of the Plan, with a goal of enhancing the climate resilience of the region. With regard to this, the RSES identifies the following Strategic Objectives for the region:

> ***RSO 8:*** *Build Climate Resilience Ensure the long-term management of flood risk and build resilience to increased risks of extreme weather events, changes in sea level and patterns of coastal erosion to protect property, critical infrastructure and food security in the Region.*

With regard to RSO 8 and the flood risk in the region, the RSES sets out the following policies and objectives:

> ***RPO 7.13:*** *EMRA will work with local authorities, the OPW and other relevant departments and agencies to implement the recommendations of the CFRAM programme to ensure that flood risk management policies and infrastructure are progressively implemented.*
>
> ***RPO 7.14:*** *Local authorities shall take account of and incorporate into the development of local planning policy and decision making the recommendations of the Flood Risk Management Plans (FRMPs), including planned investment measures for managing and reducing flood risk.*
>
> ***RPO 7.15:*** *Local authorities shall take opportunities to enhance biodiversity and amenities and to ensure the protection of environmentally sensitive sites and habitats, including where flood risk management measures are planned.*
>
> ***RPO 10.15:*** *Support the relevant local authorities (and Irish Water where relevant) in the Region to improve storm water infrastructure to improve sustainable drainage and reduce the risk of flooding in the urban environment and in the development and provision at a local level of Sustainable Urban Drainage solutions.*

Flooding is a risk to infrastructure, homes, businesses and the economic health of Mountmellick. The proposed Flood Relief Scheme is in keeping with Strategic Objectives of the RSES in addition to the policies outlined. The proposed works will ensure that Mountmellick develops in a manner which is climate resilient, in line with the vision of the RSES.

Barrow River Basin Flood Risk Management Plan (CFRAM)

The CFRAM Programme, prepared by the OPW, has examined the flood risk, and possible measures to address the risk, in 300 communities throughout the country at potentially significant flood risk. The Flood Risk Management Plan (the 'Plan') for the Barrow River Basin[15] sets out the feasible flood risk mitigation measures for the river basin network which includes Mountmellick.

The CFRAM outlines that in the past there have been significant flood events in Mountmellick as a result of heavy and prolonged rainfall, resulting in roads and lands being flooded.

The CFRAM sets out the flood relief measures are required which may include a series of hard defences consisting of flood embankments and walls in order to protect properties, businesses and community infrastructure at risk of flooding. The CFRAM outlines that a project-level flood relief system is required in Mountmellick.

[15] The Office of Public Works (2012), *Barrow River Basin Flood Risk Management Plan (CFRAM)*

2.3.4 Local Planning Policy

Laois County Council Development Plan 2021-2027

The Laois County Development Plan 2021-2027[16] was adopted on 25th January 2022 and came into effect 8th March 2022.

The Laois County Development Plan sets out the policies and objectives, with regard to both National and Regional planning policies, which will guide the development of the Laois environs to 2027.

The Plan identifies the role of Laois County Council plays in mitigating and adapting to climate change, recognising that climate change will have far reaching impacts on a global and local level that severe weather events and flooding events will become more regular.

With regard to the flood risk management, the Plan sets out the following objectives:

> ***FRM 2:*** *Ensure that all development proposals comply with the requirements of the Planning System and Flood Risk Management-Guidelines for Planning Authorities' (DEHLG 2009) and to ensure that the Justification Test for Development Management is applied to required development proposals and in accordance with methodology set out in the guidelines and new development does not increase flood risk elsewhere, including that which may arise from surface water runoff.*
>
> ***FRM 3:*** *Support the implementation of recommendations in the CFRAM Programme to ensure that flood risk management policies and infrastructure are progressively implemented.*
>
> ***FRM 4****: Support the implementation of recommendations in the Flood Risk Management Plans (FRMP's), including planned investment measures for managing and reducing flood risk.*
>
> ***FRM 5:*** *Consult with the OPW in relation to proposed developments in the vicinity of drainage channels and rivers for which the OPW are responsible, and to retain a strip on either side of such channels where required, to facilitate maintenance access thereto.*
>
> ***FRM 6:*** *Assist the OPW in developing catchment-based Flood Risk Management Plans for rivers in County Laois and have regard to their provisions/recommendations.*
>
> ***FRM 7:*** *Protect and enhance the County's floodplains and wetlands as 'green infrastructure' which provides space for storage and conveyance of floodwater, enabling flood risk to be more effectively managed and reducing the need to provide flood defences in the future, subject to normal planning and environmental criteria.*
>
> ***FRM 8:*** *Protect the integrity of any formal (OPW or Laois County Council) flood risk management infrastructure, thereby ensuring that any new development does not Adversely impact any existing defence infrastructure or compromise any proposed new infrastructure.*
>
> ***FRM 9:*** *Ensure that where flood risk management works take place that the natural and cultural heritage, rivers, streams and watercourses are protected and enhanced.*

[16] Laois County Council (January 2022), *Laois County Development Plan 2021-2027*

FRM 10: *Ensure each flood risk management activity is examined to determine actions required to embed and provide for effective climate change adaptation as set out in the OPW Climate Change Sectoral Adaptation Plan Flood Risk Management applicable at the time.*

FRM 12: *Prioritise plans for flood defence works in the towns as indicated in the Strategic Flood Risk Assessment in order to mitigate against potential flood risk.*

The proposed works and subject of this EIAR, seeks to deliver works which would be entirely consistent with the climate change adaptation and flood risk management objectives outlined in the County Development Plan.

As per Objective *CS 08* of the Plan, the Laois County Development Plan 2021 is the guiding policy document for development in Mountmellick until such a time that a review of the Mountmellick Local Area Plan can be reviewed.

Within the Plan, Mountmellick is identified as a Self-Sustaining Towns. Self-Sustaining Towns are described as towns *'with high levels of population growth and a weak employment base which are reliant on other areas for employment and/or services, and which require targeted 'catch up' investment to become more self-sustaining'.*

The Plan identifies that Mountmellick has had limited growth over the period of the previous development plan. Despite this the town has an important role as an urban centre in providing a key employment, retail, community infrastructure base to their urban population as well as those in the rural hinterland of the towns. In addition to this, the Plan identifies that Mountmellick has a role in supporting Portlaoise, the Key Town within the County.

The Plan sets out the following policies in relation to Self-Sustaining Towns:

CS 25: *Promote commensurate population and employment growth in the designated Self-Sustaining towns, providing for natural increases and to become more economically self- sustaining, in line with the quality and capacity of public transport, services and infrastructure available.*

CS 26: *Identify opportunities sites within the Self-sustaining towns for residential, employment or social functions.*

CS27: *Ensure that population growth is appropriate in pace and scale and diversity of uses and services within its identified role in the settlement hierarchy.*

The proposed works, and subject of this EIAR will facilitate Mountmellick to develop in accordance with the policies outlined while also continuing to support the population base and the town of Portlaoise. As such, the proposed works are aligned with the policies outlines within the Plan.

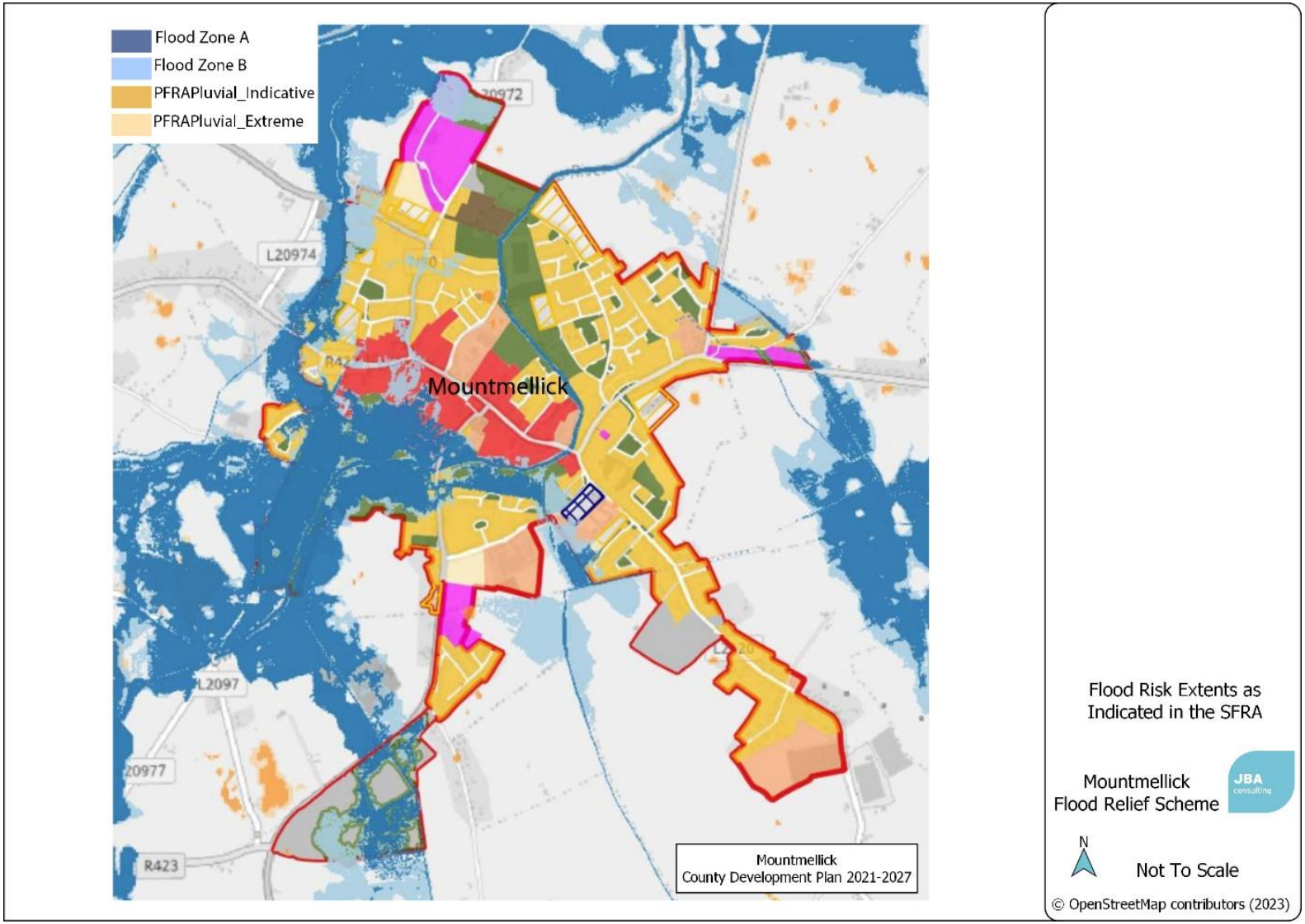


Figure 2-1: Mountmellick Flood Risk Extents as indicated in the SFRA

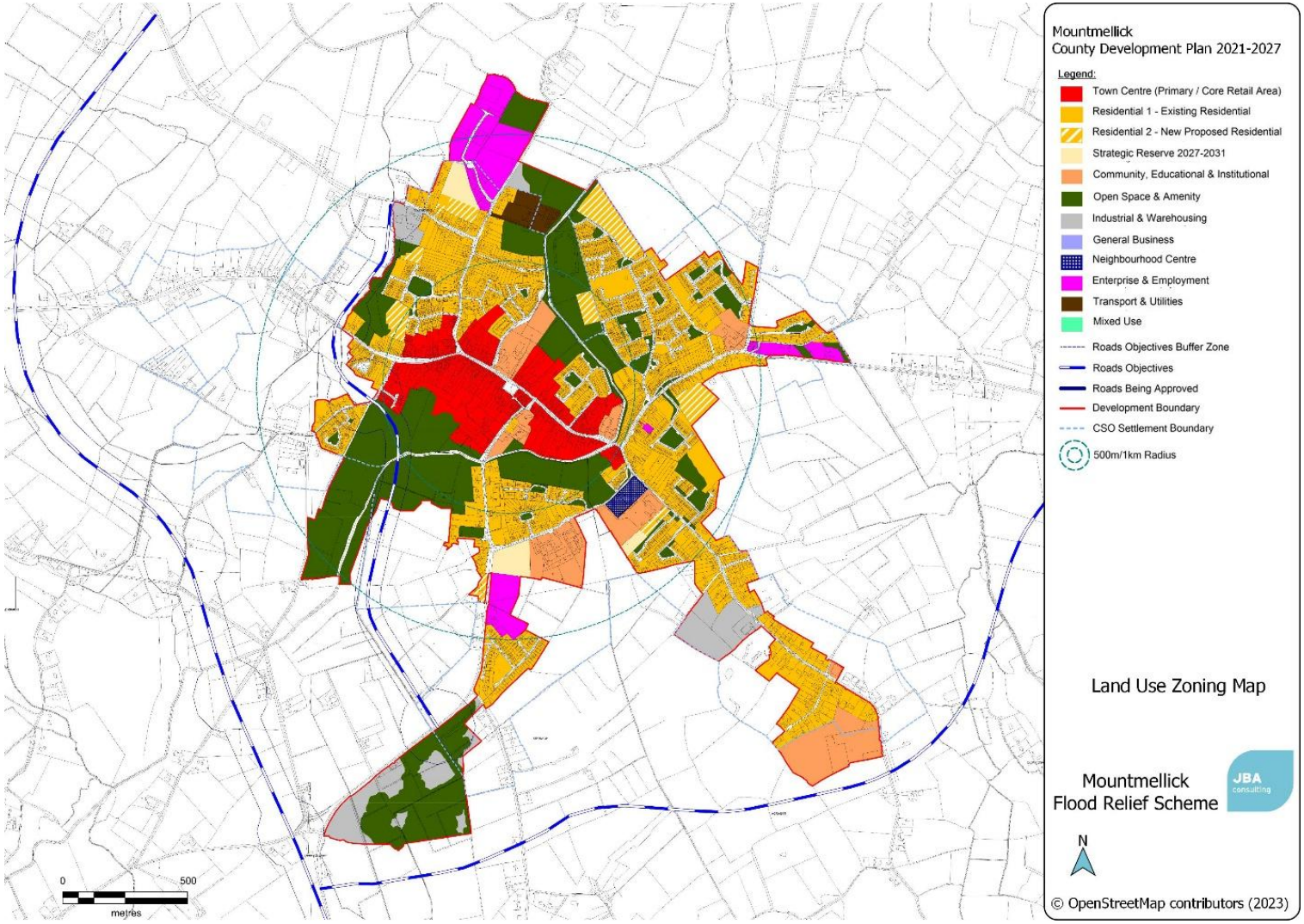


Figure 2-2: Mountmellick Land use zoning Objectives as per County Development Plan

The Strategic Flood Risk Assessment (SFRA) which accompanies the County Development Plan indicates the extents of the lands within Mountmellick which are within Flood Zones A&B. This is seen in Figure 2-1.

The proposed works seek to mitigate the risk of future flood events in the town. As indicated in Figure 2-1 above, there are significant areas of the town which are at risk of flooding.

The proposed works are to be carried out across a number of areas within Mountmellick. As a result of this there are a range of different land use zonings in these areas. The land use zonings for the town of Mountmellick are set out below in Figure 2-2.

The land use zoning objectives for the lands of the proposed works are outlined below:

Table 2-1: Land Use Zoning Objectives as per County Development Plan

Area of Proposed Works	Land Use Zoning Objective(s)
Defence 1	No Active Zoning – Outside Development Boundary
Defence 2	No Active Zoning – Outside Development Boundary
Defence 3	Open Space and Amenity Adjacent to Existing Residential
Defence 4	Town Centre Open Space and Amenity Community, Educational and Institutional
Defence 5	Open Space and Amenity
Defence 6	No Active Zoning – Outside Development Boundary
Defence 7	No Active Zoning – Outside Development Boundary
Defence 8	Existing Residential Strategic Reserve Community, Educational and Institutional No Active Zoning – Outside Development Boundary
Defence 9	No Active Zoning – Outside Development Boundary
Defence 10	Enterprise and Employment No Active Zoning – Outside Development Boundary

As indicated above in Table 2-1, there are a number of land use zoning objectives on or adjacent to the sites of the proposed works. The objectives of these zoning types are set out below:

Town/ Village Centre:

To protect and enhance the special physical and social character of the existing town centre and to provide for and improve retailing and commercial activities.

Residential 1 (Existing Residential):

To protect and enhance the amenity of developed residential communities.

Strategic Reserve:

To provide lands for future development in line with national and regional targets over the next Plan period 2021-2027.

Community, Educational and Institutional:

To protect and provide for local neighbourhood, community, ecclesiastical, recreational and educational facilities.

Open Space and Amenity:

To preserve, provide for and improve active and passive recreational public and private open space.

Enterprise and Employment:

To provide lands for enterprise and employment use, more specifically low input and emission manufacturing, campus-style offices, storage uses, wholesaling and distribution, commercial services with high space and parking requirements that may not be suitable for town centre locations.

A number of different development types are open for consideration or permissible in these land use zoning objectives including the development of infrastructure projects.

As indicated in Table 2-1, there are a number of areas which do not fall within the development boundary of Mountmellick, as a result these areas have no active land use zoning objectives. With regard to this, the Plan states that *'developments in rural areas that would undermine appropriately zoned lands or policies in forgoing chapters will not be permitted'.* The works proposed in these areas will in fact support and facilitate the future development of the lands within the town which are zoned and as a result are aligned to the policies set out in the Plan.

Mountmellick town centre is a proposed Architectural Conservation Area (ACA). There are a number of buildings identified within the County Development Plan which have been placed on the Record of Protected Structures (RPS) due the architectural/cultural/historic/social value of the building. A number of these buildings are located within 100m to the proposed works, as shown in Table 2-2.

Table 2-2: RPS and NIAH structures within 100m of a flood measure (measured from RPS point data)

RPS ref.	NIAH ref.	Name	Site type	Address	FRS Measure
001	12900306	Presentation Convent	Convent/ nunnery	Sarsfield Street	c. 8 m from the Downstream of Convent Bridge measure, on the opposite side of the river.
002	12900307	Saint Joseph's Catholic Church	Church/ chapel	Sarsfield Street	c. 50m west of the Downstream of Convent Bridge measure, on the opposite side of the river.
N/A	12900305	House	House	Lord Edward Street	c. 77m West of the Downstream of Convent Bridge measure
003	12900355	Parochial House	Parochial house	Sarsfield Street	c.67m north of the Mountmellick Bridge to Convent Bridge measure
004	12900356	House	House	Sarsfield Street	c.77m north of the Mountmellick Bridge to Convent Bridge measure
005	12900357	Scott & Dunne House	House	Sarsfield Street	c.100m north of the Mountmellick Bridge to Convent Bridge measure
037A	12900365	Park Terrace	House	Park Terrace, Park Street	c.70 east of the Owenass Bridge to Mountmellick Bridge flood wall.
037B	12900365	Park Terrace	House	Park Terrace, Park Street	c.70 east of the Owenass Bridge to Mountmellick Bridge flood wall.
039A	12900362	House	House	Park Street	The flood relief measure (flood wall) for the Mountmellick Bridge to Convent Bridge runs to the rear boundary wall of this property. c.58 east of the Owenass Bridge to Mountmellick Bridge flood wall.
039B	12900362	House	House	Park Street	The flood relief measure (flood wall) for the Mountmellick Bridge to Convent Bridge runs to the rear boundary wall of this property. c.58 east of the Owenass Bridge to Mountmellick Bridge flood wall.
040A	12900363	House	House	Park Street	c.80 east of the Owenass Bridge to Mountmellick Bridge flood wall.
040B	12900364	House	House	Park Street	c.80 east of the Owenass Bridge to Mountmellick Bridge flood wall.
690	12900304	House	House	Lord Edward Street	100m from of the Downstream of Convent Bridge measure
693	12900332	Mountmellick Railway Station	Railway station	Wolfe Tone Street	c. 76m northwest of the compound and c.117m from the embankment at the Garroon Stream measure
701	12900359	Convent Bridge/ Ballycullenbeg Bridge	Bridge	Sarsfield Street	Part of the Mountmellick to Convent Bridge flood measure
703	12900360 (Record only)	National Training & Development / Mountmellick Steam Mill	Mill/ Civic building	Park Street	c. 70m north of the Owenass Bridge to Mountmellick Bridge measure (flood wall section).
704	12900361 (Record only)	Standing Stones sculpture within the public park and playground	Monument	Park Street	Part of the Mountmellick to Convent Bridge flood measure is located in the area of the park. c. 50m north of the Owenass Bridge to Mountmellick Bridge measure (flood wall section).
707	12900366	Hibernia Foundry	Building misc	Ballycullenbeg	The flood relief measure (flood wall) for the Mountmellick Bridge to Convent Bridge runs to the rear of this property.
829	N/A	Railway bridge	Railway bridge	Derrycloney	c.55m from the embankment for the Owenass Bridge to Mountmellick Bridge measure
857	N/A	Thatched house	Thatched house	Derrycloney	30m east (and across the road) of the Owenass Bridge to Mountmellick Bridge measure. C. 54m from the compound on the

RPS ref.	NIAH ref.	Name	Site type	Address	FRS Measure
					northern side of the Owenass river (on the opposite side of the road).

In addition to the structures identified above listed on both the RPS and NIAH, there is a significant number of structures listed on the RPS and NIAH within the town centre of Mountmellick. The proposed Flood Relief Scheme will aide in mitigating the risk future flood events present to these structures. There are also 3 recorded archaeological sites within the study area, see Table 2-3.

Table 2-3: RMP sites in the study area

RMP / SMR no.	Class	Townland	ITM E	ITM N	FRS Measure
LA008-032	Historic town	Townparks	645043	707613	The Zone of Notification the historic town and the church and graveyard lies is in the Mountmellick Bridge to Convent Bridge Measure and immediately to the west of the within the Downstream of Convent Bridge Measure
LA008-032001	Church	Townparks	645112	707503	
LA008-032002	Graveyard	Townparks	645103	707484	

Areas of the proposed works fall within the River Barrow and River Nore Special Area of Conservation (SAC). The River Barrow and River Nore SAC is protected under the EU Habitats Directive and are of international importance as it is the location of a number of habitats and species which are protected under the EU Habitats Directive.

In this respect, a Natura Impact Assessment (NIS) has been prepared. It concludes that provided that the mitigation measures outlined are strictly adhered to, there will be no adverse impacts from the works involved with the proposed Flood Relief Scheme in Mountmellick; either alone or in-combination with other projects and plans on the screened-in Natura 2000 sites.

The Mountmellick Local Area Plan 2018-2024

The Mountmellick Local Area Plan 2018 – 2024[17] was formally adopted at a meeting of Laois County Council on 10th September 2018. As outlined previously, the Laois County Council Development Plan 2021-2027 was adopted in 2021. The County Development Plan notes that in the absence of a review of the Local Area Plan, the County Development Plan is the policy document which will guide the development of Mountmellick.

As the Local Area Plan has not yet expired and a review is not underway, this EIAR has regard to the policies and objectives set out in the Local Area Plan.

[17] Laois County Council (September 2018), *Mountmellick Local Area Plan 2018-2024*

The Local Area Plan sets out the following Specific Objectives for Mountmellick:

1. *To support and facilitate sustainable intensification and consolidation of the town centre and established residential areas.*
2. *To promote balanced economic development and employment, ensuring a diverse range of economic sectors are developed and supported.*
3. *To support and facilitate development on zoned land based on the policies and objectives of the Laois County Development Plan 2017-2023.*
4. *To focus new residential development primarily into infill and back land sites.*
5. *To protect, conserve and enhance the built, natural and cultural environment, through promoting awareness, utilising relevant heritage legislation and promoting good quality urban design.*
6. *To develop and improve flood alleviation measures throughout the town and rural hinterland.*

The Plan identifies that there have been significant flood events in recent years and that the frequency of such events will be increased as a result of climate change. With regard to this, the Plan outlines that a Flood Relief Scheme is required for the town.

With regard to this, the Plan sets out the following objectives:

Strategic Aim:

To develop and improve flood alleviation measures throughout the town and rural hinterland so as to compliment the overall strategy for economic and population growth and to achieve improved physical and environmental protection.

FM O3:

To carry out a programme of infrastructure and flood defence works in conjunction with the OPW to alleviate flooding in the town and hinterland.

FM O1:

In conjunction with OPW implement a program of flood defence works for the Town.

FM O10:

Ensure protection of Natura 2000 sites supporting rivers and streams by avoiding development on flood plains and ensure flood risk assessment policies, plans or projects are compliant with Article 6 of the Habitats Directive and avoid or mitigate Adverse impacts on Natura 2000 sites.

With regard the policies and objectives outlined above, it can be concluded that the proposed works, subject of this EIAR, are in keeping with the objectives set out in the Mountmellick Local Area Plan and in keeping with the proper planning and sustainable development of the town.

2.4 Planning History

There are a number of historical planning applications in the vicinity of works. Table 2-4 sets out the recent planning history associated with the locations of works in Mountmellick.

Table 2-4: FRS Planning History[18]

Planning REF	Location	Development	Decision
17227	Irishtown, Mountmellick, Co. Laois	Permission to retain domestic garage, alterations to front façade, attic conversion and extension	Grant
18256	2 Park Terrace, Irishtown, Mountmellick, Co. Laois	Permission to demolish existing extension, erect new extension and all associated site works. This is listed on the record of Protected Structures as PRS037-B	Grant
11492	Irishtown, Mountmellick, Co. Laois	Permission to construct two storey/storey and a half style extension to existing dwelling and all associated works	Grant
2360022	7 Grove Park, Mountmellick, County Laois	Permission to retain single storey domestic extension to the rear and side of the existing dwelling and all associated siteworks to the side and rear of existing property	Grant
2360250	No. 2 Sarsfield Street, Mountmellick, Co. Laois	Permission to change use from ground floor office to retail off licence, internal alterations, new shopfront and new external signage, along with all ancillary site services and associated site works	Grant
19233	Presentation Convent, Sarsfield Street, Mountmellick	Permission to subdivide existing rooms to form a total of 14 ensuite bedrooms on first and second floor levels and associated works. Works to include fire safety measures to existing corridors and renovation of existing timber sash windows to rear elevations	Grant
21362	8, Lord Edward Street, Mountmellick	Permission to retain shed to rear of property and associated site works	Grant
20540	16 Lord Edward Street, Mountmellick	Permission to retain domestic garage and store and all associated site works	Grant
23172	Derrycloney, Mountmellick	Permission to retain alterations made to the existing dwelling to include retention of first floor area. 2 no. dormer windows and raised roof section, retain existing garage and storage shed and retain relocated entrance	Grant
19329	Scoil Phadraig Naofa, Davitt Road, Mountmellick	Permission to construct a single storey extension to the Front/North East of the School containing a Home School Liaison Room, 1 no. classroom, 1 no. resource room and administration accommodation, a single storey extension to the side/South East of the school containing 2 new resource rooms and an accessible WC and a single storey extension to the rear/South West of the school containing 2 no.	Grant

[18] Laois County Council (December 2023), Online Planning Application Portal

		classrooms. The proposed works also include the removal of an existing single storey outbuilding to the front/North East of the School along with minor alterations to the existing school, together with all associated site works, including the re-organisation of the existing car-parking area to the North-East of the School	
19380	Scoil Phadraig Naofa, Davitt Road, Mountmellick	Permission to construct a single storey temporary prefabricated accommodation unit for Special Education Needs consisting of 1 no. Classroom, multi-sensory room, safe base, 2 no. stores, User Assisted Toilet and 2 no. WC's, external ramp and steps all located to the rear-North of the School	Grant
12363	Davitt Road, Mountmellick	Permission to construct a single storey extension to the north east/front of the existing school building, consisting of 2 no. classrooms, 1 no. resource room and a new corridor/hallway linking the proposed accommodation to the existing school building together with all associated siteworks.	Grant
16299	St. Joseph's Girls National School, Davitt Road, Mountmellick,	Permission to construct a single storey extension to the north east/front of the existing school building, consisting of a new entrance lobby and a new reception/administration office, together with all associated site works	Grant
18512	Davitt Road, Mountmellick	Permission to retain prefabricated accommodation, consisting of 3 no. classrooms and toilets, all located to the south/rear of the existing school and all associated site works	Grant
18598	Davitt Road, Mountmellick	Permission to construct a single storey extension to the rear of the school, consisting of 2 no. classrooms and toilets together with the demolition of an existing single classroom prefab, all located to the West/Rear of the existing school and all associated site works	Grant
20620	Davitt Road, Mountmellick	Permission to demolish existing building, build 36 two bedroom apartment in eight, two storey blocks, Bin bay and cycle shelters, and site entrance and all associated site works	Grant
22568	Davitt Road, Mountmellick	Permission to demolish existing building, build 32 two bedroom apartments, in four, two storey blocks, bin bays and cycle shelters, 61 parking spaces, and site entrance and all associated site works.	Grant - Decision Appealed
17184	Unit 21, Bay Road Industrial Estate, Bay Road, Mountmellick	Permission to construct a two storey extension to our existing office facility together with all associated site works	Grant

18650	Bay Road Business Park, Bay Road, Mountmellick	Permission to amend the use from light Industrial and manufacturing area to proposed hire depot for construction and construction related equipment	Grant
21204	Townparks, Mountmellick	Permission to construct a dwelling house, detached domestic garage / shed, waste water treatment system and all associated site works	Grant

2.5 Conclusion

Having regard to the provisions of:

- EU 'Floods' Directive 2007
- The National Planning Framework
- The Regional Spatial and Economic Strategy for the Eastern and Midland Region
- The Planning System and Flood Risk Management 2009
- Climate Change Sectoral Adaptation Plan for Flood Risk Management, 2015
- Our Sustainable Future: Framework for Sustainable Development
- National Climate Action Plan
- The Barrow River Basin Flood Risk Management Plan
- Laois County Development Plan 2021-2027
- The Mountmellick Local Area Plan 2018-2024

It is concluded that the proposed development would be in compliance with national, regional and local planning policy provisions and would not seriously injure the amenities of the area or significantly impact the current land use objectives in Mountmellick and would, therefore, be in accordance with the proper planning and sustainable development of the area.

3 Examination of Alternatives

This chapter of the EIAR provides an overview of the alternative approaches, locations, designs, and concepts that have been considered prior to the selection of the Preferred Option for the FRS. It describes the process of selecting the Preferred Option based on the engineering, design, and environmental criteria. The aim of this Flood Relief Scheme is to reduce the risk of flooding in Mountmellick. Alternatives were selected to comply with the aim, providing feasible engineering and design with the lowest impact on the environment.

3.1 Alternatives Considered

Alternative options were considered in the early phases of the development. The consideration of alternatives was done in a two-stage approach. The initial phase included screening of potential measures based on hydraulic performance to determine whether they provide the required level of flood protection. The feasible screened options were further developed into full Options; Options then were assessed from an environmental point of view. A multi criteria analysis to assess both the impacts and benefits in terms of social, technical, economic, and environmental considerations was carried out to aid the identification of the Preferred Option.

Table 3-1 shows a succinct summary of the Options assessment process. This process is described in detail in the following sections and the full option assessment in provided in the Options Report[46].

3.1.1 Directive 2014/52/EU

The EIA Directive 2014/52/EU[19] requires that the main alternatives of a proposed FRS be considered and presented in the EIAR, and the reasons for selecting the emerging Preferred Option to be justified accordingly. This requirement is outlined in the following statement:

"A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects".

Alternatives were considered for this development early in the Options Development phase, and their viability assessed regarding applicability to the areas, economic impacts/benefits, environmental impacts/benefits, social impacts and acceptability, and cultural benefits/impacts. The process employed at the early phase is described further below.

3.1.2 First stage: Initial screening

A review of alternative Flood Risk Management (FRM) approaches has been undertaken to consider the different FRM methods that could potentially be viable, and which relate to the study area. Options were screened based on the following criteria:

- Applicability to the area.
- Economic (potential benefits, impacts, likely costs etc);
- Environmental (potential impacts and benefits);

[19] European Commission, (April 2014) EC Directive 2014/52/EU of 6 April 2014 amending Directive 2011/92/EU *Assessment of the effects of certain public and private projects on the environment,* Official Journal of the European Union No. L 124/1, 25/04/2014

- Social (impacts on people, society and the likely acceptability of the measure); and
- Cultural (potential benefits and impacts upon heritage sites and resources)

During the screening process eight FRM approaches were screened. These approaches are provided in the Mountmellick Flood Relief Scheme "Options Report" [20] and summarised below:

3.1.2.1 FRM Approach 1: Re-purposing of Existing non-flood Management Infrastructure

This approach examines whether existing walls and infrastructure could be used be re-purposed into flood management infrastructure. There are no existing flood defences that could be re-purposed into flood management defences in Mountmellick.

This approach is not applicable to Mountmellick.

3.1.2.2 FRM Approach 2: Catchment Scale and Disperse Actions to Reduce Flow Downstream

This approach considered the use of catchment wide measures or measures upstream of the key risk area to reduce flows. Measures included in this approach are linked to Nature Based Solutions (NBS). Water retention and water storage NBS considered were leaky barriers, creation of bunds, re-naturalizing channels, creation of ponds, increasing of buffer zones and land use management. The various measures were tested for the scheme area within the hydraulic model. Further details are provided in the "Mountmellick Flood Relief Scheme Options Report" and summarized below.

- Upland Storage along Owenass River
- Upland Storage along Pound River

Test results showed that the decrease in peak water level was insufficient to remove the need for additional measures and hard defences for both rivers. Furthermore, there is already natural storage occurring in the system in the baseline scenario for Upland Storage.

- Changes to Owenass River Maintenance Regime

The Owenass River is subject to maintenance by the Laois County Council, which includes regular clearing of vegetation and silt deposits to increase conveyance. A hydraulic model tested if there would be any reduction in volume or extend the flood time reaching Mountmellick town, by increasing roughness. The results showed that reducing or stopping maintenance would not be an effective measure to reduce flood levels.

- Re-meandering of the Blackwater River

Hydraulic model of re-meandering the Blackwater River, a tributary of the Owenass River tested the decrease in flood level in Mountmellick town. The results showed benefits in water level decrease. However, hard defences would still be required and works required to achieve the delay in the hydrograph along the watercourse would be extensive and costly.

All measures associated with this approach have been screened out at this stage as stand-alone measures, as the tests showed they were not effective in reducing peak level in Mountmellick.

[20] JBA Consulting (March 2024) *Mountmellick Flood Relief Scheme - Options Report*. Laois County Council and Office of Public Work

However, Nature-Based Solutions could be considered in combination with the final scheme Option to enhance the environment and provide multiple benefits to the wider area.

3.1.2.3 FRM Approach 3: Inline Storage on main Watercourses or Tributaries to Reduce Flow Downstream

This considered storage along watercourses to reduce flows downstream, through a two-stage channel which was tested for the Owenass River within the hydraulic model. Details of the tests are given in the Options Assessment Report. Results showed the flood level reduction would be insignificant.

Therefore, the measures associated with this approach were not taken forward, as it would not provide significant water level reduction.

3.1.2.4 FRM Approach 4: Diversion of Flow Around and Away from Flood Risk

This approach considered the potential to move water away from key risk receptors to reduce flood risk. A formalised overflow channel through the field in Mountmellick town was tested in the hydraulic model and further details are given in the Options Report[46]. The results showed this measure would not reduce water levels and would result in increased flooding downstream on the Pound watercourse. Furthermore, the required bed profile of the channel to allow for the construction of the culverts would result in the need for a very deep channel to be constructed, making it unfeasible.

Therefore, this measure was screened out at this stage, as it is not suitable to be taken forward.

3.1.2.5 FRM Approach 5: Improved Conveyance of Flow

This approach considered the removal of constrictions and was viable for this site as there are several critical structures along the Pound and Owenass where conveyance could be improved. Measures associated with this approach were tested and further details are provided in the Mountmellick Options Assessment Report. Measures considered are given below:

- Removal of Structures along the Pound River
- Increase in capacity at Wolfe Tone Bridge
- Dredging of the Owenass
- Removal of Mountmellick Mill Bridge and Right Bank Restrictions

All of these measures were model tested, and the tests resulted in very little decrease of water levels for the first three measures. The removal of Mountmellick Mill Bridge and right bank restrictions showed it would have significant reduction in peak level upstream the bridge location but, would have resulted in increased levels downstream. Furthermore, this measure would have not been cost effective and would have had significant impacts on the town access.

Measures associated with this approach were not taken forward for Option assessment as they do not provide significant water level reduction, have significant impacts and are not cost-effective.

3.1.2.6 FRM Approach 6: Refurbish or Enhance Defences to Achieve the Standard of Protection

This FRM approach is not viable for the Mountmellick FRS as there are no existing defences to enhance within the scheme area.

3.1.2.7 FRM Approach 7: Containment of Flood Level

This approach considered the containment of flood levels through flood wall and embankment as key measures for the Mountmellick site. Various defence configurations were tested, and further details are given in the Mountmellick Options Assessment Report. Measures associated with this approach included a

separation of flood flows between the Pound and Owenass. The Midland Steel site is located at the downstream end of the Pound and Owenass, just before they join the Barrow. At this site, containment of flood levels with hard defences would be the only viable approach to protect the commercial property and its compound area.

Measures associated with this approach were taken forward for Options assessment, as they provide the required flood protection within the Mountmellick town.

3.1.2.8 FRM Approach 8: Flood Resilience, Preparedness and Emergency Response

This FRM considered emergency response plans and potential flood forecasting to aid with the protection of risk receptors and enable residents the opportunity to act and evacuate if necessary. It includes individual property protection (IPP) and potential relocation of receptors and infrastructure. This approach does not remove the need for defences. Furthermore, hard defences would provide the needed protection that would eliminate the need for this approach.

As this approach would not provide the level of protection required without the need to construct the hard defences, it was not taken forward.

3.1.3 Second stage: Technical assessment of feasible Options

Further to the initial screening of the FRM approaches, the following flood risk management measures were identified as potentially feasible for Mountmellick and were taken forward for further technical assessment. The potentially feasible measures were then considered on an area-by-area basis in the Options assessment, taking into account the constraints faced at in different locations within and around Mountmellick. The potentially feasible measures consisted of:

- Do nothing;
- Do minimum;
- Structural Measures:
  - Walls and embankments
  - Sluice/ flow control structure
  - Pumping station

Do Nothing
The 'Do Nothing' scenario is defined as the Option involving no future expenditure on flood defences or maintenance of existing channels. The implication is that the existing risk of flooding persists in the study area and possibly worsens over time, due to climate change impacts.

This is not sustainable as there are no formal flood defence assets in place and the existing arrangement does not provide the town with an adequate level of protection; therefore, it was not considered further.

Do Minimum
The 'Do Minimum' scenario would involve ongoing maintenance works of the current operational, if any standard of protection is available and would generally involve repairing of existing defences now and in the future.

The lack of existing flood defence assets means that this is not viable for Mountmellick.

Structural Measures - Direct flood defences
The construction of flood defences, including embankments, flood wall and culverts, along the length of the watercourses would contain volumes and flows within the vicinity of the channels and utilise controlled flood

storage areas. The final choice of method was determined following a further review of the initial site investigation and subsequent outline design. In general, combined earth embankments and flood walls are constructed to Mountmellick town area and across all the sites. Therefore, these measures were considered in the Options assessment. Flood walls and embankments are also considered downstream of Mountmellick Mill Bridge, with embankment along the Clontygar and around the Midland Steel site. It was also determined to include the provision of a throttle to control the flow in the Pound watercourse on the first culvert at the Manor Court junction.

These were the structural measures that were taken forward and assessed further.

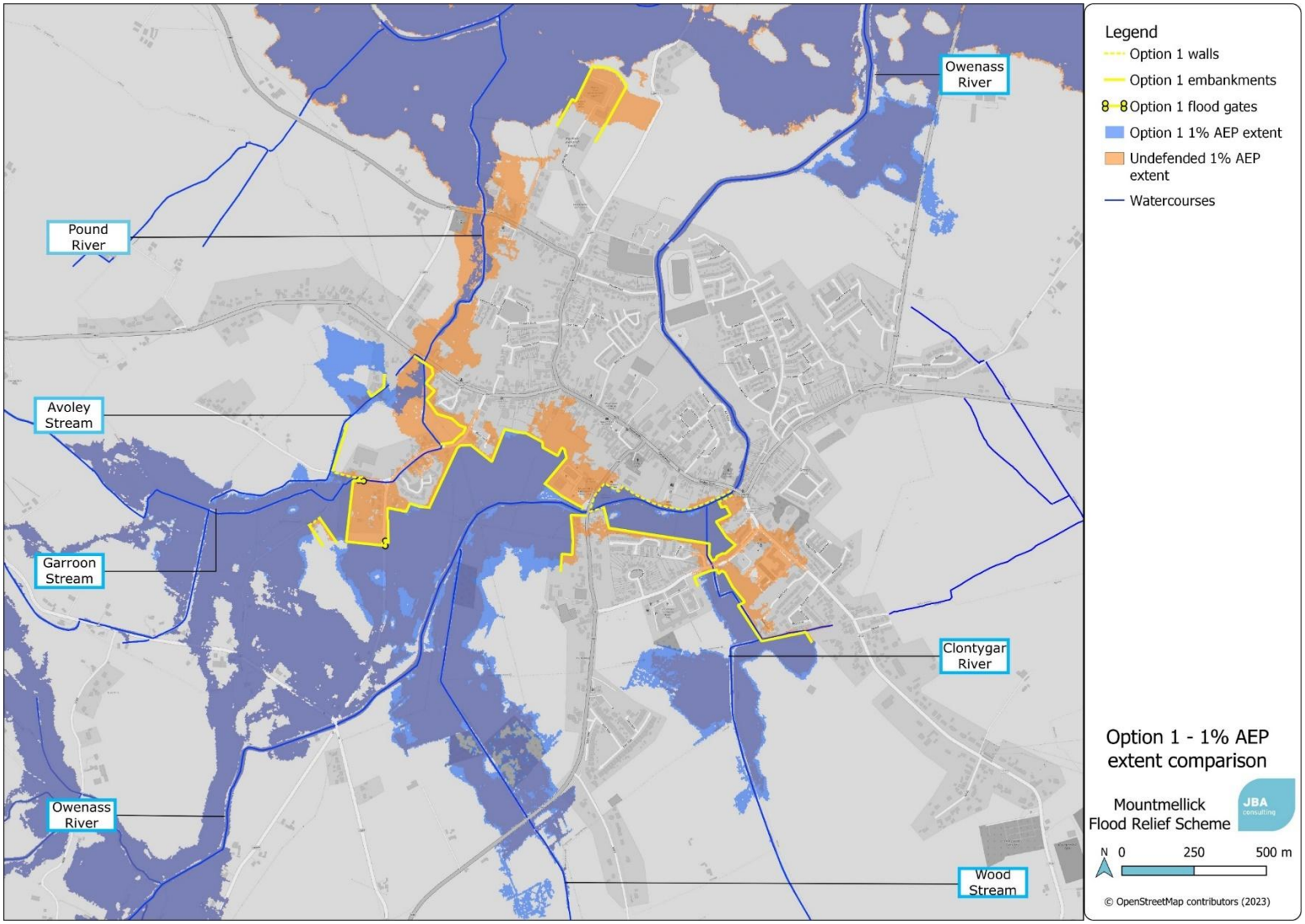


Figure 3-1: Option 1 - Overview

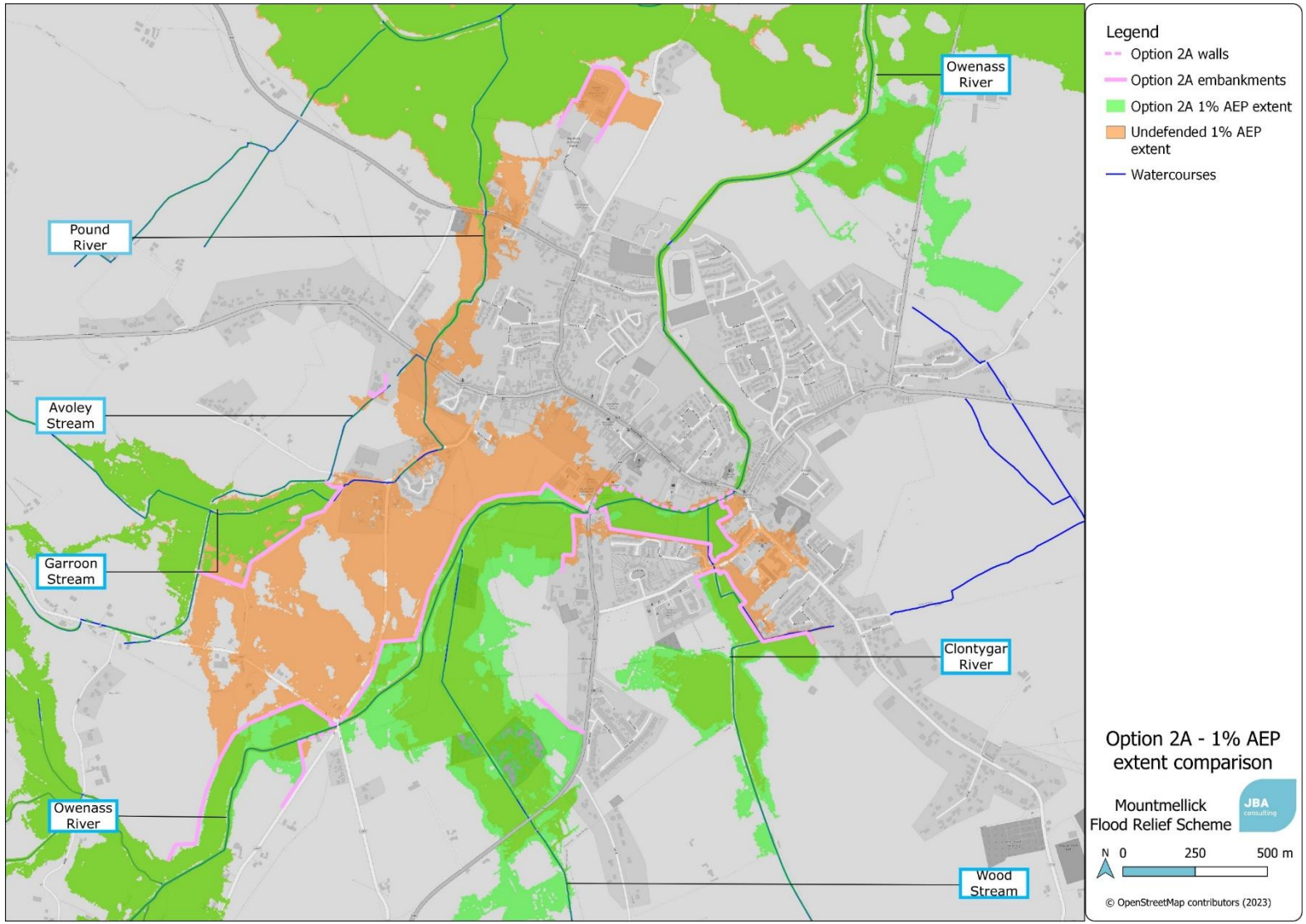


Figure 3-2: Option 2A - Overview

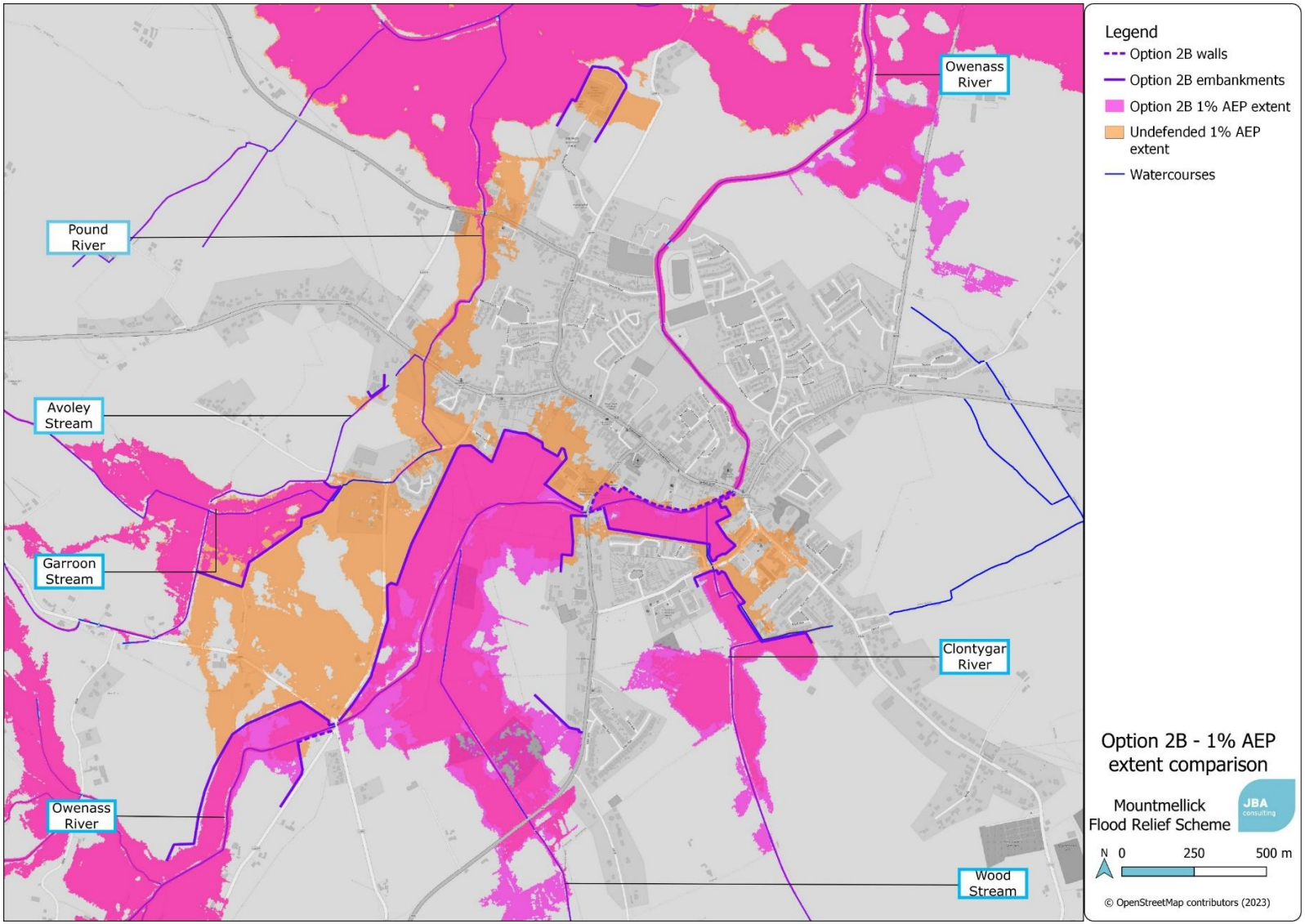


Figure 3-3: Option 2B - Overview – Original Proposal that was developed as detailed in Section 4

Table 3-1: Options assessment process summary

First stage: Initial screening Measures associated with potentially viable FRM approaches		Second stage: Development of Flood Risk Management (FRM) Approaches and Technical Assessment of Options in Study area		Third Stage: MCA and Selection and Development of Preferred Option
Flood Risk Management Approaches (8 Approaches and NbS)	**Screening of Flood Risk Management (FRM) Approaches**	**Development of FRM Approaches and Technical Assessment of Feasible Options (FRM7 Containment in combination with other measures FRM7 Others):**	**Env Assess of Options (Containment in combination with other measures)**	**MCA Technical, Economic, Social and Environmental Appraisal**
FRM Approach 1: Re-purpose of existing non-flood management infrastructure	This approach is not viable for the Mountmellick scheme area as there is no infrastructure that can be adequately repurposed to provide flood defence. **Not Taken Forward**			
FRM Approach 2: Catchment scale /disperse actions to reduce flow downstream	Not viable as stand-alone measures or stand-alone approach. Potentially viable as a measure to optimise scale of other measures. **Not Taken Forward**			
FRM Approach 3: Inline storage on main watercourses or tributaries to reduce flow down stream	Not viable as stand-alone measures or stand-alone approach. Potentially viable as a measure to optimise scale of other measures. **Not Taken Forward**			
FRM Approach 4: Diversion of flow around and away from risk areas	This measure is therefore not suitable for consideration in any potential option and is screened out of the assessment at this stage. **Not Taken Forward**			
FRM Approach 5: Improved	Measures tested were shown to be limited and, in many cases, the adverse impacts on environmental			

conveyance of flow.	and social aspects mean that they are not viable. **Not Taken Forward**			
FRM Approach 6: Refurbish or enhance defences to chieve standard of protection	Not viable for the Mountmellick FRS as there are no existing defences to enhance within the scheme area. **Not Taken Forward**			
FRM Approach 7: Containment of flood level	While other FRM approaches were considered potentially viable from the testing carried out they are unable to provide the standard of protection required as the impact on peak levels are all minimal. Therefore, containment of flood levels through the use of flood wall and embankments is key to providing protection within Mountmellick. Various configurations of containment defences were tested within the hydraulic model. **Taken Forward for further analysis**	**Option 1** - embankments and concrete walls around the Mountmellick town area to prevent flood waters from the Owenass, Pound and surrounding watercourses impacting properties and at Mountmellick Mill Bridge and around the Clontygar as well as around the Midland Steel site. Hard defences (walls, embankments, movable flood barriers and road raising are also required along the Pound River system to protect risk receptors. **Option 2A** - embankment running along the left bank of the Owenass river from upstream of Owenass Bridge to Mountmellick Mill Bridge to stop floodplain flow from the Owenass moving across to the Pound system, defences also around the Clontygar as well as around the Midland Steel site. A throttle (sluice/flow control structure) is placed at the upstream extent of the Pound to control flow at Manor Court. The alignment of the Owenass embankment will sever the floodplain connection in this area and presents the risk of impacts to the watercourse and riparian habitats. **Option 2B** embankment running set back from the riverbank of the Owenass river from upstream of Owenass bridge to Mountmellick Mill bridge to stop floodplain flow from the Owenass moving across to the Pound system defences also around the Clontygar as well as around the Midland Steel site. A throttle (sluice/flow control structure) is placed at the upstream extent of the Pound to control flow at Manor Court. The alignment of the embankment is along existing road edges and field boundaries therefore engaging more of the	**Option 1** - Biodiversity has High potential effects between Mountmellick Mill Bridge to Convent Bridge. Cultural Heritage has High potential effects Mountmellick Mill Bridge to Convent Bridge, and from Owenass Bridge to Mountmellick Mill Bridge. Hydrology and Hydromorphology have High potential Manor House, Manor Court, and Manor Road and at Garroon Stream **Option 2A** - Biodiversity has High potential effects between Mountmellick Mill Bridge to Convent Bridge, from Owenass Bridge to Mountmellick Mill Bridge and upstream of Owenass Bridge. Cultural Heritage has High potential effects Mountmellick Mill Bridge to Convent Bridge. **Option 2B** - Biodiversity has High potential effects between Mountmellick Mill Bridge to Convent Bridge, and upstream of Owenass Bridge. Cultural Heritage has High potential effects Mountmellick Mill Bridge to Convent Bridge. The emerging options (1, 2A and 2B) were published and formed the basis of the Emerging Options Engagement Event held in April 2021.Option 1 has greater potential adverse effects overall than Options 2A and 2B, so Option 1 is the least preferred option for environment.	The outcome of the MCA Analysis shows that **Option 2B** provides the highest score in terms of technical, economic, social, and environmental criteria and is the Preferred Option. It achieves the objective of the project to achieve the reduced flood levels, is technically feasible and has the lowest impact from an environmental perspective. **Option 2B taken forward for Environmental Impact Assessment, AA Screening and Preliminary Design** To improve the efficiency of the design in relation to buildability and visual impact, Option 2B was developed further with the proposed embankments within the area of the town replaced by flood walls as well as moving the alignment of the embankment in Baker's Field to extend through the middle of the field. Following the Public Information Day on the Preferred Option on 12 September 2023 further changes and modifications were made to option 2B **Option 2B (refined) is taken forward**.

		existing floodplain area and reduces impact of defences on workable lands and that there is still connection between the river and a portion of floodplain. **Taken Forward for Option Assessment**	**Options 2A and 2B resulted in very similar potential environmental effects and were equally preferred**	
FRM Approach 8: Flood Resilience, preparedness	This FRM approach could be enacted in Mountmellick however it does not remove the need for defences which will protect residents and remove the need for emergency planning, individual protection and forewarning and so was not considered further. **Not Taken Forward**			

3.2 Options Assessment

The Options Report[21] presents the various structural defences in the wider context through the screening of all available alternatives considered (as described above in Section 3.1). The emerging Options were a combination of containment measures that were determined to be the most appropriate for Mountmellick and they are based on the 1% AEP flood event (or event that has a 1% chance of happening in any year, otherwise called the 1 in 100-year flood). Three Options were developed (1, 2A and 2B), were published and formed the basis of the Emerging Options Engagement Event held in April 2021. After this event, Option 2B was developed further and amended and was presented in the Public Information Day (PID) held on 12 September 2023. The PID gave the public the opportunity to review the Option and discuss it with the design team. The public was invited to provide comments on the proposal, which were then reviewed and enabled the option to be developed further. Each of the Options considered how the scheme may need to be altered in the future to allow for adaptation in terms of alignment and height of defences from the impact of climate change on flows and flood levels. The site was divided in seven areas of assessment for the FRS Options, which are listed below. A map of the extent of each area is provided in the Options Assessment Report.

- Upstream Owenass Bridge including replacement of Owenass Bridge;
- Owenass Bridge to Mountmellick Mill Bridge;
- Clontygar Stream;
- Mannor House, Manor Court, Manor Road;
- Mountmellick Mill Bridge to Convent Bridge;
- Garroon Stream; and
- Bay Road Business Park.

[21] JBA Consulting (March 2024) *Mountmellick Flood Relief Scheme - Options Report.* Laois County Council and Office of Public Work

Table 3-2: Summary of the measures for the three Options for Mountmellick FRS

Measures location	Option 1	Option 2A	Option 2B
Upstream Owenass Bridge including replacement of Owenass Bridge;	No defences proposed in this area Replacement of Owenass Bridge is not required as part of Option 1	Replacement of Owenass Bridge **Left bank:** ▪ Extension of wing wall from the upstream face of the new Owenass Bridge to the riverbank ▪ Earth embankment starting at the end of the wing wall, extending through the fields and parallel to Rosenallis Road. Access will be maintained through three ramps crossing the embankment. Three piped drainage ditches will be constructed crossing by embankments to maintain flow. **Right bank** ▪ Extension of the wing wall upstream face of the new Owenass Bridge to a position beyond Riverside Lodge. ▪ Earth embankments beyond the garden of Riverside Lodge extending southwards till meeting the road, turning adjacent to the road onto higher ground where it ends. Access will be maintained through a crossing point	Same as Option 2A

Owenass Bridge to Mountmellick Mill Bridge	▪ Concrete flood wall from upstream Mountmellick Bridge ▪ Increase of existing wing wall of Mountmellick Bridge, maintaining access through existing gate ▪ Embankment perpendicular to the alignment of the Owenass River and along the rear boundary of the gardens of the properties on Pearse Street ▪ North of Owenass the embankment extends from Mill Bridge along the boundary of the Mountmellick Development Association (MDA) site and along the boundary of Baker's field and around Manor Grove and Manor Road	**Left bank:** ▪ Concrete flood walls from downstream to Owenass Bridge turning 90 degrees to form the embankment end. At Derrycloney Road the embankment moves away from the river to the roadside of the open field. Access is maintained ▪ Extension of the Embankment to the Owenass River west of the riparian vegetation alongside riverbank ▪ Concrete flood wall construction at connecting into the upstream elevation of Mountmellick Bridge as its wing wall ▪ Footpath will be moved to run within the edge of the MDA site **Right bank:** ▪ Concrete flood wall from extended from the end of the existing wing wall ▪ Increasing the height of the existing wing wall ▪ Flood embankment extending perpendicular to the alignment of Owenass River and along the rear boundary of the gardens of properties on Pearse Street ▪ Short length flood wall adjacent to Irishtown Road ▪ Earth embankment to the west of the garden centre extending east and west along edge of the tree line and running into higher grounds at the western end	Similar to Option 2A with changes after the review based on PID discussions and comments: **Left bank:** ▪ Embankment extension after Derrycloney Road follows a line across the open land moving away from the Derrycloney Road to enter Baker's Field to the rear of the gardens at Manor Grove. Within Baker Field the embankment takes a line across the middle of the field to a point at the edge of MDA ▪ Flood wall starting at MDA connecting into the upstream elevation of Mountmellick Mill Bridge at its wing wall ▪ Increasing the level of the wing wall and the upstream parapet of the bridge **Right bank:** ▪ Beyond the gardens of the properties on Pearse Street, the flood wall continues southwards along the boundary with the gardens until it runs into higher ground. ▪ The flood wall continues southwards along the boundary with the gardens until it runs into higher ground.

Manor House, Manor Court, Manor Road	▪ Flood barrier crossing Manor Road ▪ Concrete flood wall extended toward the west along Manor House boundary. ▪ Embankments surrounding the houses of Manor Court and Manor Road with a small stretch if flood wall. ▪ Earth embankments to both sides of the Sandy Lane property ▪ Flood wall along the roadside of the property. Floodgates for access on the floodwall	▪ Move the alignment of the Pound watercourse Near the junction between Manor Road and Sandy Lane, west of the proposed embankment. Control structure to force water to back up behind the embankment ▪ Embankment along Pound River extending along west side of Sandy Lane, turning perpendicular to Sandy Lane, and extending into higher ground. Raised crossing embankments where access is required	Same as Option 2A
Clontygar Stream and Davitt Road	▪ Concrete flood wall extending across upstream headwall of the existing culvert carrying the Clontygar Stream below Irishtown Road ▪ New flood embankment extending along a line outside the boundary of school play area and along rear the gardens of the properties on Davitt Court, back to the gardens and extends up to the gardens of the properties on Brook View ▪ Culvert adjacent to Brook View ▪ New Stream alignment to allow it running on the west side of the embankment. ▪ Diversion of Clontygar Stream to the South connecting into the existing alignment toward Irishtown Road culvert.	Same as Option 1	▪ Concrete flood wall extending across upstream headwall of the existing culvert carrying the Clontygar Stream below Irishtown Road ▪ New flood wall extending along a line outside the boundary of school play area and along rear the gardens of the properties on Davitt Court, back to the gardens and extends up to the gardens of the properties on Brook View ▪ Culvert adjacent to Brook View ▪ New Stream alignment to allow it running on the west side of the embankment. ▪ Diversion of Clontygar Stream to the South connecting into the existing alignment toward Irishtown Road culvert.

Mountmellick Mill Bridge to Convent Bridge	▪ Concrete flood wall on the left bank (north river side) downstream end of the Mill Bridge extended along the boundary of the children's park area and beyond to Mountmellick Community Arts Centre to upstream face of Convent Bridge. Flood gates provided to all the access points. ▪ Concrete flood wall on the right bank (south river side) starting downstream end of the Mill Bridge wing wall extending along the top of riverbank along the length of the existing buildings. After that it extends to the open field along the rear gardens of the properties on the Grove Park. At the end of Grove Park, the embankment extends across Clontygar Stream to meeting Irishtown Road. ▪ Extension of embankments adjacent to Irishtown Road along the outside edge of the field area and back to Owenass River. Flood gates are provided in every access point.	Same as Option1	Same as Option 1 and 2A but with the following amendments: ▪ On the south side of the River Owenass, the flood wall continues along the boundary with Grove Park and Irishtown Road until it meets the Owenass again upstream of Convent Bridge.
Garroon Stream	▪ Flood wall along eastern side of the properties adjacent Garroon Stream. Gated openings will be included to maintain access to the properties.	▪ Flood wall along eastern side of the properties adjacent Garroon Stream. Gated openings will be included to maintain access to the properties.	▪ Flood walls along the eastern side of the properties. Access to the properties will be maintained through several gated openings along wall length ▪ Earth embankment to south extending across the field to higher ground west of the properties
Bay Road Business Park	▪ Embankment surrounding the northern portion of the Bay Road Business Park to protect the Midland Steel site	Same as Option 1	▪ Flood walls surrounding the northern portion of the Bay Road Business Park to protect the Midland Steel site

Table 3-2 shows the differences and similarities between the three options. Option 2A and 2B are very similar and were even more similar in the earlier stages of optioneering – as shown in Figures 3-2 and 3-3. However, Option 2B has been developed further following an assessment of the visual impact of the embankments within the town centre, the decision to move the protection to the river side of the children's park and to move the line of the defence to run through the centre of Baker's Field.

3.2.1 Environmental impact assessment of Options

The potential environmental impacts associated with the three Options are summarised below. The discussion focusses on the comparison of impacts of the measures among Options, particularly for measures that differ. As some areas of assessment within the FRS site are part of an SAC, the final scheme would undergo screening for Appropriate Assessment.

3.2.1.1 Option 1

Biodiversity

The highest impact on biodiversity for this option would be in the Mountmellick Mill Bridge to Convent Bridge assessment area. Construction of the embankment would take place adjacent to the river Barrow and River Nore SAC, leading to disturbance, loss of habitat and pollution or increased sedimentation. This would have long term High adverse effect on ecology.

Permanent Moderate adverse effects would be expected on Clontygar Stream and Davitt Road- Riparian strip, this is due to removal of vegetation along the Clontygar, causing disturbance of instream habitat and aquatic species. Disturbance due to construction at Manor House, Manor Road and the Garron Stream area, would result in loss of habitat. Also, construction at Manor Road could risk accidental spread of the invasive Chinese Bramble, present at this location.

With Option 2B the Owenass Bridge to Mountmellick Mill Bridge embankment would be set back from the SAC upstream from the MDA, allowing for connectivity with the Owenass River to the floodplain. This is in contrast to Option 2A where the extension of the embankment is alongside the riverbank. Option 2B would have lower ecological adverse impacts in comparison to Option 2A, with long-term benefits on aquatic species and habitat. However, Option 2B would have higher impact on private properties due to the embankment running through Baker's Field and the location closer to the rear gardens, this can cause a reduction in privacy if viewed from the top.

Hydrology and Hydromorphology

Option 1 impacts on hydrology and hydromorphology would be chiefly at Manor House, Manor Court, Manor Road and Garroon Stream areas. Once operational an additional throttle will act as a barrier to longitudinal connectivity thus restricting sediment transport and fish passage, while increasing sedimentation. This would lead to Garroon Steam receiving much higher flows in the operational stage, with higher bank and bed erosion along with deposition of finer sediments on the bed. Impacts in these areas would be permanent High Adverse.

Moderate Adverse impacts would be expected at Mountmellick Mill Bridge to Convent Bridge section, including Clontygar Stream and Davitt Road. Construction of walls and embankments has the potential to increase sedimentation and runoff into the watercourse. Also, during the operational phase proposed walls on the left bank have the potential to cause localised increased velocity.

The Owenass Bridge to Mountmellick Mill Bridge section, with Option 2B the embankment will be set back from the river allowing greater floodplain connection. On operation this will lead to long-term positive impacts, this is opposed to Option 2A with the embankment running alongside the riverbank. However, Option 1 construction impacts would be lower than Option 2A and 2B.

Cultural Heritage

The highest adverse impacts on cultural heritage for this Option would be expected on Mountmellick Mill Bridge to Convent Bridge and Owenass Bridge to Mountmellick Mill Bridge assessment areas as the embankment would be partially located within the ZAP of the historic town of Mountmellick (RMP LA008-021). In addition to the inherent archaeological potential associated with the riverine/greenfield environment, an embankment was proposed within the former demesne lands of Irishtown House. High potential effect was identified for the monument in the playground (RPS 704) as the surrounding wall will significantly alter its setting. A historic stone wall on Park Street (CH1) will be partly demolished to facilitate an embankment and pedestrian access as part of this option. The overall potential effect on cultural heritage would be permanent High adverse.

Moderate adverse impacts would be expected at Manor House, Manor Court and Manor Road as there is archaeological potential associated with the Garroon Stream, which functioned as the tailrace of the Manor Mills which would be impacted during works. In addition to the potential effects to inherent archaeological potential associated with the riverine/greenfield environment.

Positive impacts would be expected for the Mountmellick Development Association (RPS 703) as embankments around the building would protect this structure from flooding and would facilitate a riverside walkway.

Landscape and Visual Amenity

Permanent Moderate adverse impacts on landscape and visual amenity are expected as a result of disruption of views for residences. These are expected in various assessment areas; Manor Court and Manor Road, Mountmellick Mill Bridge to Convent Bridge, Clontygar Stream and Davitt Road and Garroon Stream.

Construction and Access Impacts

During construction no significant access impacts would be expected for pedestrians and road users. Access to the playground within Mountmellick Mill Bridge to Convent Bridge assessment area would likely be restricted temporarily during construction.

3.2.1.2 Option 2A

Biodiversity

Highest impact on biodiversity from this option would be expected at Mountmellick Bridge to Convent Bridge, which would be the same as Option 1 and Option 2B as the measures involved would be the same across the three Options. Furthermore, High adverse impacts for this Option would be expected at Owenass Bridge to Mountmellick Mill Bridge area, as the construction of embankments will take place adjacent to the River Barrow and River Nore SAC, causing disturbance, loss of habitat, pollution, and increased sedimentation. The extent of the embankment is 1 km which would have the potential for permanent High ecological effects. The impacts on this assessment for Option 2A are higher than Option 1 and Option 2B.

High adverse impacts would also be expected Upstream the Owenass Bridge and from the replacement of Owenass Bridge for this Option and would be higher than Option 1 as the construction of embankments and retaining wall will take place adjacent to or partially within the River Barrow and River Nore SAC with noted presence of non-native invasive species. These impacts would be higher than Option 1 which does not involve intervention in this area at all.

Permanent Moderate impacts are expected at Manor Road due to the potential risk of accidental disturbance and spread of the Chinese Bramble non-native invasive species, same as in Option 1.

Hydrology and Hydromorphology

Impacts on Mountmellick Mill Bridge to Convent Bridge and Clontygar Stream would be the same as Option 1, as both Options include the same measures in these assessment areas.

Permanent Moderate adverse effects would be expected also at Owenass Bridge to Mountmellick Mill Bridge area, which would be higher than Option 1 and 2B, as a result of disconnection of the river with its floodplain on the left bank during operation.

Cultural Heritage

The highest impacts on cultural heritage would be expected at Mountmellick Bridge to Convent Bridge, which would be High adverse, same as Option 1 and 2B as the measures in this area, are the same for the three Options.

Permanent Moderate adverse effects are expected at Clontygar Stream and Davitt Road due to the partial demolition of the historic stone wall on Park Street. This Option would have greater potential impacts on the railway. Also proposed embankments at Manor House would impact the Townparks/Derrycloney townland boundary which also functions as the Ardea/Rosenallis parish boundary and the Prognathic/Tinnahinch barony boundary. Positive impacts would be expected at Manor House and Manor Mills, as this Option would provide flood protection to these structures. Overall impacts on cultural heritage from this Option would be Slight adverse, lower than Option 1.

Landscape and Visual Amenity

Impacts on Mountmellick Mill Bridge to Convent Bridge section, Clontygar Stream and Davitt Road assessment areas would be similar to Option 1, as they include the same measures.

Higher impacts compared to Option 1 and Option 2B would be expected at the Owenass Bridge to Mountmellick Bridge as placement of embankments along the riverbank would potentially require removal of riparian vegetation, causing permanent Moderate adverse impacts.

Construction and Access Impacts

Construction and access impacts from measures in Option 2A, would not be significant. Only Slight effects would be expected during construction across the site, same as Option 1 and Option 2B.

3.2.1.3 Option 2B

Biodiversity

Highest impacts of this Options would be the same as Option 2A and 1, in the assessment areas that involve the same measures.

The difference between Option 2B and Option 2A relates to Owenass Bridge to Mountmellick Mill Bridge assessment area. Impacts on Biodiversity in this area are lower for Option 2B compared to Option 2A. The proposed embankment was set back from the River Owenass In this Option, consequently having lower impacts. It would allow the area between the embankment and the river to act as an occasional floodplain. This would have multi benefits such as water quality and river hydrology. In this location the measures of Option 2B would provide benefits to the aquatic habitat and species in the long term. This option will result in potential permanent moderate effects on ecology in this area.

Hydrology and Hydromorphology

Impacts on hydrology and Hydromorphology of Option 2B would be the same as Option 2A with difference in the Owenass Bridge to Mountmellick Mill Bridge assessment area. As the Option 2B does not involve works in the river as the embankments would be set back in the middle of Baker's Field, impacts would be lower than Option 2A. In the operational phase, increased floodplain connectivity would have benefits for water quality and sediment transport. Therefore, the impacts for this Option on Hydrology and Hydro

morphology would be neutral to Slight adverse, making this Option with the lowest impacts on hydrology and hydromorphology among all the three Options.

Cultural Heritage

Impacts on cultural heritage would be the same as Option 2A, except the Owenass Bridge to Mountmellick Mill Bridge assessment area where the two Options differ. In the Option 2B, as the proposed embankment would be set back from the river there would be less risk of impacts on the inherent archaeological potential associated with the riverine/greenfield environment. However, this option would potentially have a greater impact on the railway. Another embankment is proposed within the former demesne lands of Irishtown House. Additionally, the embankment will extend about the eastern side of Owenass Bridge which would cause a potential adverse effect.

The overall potential effect on cultural heritage is permanent Moderate adverse.

Landscape and Visual Amenity

Impacts on landscape and visual amenity for this Option would be the same as Option 2A in the areas that involve the same measures. Lower impacts would be expected at the Owenass Bridge to Mountmellick Mill Bridge as the embankment would be set back from the river's edge and from the rear properties along Manor Court and Manor Road. Therefore, impacts would be Slight adverse, the lowest among all the Options. This makes Option 2B the one with the lowest overall impacts on landscape and visual amenity, among all the three Options.

Construction and Access Impacts

Construction and access impacts would not be would not be significant. Only Slight effects would be expected during construction across the site, same as Option 1 and Option 2A.

The environmental impacts discussed above are summarised in Table 3-3 below. It provides a clearer comparison between impacts of Options for each assessment area. The weight of the effect is displayed by different symbols: the blue circle represents High potential effects; orange represents Moderate potential effects and green is a Slight or Neutral effect. These symbols are shown below.

Table 3-3: Colour coded system representing the expected level of impacts

Legend	
High potential effect	
Moderate potential effect	
Slight/no potential effect	

Table 3-4: Summary of the impact assessment of each Option

Areas of assessment within site																					
	Upstream of Owenass Bridge and replacement of Owenass Bridge			Owenass Bridge to Mountmellick Mill Bridge			Manor House, Manor Court, and Manor Road			Clontygar Stream and Davitt Road			Mountmellick Mill Bridge to Convent Bridge			Garroon Stream			Bay Road Business Park		
Options	**1**	**2A**	**2B**	**1**	**2A**	**2B**	**1**	**2A**	**2B**	**1**	**2A**	**2B**	**1**	**2A**	**2B**	**1**	**2A**	**2B**	**1**	**2A**	**2B**
Biodiversity																					
Hydrology and Hydromorphology																					
Cultural Heritage																					
Landscape and Visual Amenity																					
Construction and Access Impacts																					
Comments	Highest impacts on Option 2A and B are related to the works adjacent to river, which would cause disturbance of habitat, pollution and sedimentation with High Adverse Impacts on biodiversity. Option 1 does not			The highest impacts on Biodiversity would be on Option 2A as the embankment would be contructed on the river banks, causing disturbance and loss of habitat, and the river would loose connection with the flood plain. This would cause			Option 1 has the highest impact in this assessment area, particulartly in hydrology and hydromorphology due to the construction of the throttle which would impact Adversely the longitudonal conncetivity of the stream. Also Option 1 would have higher impacts on cultural			Impacts in this assessment area are the same for all the Options as they involve the the same measures. Impacts are related to the potential disturbance of watercourse due to emabnkment construction, on Biodiversity. Also changes on the hydrology would be			Impacts in this area would be the highest, and as all the Options involve the same measures, the impacts are all the same in the three Options. Highest impacts would be expected in biodiversity and cultural heritage. However Option 2B would have lower impacts in the			Option 1 has the highest impacts in this assessment area as it includes flood walls adjacent to the Garroon stream, requiring extensive works on stream with high adverse impacts on hydrology and hydromoprphology, and also higher impacts compared			This is the area with the lowest impacts, as the amount of works would be lowest, and is the same among all Options. It includes embankments in the northen part of the Bay Road Business Park area which		

	include any measure in this area nor does it inlcude replacement of Owenass Bridge,, thus it would have no imoacts on biodiveristy.	High impacts on ecology. This impact would be lower for Option 1, however the placement of embankments near the properties and structures would have High Adverse impacts on cultural heritage. Therefore the Option 2B has the lowest impact as the embankment would be placed in the middle of the field, having lowest impacts on biodiversity, hydrology, and cultural heriatge. Option 2B proivdes also lowest impacts on visual amenity as the embankment would not be placed near the properties. Option 2A is the Option with the lowest impacts for this assessment area.	heritage as the embankment would be partially located within the ZAP of the historic town of Mountmellick.	related to the changes in flow as a result of increased water velocity drom the flood walls.	children's park area, as the flood wall would be offset from the tree line, allowing for banks stability and persevance and enhancement of tree line. However this would not be enough to offset the adverse impact. Therefore impacts in this assessment area would be of the same magnitude for all the Options.	to Option 2A and 2 B on biodiversity due to disturbance and loss of habitat. Flood walls in this area for Option 1 would be constructed rear to the properties having higher impacts on visual amenity. In Option 2A and 2B, as the earth embankments would extend across the field to higher ground west of the properties and eastern part, there would be no work adjacent to the stream, resulting in Slight impacts. Also flood walls would be moved from the properties borders which would maintain access and would not have significant impacts on visual amenity and cultural heritage.	would not be expected to cause significant impacts.

3.2.2 Costs

A full break down of cost for each Options is provided in the Options Assessment Report.

3.2.3 Multi Criteria Analysis Outcomes

The effectiveness of each of the feasible Option can be measured in terms of how it achieves a set of flood risk management objectives. This section summarises the detailed multi-criteria analysis (MCA) of the shortlisted Options which was carried out to evaluate the performance of each Option in terms of predefined objectives. It follows the OPW Guidance Note adopted for the Flood Risk Management Plans, which was applied to the detailed scheme appraisal. Each of MCA objectives has also been weighted both globally and locally to reflect the importance of each. These weightings are in accordance with the OPW Technical Methodology Note (TMN) – Option Appraisal and the Multi-Criteria Analysis (MCA) Framework.

Criteria Scores: The MCA produces a weighted score for each objective and the sum of these within each of the criteria classifications is the Criteria Score, as summarised in:

- **MCA Benefit Score**: The sum of the scores for the economic, social and environmental criteria. It excludes the technical criteria score. This score represents the net benefits of the Option.
- **Option Selection MCA Score**: The sum of the scores for all four of the criteria. This score compliments the MCA Benefit Score with the Technical Criteria Score, and hence includes all of the aspects that should be taken into account in considering the Preferred Option for a given location.

Table 3-5: Summary of MCA scores for each Option

Criteria	Option 1	Option 2A	Option 2B
Technical	800	1000	1000
Economic	149	217	243
Social	483	526	527
Environmental	-481	-193	72
MCA Benefit Score	**153**	**551**	**843**
Options Selection Scores	**953**	**1551**	**1843**

As shown in Table 3-5 above, Option 2B has the highest options selection scores. All the Options have the similar technical scores, as all of them include same type of defences; flood wall and embankments, but Option 1 relies on demountable flood barriers crossing the highway at a number of locations forming an integral part of the protection. Social scores are higher in Option 2B with a very little difference from Option 2A while Option 1 scores lower. The environmental criteria make the difference among all option with Option 1 and 2A scoring adverse values and Option 2B scoring positive values. This is attributed to the set back of the embankment on the area Owenass Bridge to Mountmellick Bridge from the river and rear of the properties. The positive value in Option 2B is also attributed to the positive impacts in Garroon Stream with flood embankment extended in the higher grounds rather than adjacent to the Stream. As seen on the table the environmental criteria are decisive in the total MCA Benefit Scores, making Option 2B the preferred Option with the highest scores.

3.3 Preferred Option selection

Following the Options assessment outlined in the sections above a Preferred Option emerged. In this process the PID played a significant role. Comments from the local community, related to the placement of the embankments in the Owenass Bridge and River Pound areas, were taken into consideration and were adapted to Option 2B.

Based on the overall environmental impacts and MCA score the Preferred Option is Option 2B. Option 1 has the highest environmental impacts compared to Options 2A and 2B at the Garroon Stream and Manor House/Manor Court/Manor Road. It would cause potential High adverse effects due to changes in hydromorphology in these areas, and Moderate effects on biodiversity, visual amenity, and cultural heritage (Manor House/Manor Court/Manor Road only). Between Owenass Bridge and Mountmellick Mill Bridge, Option 1 performs worse in terms of environmental criteria than Option 2B due to the construction of the embankments along the edge of Mountmellick town, a Zone of Archaeological Potential. It performs slightly better than Option 2A in this area, as the embankments are set back from the riverbank. However, with the embankment being placed adjacent to the properties in Option 1, it causes higher social impacts.

As Options 2A and 2B are very similar the measures in the Owenass Bridge to Mountmellick Mill Bridge assessment area make up the difference, placing Option 2B as the Preferred one due to benefits in setting back the embankments from the Owenass River and the rear of the properties.

In Option 2B the alignment of the proposed flood wall to the south side of the MDA extends into the area of land between the car park and the river. This ensures greater access and moves works away from the river environment, which make Option 2B preferred over Option 1 and 2A. In Option 2B, the movement of the embankments from the rear of the gardens would remove the risk of any privacy invasion resulting from the access to the crest of the embankment and looking into gardens/windows of the properties at Manor Grove and Manor Court area. Also, the option enables an area of the field to be utilised as an asset for the town. Compared to Option 1 and 2A, Option 2B would result in a reduced total length of embankment, which would reduce the environmental impact assessment during construction

For all the above, Option 2B emerged as the preferred Option.

3.3.1 Summary of Preferred Option (Option 2B)

The Preferred Option, Option 2B provides flood protection through embankments and concrete flood walls in all the assessment areas, while having the lowest environmental impacts among all the Options. The measures in Owenass Bridge to Mountmellick Bridge area, include an embankment set back from Owenass River and rear of the properties, allowing connection of the river with its floodplain and access. This would provide long term positive benefits to water quality hydrology and biodiversity. The preferred Option assures flood protection to properties while maintaining and enhancing natural features, and accessibility. This Preferred Option emerged as such, after the PID in which public had the Opportunity to discuss with the designers, who later adapted the publics comments in developing further the Option with more positive impacts. Description of the Preferred Option is provided in the next section, Chapter 4.

4 Description of Proposed Development

4.1 Introduction

This section of the EIAR outlines the development of the FRS for Mountmellick as show in Figure 4-1. The proposed FRS has been previously described in the Options Report as the Emerging Preferred Option. The options process is described in Chapter 3 of this report.

4.2 Preliminary Engineering Elements

Generally, the proposed flood relief scheme comprises 10No. continuous flood defences to protect properties from flooding from the Owenass River, Garroon Stream, Pound River and Clontygar River. The flood defences comprise:

- A series of embankments with culverts, and walls;
- One bridge (replacement of the Owenass Bridge);
- One pumping station (subterranean precast storage tank, control panel kiosk and above ground gantry structure); and
- Realignment of the Clontygar Stream to the east of the houses on Davitt Close.

There will be localised upgrades to surface water drainage around the walls, and flow control measures on the Pound. 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 are shown on Figure 4-1.

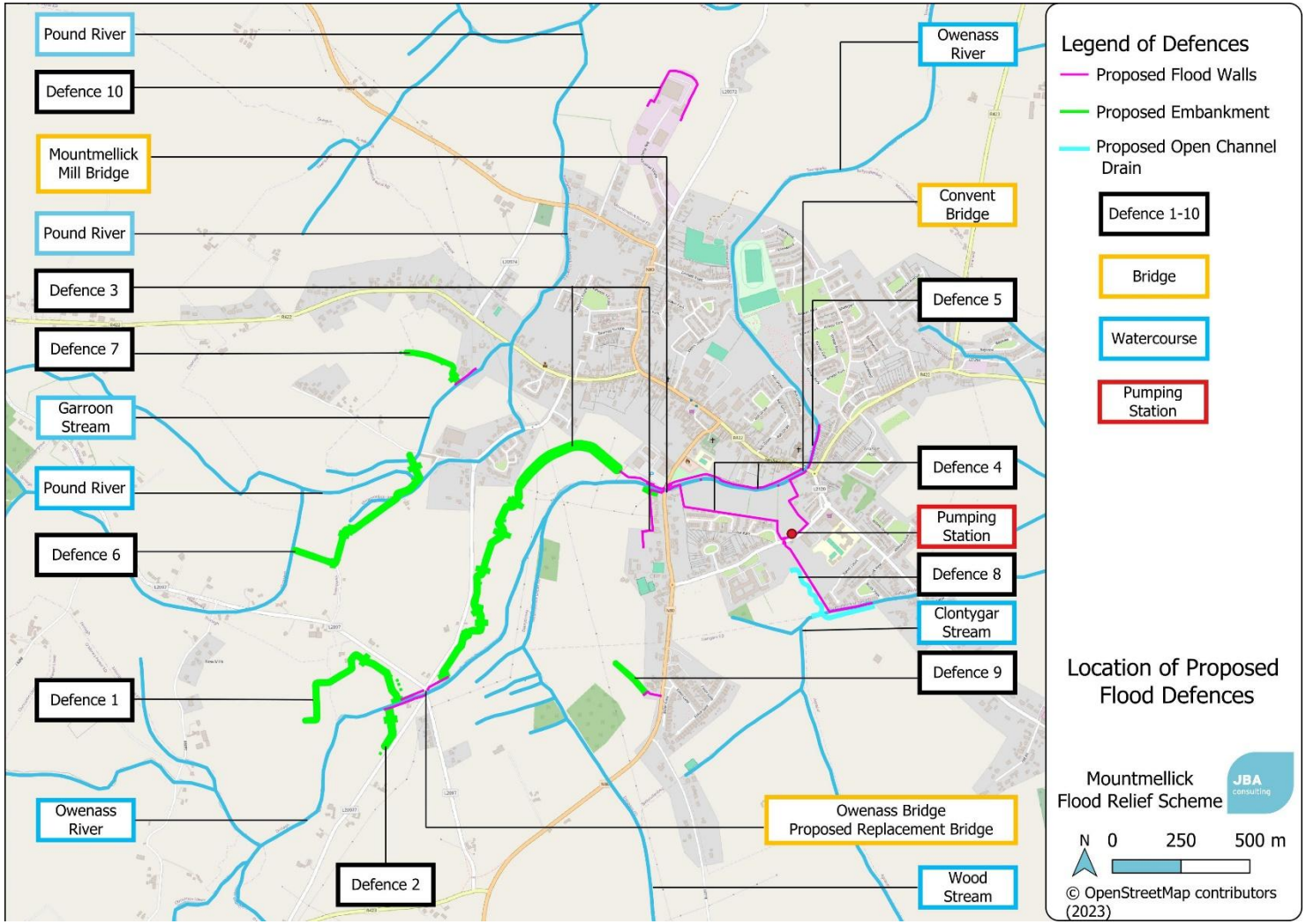


Figure 4-1: Flood defences, watercourses and bridges

Engineering Drawings

Flood Defences - Engineering design of the flood defences is shown on the following drawings:

- 19105-JBB-XX-XX-DR-C-02801 to 19105-JBB-XX-XX-DR-C-02840 - **Plans**
- 19105-JBB-XX-XX-DR-C-02751 to 19105-JBB-XX-XX-DR-C-02759 – **Sections**
- 19105-JBB-XX-XX-DR-C-02841 to 19105-JBB-XX-XX-DR-C-02851 - **Elevations**

Bridge - Engineering design of the replacement Owenass Bridge is shown on the following drawing:

- 19105-JBB-XX-XX-DR-C-02828 - **Plan**

Pumping Station - Engineering design of the Grove Park Pumping Station on Davitt Road is shown on the following drawings:

- 19105-JBB-XX-XX-DR-C-02860 – **Plan**
- 19105-JBB-XX-XX-DR-C-02861 – **Sections**

Site Compounds - Locations for potential site compounds are shown on the following drawings:

- 19105-JBB-XX-XX-DR-C-02760 to 19105-JBB-XX-XX-DR-C-02762 - **Plans**

Flood Embankment Design

Approximately 3,160 linear metres of embankment will be formed. The volume of material required to form the embankments is approximately 105,000m^3 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 105,000m^3 which may be reduced to 85,000m^3 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 77,000m^3. 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 56,000m^3. 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 embankments 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(vertical):2(horizontal) 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. The embankment will be either grass seeded or sewn with an indigenous wildflower mix to suit the location.

Overall, 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. A suitable corridor (minimum 3m) has been provided adjoining the foot of each embankment to allow access for maintenance to the fencing.

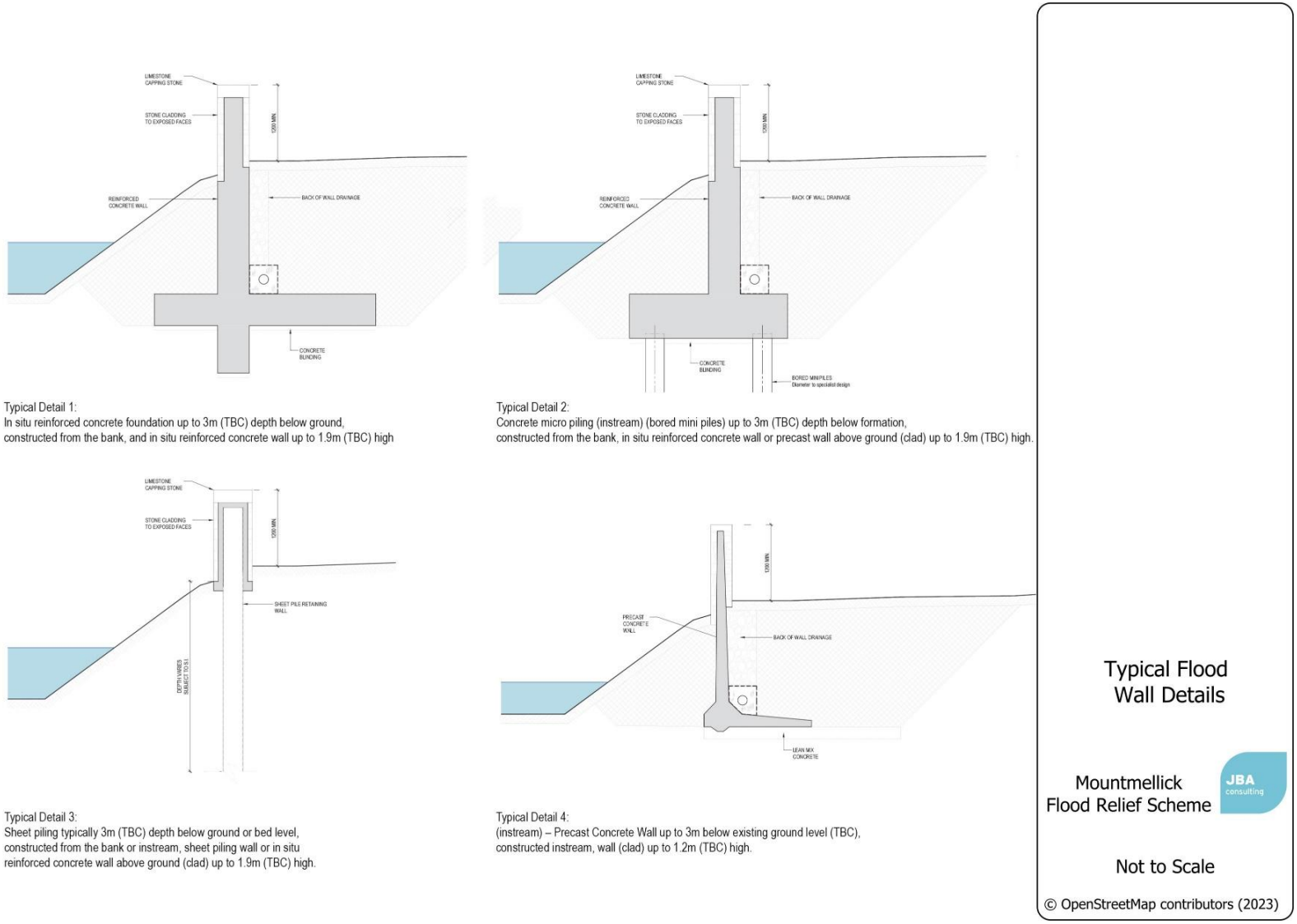
Flood Wall Design

Approximately 3,500 linear metres of flood defence wall will be constructed. For the purposes of environmental assessment and mitigation, four types of wall construction are proposed for the proposed development, as shown on Figure 4-2.

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. A 2m wide right of way is proposed on the dry side of all proposed defences to allow the operator to undertake regular inspections.

- **Type 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.
- **Type 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.
- **Type 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.
- **Type 4** (instream) – precast concrete wall up to 3m below existing ground level (TBC), constructed instream, wall (clad) up to 1.2m (TBC) 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.



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.

Figure 4-2: Typical flood wall details

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.

4.3 Location of Defences

The location of defences is shown on Figure 4-1 and summarised in text below.

4.3.1 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 L20977 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 L20977. 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 the 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 Drawings 19105-JBB-XX-XX-DR-C-02829, 19105-JBB-XX-XX-DR-C-02830, 19105-JBB-XX-XX-DR-C-02831 and 19105-JBB-XX-XX-DR-C-02832 (sheet 29-32 on engineering key drawing).

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

- A flood defence embankment (location 1A on Figure 4-3) (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 - instream sheet piling) (location 1B on Figure 4-3) of 84m in length and up to 1m in height will be constructed on the northern riverbank from the proposed Owenass Bridge replacement works. A temporary haul road in the river (made up of clean stone and using a coffer dam arrangement) will be constructed to implement the flood wall.
- Construction compounds (location A and B on Figure 4-3) 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.

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 Drawings 19105-JBB-XX-XX-DR-C-02832 and 19105-JBB-XX-XX-DR-C-02833 (sheets 32 and 33 on engineering key drawing).

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 4-3) (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- instream sheet piling) (location 2B on Figure 4-3) 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 4-3) 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.

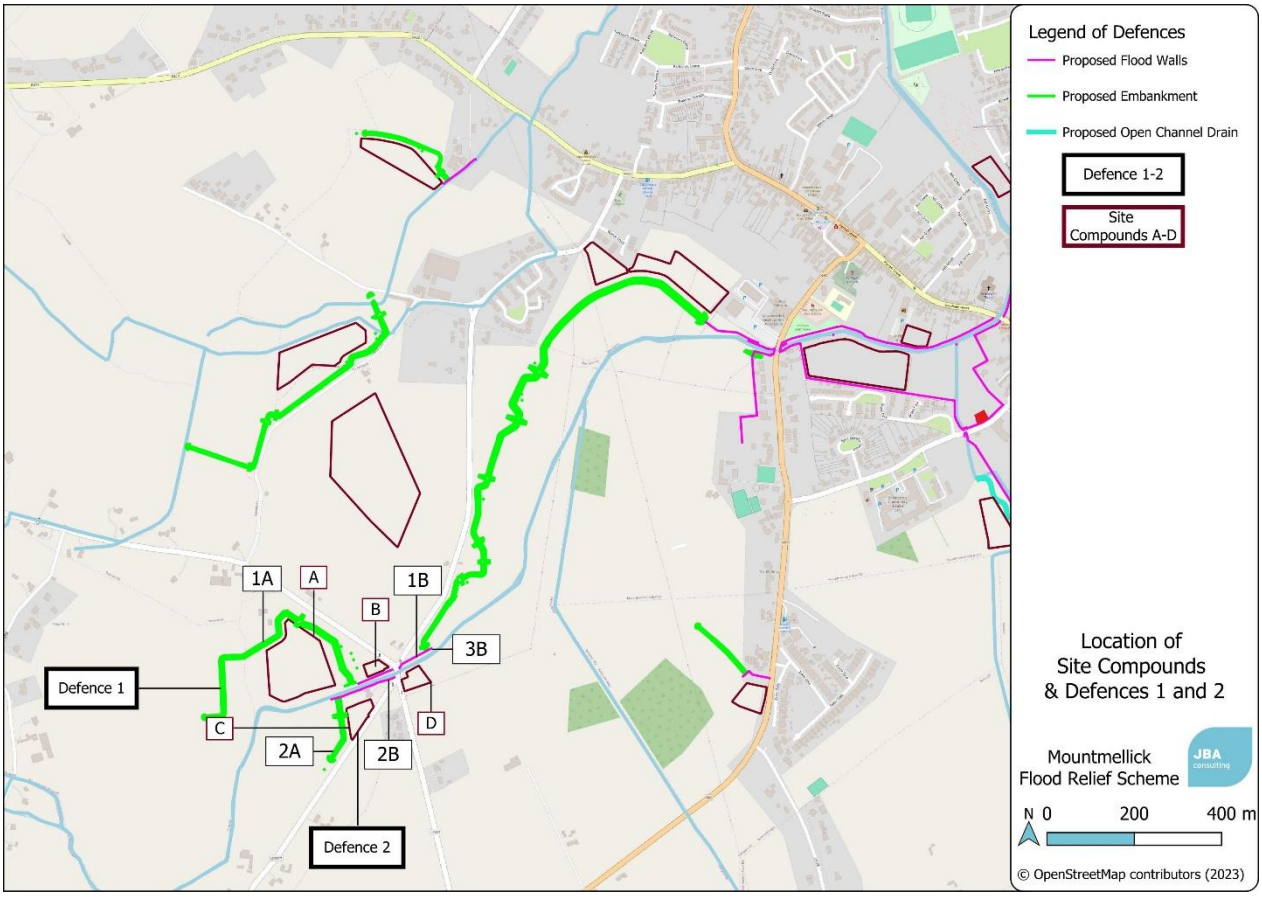


Figure 4-3: Defences 1 and 2 including site compound locations

4.3.2 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 to 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[23].

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 Drawing 9105-JBB-XX-XX-DR_S-02401, see Appendix 4.3. The bridge walls will tie into Defences No.1 and No. 2 as shown on Drawing 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.

4.3.3 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 Drawings 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.

[23] Hammond. F for Laois County Council *Bridges of County Laois: An Industrial Heritage Review Part 2 (*March 2009) Heritage Council

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

- A flood defence embankment (location 3A on Figure 4-3) (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 4-3), a new flood defence wall (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 4-3) (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 4-3) (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 4-3) will be accessed off Manor Road and located north of embankment. A further compound on higher ground to the west (location K on Figure 4-3) will be used to store soil for forming the embankment.

4.3.4 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 Drawings 19105-JBB-XX-XX-DR-C-02807 to 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 a flood defences walls and a formalised floodplain to the south of the Owenass River. This will consist of the following:

- Construction of new flood defence wall (location 4A on Figure 4-4) (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 4-4) downstream of Mountmellick Mill Bridge, right side of Owenass River, with a raised footpath. Height up to 1.9m, Length 115m (Wall Type 3 - instream sheet piling)
- Construction of new flood defence wall (right bank) (location 4C on Figure 4-4) 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 4-4) 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 4-4) will be accessed off Sarsfield Road and Irishtown and set back from the river to provide protection for the SAC.

4.3.5 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 Drawings 19105-JBB-XX-XX-DR-C-02805 to 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 S.I. 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 4-4) (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 4-4) 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.

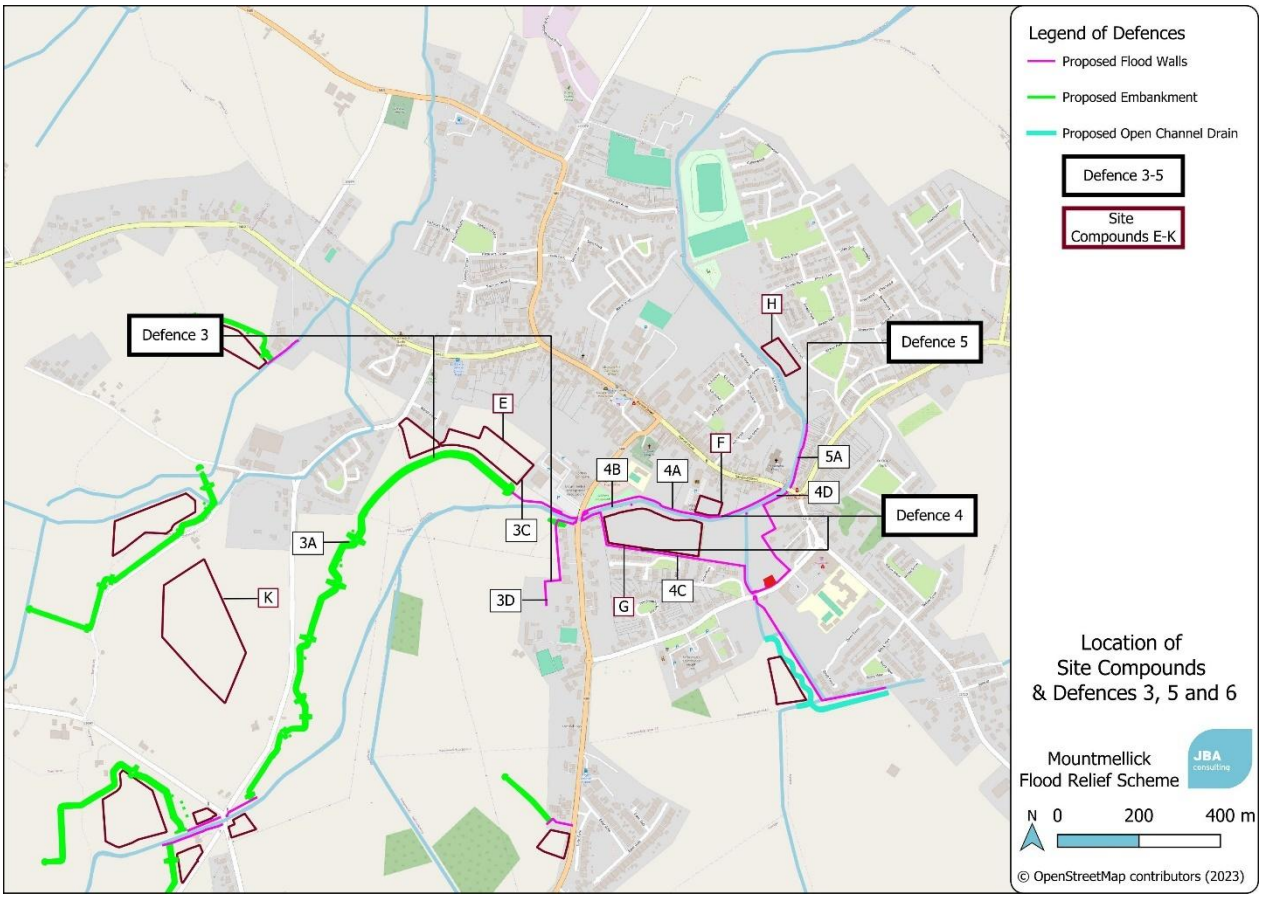


Figure 4-4: Defences 3, 4 and 5 including site compound locations

4.3.6 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 Drawings 19105-JBB-XX-XX-DR-C-02834 to 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 4-5) 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 4-5). 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 4-5) will be accessed off Manor Road and in the field close to the location for the embankment.

4.3.7 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 Drawing 19105-JBB-XX-XX-DR-C-02803 to 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 4-5) 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 4-5) (Wall Type 1 – In-situ 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 4-5) will be accessed off Wolfe Tone Street and in the field close to the location for the embankment.

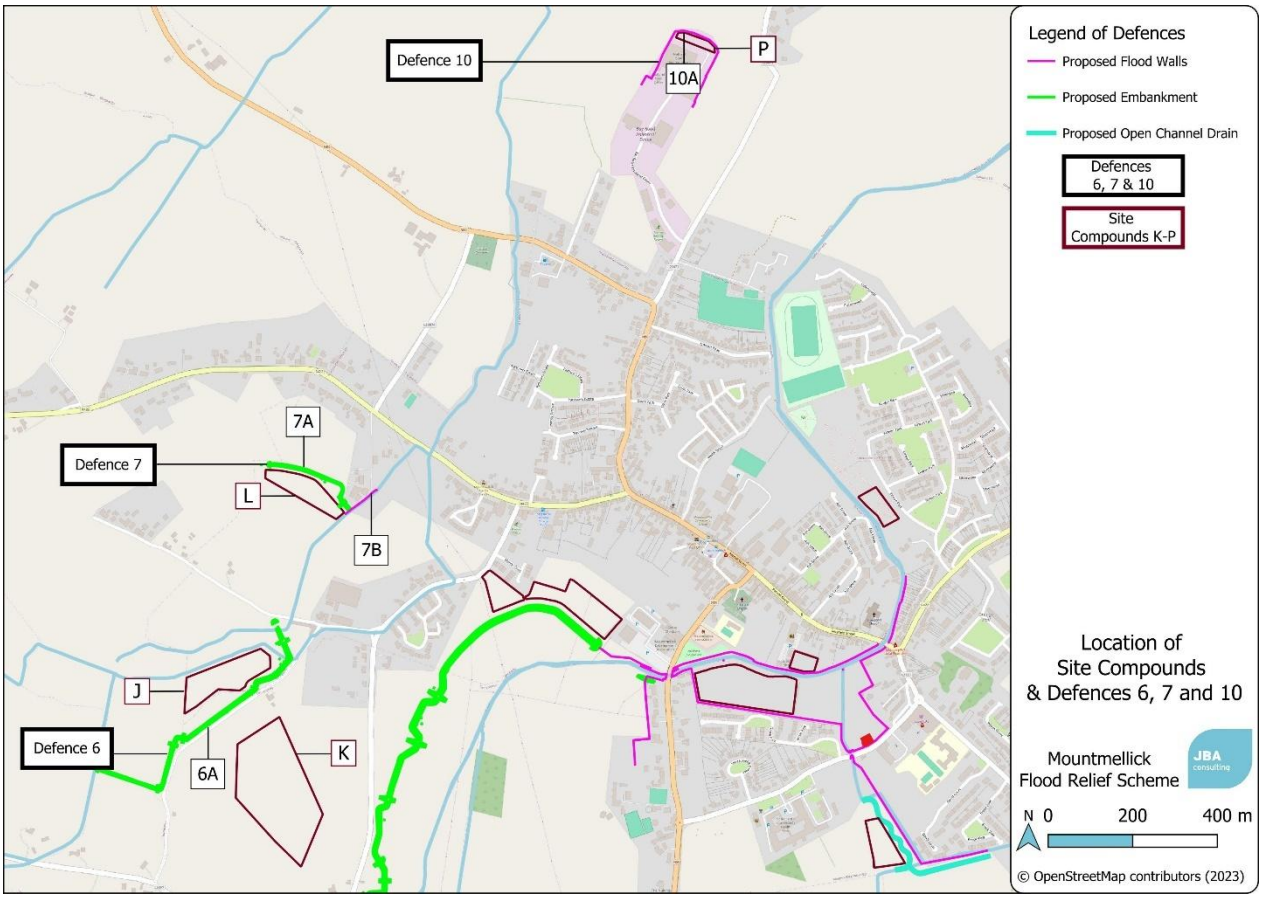


Figure 4-5: Defences 6, 7 and 10 including site compound locations

4.3.8 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 Drawings 19105-JBB-XX-XX-DR-C-02812 and 19105-JBB-XX-XX-DR-C-02814 to 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 4-6) (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 4-6) will be accessed off Irishtown and will involve removal of hedgerow.

4.3.9 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 Drawings 19105-JBB-XX-XX-DR-C-02839 and 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 4-6) (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 4-6) (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 4-6) will be accessed off N80 and will involve removal of hedgerow.

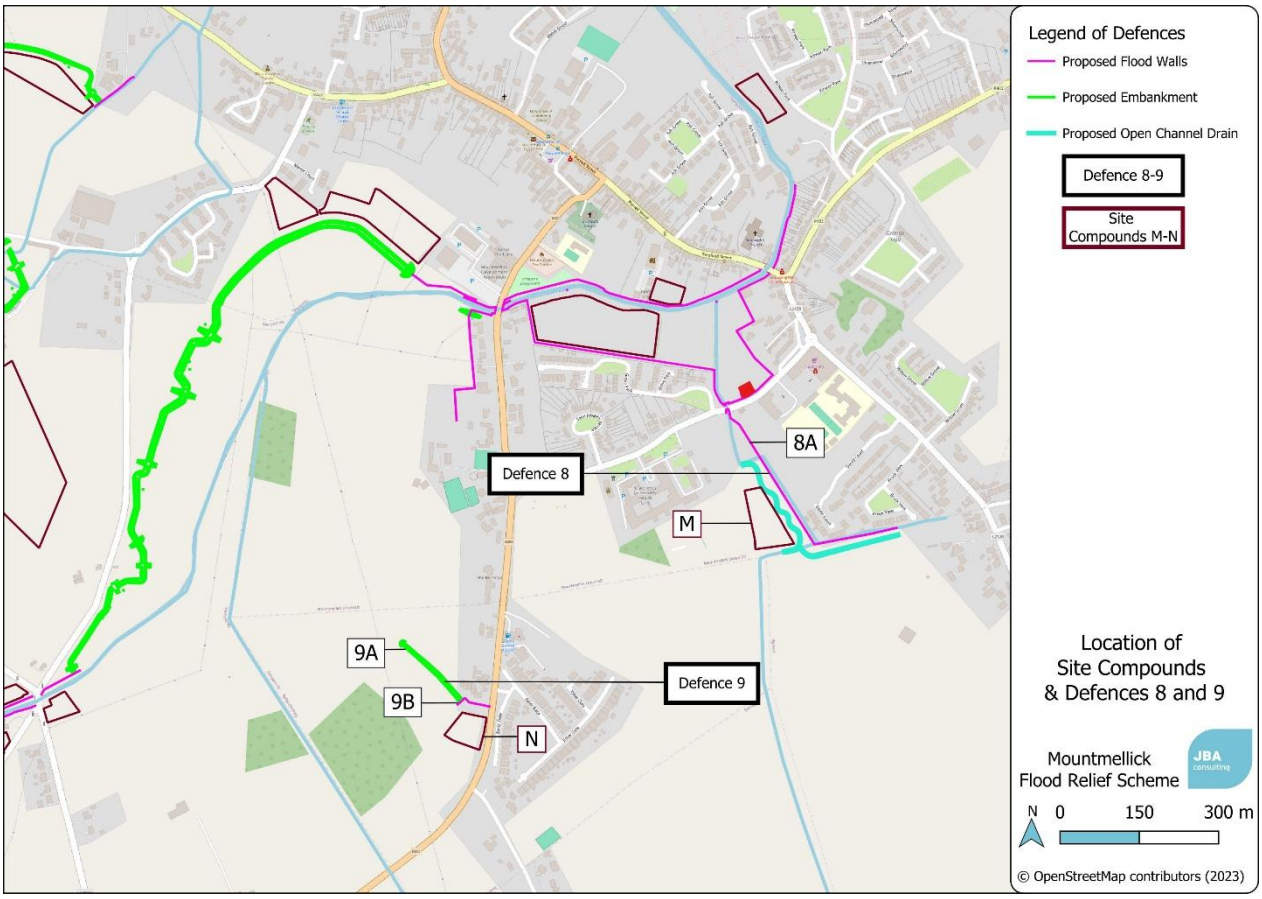


Figure 4-6: Defences 8 and 9 including site compound locations

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 Drawings 19105-JBB-XX-XX-DR-C-02801 and 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 4-5) (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 4-5) 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).

4.4 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.

4.4.1 Compound Locations

Proposed defences (Walls and Embankments), compound locations (A to P), and access points are shown in Figure 4-7.

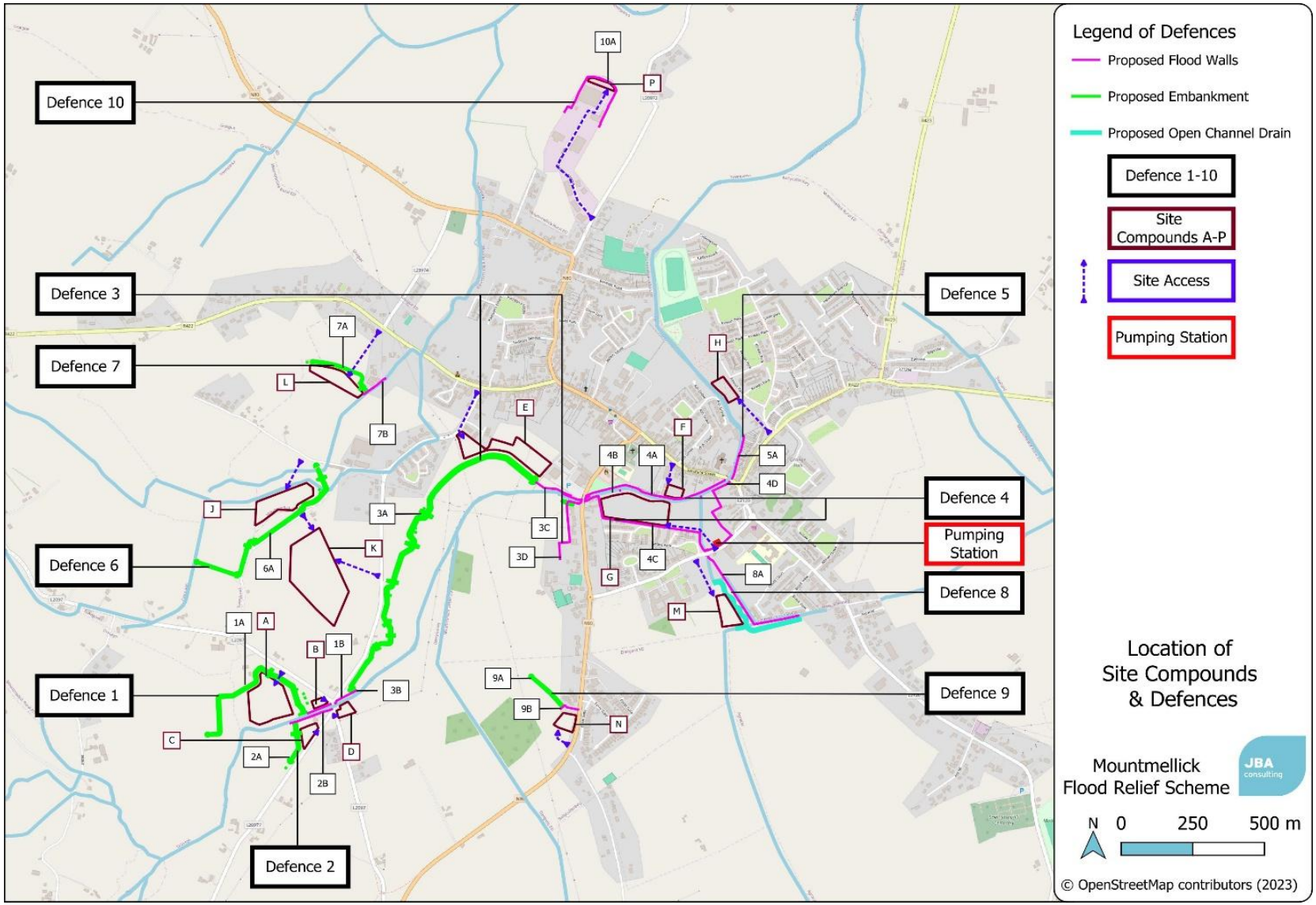


Figure 4-7: Construction defences, compound locations and access points

5 Consultation

5.1 Introduction

Consultation is an on-going part of the EIA process. There are two elements of consultation which take place prior to the submission of an EIAR: (i) Statutory Consultation on the EIAR Scoping Document and (ii) Public and Local Stakeholder Consultation on the Flooding History of the town, on Emerging Options for flood relief and on the Preferred Design.

The first avenue for consultation is to seek opinions and input from Statutory Consultees that have an interest or who may be affected by parts of the development, including government bodies and regulatory bodies. Non-governmental organisations and other relevant organisations were also contacted as part of this consultation process. These consultees were identified in the Scoping stage of the EIAR and were contacted as specified below. The second avenue is to consult with local residents, business owners, and locals who may be impacted by the development or any member of the public who has an interest in the proposed FRS. This was undertaken through Public and Local Stakeholder Consultation events held throughout the scheme process.

5.2 Statutory Consultation on EIAR Scoping Stage

In accordance with the EIA Directive (85/337/EEC) as amended in 2011 Directive (2011/92/EU) and 2014 Directive (2014/52/EU) under Article 6 and the Aarhus Convention, statutory and non-statutory bodies, local authorities, and relevant stakeholders must be consulted on the specific characteristics of the project and its likely impacts on the environment.

The EIAR requirements for consultation are defined in the EIA Directive (85/337/EEC) as amended in 2011 Directive 2011/92/EU and 2014 Directive 2014/52/EU under Article 6.

Article 6 (1)

Member States shall take the measures necessary to ensure that the authorities likely to be concerned by the project by reason of their specific environmental responsibilities are given an opportunity to express their opinion on the information supplied by the developer and on the request for development consent.

Statutory and non-statutory consultees were issued the EIAR Scoping Report via email and were asked to submit any comments, observations, or submissions in relation to the proposed scope and level of information to be included in the EIAR.

The list of consultees who were sent a copy of the EIAR Scoping Report are:

- An Taisce - The National Trust for Ireland;
- Bat Conservation Ireland;
- Birdwatch Ireland;
- Coillte;
- Dept. of Agriculture, Food, and Marine;
- Dept. of Environment, Climate and Communications;
- Dept. of Housing, Planning, and Local Government;
- Dept. of Transport, Tourism, and Sport (DTTAS);
- Environmental Protection Agency (EPA);
- Electricity Supply Board (ESB);
- Failte Ireland;
- Geological Survey Ireland (GSI);

- Health Service Executive (HSE);
- Inland Fisheries Ireland (IFI);
- Irish Environmental Network;
- Irish Heritage Trust;
- Irish Wildlife Trust;
- Laois County Council;
- Local Authorities Water Programme (LAWPRO);
- National Monuments Service;
- National Parks and Wildlife Service;
- National Transport Authority;
- Office of Emergency Planning;
- Office of Public Works (OPW);
- Sustainable Water Network Ireland (SWAN);
- Teagasc;
- The Heritage Council;
- Transport Infrastructure Ireland; and
- Uisce Éireann.

5.2.1 Statutory Consultation Responses to EIAR Scoping Report

Of the consultees contacted, the following responses were submitted (Table 5-1).

Table 5-1: List of responses received from EIAR Scoping Consultation

Consultee	Response	Response Date
Department of Housing, Local Government and Heritage – Development Applications Unit (DAU)	Email with letter detailing recommendations related to heritage assessment within the EIAR. Appendix 5.1 of Volume III	04/01/2024
Fáilte Ireland	Email with letter detailing recommendations regarding tourism and tourism related projects within the EIAR. Appendix 5.2 of Volume III	12/12/2023
Geological Survey Ireland (GSI)	Email with letter detailing publicly available GSI datasets that should be used to carry out the EIAR, and an accompanying list of dataset names and links. Appendix 5.3 of Volume III.	05/12/2023
Inland Fisheries Ireland (IFI)	Email with letter detailing recommendations relating to maintaining the ecological status of aquatic habitats that are included within the EIAR. Appendix 5.4 of Volume III.	15/12/2023
Uisce Éireann	Email with letter detailing recommendations with regard to water infrastructure for EIARs, and additional recommendations given at a later date following a review of submitted planning documents. Appendix 5.5 of Volume III.	21/11/2023 & 04/01/2024
Transport Infrastructure Ireland	Email with general guidance for the preparation of an EIAR, which may affect the national road network. Appendix 5.6 of Volume III	22/11/2023

Detailed responses from the EIAR Scoping Consultation are further summarised and addressed in Table 5-2, full responses are in Appendix 5.

Table 5-2: Detailed summary of EIAR Scoping Responses

Consultee	Summary of issues raised	How the issue is addressed in the EIAR
Development Applications Unit	It is advised that the Office of Public Works Project Archaeologist (PA) team is engaged with by the design team to advise on all aspects of this scheme from design, through EIAR compilation to construction.	The OPW Project Archaeologist team was engaged with and provided comment on all archaeological issues (Chapter 10).
	It is vital that Archaeology and Flood Relief Scheme guidelines, developed by the National Monuments Service, are followed to ensure the efficient planning and development of Flood Relief Schemes while protecting archaeological heritage. These guidelines outline how to integrate archaeological considerations into the design and construction processes and emphasising early-stage assessments and mitigation to minimise and avoid delays.	The Cultural Heritage of this EIAR (Chapter 10) has been guided by the methodologies and recommendations outlined in Archaeology and Flood Relief Scheme: Guidelines (NMS, 2023).
	The Cultural Heritage EIAR methodology should follow the steps as outlined in the DAU response. In summary these are: • Desk-based assessment • Geophysical surveys • Test excavations • Underwater archaeological impact assessment • Comprehensive buildings archaeology assessments of built heritage structures and features within the proposed development area, namely of the Owneass Bridge • Advance screening and monitoring	The Cultural Heritage chapter of the EIAR (Chapter 10) follows the prescribed methodology as outlined in the DAU response.
	All archaeological test-excavations, monitoring, and related activities (such as metal detection and dive/wade surveys) require specific licenses from the National Monuments Service and must follow approved method statements and health and safety regulations.	All archaeological test-excavations, monitoring and related activities were carried out under licence to the National Monuments Service, as per Chapter 10 of the EIAR.
	The results of the archaeological investigations should be included in the EIAR.	Results of the archaeological investigations are included in the Cultural Heritage chapter of the EIAR (Chapter 10).
Fáilte Ireland	Contributors to the EIAR regarding tourism-related projects should be experts in tourism. If a tourism project involves heritage or cultural components, input from heritage consultants, conservation architects, or historians may be required.	The Mountmellick Flood Relief Scheme is itself not a tourism-related project and so no tourism experts have been consulted for this project. Cultural heritage components of the scheme have been addressed in Chapter 10 of the EIAR, with input from heritage consultants.
	Key requirements for the EIAR should be considered in relation to tourism and tourism-related projects. These	The Mountmellick FRS is not a tourism-

	include: • Project description: Any tourism sensitivity receptors should be identified in the project description • Assessment of alternatives: Evaluate various reasonable alternatives, especially for location-dependent tourism projects • Baseline assessment: Highlight sensitive tourism resources, describe the area's tourism character and note the significance of tourism assets and activities • Impact assessment: Consider any impacts of the Flood Relief Scheme in relation to tourism under the mandatory EIA topics • Major accident and natural disaster: Tourism developments must describe their vulnerability to major accidents and natural disasters • Transboundary impact: Include transboundary impacts in the EIAR, especially for tourism projects involving international travel • Mitigation and monitoring: The hierarchy of minimisation should be followed o Avoid sensitive tourism resources o Reduce the adverse effects to tourism land uses and patterns of activities o Remedy any unavoidable significant residual adverse effects on tourism resources or activities	related project but Mountmellick town is a proposed Architectural Conservation Area. This is addressed in the Cultural Heritage chapter of the EIAR (Chapter 10).
Geological Survey Ireland	Proposed developments need to consider any potential impact on specific groundwater abstractions and on groundwater resources in general by referring to groundwater maps and the GSI Groundwater Data Viewer. This will help to identify any vulnerabilities relating to groundwater-surface water interactions.	GSI groundwater maps are referred to in the Water – Surface and Groundwater chapter of the EIAR (Chapter 9), where they are used to identify local groundwater vulnerabilities.
	Design of the Flood Relief Scheme will need to be conscious of Mountmellick Derrygile Public Water Supply which has zones of contribution and source protection areas close to the study area, to prevent ingress of runoff to the aquifer. Appropriate mitigation measures, such as SUDS, should be undertaken. The effects of any potential contamination of the Public Water Supply should be assessed, due to its proximity to the scheme.	The Mountmellick Derrygile Public Water Supply falls outside the study area for the Flood Relief Scheme.
	A robust assessment should be undertaken to identify groundwater abstraction sites in the locality, including a survey of all current wells and water abstractions within the vicinity.	Groundwater vulnerability is addressed in the Water – Surface and Groundwater chapter of the EIAR (Chapter 9).
	Consider geohazards, such as landslides and flooding, especially when developing in risk prevalent areas, and refer to GSI datasets and resources (e.g. Landslide Susceptibility Map).	The risk of geohazards within the Flood Relief Scheme area are identified and considered in the Land and Soil chapter of the EIAR (Chapter 8).
	Areas of high to very high source aggregate potential within the Flood Relief Scheme area should be identified using GSI's Aggregate Potential Mapping viewer. Mapping viewers should also be used to ensure that natural resources used within the Flood Relief Scheme are sustainably sourced from properly recognised and licensed facilities.	The nearest source of fill material will be from a licenced soil recovery facility within Co. Laois. Excavated material will be sent to any of seven licensed sites within Co. Laois that have been sourced and have the capacity to receive unsuitable material.
Inland Fisheries Ireland	An integrated, catchment-based approach to flood mitigation and flood management is recommended. IFI request that this scheme includes habitat restoration works to offset the immediate works area that incorporates the	Detailed liaison has taken place with IFI and specific changes have been appropriately

	catchment areas upstream of Mountmellick. Among works which can be considered are the removal of barriers, the re-meandering of watercourses, and the restoration of their lateral and longitudinal connectivity. Reconnecting floodplains (lateral connectivity) increases natural flood storage and reduces the speed at which waters arrive at vulnerable sites downstream.	addressed in the FRS. See Table 5-4 below.
	The study should consider the protection of vulnerable flood areas for recreational and amenity use rather than development, for example as recommended by IFI's Planning for Watercourses in the Urban Environment (2020).	The FRS has allowed for reconnection of two areas of flood plain as detailed in further communication in Table 5-4.
	The proposed surveys and reports of the Flood Relief Scheme must demonstrate how this project would cause no deterioration to surface water bodies located within the scheme area (Triogue_040, Owenass_020, Barrow_040) and is consistent with their restoration to good ecological status, as per Article 5 and Article 28(2) of the Surface Water Regulations (SI 272 of 2009).	Mitigation measures to prevent any deterioration to surface water bodies located within the scheme area are outlined in the Water – Surface and Groundwater chapter of the EIAR (Chapter 9).
	IFI requests the following assessments be provided: • Baseline ecological assessments of water courses potentially affected by the proposed development, including fish species as well as other biological and physico-chemical surveys • Maps of all aquatic habitats potentially affected by the project, including all drainage channels (temporary and permanent) potentially impacted by the proposed development • An assessment of the potential adverse effects of the proposed works on all relevant aquatic receptors, including fish. Assessments should cover area of the proposed development and the potential upstream and downstream impacts • An assessment of the cumulative effects of the proposed development along with other existing or approved projects • An assessment of the impact on the conservation objectives of species listed as qualifying interests in the Barrow – Nore SAC, which includes Lamprey species and Atlantic Salmon • The proposed mitigation measures to prevent erosion from soil disturbance in excavation areas and areas where there is significant movement of plant and machinery	All listed assessments are addressed and included in the Biodiversity chapter of the EIAR (Chapter 7).
	During the construction and operational phases, the applicant should adhere to the recommendations and guidelines outlined in IFI's Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters 2016.	The IFI's Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters 2016 has guided the formation of the Biodiversity chapter of the EIAR (Chapter 7).
	Instream works may only take place during the period 1 July to 30 September. There should be no interference with the bed, gradient, profile or alignment of watercourses without prior notification and the agreement of Inland Fisheries Ireland. Natural flow paths should not be interrupted or diverted in a manner that would increase the risk of erosion.	All in-stream works will be conducted between July and September inclusive as per IFI recommendations.
	Proposed instream works must be accompanied by a site-specific method statement provided to IFI. The applicant should provide a commitment to provide these at least ten working days before works commence. Written approval from IFI should be obtained before works proceed.	Method statement for the proposed instream works will be provided to the IFI in advance of the works commencing.
	Where existing water crossings must undergo alteration, IFI request that these crossings are upgraded in the interests of habitat improvement and biodiversity enhancement. Crossings should be designed to meet IFI's Fisheries Construction Guidelines referred to above. IFI also recommends that the applicant refer to the OPW's	One bridge upgrade is included in the FRS and will be constructed in accordance with IFI Guidelines, see detailed communication

	Design Guidance For Fish Passage On Small Barriers (2021). IFI should be consulted at the design stage for any new crossings or alterations to existing crossings.	in Table 5-4.
	At all times the precautionary principle should be applied throughout the development. Particular attention should be paid to the various environmental directives including the Water Framework Directive, the Habitat and Birds Directives, the Fisheries Acts and the Local Government (Water Pollution) Acts. Other environmental legislation should be considered as appropriate.	The precautionary principle has been applied across the development, with reference to any environmental directives or legislation.
	Provision should be made for the appointment of a suitably qualified Project Environmental Manager and Ecological Clerk of Works.	All of the works and mitigation measures will be monitored by a suitably qualified Environmental Clerk of Works (ECoW) during the construction period, with findings reported to the competent authority.
	Records should be kept of biological and chemical monitoring of undertaken for the development. Records should also be kept of inspections of proposed surface water mitigation measures. These records should be made available upon request to any authorised person as defined under the Local Government (Water Pollution) Acts.	To determine the effectiveness of proposed measures, the site will be monitored prior to, during and for at least 5 years post construction (Ref Chapter 7). A copy of all data on species will be uploaded to the National Biodiversity Data Centre within 4 weeks of a survey being carried out, and all data will be made available in a public repository, in line with the Open Data Directive. All monitoring of proposed surface water mitigation measures is outlined in the Water – Surface and Groundwater chapter (Chapter 9) as well as the accompanying CEMP.
Uisce Éireann – Response to EIAR Scoping	Measures taken to mitigate any potential impact to Uisce Éireann Drinking Water Sources during the construction or operational phase of development will be provided to Uisce Éireann. Hydrological/hydrogeological pathways between the Flood Relief Scheme area and receiving waters should be identified as part of the report.	Services at the Clontygar Stream will be diverted. Water main services are located at the southwestern corner of the site, feeding water to Brock View estate. Between Owenass Bridge and Mountmellick Mill Bridge, the Existing Uisce Éireann Pumping Station adjoining the Mountmellick Development Association will be protected. The above ground structure may be removed as accommodation works to facilitate sheet piling from the riverbank if this were the selected contractor method. Hydrological and hydrogeological pathways between the Flood Relief Scheme area and receiving waters are identified in the Water –

		Surface and Groundwater chapter of the EIAR (Chapter 9).
	Where the development proposes the backfilling of materials, a waste sampling strategy to ensure the material is inert is to be included.	A waste sampling strategy is included in Chapter 6 of the CEMP (Soils and Geology).
	Mitigations should be proposed for any potential adverse impacts on any water source(s) which may be in proximity and included in the environmental management plan and incident response.	Mitigation measures to prevent any potential adverse impacts on any water sources which may be in proximity to the Flood Relief Scheme area are outlined in the Water – Surface and Groundwater chapter of the EIAR (Chapter 9).
	Any and all potential impacts on the nearby reservoir as public water supply source(s) should be assessed, including any impact on hydrogeology and any groundwater/surface water interactions.	The public water supply source falls outside the study area for the Flood Relief Scheme. Groundwater vulnerability is addressed in the Water – Surface and Groundwater chapter of the EIAR (Chapter 9).
	Impacts of the development on the capacity of water services (i.e., do existing water services have the capacity to cater for the new development). This is confirmed by Uisce Éireann in the form of a Confirmation of Feasibility (COF). If a development requires a connection to either a public water supply or sewage collection system, the developer is advised to submit a Pre-Connection Enquiry (PCE) enquiry to Uisce Éireann to determine the feasibility of connection to the Irish Water network. All pre-connection enquiry forms are available from https://www.water.ie/connections/connection-steps/.	This does not apply to this type of development as there is no added strain to be put on this network.
	The applicant shall identify any upgrading of water services infrastructure that would be required to accommodate the proposed development.	A pumping station on Davitt Road, is proposed as part of the scheme, see project description in Chapter 4 (Description of Proposed Development).
	In relation to a development that would discharge trade effluent – any upstream treatment or attenuation of discharges required prior to discharging to an Uisce Éireann collection network.	No discharge of trade effluent is required.
	In relation to the management of surface water; the potential impact of surface water discharges to combined sewer networks and potential measures to minimise and or / stop surface waters from combined sewers.	No surface water discharges to combined sewers are required.
	Any physical impact on Uisce Éireann assets – reservoir, drinking water source, treatment works, pipes, pumping stations, discharges outfalls etc. including any relocation of assets. When considering a development proposal, the applicant is advised to determine the location of public water services assets, possible connection points from the applicant's site / lands to the public network and any drinking water abstraction catchments to ensure these are included and fully assessed in any pre-planning proposals. Other indicators or methodologies for identifying infrastructure located within the applicant's lands are the presence of registered wayleave agreements, visible manholes, vent stacks, valve chambers, marker posts etc. within the proposed site.	The Owenass Bridge to Mill Bridge area, next to Mountmellick Development Association on the north bank, will require the construction of a flood defence wall near the Uisce Éireann pumping station. As part of the accommodation works, the above ground structure may be temporarily removed (confirmation during Detailed Design Stage) to accommodate installation of the flood defence wall. The flood relief scheme itself benefits the pump station through reducing flood risk upon completion of the works. This

		has been assessed in the Material Assets chapter of the EIAR (Chapter 12). No other physical impact on UÉ assets is expected.
	Any potential impacts on the assimilative capacity of receiving waters in relation to Uisce Éireann discharge outfalls including changes in dispersion / circulation characterises. Hydrological / hydrogeological pathways between the applicant's site and receiving waters should be identified within the report.	The water environment including hydrological and hydrogeological pathways has been assessed in Chapter 9. This chapter outlines mitigation measures for the protection of water.
	Any potential impact on the contributing catchment of water sources either in terms of water abstraction for the development (and resultant potential impact on the capacity of the source) or the potential of the development to influence / present a risk to the quality of the water abstracted by Uisce Éireann for public supply should be identified within the report.	The water environment including water abstraction has been assessed in Chapter 9. This chapter outlines mitigation measures for the protection of water, including water sources. No water abstraction is required for the proposed development.
	Where a development proposes to connect to an Uisce Éireann network and that network either abstracts water from or discharges wastewater to a "protected"/ sensitive area, consideration as to whether the integrity of the site / conservation objectives of the site would be compromised should be identified within the report.	No connection from the Uisce Éireann network to a protected or sensitive area is proposed.
	Mitigation measures in relation to any of the above ensuring a zero risk to any Uisce Éireann drinking water sources (Surface and Ground water).	Mitigation measures are included in relation to the above in Chapter 9 and Chapter 12.
Uisce Éireann – Further considerations to be addressed as part of the Formal Planning Application	**Build Over/Diversions** The proposed works associated with Defences 3, 5 and 8 appear to traverse or are in close proximity to existing Uisce Éireann infrastructure. Where building near / building over / diversions of existing UÉ assets are proposed, the associated designs need to be agreed with the Diversions team in UÉ and where appropriate an associated Build Over Agreement / Diversion Agreement executed between the applicant and UÉ Further details on the process to be followed are outlined on the UÉ website at https://www.water.ie/connections/developer-services/diversions/. An associated application form can be downloaded from this location, and it should be submitted, along with associated design drawings, to diversions@water.ie. Design proposals are required to be in accordance with UÉ Standard Details and Codes of Practice. There are a number of wastewater pumpstations and treatment plants in close proximity to the FRS works. The EIAR must be updated to identify any impacts and mitigation measures in order to ensure no impacts to Uisce Eireann's assets. Noting there are stormwater overflows from two pumping stations (Irishtown and Connolly Street WWPS) to the watercourse. The introduction of flood defences that will interact with these discharge points need to be discussed with and agreed to by Uisce Eireann. Details of public water services assets, where known, can be obtained by emailing an Ordinance Survey map identifying the proposed location of your intended development to datarequests@water.ie. Other indicators or methodologies for identifying infrastructure located are the presence of registered wayleave agreements, visible manholes, vent stacks, valve chambers, marker posts etc. within the proposed development area. Any physical impact on UÉ assets – drinking water source, treatment works, pipes, pumping stations, discharges outfalls etc must be determined. This includes any potential increase or decrease to the level of overburden on	The proposed development has been designed in accordance with the requirements as outlined. Where required, consultation will take place with Uisce Éireann prior to works proceeding.

	assets as well as the impact of any changes in river levels on stormwater overflows, WWTP outfalls, WTP intake, etc.	
	Surface Water Discharge The EIAR must outline the potential impact of existing surface water discharges to combined sewer networks & potential measures to minimise/stop surface waters inflow to combined sewers. The removal of surface water from combined networks frees capacity for foul drainage from new developments, supporting the achievement of compact growth objectives set out in the National Planning Framework. Uisce Éireann will not accept new surface water discharges to combined sewer networks. The provision of Blue Green infrastructure/ SUDS is encouraged.	The proposed development has been designed in accordance with the requirements as outlined.
Transport Infrastructure Ireland	Consultations should be had with the relevant Local Authority/National Roads Design Office with regard to the locations of existing and future national road schemes in the area.	Consultation has taken place with LCC Roads Department throughout the scheme development. No National Road will be required to be altered as part of the proposed development.
	Potential significant impacts the development would have on the national road network (and junctions with national roads) in the proximity of the proposed development should be assessed, i.e., the N80 national road.	Potential impacts on the road network during construction stages have been assessed in the Material Assets chapter of the EIAR (Chapter 12).
	Potential visual impacts from existing national roads should be assessed.	Potential visual impacts from nearby receptors including the road network are assessed in the LVIA chapter of the EIAR (Chapter 11).
	The developer should have regard to any Environmental Impact Assessment Report/Statement and all conditions and/or modifications imposed by An Bord Pleanála regarding road schemes in the area. The developer should, in particular, have regard to any potential cumulative impacts.	Potential cumulative effects have been assessed in each chapter by the relevant chapter author and are collated in Chapter 15.
	The developer, in conducting Environmental Impact Assessment, should have regard to TII Publications (formerly DMRB and the Manual of Contract Documents for Road Works).	Noted, the design of the replacement Owenass Bridge (on Derrycloney Road) has been designed in accordance with TII standards.
	The developer, in conducting Environmental Impact Assessment, should have regard to TII's Environmental Assessment and Construction Guidelines, including the 'Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes' (National Road Authority (NRA), 2006).	Air Quality has been assessed in Chapter 13, Construction Impacts. The methodologies used in the assessment of air quality are up to date best practices.
	The EIAR should consider the 'Environmental Noise Regulations 2006 (SI 140 of 2006)' and, in particular, how the development will affect future action plans by the relevant competent authority. The developer may need to consider the incorporation of noise barriers to reduce noise impacts (see 'Guidelines for the Treatment of Noise and Vibration in National Road Schemes' (1st Rev., NRA, 2004)).	Noise Impacts have been assessed in Chapter 13, Construction Impacts. The methodologies used in the assessment of noise are up to date best practices.
	Where new structures may be proposed on national roads, the developer is reminded of the requirements of TII Standard: 'Technical Acceptance of Road Structures on Motorways and Other National Roads'. This Standard specifies the procedures to be followed in order to obtain Technical Acceptance for structures on motorway and other national road schemes and for the submission of as built records. The procedures cover the design of all road	The N80 national secondary road passes through Mountmellick town. No new structures are proposed on the N80

	structures, including bridges, tunnels, subways, culverts, buried corrugated steel structures, retaining walls, reinforced earth structures, gantries, environmental noise barriers and temporary structures under or over motorways or other roads carrying public traffic.	road.
	The developer should also be aware that there are Technical Acceptance requirements relating to the assessment, alteration, modification, strengthening and repair of all existing road structures (national roads) and same shall be agreed with the Bridge Management Section of TII. In that regard, although TII has not identified any national road structures within the Scheme Area, however, there are a number of structures on the nearby M7 Motorway: • Structure ID: LS-N80-008.00 (Mountmellick Culvert) • Structure ID: LS-N80-009.00 (Mountmellick Bridge) • Structure ID: LS-N80-010.00 (Moll Rowe's Corner Bridge)	Noted. The Design Team has been made aware of these guidelines and these structures.
	A hydraulic analysis should be undertaken to identify the impact of proposed flood alleviation works on the hydraulic capacity of any TII Structures impacted and the potential for scour at the structure. An assessment of scour and other hydraulic actions on national road structures in accordance with UK BD 97/12 should be undertaken where necessary. Scour prevention measures will be required if the assessment illustrates the potential for scour beneath the foundations.	Hydraulic analysis and scour potential has been carried out and assessed throughout the design phase of the scheme. Scour prevention measures were not found to be required as part of the design of the scheme.
	It would be important that, where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment (TTA) be carried out in accordance with relevant guidelines, noting traffic volumes attending the site and traffic routes to/from the site, with reference to impacts on the national road network and junctions of lower category roads with national roads. TII's 'Traffic and Transport Assessment Guidelines' (2014) should be referred to in relation to proposed development with potential impacts on the national road network. The scheme promoter is also advised to have regard to Section 2.2 of TII's TTA Guidelines, which addresses requirements for sub-threshold TTA.	TII's 'Traffic and Transport Assessment Guidelines' (2014) have been assessed as part of Chapter 12 Material Assets. It has been concluded that the proposed development does not meet the appropriate thresholds and criteria, and so a TTA has not been prepared. Potential impacts related to traffic are included in Chapter 12.
	The designers are asked to consult TII Publications to determine whether a Road Safety Audit is required.	Chapter 12 addresses the construction-related traffic and the routes affected. This comment has been forwarded for inclusion in the site-specific Construction Management Plan (CMP).
	In the interests of maintaining the safety and standard of the national road network, the EIAR should identify the methods/techniques proposed for any works traversing/in proximity to the national road network.	Chapter 12 addresses the construction-related traffic and the routes affected.
	In relation to haul route identification, the applicant/developer should clearly identify haul routes proposed and fully assess the network to be traversed. Where abnormal loads are a feature of the proposed development, separate structure approvals/permits and other licences may be required in connection with the proposed haul route and all structures on the haul route should be checked by the applicant/developer to confirm their capacity to accommodate any abnormal load.	The proposed haul routes for each phase of construction have been identified as part of Chapter 12. No abnormal loads are required as part of the proposed development.

5.3 Public and Local Stakeholder Consultation

5.3.1 Ongoing Consultation

Comprehensive communication and engagement plans have been developed and adopted by the team, including the development, and maintenance of a project website, direct emails, newsletters, local media, and public consultation among other approaches as listed in Table 5-2 Mountmellick FRS Communication and Consultation Approaches.

Key elements of the project include the establishment of social media forums, such as a Facebook project page and website. The purpose of the social media accounts is to maintain communication flow and provide updates for all interested stakeholders that have access to it; it can be a faster and more efficient way to keep the public informed of the progress of the project and is already established as a method of communication amongst community groups in the town.

Table 5-3: Mountmellick FRS Communication and Consultation Approaches

Communication Activity	Details and Purpose
Project website	www.mountmellickfrs.ie Promoted and provided information to stakeholders about the project. It provided a source of information that stakeholders and members of the public can download and review. It gave a means of consultation and allows stakeholders to ask questions or submit information.
Direct email	Where stakeholders have supplied their contact details, we notify of project updates, invitations to consultation events via email. Statutory consultees were also notified of the commencement of the project and of the consultation events.
Social Media	Facebook page was established alongside the website to reach residents and community groups. This page is updated with key project stages and used as a rapid reach tool, supporting the website.
LCC website	News headlines, links to project website, publicise consultation events.
Local Media TV, radio, newspapers, magazine or publications	Press releases were prepared in advance of public meetings and distributed to the media. Media was monitored periodically for news and articles relating to the scheme.
Local community publications such as parish newsletters	Press releases were prepared in advance of public meetings and distributed to local community groups, churches etc.
Public Engagement Days / workshops - held at a community venue.	Consultation exhibitions / events offered a more extensive and open form of engagement on a personal basis. They provided opportunities for members of the public to express views on the consultation subject area, ask questions, take on board the information at their leisure, discuss any concerns, provide a view and receive feedback on the issues they raise.
Community groups and forums	Community groups provide opportunities to reach a wider community. Meetings were used as an opportunity to promote a project event.
Council meetings	Council meetings provided opportunities to promote the study and website via meetings and newsletters. Engagement with elected members also allowed for promotion of the scheme and engagement events within the wider community.
Telephone calls and direct messages	Where a relationship with an interested party has been formed, phone calls and text messages were used to provide short updates or seek feedback on specific aspects of the project.

5.3.2 Public Engagement Day

Shortly after project commencement, the first Public Engagement Day (PED) event was held in Mountmellick with the aim of meeting with stakeholders that may be directly or indirectly affected by the FRS. The goal of the event was to find out more about the flooding history of the town, elicit early opinions and to start to build a relationship with members of the local community. The event was open to any and all interested parties.

The PED took place on 13 November 2019 and ran from 3pm to 8pm. It was held at the Mountmellick Development Association (MDA), Irishtown, Mountmellick. The event was set-up in a drop-in format, the exhibition room had information stands and posters, a registration table, one-to-one and small group discussions, and questionnaires to be completed or taken away for later submission. Due to an early influx in attendees, a presentation was also given, providing an overview of the stages and aims of the scheme.

The promotion of the public consultation workshop was carried out through various means such as posters, social media, traditional media (newspaper, radio), leaflet drop and word of mouth.

Nearly 100 people attended the event, with 26 questionnaires returned either on the day, or subsequently to the JBA office. The feedback provided on the day, and in following conversations, has been useful in developing the flood relief scheme. There was a lot of genuine interest in the works, and particularly in the timeline for construction. However, the feeling from most attendees was that a solution was needed, and there were concerns about what would happen until the scheme was finished. Calls for river maintenance were widely heard. There was also a lot of discussion of flooding from the combined system, with a number of attendees reporting this is the mechanism that caused flooding, rather than the river directly.

There was also a good representation from residents outside Mountmellick, particularly in Derrycloney, many of whom nearly flooded in 2017 and were concerned about the impact of a scheme on future flooding.

The forestry practices in the Slieve Blooms were widely discussed and were thought by some attendees to have exacerbated runoff over recent years.

5.3.3 Emerging Options Engagement Event

A second engagement event was held in April 2021. Due to COVID-19 restrictions, this event was held on-line with a virtual meeting room set up as part of the project website. As with the PED, the event was promoted through the traditional media, social media (Facebook and website) an extensive paid-for leaflet drop, posters in the town and word of mouth, particularly following a briefing of elected members prior to the event launch.

The event was launched on 16 April 2021 and ran officially until 10 May 2021, although submissions via email and phone were received for some time after this date.

As well as a video presentation and documents available within the meeting room, there were opportunities for interested parties to return a questionnaire or request a follow up call / Teams meeting to discuss particular areas of interest.

5.3.4 Public Information Day

The Public Information Day (PID) took place on 12 September 2023 and ran from 3pm to 8pm. It was held at the Mountmellick Development Association (MDA), Irishtown, Mountmellick. The purpose of the event was to inform the public about the preferred option – how it was developed, why it was chosen and the impact it would have on flood risk in the town and the area upstream of the town. event was set-up in a drop-in format, the exhibition room had information stands and posters, a registration table, one-to-one and small group discussions, and questionnaires to be completed or taken away for later submission.

The promotion of the public consultation workshop was carried out through various means including a newsletter, the scheme website, press release, social media, radio and word of mouth. 88 people attended the event, with 16 questionnaires returned either on the day, or subsequently to the JBA office. In addition, ten members of the project Design Team were present at the event (three from JBA, two from JBB, three from LCC

and two from OPW) to discuss the project on a one-to-one basis with the attending public. This resulted in a further 21 issues being raised.

The display materials used at the event were uploaded to the project website, www.mountmellickfrs.ie immediately following the event. The feedback provided on the day is to be used in developing and finalising the preferred option of the flood relief scheme and progressing into Stage 2 - Planning.

5.4 Statutory Consultation during the EIAR

Additional consultation took place during the EIAR (2023 to 2024) to discuss the results of survey work, potential impacts and proposed mitigation. This is summarised in Table 5-4.

Table 5-4: Consultation during EIAR 2023-2024

Date /Consultee	Comment Received	Addressed in EIAR
20-11-2023 **DAU/ NPWS/ NMS letter**	DAU/NPWS/NMS letter received 20-11-2023, recommending a meeting to agree methodology. Follow up meeting held with DAU 20th December 2023.	Chapter 7 Biodiversity and Chapter 10 Cultural Heritage
15-12-2023 **IFI letter**	Inland Fisheries Ireland (IFI) letter received 15-12-2023- IFI requested that the following assessments be provided: ▪ Baseline ecological assessments of water courses potentially affected by the proposed development, including fish species as well as other biological and physio-chemical surveys ▪ Maps of all aquatic habitats potentially affected by the project, including all drainage channels (temporary and permanent) potentially impacted by the proposed development ▪ An assessment of the potential adverse effects of the proposed works on all relevant aquatic receptors, including fish. Assessments should cover area of the proposed development and the potential upstream and downstream impacts ▪ An assessment of the cumulative effects of the proposed development along with other existing or approved projects ▪ An assessment of the impact on the conservation objectives of species listed as qualifying interests in the Barrow – Nore SAC, which includes Lamprey species and Atlantic Salmon ▪ The proposed mitigation measures to prevent erosion from soil disturbance in excavation areas and areas where there is significant movement of plant and machinery	Chapter 7 Biodiversity
Date /Consultee	**Comment Received**	**Addressed in EIAR**
21-12-2023 **Meeting with NPWS re EIAR mitigation**	Key points of meeting: Fisheries ▪ DAU ask for clarification on assume fish spawning season and requested Lamprey survey also be considered. (meeting held with IFI on 08-02-2024) ▪ JBA stated that LCC Active Travel would be interested in widening any paths to allow for improved access and cycling along the river. DAU preferred that any new paths be diverted away from 10m riparian strip and if future paths could be rerouted behind the proposed embankments as per Ref IFI 'Urban Watercourse Planning Guide'. ▪ DAU prefer the disturbed riparian strip to be left to re-naturalise rather than be planted or have bulbs sown e.g. by the Tidy towns.	Chapter 7 Biodiversity Meeting minutes in Appendix 5.7

	▪ DAU requested that any derogation licences be applied for prior to planning. JBA stated that no bats had been found at Owenass Bridge, no bats noted during emergence surveys, but proposed bridge will have bat bricks incorporated and a mammal tunnel in abutment. Invasive species ▪ Invasives are currently being managed on site. There are 2 areas of Japanese Knotweed: in between Mill Bridge and Convent Bridge and upstream of Mill Bridge, it is understood the further treatment will take place in early 2024. Treatment will continue over next 18 months until the construction period commences. Additionally, Montbretia and Three-cornered Garlic are also present. Defences Flood walls ▪ DAU requested biodiversity survey results, and later EIAR Biodiversity chapter and NIS to be sent for comment prior to planning submission to agree mitigation strategy. Embankments ▪ DAU asked where source of fill material for proposed embankment will come from. RB clarified that the client is sourcing it over next 18 months from various local development sites and stored at an existing landfill site to the south of Mountmellick. ▪ Finish to embankments to be natural grass not mown grass, no tree or hedgerow planting permitted due to the need to inspect the embankment for any defects. A local wildflower mix to be used and if possible, to include sand patches rather than grass on south facing slopes for solitary bees. ▪ At the bottom of the embankment there will be a 5-10m temporary access strip to allow for inspection of the embankment toe drain, then a fence.	
Date /Consultee	**Comment Received**	**Addressed in EIAR**
21-12-2023 **Public Consultation** **Communication from January 2024 to April 2024 and again in August 2025**	Derrycloney Residents Letter from residents in the area south of the Owenass Bridge and north of Derrycloney Bridge. The Owenass river flows north-west of this community. At present, when the Owenass overflows it floods the land to the north-west, away from their homes. The proposed flood relief scheme will see barriers erected to prevent this, preventing the river from taking its natural course and creating a new flood plain towards their homes. Concerns as all of their properties are within 200 meters of the unprotected side of the river, the new flood plain, while all the emphasis is being placed on protecting properties 700 meters away. Requested meeting with Design team and LCC. Laois County Council (LCC) provided letters of response on 23rd January 2024 and 28th March 2024 to the queries raised by the Derrycloney residents group. In response to these letters addressing queries raised, the residents replied to LCC on the 20th April 2024 highlighting more questions, and perceived inconsistencies in data provided previously supplied by the council. To progress the discussion and clarify a number of points a meeting was held between the Derrycloney residents, members of LCC, and JBA Consulting on the 15th May 2024 to discuss the points raised in	Scheme Design Chapter 4

	the letter of the 20th April 2024. The meeting was constructive with many of the points raised clarified or points where further information needed to be provided noted. A separate Note dated 8th August 2025 was produced for the residents responding to further points.	
18-01-2024 **Meeting with NMS re. EIAR mitigation**	Key points of meeting: Methodology ▪ JBA/CD explained that the work has been steered by the 'Archaeology and Flood Relief Schemes: Guidelines' (NMS 2023) ▪ Owenass Bridge and environs ▪ DAU asked for clarification if Owenass Bridge had been assessed for retention ▪ DAU asked what upstream measures had been considered to avoid the removal of the bridge ▪ DAU asked that a Conservation Architect join the team to advise on the design of the replacement Owenass Bridge and be allowed to work with structural engineer on the design options. ▪ DAU also not yet satisfied that all alternatives have been explored and identified, needs a review of the project Options Report or the part of the report dealing with flood options at that area. ▪ DAU would like to see the scale and character of the historic cottage to the north in relation to the new bridge and if there are any Mill buildings around this focal point ▪ Convent Bridge area ▪ DAU stated that the Convent Bridge area also needs an integrated design solution to achieve and retain its heritage setting. It would benefit from input by a Conservation Architect. ▪ DAU stated that the town of Mountmellick is under researched, and it may be a 16th Century Bastian town and garrison close the convent and possible historic wall remains within the right-hand bank. ▪ DAU asked if the Convent graveyard would be affected by the flood scheme. ▪ DAU asked for the scope of the Underwater survey to confirm which riverbank would be surveyed. ▪ DAU also asked that any it be recommended that any demolitions in the town have natural stone reserved for the proposed flood walls.	Chapter 10 Cultural Heritage Meeting minutes in Appendix 5.8
Date /Consultee	**Comment Received**	**Addressed in EIAR**
08-02-2024 **Meeting with IFI**	Key points of meeting ▪ Project aim - to provide flood relief for Mountmellick principally from Owenass and Pound Rivers. Proposed defences would be walls and earth embankments plus bridge replacement at the Owenass River in the south of the scheme. The work would comprise limited working within the rivers, the work will mostly be from the bankside. ▪ Key watercourses - River Barrow and River Nore SAC [002162] is within study area. JBA discussed that some of the works would be in the SAC and the qualifying interests. Direct impacts and works within the SAC discussed. ▪ IFI asked about the hydromorphological extent of the scheme and if any natural measures (NbS) were considered. JBA stated that the scheme Options Report considered a range of NbS but that none provided sufficient storage for scheme. The EIAR which would form part of the planning submission includes a summary of the Option process. ▪ IFI asked about any measures to connect the river with the riparian edge. JBA explained that Defences No 3 (long embankment) and Defence No 4 (removal of a riparian wall) see overleaf, will allow for	Chapter 7 Biodiversity and Chapter 9 Water Quality Meeting minutes in Appendix 5.9

	flooding into adjacent riparian strip and beyond up towards the new defence. ▪ JBA suggested that the stretch of Owenass River located north of Convent bridge (adjacent to Defence No 5) is a sensitive area for fish and would benefit from IFI advice on construction methodology. ▪ IFI stated that they would advise on the preferred in-stream construction times i.e. with the July to Sept period which generally coincided with low flow water levels. ▪ IFI asked about the need for the replacement Owenass Bridge. RB explained that the effect of diverting the flood off the adjacent fields (by implementation of the proposed flood defences) and forcing the flood waters through the existing bridge would affect the integrity of the bridge. As such they needed to strengthen the structure with a new bridge with stronger foundations and a wider arch. The replacement bridge would still be a single arch and stoned faced to match the existing character.	
26-02-2024 **IFI letter**	Key points of letter: ▪ Concerns that hard engineering defences have the capacity to considerably degrade the hydromorphological status on the impacted rivers and watercourses ▪ Concerns re compliance with the requirements of the Water Framework Directive, Habitats Directive, the National Biodiversity Action Plan or Laois County Council's objectives in its County Development Plan or Laois Draft Climate Action Plan ▪ Concerns regarding insufficient identification at Options stage re habitat restoration or biodiversity enhancement works to offset the impact of the proposed works ▪ Concerns regarding status of water quality and no further deterioration ▪ Seeks clarification on positioning of all hard defences (Defences No's1-10 in EIAR) adjacent to the riverbank (site visit needed) ▪ Replacement Owenass Bridge -IFI wants clarification on additional conveyance capacity is provided and timescale for proposed works. Requests that method statement be supplied by contractor for agreement and that Instream works can only take place during period 1 July to 30 September. Electrofishing must be completed before dewatering can take place. S14 authorisation required for same. All works must comply with IFI's Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters 2016.	Chapter 7 Biodiversity and Chapter 9 Water Quality
06-03-2024 **Site walkover with IFI**	Key points of meeting ▪ General discussion to explain that the position of defences 3A and 4C would allow for reconnection for floodplain to river during flood events and for natural establishment of wetlands. ▪ Walkover started at MDA and then moved to the length from Mill Bridge to Convent Bridge. Then to Owenass Bridge. ▪ MDA (defence 3C from Fig 4-4 of EIAR) – IFI happy with proposed wall to the left bank u/s of Mill bridge to allow the inclusion of the access ramp without the need for a gate. Proposed wall will run along the top of the existing bank and so the existing riverbank can remain in place. ▪ Discussed the provision of riverbed features to improve spawning opportunities. In particular the provision of gravel banks on the inside of bend in the Owenass and inclusion of boulders/barriers to create deflection features in the bed. Limited to the area of Baker's Field. Exact details to be confirmed after IFI complete a survey in low flows (May/June). Generic details included at this stage. These would be limited to 2 or 3 areas of gravel bank and would be low cost elements	Chapter 7 Biodiversity and Chapter 9 Water Quality

	of work that will show how we are working with the natural geomorphology of the river. ▪ IFI happy with the upstream right wall (defence 3D from Fig 4-4 of EIAR) as it is set back 2m or so from the existing river wall and so no access is required into the river to complete the works. ▪ Downstream of Mill Bridge – IFI happy with the left bank (defence 4A from Fig 4-4 of EIAR) as wall is set back behind the trees. IFI had concerns about the right bank (defence 4C from Fig 4-4 of EIAR) in this area and asked if the access ramp could be moved closer to Mill Bridge to reduce the length of the wall required along the edge of the Owenass. ▪ Downstream of the children's play park, IFI asked of the wall (defence 4A from Fig 4-4 of EIAR) could be stepped back as area is not used and is not an obvious garden area to maintain a riparian strip of 10m or so. JBA to review. At the existing wall along the river bank, the proposed flood wall will be stepped back behind the wall. In the gardens, the wall will be set close to the top of the riverbank to minimise the loss of garden area. ▪ On the right bank (defence 4D from Fig 4-4 of EIAR) on the approach to Convent Bridge IFI was told that the old barn would be removed to allow as much work as possible to be completed from the land side. However, there was no option but to work in the river from the old barn to Convent Bridge. IFI asked if the new wall could be set behind the existing wall – he was told that there would not be enough room to build the wall and maintain the public footpath between the flood wall and the existing house. There as a silt bank in front of the wall near Convent Bridge. IFI said this could be important for lamprey, but not for spawning. IFI noted gravel on the left side of the river at Convent Bridge and said that it was more important. ▪ There was discussion about a temporary haul road crossing the river from the left bank to the right and IFI said they would not want this and would prefer a haul road running from the location of the old barn to the bridge along the right bank. IFI suggested that the haul road may be permitted to stay in position outside the July to September working period as the area was important for spawning. ▪ Downstream of Convent Bridge (defence 5A from Fig 4-4 of EIAR) – IFI said the riverbed was important for spawning and asked how much of the riverbed would be taken up with a haul road. RB said about 1/3 or the bed would be required for the haul road. IFI said that they would complete a survey in dryer weather (May/June) to confirm the areas of gravel bed important for spawning and said it may be the case that the areas are localised and that the haul road may be allowed to remain in place after September. IFI would also be concerned about the condition of the gravel riverbed following the removal of the haul road. It may become too compacted which would impact its use as a spawning area. ▪ Clontygar – IFI asked if the proposed wall (defence 8A from Fig 4-4 of EIAR) could be offset to the other side of the area of scrubland to the east of the stream. Was told that this was the school playing field and so was to be protected. IFI asked about the new alignment of the re-aligned Clontygar – JBA to include a more naturalised alignment through the field to the Irishtown Road crossing. ▪ Owenass Bridge - IFI happier that the proposed wall to the upstream left bank (defence 1B from Fig 4-4 of EIAR) was set back from the river and that the wall to the downstream left bank (defence 3B from Fig 4-4 of EIAR) was also set back from the river. IFI appreciated that there was not opportunity to set back the wall on the upstream right bank (defence 2B from Fig 4-4 of EIAR) because of the location of the property and so in-stream working could not be avoided. ▪ There was discussion about the demolition and construction of a replacement Owenass Bridge. Temporary works would be required	

	during demolition to prevent material falling from the bridge and into the river. IFI would not like to flume the river through the bridge and would rather see half the river dewatered in turn to allow the construction of the new abutments. IFI said that it could be possible to get into the river before 1 July (local authority would need to apply to IFI for a derogation licence for instream working before July i.e. June), but it would not be possible for the works to continue after 30 September. IFI proposed to complete a river survey in dryer weather (summer 2024/2025) to determine the location of gravel areas important for spawning. This will be used to plan the works – ensuring the most sensitive areas are dewatered first. JBA discussed the method and duration of the works at the bridge with the contractor at a forthcoming internal buildability workshop.	
07-03-2024 **Site walkover with NMS**	Key points of meeting Walkover covered Mill Bridge to Convent Bridge. ▪ NMS generally happy with the location of the proposed wall on the left bank. ▪ NMS would want to see the section of the existing wall on the left bank remaining and our wall stepped behind it. NMS asked if we could use the existing wall as the flood wall, but it was explained that we need to provide a design life for the scheme and could not guarantee the integrity of the existing wall to last the design life of the scheme. ▪ NMS did have concerns about how we were going to gain access along the left bank to construct the works. There are a number of old walls that extend perpendicular to the line of the Owenass separating the gardens and they wanted to minimise the lengths that will need taking down (use already missing areas if we can) and any reconstruction needs to be completed appropriately as existing. JBA provided engineering drawings to NMS. ▪ NMS do not want to see the existing masonry wall along the right bank removed. It was explained that we need connectivity between the river and the floodplain, and they suggested a number of pipes below the wall running into chambers in the field. JBA explained that would present a hazard to the public. NMS said we could remove limited sections of the wall. JBA agreed to look at the topography to determine the most appropriate sections to remove to allow for the movement both out of and back into the Owenass. ▪ At Convent Bridge NMS asked if the existing wall on the left bank could be used rather than building a new one in front of it. Said they would want to see the input of a heritage engineer. ▪ Downstream of Convent Bridge NMS had concerns about constructing a haul road and the potential damage that could cause to any archaeology in the bed. JBA agreed to provide NMS with wading survey results. ▪ NMS asked if Owenass Bridge could be strengthened with a concrete saddle. ▪ NMS said they would want to see details of the alternatives we have considered and asked if they could investigate the bridge foundations and potential earlier structure details before we start work on construction. JBA said that the window to gain access to the river was very small – July to September (possibly June to September) and that the period would be needed for construction rather than archaeological investigation. I said that the road would be closed for a long period anyway and that if we could not complete the substructure works within the period July to September, it would have to be closed for over a year. They asked if we had considered	Chapter 10 Cultural Heritage Scheme Options Report

	building the new bridge to the side of the existing bridge – the design team did look at this, so we agreed to supply details.	
27-03-2024 **IFI letter**	Key points of follow up letter regarding positioning of defences following site visit **(JBA final design action noted against each point):** ▪ Defence 1B – Wall to be set back c. 5m from top of existing bank behind tree line (JBA Agreed and included as final design for planning) ▪ Defence 2B – Wall to be along line of existing fence (JBA Agreed and included as final design for planning) ▪ Owenass Bridge – Salmonid spawning documented downstream of bridge. Preferred method for instream works is half and half, i.e. dewatering half of channel while the other half is allowed to flow naturally. Electrofishing must be completed before dewatering can take place. S14 authorisation required for same. JBA enquired regarding close season for works. IFI advised extension more likely to be provided at start of season for month of June rather than extended into October. IFI to revert on possibility of same. IFI to check during lower water levels in May/June regarding possibility of leaving haul road in river during close season. (JBA Agreed and included as final design for planning) ▪ Defence 3A – JBA to explore reconnecting river with floodplain along left bank. (JBA Agreed, this will happen during flood events) ▪ Defence 3B – Wall to be set back from river by 5-10m (JBA Agreed and included as final design for planning) ▪ Defence 3C – Wall to be on riverside of path until ramp for pathway. Thereafter the wall will be on the landside of the path until tie-in with 3A (JBA Agreed and included as final design for planning) ▪ Defence 3D – Wall will be set back from river c. 5-10m. Wall is perpendicular to river once upstream of existing dwellings. Reconnection with floodplain will be permitted. (JBA Agreed) ▪ JBA to explore re-introduction of instream gravel along suitable sections upstream of Mill Bridge. Walkover with IFI during lower water levels in early summer to confirm locations. (JBA Agreed and included as final design for planning) ▪ Defence 4A – Wall will be located along current line of footpath in playground. Where trees must be felled the stumps will remain to help preserve bank integrity. Additional planting may take place between the stumps. Further downstream the wall is to be a minimum of 5m from top of bank along its entire length to Convent Bridge. Ramp to be provided in back garden. Where additional steps are required in garden these will be on the land-side of the existing steps. (JBA Agreed and included as final design for planning) ▪ Defence 4B – Setback wall from top of bank for initial 50m. Ramp in situ, whereafter wall is on landside of path. IFI preference that wall does not extend downstream past tie-in with Defence 4C (JBA Agreed and included as final design for planning) ▪ Defence 4C – Crossing of channel linking Clontygar Stream at link road to be clear span crossing (JBA Agreed and included as final design for planning) ▪ Defence 4D – Wall to be situated on top of existing bankside wall until upstream of ramp to allow access to public pathway. Wall will be set back from river upstream of ramp and will turn away from river from location of old shed which is to be demolished. IFI prefer that wall does not extend upstream of tie-in with Defence 4C. (JBA Agreed and included as final design for planning) ▪ JBA queried leaving haul road work platform in river during close season (but allowing re- wetting). IFI to revert with reply after	Chapter 7 Biodiversity and Chapter 9 Water Quality

	walkover during lower water levels in early summer. Proposed location is on right bank immediately upstream of Convent Bridge. (Contractor to work in closed season only July – Sept but in final stage IFI will consider the use of clean stone as a haul road remaining in stream) ▪ Defence 5A – Wall to be situated along existing walls at back of properties on right bank downstream of Convent Bridge. Any instream works can only take place during period 1 July to 30 September. Given that is a documented salmonid spawning site this will be strictly enforced. Haul road must be taken up before 30 September and cannot be left instream during close season. JBA to explore alternative access to this section. JBA also to investigate if haul road can be taken up sequentially as works progress. (JBA Agreed and included as final design for planning) ▪ Defence 6A – IFI not in favour of sluice gate at point where embankment crosses the Pound River. JBA to reinvestigate providing additional light-wells along Manor Road section of Pound River. (JBA Agree to remove sluice gate and just have a culvert. No additional light wells needed along Manor Road) ▪ Defence 7B – Wall left side of Garroon Stream, to be set back from top of bank (JBA Agreed and included as final design for planning) ▪ Defence 8A – Wall to east of channel linking Owenass and Clontygar Rivers. This channel alignment may be changed to move it away from the wall. Realignment to be agreed in advance. Potential for re-meandering to increase capacity and create habitat diversity along with introduction of gravel to create fish habitat. Channel will retain lateral (floodplain) connectivity along its western side. (JBA Agreed and included as final design for planning) ▪ As indicated previously, method statements are required in advance for the above works and must be agreed in writing. Instream works must take place in the dry. Electrofishing must be completed before dewatering of channels can take place. Authorisation under Section 14 of the Fisheries (Consolidation) Acts is required for same. Instream works can only take place during the period 1 July to 30 September, unless a derogation licence is granted by the Department of Environment, Climate and Communications. All works must comply with IFI's Guidelines on Protection of Fisheries during Construction Works in and adjacent to Waters (2016). (JBA Agreed) **Final email from IFI on 22-07-2024:** *IFI is satisfied with the details of the drawings you have forwarded. I have one question / suggestion: would the client consider the use of clean washed gravels and cobbles for the haul road? The advantage is that these can be left in the river and allowed to re-distribute naturally when water levels rise.*	

6 Population and Human Health

6.1 Introduction

This chapter describes the likely impacts of the proposed FRS on the human environment including the potential effects on human health and disruptions to the population of Mountmellick and the surrounding area. This chapter primarily addresses the potential effects of the proposed scheme on human health, demographics, receptors such as schools and existing community facilities, recreation and tourism. Other chapters of the EIAR, such as Chapter 13 on the construction impacts with regard to noise and air quality, are closely linked to effects on population and human health. All of these chapters should be read to gain a full understanding of the impacts on human health.

6.2 Methodology

This chapter has been prepared having regard to the EIA Directive 2014/52/EU and the associated Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022), as well as the Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, 2018. It is noted that Article 3 of the 2014 Directive effectively defines the EIA process as identifying, describing and assessing in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on a series of specified environmental factors. The first of these is “population and human health” which replaces “human beings” in the 2011 Directive. The term “human health” is not defined in the 2014 Directive.

Consideration of human health effects resulting from the construction and operation of a project should focus on health issues arising in the context of the other environmental factors listed in Article 3 of the Directive/ Section 171A of the Act, namely:

- Population;
- Biodiversity, with particular attention to protected species and habitats;
- Land, soil, water, air and climate;
- Material assets, cultural heritage and the landscape; and
- Interaction between the above factors.

European Commission guidance relating to the implementation of the 2014 Directive, in reference to “human health” states “*Human health is a very broad factor that would be highly Project dependent. The notion of human health should be considered in the context of other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population*”.

A desk study has been carried out to establish the baseline associated with economic activity, employment opportunities, settlement, and social patterns. Noise and dust generation during construction has been assessed in the Construction Impacts chapter.

The proposed development site is located within the following Electoral Divisions (ED): Mountmellick Urban, Mountmellick Rural and in a small portion of Graigue. The main part of the town lies within Mountmellick Urban ED with a small section of the northwest in Dangans, for statistical purposes Mountmellick Urban electoral division was used. Baseline information with respect to the demographic and employment characteristics of the resident population within the area was sourced from the 2022 Census from the Central Statistics Office. The data included information on population, structure, age profile, and household size, number of persons at work and employment profile. Information was also sourced from the Mountmellick Local Area Plan 2018 – 2024.

6.3 Existing Environment

Mountmellick is situated within Co. Laois, approximately 75km southwest of Dublin and 10.5km from the M7, lying between the towns of Portarlington and Portlaoise. It is laid out around a relatively narrow and long linear Main Street that extends roughly southeast to northwest with O'Connell Square located in the centre. A number of approach roads gather at either end of this Main Street with several other roads branching in a perpendicular manner (Laois County Council, 2018). There are four main local watercourses within its environs, namely the River Triogue, River Barrow, River Owenass and River Pound. The two latter of which are more central to the town, with the River Owenass encompassed within the local Natura 2000 site, also the River Barrow and River Nore Special Area of Conservation (SAC)[59].

Mountmellick is located in close proximity to the Slieve Bloom Mountains and associated amenities including the Mountain Bike Trail and hiking trails. Combined with Mountmellick's unique built and cultural heritage and existing green infrastructure, the town's assets provide the basis for a unique opportunity to create a strong tourism industry[60].

6.4 Demographics

The smallest geographical units distinguished by the Central Statistics Office (CSO) are Electoral Districts (EDs) and Small Areas (SAPS).

Table 6-1 outlines the population change between 2016 and 2022 in the State, in Laois, and Mountmellick. This table demonstrates that population increases are largely consistent across all regions, with Laois seeing the same percentage increase in population as across the State, and Mountmellick slightly lower.

Table 6-1: Population Trends between 2016 and 2022

District	2016	2022	Change from 2016-2022 (%)
State	4,761,865	5,149,139	+8.1
Laois County Council	84,967	91,877	+8.1
Mountmellick Urban	2,994	3,174	+5.6

The majority of the population of Mountmellick are in the age 20-64 cohort, with 1,835 of the 3,172 people in that group (57.8%).

Table 6-2 Age range demographics of Mountmellick

Age cohort	Population No.
Pre-school children (0 to 4 years)	193 (6.08%)
School children (5 to 19 years)	609 (19.1%)
Adults (20 to 64 years)	1,835 (57.8%)
Adults over 65	535 (16.6%)

[59] National Parks and Wildlife Service (2011) *Conservation Objectives for River Barrow and River Nore SAC [002162]*. Available online at: https: www.npws.ie/sites/default/files/protected-sites/conservation_objectives/CO002162.pdf (Accessed: 21 December 2023).

[60] Laois County Council, (2018) *Mountmellick Local Arean Plan 2018 – 2024.* Available at: Mountmellick-Local-Area-Plan.pdf (laois.ie) (Accessed: 21 December 2023).

6.4.1.1 Households

Table 6-3 below outlines the average household size in each of the geographical areas assessed. The statistics illustrate that Mountmellick has slightly increased in average household size, with the State and Co. Laois remaining largely stable over the same period.

Table 6-3: Average Household Size (persons per household)

District	2016	2022
State	2.75	2.74
Laois	2.86	2.89
Mountmellick	2.50	2.54

There were 1,218 households in Mountmellick Electoral Division in 2022.

6.4.1.2 Employment

Recent trends in employment were evaluated using CSO information generated from the 2016 and 2022 Census statistics. The information was compiled on the basis that:

- The labour force is defined as the sum of people aged 15 years and over who are at work or who are employed; and
- The participation rate is the proportion of persons in the labour force aged 15 years and over expressed as a percentage of all persons in that age group.

Statistics shown in Table 6-4 below outline the employment figures for Laois and Mountmellick.

Table 6-4: Employment Figures for Laois and Mountmellick

Area	At Work		Unemployed (ex 1st time job seekers)		% Rates of Participation in Labour Force	
	2016	2022	2016	2022	2016	2022
Laois	33,541	39,934	5,452	3,172	52.50	55.87
Mountmellick	1,028	1,289	309	127	43.87	50.21

This indicates that the number at work in Mountmellick increased during that period. The participation in the labour force is at lower rates compared to county-wide, however the rate of employment has increased quicker in Mountmellick than the rest of Co. Laois.

Table 6-5: Distribution of employment by broad industrial group in Laois and Mountmellick (Number of persons aged 15 and over) 2022

Industry	Laois	Mountmellick
Administrative and Secretarial Occupations	3,989	109
Associate Professional and Technical Occupations	4,565	140
Caring, Leisure and Other Service Occupations	3,974	189
Elementary Occupations	3,759	149
Managers, Directors and Senior Officials	3,062	115
Process, Plant and Machine Operatives	3,242	131
Professional Occupations	6,819	150
Sales and Customer Service Occupations	2,920	122
Skilled Trades Occupations	6,767	192
Not stated	4,039	119
Total	23,807	1,416

6.4.1.3 General Health

The population was surveyed in the 2022 Census and asked if they considered their health to be bad or very bad. 15 people in Mountmellick answered bad or very bad, or 0.47% of the population.

6.5 Principal Potential Receptors

An assessment of the principal potential receptors within the environs of the proposed development including homes, schools, tourism, agriculture and commercial and industrial premises was conducted in detail below.

6.5.1.1 Homes

According to the most recent 2022 census, Mountmellick contains 1,218 dwellings, the vast majority (1,090) being houses or bungalows. There are a small number of flats or apartments (123), and 5 caravan/mobile homes. The following housing estates and houses will be affected by the flood relief scheme;

Upstream of Owenass Bridge - 1 property on the southern bank of the Owenass river will be impacted during construction of the flood defence wall. The garden will be impacted trees, kerbs, gates will need to be removed for access and will be reinstated as part of the works.

Replacement of the Owenass Bridge– Approximately 30 properties will be affected by the works on Owenass bridge, which connects from the north towards the south across the Owenass River. The bridge will be closed during the replacement works. Two diversion routes are identified; if traffic and pedestrians are directed via the N80 diversion there will be a detour of approximately a 4-minute drive/ 40-minute walk. A secondary diversion is via Cloncannon Lower, Drinagh and Manor Road a 10-minute drive/74-minute walk.

Mill Bridge to Convent Bridge – Up to 20 properties will be affected on the north bank of the river as some minor accommodation works are proposed allowing for the construction of the proposed flood defence walls. Private gardens will be impacted through facilitation of construction works. Site clearance and access will be required from within these gardens, to be reinstated upon completion.

Downstream of Convent Bridge – Approximately 28 properties and businesses will be affected, by the construction of the new flood wall. Rear gardens including boundary walls and structures will be impacted by the works, with the new flood wall extending along existing boundary.

Garroon Stream – 1 property will be affected through the implementation of temporary traffic management, access to back buildings east of the site compound location.

Along with these groups of properties, homes in other parts of Mountmellick will also potentially be affected during the construction and/or operation of the scheme.

6.5.1.2 Educational facilities

There are four educational facilities in Mountmellick displayed in the Table 6-6 below.

Table 6-6: Educational facilities in the area

School type	Name
Primary school	St. Joseph's Girls National School
Primary school	Scoil Phádraig Naofa
Primary school	St. Paul's National School
Secondary school Further Education Centre	Mountmellick Community School Mountmellick LOETB

6.5.1.3 Childcare Facilities

There are two childcare facilities within Mountmellick, both located within 500m radius of the proposed development:

- Majellas Montessori School, Acragar Cottage; and
- Rias Kids Academy, Ballycullenbeg,

6.5.1.4 Health, Social, Community, and Recreational Facilities

There are several health, social, community and recreational facilities in Mountmellick within or in close proximity to the proposed development.

Table 6-7: Health, Social, and Community Facilities in Mountmellick

Name	Address
Medical Facilities	
Mountmellick Health Clinic	St Vincents Hospital Grounds, Irishtown
Mountmellick Primary Care Centre	Connolly Street
Glenard Clinic	Connolly Street
Midlands Crisis Pregnancy	Connolly Street
Mountmellick, Veterinary Centre	Emmett Stret, Townparks
Social Facilities	
St. Vincent's Community Nursing Unit	Irishtown
Foróige Youth Centre	Davit Shopping Centre, Unit 2, Connolly St.
Mountmellick Community Arts Centre	Parnell St, Townparks
Churches	
St Joseph's Catholic Church	Sarsfield St, Townparks
St. Paul's, Church of Ireland	Pearse St, Townparks
Recreational Facilities	
Mountmellick United FC	Townparks
Mountmellick Gymnastics Club	Unit 2-3, Bay Road Business Park
Mountmellick Tennis Club	Irishtown

6.6 Predicted Impacts

6.6.1 Do Nothing Scenario

Under the Do-Nothing Scenario, it is likely that flooding will continue to occur in Mountmellick. Flooding has the potential to affect up to 127 properties, as well as the identified businesses, health, social, community, and recreational facilities.

Flooding is likely to compromise human health directly through destruction of property, and indirectly through social and economic damages.

Impacts to population and human health under the do-nothing scenario, through continued flooding in Mountmellick, would be **Significant, Adverse, Long-term.**

6.6.2 Construction Phase

The potential construction phase impacts on local residences and businesses associated with the proposed development will relate mainly to visual impacts traffic and noise and air emissions all of which are outlined in Chapter 11 Landscape and Visual Amenity, Chapter 12 Material Assets, and Chapter 13 Construction Impacts, of this EIAR.

During construction there is a risk to the health and safety of workers on the development, which are typical for any construction project. There is also the potential for adverse impacts on the community as a result of air emissions, disturbance from noise disturbance and visual impacts during construction.

6.6.2.1 Impacts on Economic Activity

During the construction phase, the employment of construction workers on-site is expected to boost local economic activity. Their personal and business-related expenditures on retail, leisure, and accommodation services are anticipated to positively impact to local businesses. In addition to direct construction employment, it is anticipated that the proposed project will lead to indirect employment via related services during the construction phase.

The impact on economic activity during construction will be **Temporary, Positive.**

6.6.2.2 Impacts on Human Health and Safety

As with any construction site there will be potential risks to the health and safety of construction personnel on-site due to the use of large, mobile machinery and heavy equipment and materials. However, health and safety procedures will be put in place as part of the construction management plan with the appointed contractor. There will be no significant offsite health and safety risks, and the proposed development site will be securely fenced from the public during the construction phase.

The impact on human health and safety during construction will be **Temporary, Imperceptible, Adverse.**

6.6.2.3 Impacts on Residential, Recreational, Commercial, and Community Amenity

The construction phase of the development will impact on residential, recreational, commercial, and community amenity in Mountmellick as a result of construction-specific impacts outlined in Chapter 13. Procedures will be put in place to address local concerns as part of the construction management plan with the appointed contractor. Impacts to access and roads and traffic will also occur, as outlined in Chapter 12 Material Assets.

This impact will be **Temporary, Slight, Adverse.**

6.6.3 Operational Phase

Once operational, the proposed development will not result in significant adverse impacts for population and human health. **Permanent, Positive** impacts are likely from the operation of the scheme as it will increase the level of flood protection for people's homes and businesses.

6.7 Mitigation Measures

6.7.1 Construction Phase

While under construction, there will be potential risks to the health and safety of construction workers. A comprehensive Health and Safety Programme will be put in place on the site prior to commencement of construction to minimise any risks to site personnel and visitors. The requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) will be complied with at all times. A Construction Stage Traffic Management Plan will be developed by the contractor and agreed with Laois County Council and the relevant property owners prior to commencement of the works.

The following mitigation measures are proposed during the construction phase:

- During pre-construction and construction phases safety will be managed in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013). A Project Supervisor Construction Stage (PSCS) will be appointed as part of the proposed project;
- Safety will be a primary concern during the construction phase of the proposed FRS. A contractor safety management program will be implemented identifying potential hazards associated with the proposed work including a permit to work system;

- The design of the final proposal will be subject to safety design reviews to ensure that all requirements of the project are safe. A Project Supervisor for the Design Process (PSDS) will be appointed as part of this process;
- Temporary contractor facilities and areas under construction will be enclosed and fenced off from the public with adequate warning signs of the risks associated with entry to these facilities. Entry to these areas will be restricted and will be kept secure when construction is not taking place;
- Measures to ensure public safety with respect to air quality and dust, and noise and vibration, are detailed in Chapter 13; and
- Measures to ensure public safety with respect to construction traffic, are detailed in Chapter 12.

6.7.2 Operational Phase

When the scheme is operational, a maintenance and monitoring schedule will be put in place to verify that the proposed flood defences are operating to the appropriate design standard. Repairs will be made as necessary. This will ensure that there is no risk to human health as the scheme ages. The proposed FRS has been designed so that guarding heights are at an appropriate level (1.20m) along flood defence walls, and that embankments are sloped gently, to ensure that there is no risk of injury arising from typical use of quay walls and embankments.

6.8 Residual Impact

6.8.1 Do Nothing Scenario

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. If the proposed development does not go ahead, flooding is likely to continue impacting Mountmellick population and properties in the future.

Under the Do-Nothing Scenario the impact on population and human health is likely to be **Significant, Adverse**, with residual **Long-term** impacts.

6.8.1.1 Construction Phase

During construction, there will be a positive impact to employment in Mountmellick, which will potentially boost local business as a result of the increased number of workers in the area. There will be potential risks to the health and safety of construction personnel. Mitigation measures in place will include adequate Health and Safety standards to ensure that no injury or accidents occur during the construction phase. The population of Mountmellick will experience disruptions to daily life and to their recreational facilities due to associated impacts on Traffic, Air, Noise, and the Visual amenity during the construction phase. Mitigation measures are described further in associated chapters of the EIAR.

Construction works will be implemented in four phases and in the following sequence, generally from downstream to upstream on the Owenass River. The construction phase of the project is expected to span 48-72 months, with each phase of construction 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 and to ensure that flood defences downstream are commissioned prior to works upstream commencing:

Construction sequence

Phase 1 on the eastern side of the town (construction traffic will access compounds from R423 northeast of town or R422 east of 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 (construction traffic will access compounds from N80 north and R422 west of 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 (construction traffic will access compounds from R422 west of town outside of hours used by the Naoinra Naomh Aine Preschool or N80 north of town)

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

Phase 4 on the southwestern side of the town (construction traffic will access compounds from R423 southwest of town or N80 south of town, see Figure 12-3 for traffic diversion routes during replacement of Owenass Bridge)

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

During construction, impacts to traffic and access due to heavy vehicle movements, including temporary road closures and one-way stop-and-go systems are expected.

The residual impacts of the construction phase on population and human health will be **Temporary, Imperceptible, Adverse.**

6.8.1.2 Operational Phase

The nature of the development is to protect both homes and businesses from flooding, The proposed FRS has the potential to make Mountmellick more desirable residential and economic area due to the reduced risk of flooding. There will be a reduction in visual amenity for houses at Pearse Street N80 which will experience reduced visibility to the open area at the rear of the properties due to the new flood wall. There will also be a reduction in visual amenity for houses towards the south view at O' Moore St., Patrick St. and the east view at Manor Groove, due to the embankment running along the west bank of the River Owenass. The residual impact to population and human health during the operation of the scheme is predicted to be **Positive, Long-term.**

6.9 Interactions with other Environmental Effects

Impacts to population and human health have the potential to interact with the following environmental factors:

- Water discussed in Chapter 9: Impacts to water quality could Adversely interact with population and human health, due to either impacts to drinking water, or the amenity value of the watercourses in the town particularly the Owenass. Adverse interactions with population and human health are not expected to occur, due to the mitigation measures to be put in place for the protection of water, and residual impacts to water being **Temporary, Adverse, Slight** to **Imperceptible**.
- Material Assets discussed in Chapter 12: Impacts to material assets, in particular to utilities or roads, traffic, and transport, could lead to interactions with population and human health if significant or allowed to go on for a long time. This is unlikely to occur given the nature of the proposed works and likely short length of disruptions to utilities. Impacts on population and human health due to material assets impacts are likely to be **Slight, Adverse, Temporary**.
- Air quality, Noise and Vibration discussed in Chapter 13: Excessive noise or vibration during construction can cause disturbance to human health to residents in Mountmellick or the surrounding area. Mitigation measures outlined in the Construction Impacts chapter will ensure that the impact of noise and vibration on population and human health will be **Not Significant, Adverse, Temporary**.

6.10 Potential Cumulative Impacts

Several developments are proposed or under construction in the area of Mountmellick, as outlined in Chapter 15 Cumulative Impacts. If the construction periods of these developments are to overlap, there is a potential to impact on population and human health through disruptions in Mountmellick. These effects will be **Temporary** while the construction phase progresses and will not be significant.

Once operational, the proposed FRS, when considered cumulatively with the above developments, will have a **Positive** impact on population and human health.

7 Biodiversity

7.1 Introduction

This chapter assesses the impacts of the proposed Mountmellick Flood Relief Scheme, on biodiversity during the construction and operation phases.

This chapter provides an overview of the assessment and field methodologies; receiving ecological environment; a description of the nature and scale of any potential significant direct or indirect impacts; and any necessary mitigation and biodiversity enhancement measures recommended as part of this Environmental Impact Assessment Report (EIAR).

Mountmellick is located along the River Owenass, ecological receptors within the study area can be strongly linked to the water environment and hydromorphological factors, and this chapter will give cognisance to the inter-relationships between these aspects, in particular.

This Chapter should be read in conjunction with the Appropriate Assessment (AA) (JBA 2024a)[61] Screening and Stage 2 Natura Impact Statement (NIS) (JBA, 2024b)[62] that has been carried out for this proposed Scheme and addresses relevant information for the Natura 2000 sites.

The scheme is divided into an assortment of measures spread throughout the catchment, as shown in Chapter 4 (Figure 4-1).

7.2 Methodology

7.2.1 Study Area

The study area of the proposed Scheme was defined by the findings of the desk study (i.e., presence/absence of protected habitats, flora, or fauna within the Zone of Influence (ZoI) (Section 7.4.7) and best practice methodology for assessing effects on those ecological receptors). In general, surveys were conducted for each of the ecological receptors within specific geographical areas; and focused on assessing potential impacts within the ZoI of the proposed Scheme.

This assessment has had regard to the following policy, legislation, and guidance documents.

7.2.2 Relevant Guidelines, Policy, and Legislation

The biodiversity assessment included a comprehensive review of the following documents:

- The Planning & Development Act 2000 & the Planning and Development (Amendment) Act, 2010 (as amended) hereafter referred to as the Planning Acts.
- Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive);
- Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (Birds Directive);
- Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 as amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 on the assessment of the effects of certain public and private projects on the environment;
- European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) (as amended);

[61] JBA (2024) *Mountmellick Flood Relief Scheme – Screening for Appropriate Assessment*
[62] JBA (2024) *Mountmellick Flood Relief Scheme – Natura Impact Statement*

- EU Water Framework Directive (2000/60/EC) and European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003);
- Office of the Planning Regulator (OPR) Practice Note PN02 Environmental Impact Assessment Screening (OPR, June 2021);
- Guidelines for planning authorities and An Board Pleanála on carrying out environmental impact assessment (Department of Housing, Planning and Local Governments, August 2018);
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (Draft) Environmental Protection Agency (EPA, 2022);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (National Roads Authority (NRA), 2009);
- Wildlife Acts 1976-2021, and Wildlife (Amendment) Act 2023;
- Flora (Protection) Order, 2022 (S.I. No. 235 of 2022);
- Inland Fisheries Acts 1959 to 2017;
- Guidelines on the Protection of Fisheries during construction works in and adjacent to water. (Inland Fisheries Ireland, 2016).
- National Biodiversity Plan 2023-2030, Department of Housing, Local Government and Heritage (DHLGH) 2024;
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (EU 2013);
- Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, (CIEEM, 2018);
- Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes (National Roads Authority, 2005)
- Guidelines for the Treatment of Otters Prior to the Construction of National Roads Schemes (NRA, 2008b).
- Riparian breeding bird surveys methods (Cummins et. al, 2010).
- Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th Edition) (Collins (ed.), Bat Conservation Trust 2023;
- Bat Mitigation Guidelines for Ireland (Marnell et al., 2022);
- The Bat Workers' Manual, 3rd Edition (Mitchell-Jones and McLeish), Joint Nature Conservation Committee 2004;
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (2008), NRA 2008;
- Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads, NRA 2010; and
- Planning for Watercourses in the Urban Environment. A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, In-stream Rehabilitation, Climate / Flood Risk and Recreational Planning, IFI 2020.

7.2.3 Data Collection and Collation

This ecological assessment is based on a combination of desk-based research and a number of ecological field surveys targeting select groups of protected fauna likely to be impacted by the construction and operation of the proposed Scheme. The desk-based research includes a data search for protected and notable species using the National Biodiversity Data Centre (NBDC) Mapping System[63]. A customised polygon was produced to extract all the species data from the set ZoI for this scheme. Data from biological records centres or online databases is historical information, and datasets might be incomplete, inaccurate or missing. It is important to note that even where data is held, a lack of records for a defined geographical area does not necessarily mean that the species is absent; the area may simply be under-recorded.

[63] NBDC (2023) *NBDC Biodiversity Maps* [online], available: https://maps.biodiversityireland.ie/Map/Terrestrial/Dataset/189

7.2.3.1 Data Sources

Reviewed data sources included relevant published biodiversity data; collation of existing information on the ecological environment; and consultation with relevant statutory bodies. Accessed data sources include:

- The Status of EU Protected Habitats and Species in Ireland Volume 1: Summary Overview, NPWS 2019;
- The Status of EU Protected Habitats and Species in Ireland Volume 2: Habitats Assessment, NPWS 2019;
- The Status of EU Protected Habitats and Species in Ireland Volume 3: Species Assessment, NPWS 2019;
- Environmental Protection Agency (EPA) Online databases on water quality and WFD maps (Available online at https://gis.epa.ie/EPAMaps/);
- Aerial photography available from www.osi.ie and Google Maps http://maps.google.com/;
- National Biodiversity Data Centre (NBDC) - Species Distribution Maps (Available online at www.biodiversityireland.ie);
- NBDC All Ireland Red Data lists for vascular flora, mammals, butterflies, non-marine molluscs, dragonflies & damselflies, amphibians, and fish (Available online at https://www.biodiversityireland.ie/resources/irish-red-lists/);
- International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species (Available online at http://www.iucnredlist.org);
- Online data available on Natura 2000 network of sites and on Natural Heritage Areas (NHAs) or proposed Natural Heritage Areas (pNHAs) as held by the National Parks and Wildlife Service (NPWS);
- Records of rare and protected species for the study area, held by the NPWS;
- Habitat and species GIS datasets provided by the NPWS;
- Bat records from Bat Conservation Ireland's (BCI) database;
- Environmental Impact Statements or Environmental Impact Assessment Reports for any developments located along the alignment of the proposed Scheme;
- Environmental information/data for the area available from the EPA website;
- Records from the Botanical Society of Britain & Ireland (BSBI);
- Information provided by Inland Fisheries Ireland (IFI), and additional information accessed through the IFI online database.

7.2.4 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 eight years in ecological consultancy She has undertaken numerous EcIAs and EIARs. Patricia is a full Member of the Chartered Institute of Ecological and Environmental Management (CIEEM).

The chapter was reviewed by Technical Director Laura Thomas BA MRes PGCert CEcol MCIEEM. Laura is a Chartered Ecologist and Technical Director at JBA, specialist in botany and with extensive experience of EcIA, NIS assessment including their production and quality assurance.

Surveying was completed by a number of experienced ecologists including JBA Ecologists William Mulville (BSc (Hons), MSc), Colm O'Leary (BSc (Hons), MSc), Malin Lundberg (BSc, MSc), Niamh Burke (BSc (Hons) PhD), Mark Desmond (BSc (Hons), MSc), and Michael Coyle (BA (Hons), MSc). Additional surveying for hydromorphological features were completed by Environmental Scientist and Geomorphologist Emily Rick (BSc (Hons) MSc), and by Hydrologist and Geomorphologist Kate de Smeth (BSc, MSc, PhD). These hydromorphological surveys were referred to, in order to gain an insight into the suitability of the riverbeds for aquatic fauna. A breakdown of surveys and results is found in Section 7.4.

7.2.5 Consultation

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 (LCC)

- National Parks and Wildlife Services (NPWS)
- Inland Fisheries Ireland (IFI)

For the last five years, LCC has been involved with weekly progress meetings in addition to monthly steering meetings.

A meeting with NPWS took place on the 20th of December 2023 where the project's ecological sensitivities and the proposed Flood Relief Scheme (FRS) design were discussed at length, in particular the interactions with the proposed Scheme and the relevant Special Area of Conservation (SAC). A document with details of ecological surveys carried out was emailed to NPWS on 27th February 2024.

The observations and recommendations obtained as a result of the above consultations are included and addressed in this report.

An informal consultation with IFI was conducted on 8th of February 2024 and an in-person meeting on site on the 6th of March 2024. Measures for protection for fish were recommended by IFI and included in this Chapter, in particular the overall design and construction mitigation. Details of consultation with IFI and agreed measures are given in Table 5.2 in EIAR Section 5.2.5.

7.3 Methodology for the Assessment of Impacts

7.3.1 General Approach

The ecological receptors identified during the walkover surveys and from desk-based assessments were reviewed.

An initial screening process is presented at the end of the receiving environment section (sub-section 7.5) to ensure that the assessment focuses only on features where the impact could have important consequences for biodiversity (valued ecological receptors). Any receptors which are important beyond the site level were identified for further evaluation. Ecological receptors with little or no value beyond the site level were screened out and a short statement explaining this is given in the screening section.

Separate Appropriate Assessment (AA) Screening[64] and Natura Impact Statement (NIS) [65] reports have been produced, to assess the potential for effects on designated Natura 2000 sites. The AA Screening Report concluded that likely significant effects were anticipated for the Qualifying Interests (QIs) of the Natura 2000 sites arising from the proposed Scheme, either alone or in-combination with other plans or projects. This conclusion triggered the production of the NIS report.

7.3.2 Valuation of Receptors

The value of designated sites, habitats and species populations is assessed with reference to:

- Their importance in terms of 'biodiversity conservation' value (which relates to the need to conserve representative areas of different habitats and the genetic diversity of species populations);
- Any social benefits that habitats and species deliver (e.g., relating to enjoyment of flora and fauna by the public); and
- Any economic benefits that they provide.

The valuation of designated sites considers different levels of statutory and non-statutory protection. Assessment of habitat depends on several factors, including the size of the habitat, its conservation status and

[64] JBA Consulting (2023) *Mountmellick Flood Relief Scheme - AA Screening*.
[65] JBA Consulting (2024) *Mountmellick Flood Relief Scheme - Natura Impact Statement*.

quality. The assessment also takes account of connected off-site habitat that has the potential to increase the value of the on-site habitat through association. Valuation of species depends on a number of factors including distribution, status, rarity, vulnerability, and the population size present.

Table 7-1: Examples of criteria used to define the value of ecological features (NRA, 2009)

Level of Value	Examples of Criteria
International	An internationally important site e.g. Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar (or a site considered worthy of such designation). A regularly occurring substantial population of an internationally important species (listed on Annex IV of the Habitats Directive). Designated shellfish waters. Major fisheries area.
National	A nationally designated site e.g. Natural Heritage Area (NHA), a proposed Natural Heritage Area (pNHA), statutory Nature Reserve, or a site considered worthy of such designation. A viable area of a habitat type listed in Annex I of the Habitats Directive or of smaller areas of such habitat which are essential to maintain the viability of a larger whole. A regularly occurring substantial population of a nationally important species, e.g. listed on The Wildlife Act 1976 or The Wildlife (Amendment) Act 2000. A species included in the Irish Red Data Lists/Books. Significant populations of breeding birds.
Regional/County (Co. Laois)	Species and habitats of special conservation significance within County Laois, as identified in Laois Heritage and Biodiversity Strategy 2021-2026. An area subject to a project/initiative under the County's Biodiversity Action Plan. A regularly occurring substantial population of a nationally scarce species.
Local	Areas of internationally or nationally important habitats which are degraded and have little or no potential for restoration. A good example of a common or widespread habitat in the local area. Species of national or local importance, but which are only present very infrequently or in very low numbers within site area.
Less than local (works site and its vicinity)	Areas of heavily modified or managed vegetation of low species diversity or low value as habitat to species of nature conservation interest. Common and widespread species.

Ecological Valuation may also be considered of Local Importance (higher value) or Local Importance (lower value) (see Table 7-2).

Table 7-2: Examples of criteria used to define the value of ecological features of local importance[66]

Level of Value	Examples of Criteria
Local Importance (higher value)	Locally important populations of priority species or habitats or natural heritage features identified in the Local Biodiversity Action Plan (BAP), if this has been prepared. Resident or regularly occurring populations (assessed to be important at the Local level) of the following: *Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; *Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; *Species protected under the Wildlife Acts; and/or *Species listed on the relevant Red Data List. Sites containing semi-natural habitat types with high biodiversity in a local context and a

[66] NRA (2009) *Guidelines for Assessment of Ecological Impacts of National Roads Schemes,* available: https://www.tii.ie/technical-services/environment/planning/Guidelines-for-Assessment-of-Ecological-Impacts-of-National-Road-Schemes.pdf.

	high degree of naturalness, or populations of species that are uncommon in the locality. Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value
Local Importance (lower value)	Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; Sites or features containing non-native species that are of some importance in maintaining habitat links

Guidance published by CIEEM (2018)[67] recommends breaking down the importance of ecological features in a geographic context similar to the NRA guidance shown in Table 7-1, with the following frame of reference to be adapted to local circumstances.

- International and European;
- National;
- Regional;
- Metropolitan (Mountmellick), County (Laois), vice-county, or other local authority-wide area;
- River Basin District (River Owenass, River Barrow and River Triogue sub basins);
- Estuarine system/Coastal cell; and
- Local.

The NRA (2009) guidance is congruent with the CIEEM (2018) guidance and includes a 'Less than local' level. The NRA (2008, rev. 2009) guidance on geographic criteria for ecological valuation, as described in Table 7-1 is followed in this chapter.

7.3.3 Descriptive Terminology

The EPA Guidelines[68] provide guidance on determining significance and type of ecological effects. Examples of relevant terms are listed in Table 1-2 in Chapter 1.

7.3.4 Significance of Impacts

The overall significance of an impact can be derived from the total description of the effect compared against the sensitivity and significance (value) of the receptor as shown overleaf in Figure 7-1 which is taken from the EPAs EIAR Guidelines (2022)[69]. The context and character of the receptor must also be assessed, such as its position in relation to the effect and its connectivity to the effect, however, this should be determined before assessing the significance of the impact.

The total description of the effect includes the character, magnitude, probability, and consequences of the effect as described in Table 7-3, which are combined to give a general description of the effect on an ordinal scale from Negligible to High. The sensitivity and significance of the receptor is also described on an ordinal scale from Negligible to High.

The placement of the general description of the effect, and the sensitivity/significance of the receptor on this scale is determined by a Competent Person (a qualified ecologist in this case) as they interpret the qualities of the effect from the categories listed in Table 1-2 and the receptors sensitivity and significance. Level of significance, also described as value of the receptor is previously set out in sub-section 7.3.1 above. Sensitivity

[67] CIEEM (2018) *Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland: Terrestrial, Freshwater, Coastal and Marine.*

[68] EPA (2022) *Guidelines on the Information to Be Contained in Environmental Impact Assessment Reports* (Draft), Environmental Protection Agency.

[69] EPA (2022) *Guidelines on the Information to Be Contained in Environmental Impact Assessment* Reports (Draft), Environmental Protection Agency.

of the receptor is assessed by the Competent Person based on the receptor's characteristics and how susceptible to impact they are from the type of effect.

The overall significance of an effect is then categorised into one of the following seven classifications:

- Imperceptible;
- Not Significant;
- Slight;
- Moderate;
- Significant;
- Very Significant; and
- Profound.

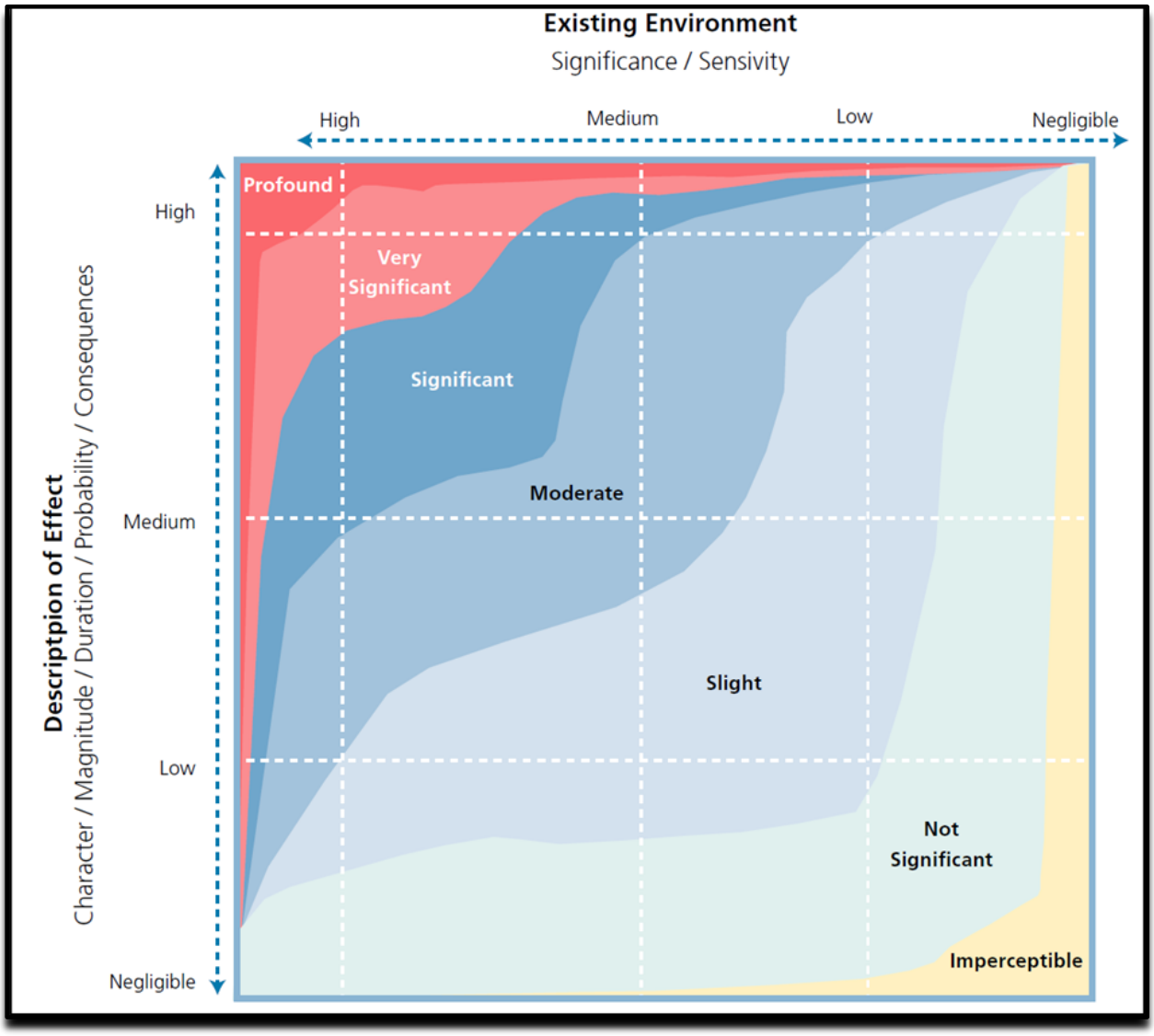


Figure 7-1: Chart showing the typical classifications of the significance of effects (EPA, 2022)

This chart has been interpreted in Table 7-3 below as a significance of impacts matrix. The scale has been ordered into an upper and lower bound for each qualitative category, so that degrees of significance within subcategories can be interpreted by the Competent Person. As Table 7-3 frames the significance of effects a as a defined categorical scale rather than a sliding gradient as is shown in the EPA guidance, it is intended to be used as an initial reference resource, rather than definitive method of assigning impacts.

Table 7-3: Significance of Effects matrix

Magnitude of impact	Sensitivity/ Value of Receptor							
	High +	**High -**	**Medium +**	**Medium -**	**Low +**	**Low -**	**Negligible +**	**Negligible -**
High +	Profound	Very significant	Very significant	Significant	Moderate	Moderate	Not Significant	Imperceptible
High -	Very Significant	Very significant	Significant	Moderate	Moderate	Slight	Not Significant	Imperceptible
Medium +	Very Significant	Significant	Moderate	Moderate	Slight	Slight	Not Significant	Imperceptible
Medium -	Significant	Moderate	Moderate	Moderate	Slight	Slight	Not Significant	Imperceptible
Low +	Moderate	Slight	Slight	Slight	Slight	Slight	Not Significant	Imperceptible
Low -	Slight	Slight	Slight	Slight	Slight	Not Significant	Not Significant	Imperceptible
Negligible +	Not Significant	Not Significant	Not significant	Not Significant	Not Significant	Not Significant	Not Significant	Imperceptible
Negligible -	Not Significant	Not Significant	Not significant	Not Significant	Not Significant	Imperceptible	Imperceptible	Imperceptible

Furthermore, the NRA (2009) and CIEEM (2018) guidelines were followed (in conjunction with the EIA guidelines), which requires examination of the following two key elements:

- Impact on the integrity of the ecological feature; and
- Impact on its conservation status within a given geographical area.

7.3.5 Ecological Integrity

Ecological integrity should be regarded as the coherence of ecological structure and function, across the entirety of a site that enables it to sustain all of the biodiversity or ecological resources for which it has been valued[70].

Ecological integrity is most often used when determining impact significance in relation to designated nature conservation areas (e.g., SACs, SPAs or pNHA/NHAs) but can often be the most appropriate method to use for non-designated areas of biodiversity value where the component habitats and/or species exist, with a defined ecosystem at a given geographic scale.

Any adverse impact on the integrity of an ecological site or ecosystem is considered to be significant if it moves the condition of the ecosystem away from a favourable condition: removing and/or changing the processes that support the sites' habitats and/or species; affects the nature, scale, structure, complexity and functioning of component habitats; and/or, affects the population size and viability of the inhabiting floral and faunal species therewithin.

7.3.6 Conservation Status

The definitions for conservation status given in the EU Habitats Directive 92/43/EEC, in relation to habitats and species, are also used in the CIEEM (2018) and NRA (2009) guidance:

- For natural habitats, conservation status means the sum of the influences acting on the natural habitat and its typical species, that may affect its long-term distribution, structure, and functions as well as the long-term survival of its typical species, at the appropriate geographical scale.
- For species, conservation status means the sum of influences acting on the species concerned that may affect the long-term distribution and abundance of its populations, at the appropriate geographical scale.

An impact on the conservation status of a habitat or species is considered to be significant if it will result in a change in conservation status.

After the definitions provided in the EU Habitats Directive 92/43/EEC, the conservation status of a habitat is favourable when:

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

And the conservation status of a species is favourable 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;
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future; and

[70] NRA (2009) *Guidelines for Assessment of Ecological Impacts of National Roads Schemes*, available: https://www.tii.ie/technical-services/environment/planning/Guidelines-for-Assessment-of-Ecological-Impacts-of-National-Road-Schemes.pdf.

- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

If it is determined that the ecological integrity and/or conservation status of a key ecological feature will be impacted on, then the level of significance of that impact is related to the geographical scale at which the impact will occur (i.e., local, county / regional, national, international). In some cases, an impact may not be significant at the geographic scale at which the ecological feature has been valued (e.g., national), but may be significant at a lower geographical level (e.g., local).

7.3.7 Residual Impacts

The project is assessed including some designed-in mitigation. This is done where mitigation is proven to be effective and will be implemented effectively with a high certainty. Where significant residual impacts are still identified, further mitigation measures will be proposed as part of the EIA process to avoid, reduce, or minimise them. Each impact assessment section assigns a final significance level to the impact described, which considers and includes the implementation of any stated mitigation measures; these are the residual impacts.

7.3.8 Cumulative Impacts

Potential sources of cumulative impacts were identified based on the ecology of valued ecological receptors. Potential sources of cumulative impacts were sought within an area where there is the potential for a significant impact on a site or species. The plans and projects identified as potential sources of cumulative impacts are described in Chapter 15.

7.4 Ecological 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). Additional surveying for hydromorphological features were completed by Environmental Scientist and Geomorphologist Emily Rick (BSc (Hons) MSc), and by Hydrologist and Geomorphologist Kate de Smeth (BSc, MSc). These hydromorphological surveys were referred to, to gain an insight into the suitability of the riverbeds for aquatic fauna. Table 7 contains further details on survey dates and types of surveys undertaken.

The ecological walkover survey recorded habitats and protected species, following the methods outlined in the documents below:

- Heritage Council (2011). Best Practice Guidance for Habitat Survey and Mapping (Smith et al. 2011)71.
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009).

Aerial photographs and site maps assisted the survey. Habitats have been classified and described following Fossitt (2000)[72]. Nomenclature for vascular plants follows that given in The New Flora of the British Isles 4th Edition (Clive Stace 2019)[73]. Identification of Irish plants generally follows Webb's An Irish Flora (Parnell and Curtis, 2012)[74].

[71] Smith, G.F., O'Donoghue, P., O'Hora, K., Delaney, E., 2011. '*Best practice guidance for habitat survey and mapping*', The Heritage Council: Ireland

[72] Fossitt, J.A., 2000. *A Guide to Habitats in Ireland, Heritage Council of Ireland series*, Heritage Council/Chomhairle Oidhreachta: Kilkenny

[73] Stace. C (2019) The New Flora of the British Isles 4th Edition

[74] Parnell, J. & Curtis, T., 2012. Webb's *An Irish Flora* [online], 8th ed, Trinity College Dublin. Available: http://www.corkuniversitypress.com/product-p/9781859184783.htm.

Table 7-4: Ecological surveys undertaken in the study area

Survey	Date	JBA Surveyor
Invasive Non-native Species survey	12th September 2019	Colm O'Leary
Baseline ecological survey	26th September 2019	Malin Lundberg Niamh Burke
Otter and hydromorphology survey	08th January 2020	Hanah Mulcahy Emily Rick
Hydromorphology Survey	31st January 2020	Emily Rick
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
Tree Survey	10th May 2023	(Sub-contract Michael Gary of Arbor-care Ltd)
Habitat survey	12th June 2023	William Mulville Michael Coyle
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
Riparian Birds (incidental with Otter surveys)	31 March 2022 28th April 2022 26th January 2023 29th March 2023 17th July 2023	William Mulville Mark Desmond Michael Coyle
Otter and Dedicated Riparian Bird Survey	09th May 2025	William Mulville Matt Hosking

7.4.1 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.

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[75]). Floral species present that were either representative of a habitat, or considered

[75] Smith, G.F., O'Donoghue, P., O'Hora, K., and Delaney, E. (2011) '*Best practice guidance for habitat survey and mapping*', The Heritage Council: Ireland

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 receptors 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 higher 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.

7.4.2 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[76]). The full tree survey is available in the appendices.

7.4.3 Terrestrial Mammals

During all ecological surveys and visits to the 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 following the guidelines in NRA (2008). Field signs include scat/ droppings, setts/ dens/ holts, and any mammal tracks.

A series of Otter surveys were completed on the 8th January 2020, 31st March 2022, 28th April 2022, 26th January 2023, 29th March 2023,17th July 2023 and the 9th 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 March 2022, 28th April 2022 and 29th 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.

7.4.4 Bat Surveys

The bat surveys comprised several elements, including daytime inspections of structures and bat habitats, dusk emergence surveys and passive static detector surveys which followed the guidelines present in Collins (2023).

7.4.4.1 Preliminary Bat Roost and Habitat Suitability Surveys

Given the presence of a number of mature trees within the proposed Scheme boundary, there was the potential for bat roosts to be present within or adjacent to the proposed Scheme. JBA ecologists carried out a preliminary bat roost potential assessment and habitat suitability surveys were conducted during daylight hours in order to identify the location of potential roosts features (PRFs) and access points (within structures).

These surveys were done in conjunction with habitat surveys (26th September 2019, 28th April, 202, 11th May 2022, 12th June 2023) and surveyors took notation of any existing features (such as cracked limbs or dense Ivy) that would be indicative to the suitability of roosting

7.4.4.2 Bat Emergence Survey

The Owenass Bridge was absent of any notable cover of vegetation or cracks within the brickwork and was considered to have low bat roosting potential. Following the guidelines of Collins (2023), one bat emergence survey was completed on the 11th of August 2023 at the Owenass Bridge. This survey was conducted by two surveyors, beginning at 9pm and ongoing for two hours. One surveyor was stationed on the existing

[76] Arbor-Care Ltd. (2023) *Arboricultural Impact Assessment - Mountmellick Flood relief Scheme* (unpublished)

Mountmellick bridge, and was overlooking the south face of the bridge, while a second surveyor was located on the bank downstream of the bridge, observing the north face of the bridge. Surveyors were monitoring if bats were seen leaving the underside of the bridge, indicating the presence of a roost underneath. This survey was conducted with each surveyor using Anabat Walkabout listening devices, and the surveyor on the banks downstream of the bridge additionally using of an Axion Thermal Imaging Monocular. The time, species and frequency (khz) of individual bat calls were recorded.

7.4.4.3 Bat Detector Surveys

Static (in situ) bat detectors [Anabat Express & Anabat Chorus – Titley Scientific] were installed along the length of the scheme (three locations in total – Owenass Bridge, Pearse Street Bridge, and in the field area in the north-east of the town). These statics were deployed between the months of July and August of 2023. These static detectors allowed for the collection of bat echolocation information over 5+ daytime periods on each occasion. The data collected provided information on the frequency of use by individual bat species within the proposed Scheme area.

7.4.5 Riparian Bird Surveys

Along with the Otter Surveys on the dates listed, 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.

7.4.6 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 water bodies and wetlands to support breeding amphibian populations. Surveying techniques were in line with those outlined in the Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes

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; and
- Returned to the laboratory for further analysis.

During eDNA testing, the filter is incubated to obtain any DNA within the sample. A polymerase chain reaction (PCR) is performed to identify the DNA of the targeted species, primers are then used to amplify target DNA, allowing it to be detected.

7.4.7 Incidental Recordings

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

7.4.8 Zone of Influence (ZoI)

The Zone of Influence (ZoI) for the proposed Scheme is based on a judgement of the likely extent of the ecological impacts on key ecological receptors. This will vary for different ecological receptors, depending on their sensitivities to environmental change.

In relation to terrestrial habitats, impacts will be limited to the lands within the site 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).

Surface water hydrological connections (e.g., drainage ditches, canals, 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.

In regard to groundwater and groundwater-to-surface water connections, the ZoI is largely determined by the site's underlying bedrock, the soil /sub-soil permeability, and the characteristics of the underlying aquifer(s). 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 7-2, Figure 7-3). 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. Therefore, the groundwater ZoI will be set to 300m given the short discharge characteristics of underlying aquifer.

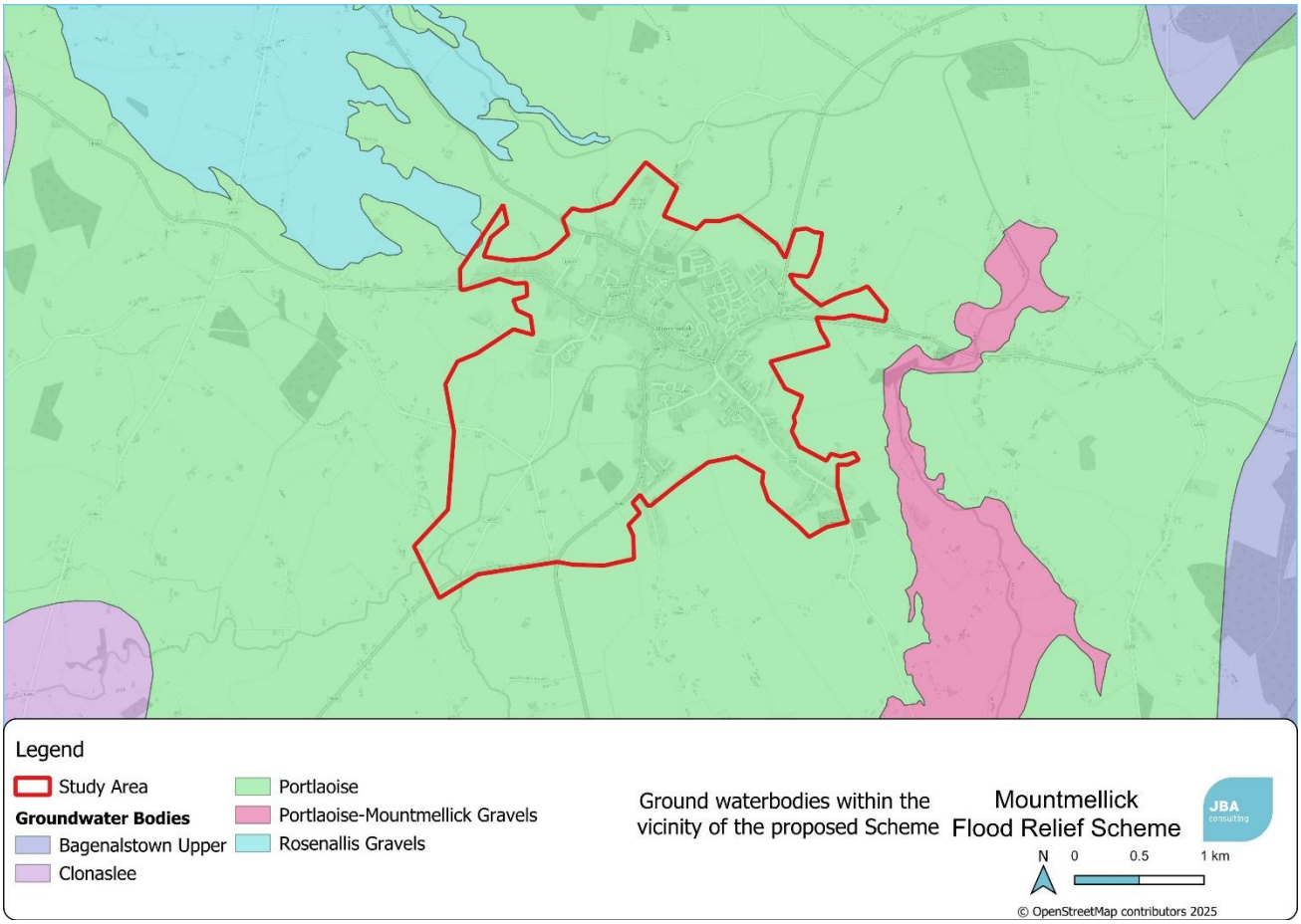


Figure 7-2: Groundwater bodies in the vicinity of site (OSM, 2025)

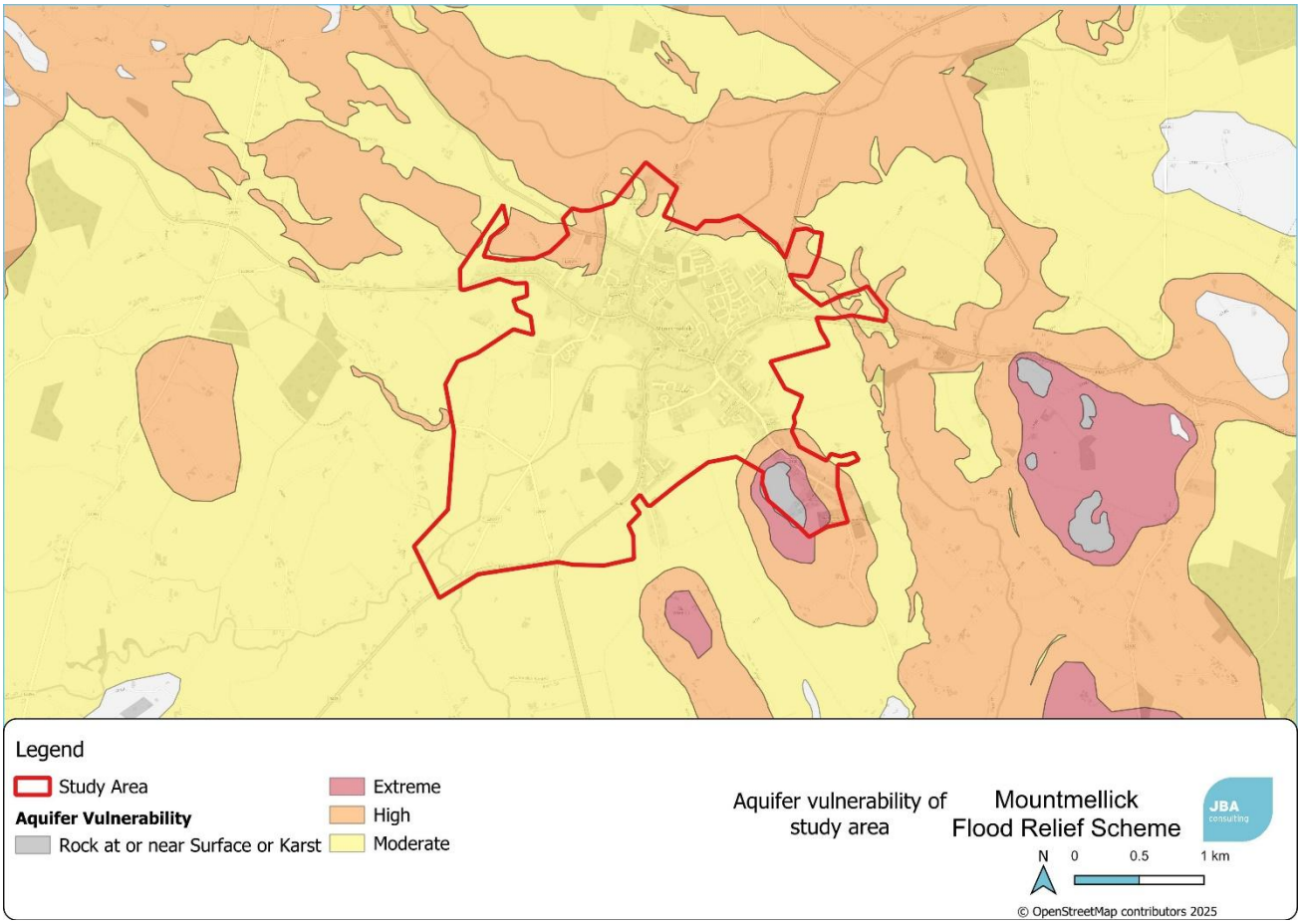


Figure 7-3: Aquifer vulnerability of the study area (OSM, 2025)

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.

In relation to physical (vibration and clearance works); audible and visual disturbance, faunal species will be considered on a species-by-species basis. Generally, smaller mammal species (e.g., Pygmy Shrew) will be given 100m disturbance zones, which is reflective of their relatively small territories. For larger mammals, such as Otter and Badger, a 150m disturbance ZoI can be established given the sensitivity of their resting / breeding location, i.e., holts and setts. A 150m disturbance ZoI has been detailed within best practice guidance documents Guidelines for the Treatment of Otters Prior to the Construction of National Road Schemes (2006a) and Guidelines for the Treatment of Badgers Prior to the Construction of National Road Schemes (2006b).

The ZoI for local bats species is centred around the degradation or removal of foraging and commuting habitats; lighting impacts within and adjacent to footprint of the scheme; as well as the schemes proximity of known bat roosts within the locality. Of the above impacts, the degradation of habitats will be the furthest reaching and will therefore set the ZoI for local bat species impacts. As habitat degradation can potential occur within the surface water, groundwater and air (dust) ZoIs, the ZoI for local bat species will be set to 300m, with the addition of downstream hydrological connections. This ZoI will include areas which are present within local bat species' core sustenance zones (a 3km radius around each of bat roosts) (Collins, 2023).

The ZoI for breeding and wintering bird species is linked with direct habitat loss and degradation within the footprint of the proposed Scheme. Additional adverse impacts for breeding and wintering birds will likely arise from the disturbance from construction works, which can extend 300m. (Cutts et al., 2013).

The ZoI for amphibians (Common Frog and Smooth Newt) is linked to the wetland and freshwater aquatic habitats, which could potentially be degraded as a result of the proposed Scheme. Therefore, the ZoI for these floral / faunal species will mirror that of the groundwater-to-surface water ZoI, i.e., 300m, with the addition of downstream surface water hydrological connections.

The ZoI for freshwater macrophytes, fish and aquatic invertebrates is linked to the wetland and aquatic habitats, which could potentially be degraded as a result of the proposed Scheme. Therefore, the ZoI for these floral / faunal species will mirror that of the groundwater-to-surface water ZoI, i.e., 300m, with the addition of downstream surface water hydrological connections.

The ZoI for terrestrial invertebrates is generally linked with direct habitat loss and degradation, as well as construction and operational disturbances. As the furthest impact pathway that can affect terrestrial habitats is 300m, this will also be the ZoI distance for terrestrial invertebrate species.

All European (Natura 2000) sites within a 15km ZoI of the proposed Scheme were considered, as per guidance in Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (Department of Environment, Heritage, and Local Government, 2010 rev.). This 15km ZoI has also been extended to the NHAs and pNHAs. Within this 15km ZoI a source-pathway-receptor model was used to screen the sites which are present, as per OPR Practice Note PN01 Appropriate Assessment Screening for Development Management (OPR, 2021)[77]. A separate Appropriate Assessment (AA) Screening report (JBA, 2024)[78] has been produced which examines the likely pathways and impacts of the proposed works on these Natura 2000 sites.

7.5 Ecological Baseline

This section summarises the baseline information about the environment within the footprint of the proposed Scheme. This is based on a desk based review of information gathered from existing reports and sources as listed in Section 7.2.3, and outlined in sections 7.5.1 to Section 7.5.9. Data collected during ecological surveys of the study area as listed in Section 7.4 are outlined in Sections 7.5.10 to 7.5.11. The screening for ecological receptors is given at the end of this section in Section 7.5.12.

7.5.1 Designated Nature Conservation Sites

Sites of international importance including Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) are collectively known as Natura 2000 sites. Designated sites, which also include Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs), which are national designations, were also identified within the proposed Scheme's ZoI. The designated search area was 15km from the proposed Scheme boundary for Natura 2000, NHA and pNHA sites Within this buffer the source-pathway-receptor model was used to screen the sites which are present, as per OPR Practice Note PN01 Appropriate Assessment Screening for Development Management (OPR, 2021)[79]European Designated - Natura 2000 Sites (SACs / SPAs)

The proposed site is located within the boundary of the River Barrow and River Nore SAC (Table 7), while it is not connected to other Natura 2000 sites (Figure 7-4). A separate Appropriate Assessment (AA) Screening report (JBA, 2024)[80] has been produced which examines the likely pathways and impacts of the proposed works to Natura 2000 sites within the ZoI.

[77] OPR (2021) '*OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management*'.
[78] JBA Consulting (2024) *Mountmellick Flood Relief Scheme –Screening for Appropriate Assessment*
[79] OPR (2021) 'OPR Practice Note PN01 - Appropriate Assessment Screening for Development Management'.
[80] JBA Consulting (2024) Mountmellick Flood Relief Scheme –Screening for Appropriate
[80] JBA Consulting (2024) Mountmellick Flood Relief Scheme –Screening for Appropriate

Table 7-5: Natura 2000 sites located within the Zone of Influence (ZoI)

Natura 2000 site	Site Code	Approximate Distance from Site	Hydrological Links
River Barrow and River Nore SAC	002162	Within Site	SAC within site
Mountmellick SAC	002141	2.2km	SAC within shared sub-catchment and potentially linked flood zone
Slieve Bloom Mountains SPA	004160	2.9km	No hydrological links present
Mountmellick SAC	002141	3.6km	No hydrological links present
Clonaslee Eskers And Derry Bog SAC	000859	14.7km	No hydrological links present

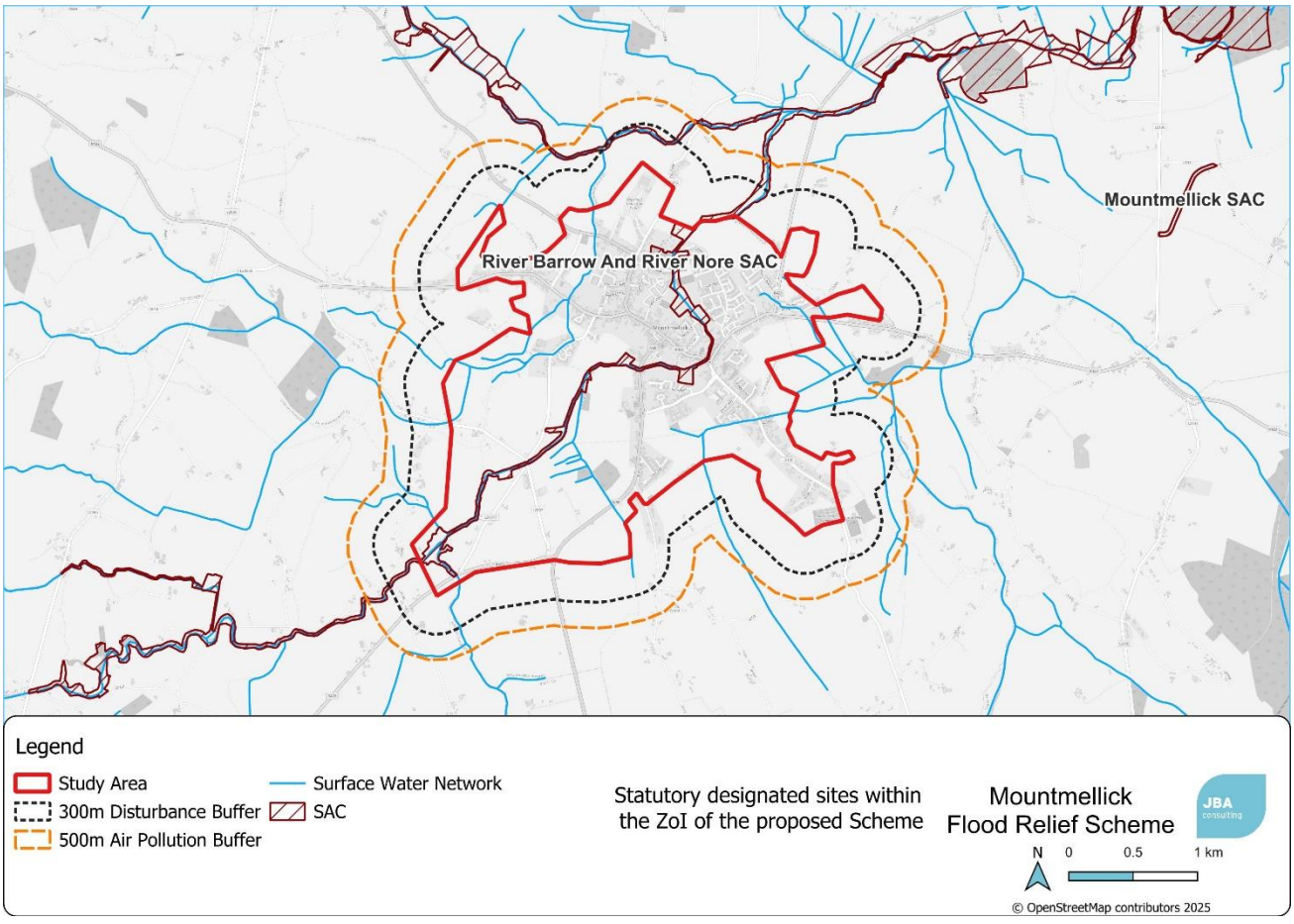


Figure 7-4: Statutory designated sites within the ZoI of the proposed Scheme (OSM, 2025)

7.5.2 Natural Heritage Areas

There are seven pNHAs and one NHA located within the 15km ZoI of the site. These sites are described, with their connections and distance to the proposed Scheme which are highlighted in Table 7. Of these eight sites, one is within Natura 2000 designated sites; this being the Slieve Bloom Mountains pNHA, which is located within

the Slieve Bloom Mountains SAC and Slieve Bloom Mountains SPA. The AA screening (JBA, 2023[81]) assesses these Natura 2000 sites with the conclusion that, due to the site location, prevailing winds, aquifer vulnerability (low) and the nature and scale of the proposed scheme, likely significant effects are not anticipated on Slieve Bloom Mountains SAC and Slieve Bloom Mountains SPA. As the Slieve Bloom Mountains pNHA has the same receptors, the same conclusion as for the SAC and SPA is considered to apply and it is considered not to be impacted.

In addition to the Slieve Bloom pNHA, there are seven other NHAs/pNHAs within 15km of the site. Raheen Bog pNHA is not located within the same sub-catchment as the proposed site. Emo Court pNHAs is partly within the same sub-catchment as the proposed site. Both the Ridge of Portlaoise pNHA and Clonreher Bog NHA are located within the same sub-catchment as the proposed site, however, none of these pNHAs or the NHA are downstream of the proposed flood relief scheme, and they are not considered to be impacted by the proposed works.

[81] JBA Consulting (2023) *Mountmellick Flood Relief Scheme –Screening for Appropriate Assessment*

Table 7-6: pNHAs within 15km of the site and requirement for further assessment

pNHA Site Code	pNHA Site Name	Distance from site	Site Description	Features of Conservation Concern	Screening for further assessment
000412	Slieve Bloom Mountains pNHA	6.8km	The Slieve Bloom Mountains lie on the Offaly-Laois border, starting about 8 km north-east of Roscrea and running about 24 km north-east, towards Clonaslee. This site is remarkable for its mountain blanket bog habitat. Generally uniform in character, the vegetation consists of a deep, spongy mat of the bog moss Sphagnum capillifolium, with other mosses and lichens. Growing on this are Heather *Calluna vulgaris* and Crowberry *Empetrum nigrum*, with smaller amounts of Cottongrasses *Eriophorum* spp., Bilberry *Vaccinium myrtillus*, Deergrass *Scirpus cespitosus* and Bog Asphodel *Narthecium ossifragum*. An unusual feature is the abundance of Bogrosemary *Andromeda polifolia* and Cranberry *Vaccinium oxycoccos*, species usually associated with raised bogs. The uncommon Lesser Twayblade *Listera cordata* occurs under Heather at this site. This extensive site is dominated by blanket bog on a high plateau. However, on more steeply-sloping flanks wet heath vegetation occurs on shallower peat (typically 0.5- 1.5 m deep). The dominant species in the wet heath are Heather and Purple Moorgrass *Molinia caerulea*, with species such as Cross-leaved Heath *Erica tetralix*, Tormentil *Potentilla erecta*, Lousewort *Pedicularis sylvatica* and the bog moss *S. capillifolium* also being frequent components. Often wet heath vegetation is associated with flushed areas along the margins of narrow streams. The site is one of the most important, and most easterly stronghold for the country's population of Hen Harrier. The mix of forestry and open areas provides optimum habitat conditions for this rare bird, which is listed on Annex I of the E.U. Birds Directive. The early stages of new and second-rotation conifer plantations are the most frequently used nesting sites, though some pairs may still nest in tall heather of unplanted bogs and heath.	- Hen Harrier Circus cyaneus - Northern Atlantic wet heaths with *Erica tetralix* [4010] - Blanket bogs (* if active bog) [7130] - Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae) [91E0]	Screened out – SAC & SPA assessed in NIS
000413	Annaghmore Lough Fen (Offaly) pNHA	13.1km	Annaghmore Lough is located approximately 10km south of Tullamore on the Laois – Offaly border. The lake has undergone shrinkage due to natural sediment accumulation or has been accelerated through drainage, however, it has been reduced to a remnant pool limited to barely 2ha large and only a few centimetres deep. This area, that was once a lake, is now a peat accumulating calcareous fen, dominated by sedge species *Carex* spp., Horsetail *Equisetum fluviatile* and Common Reed *Phrafmites australis.* The site also has the presence of vegetation indicative of high-calcium soils including Grass-of-parnussu *Parnassia palustris* and Marsh Helleborine *Epipactis palustris.* North and south of the old lake are tree species colonisig the land, including Willows *Salix* spp. and Downy Birch *Betula pubescens.*	- One of few remaining intact raised bogs in the country	Screened out - no pathwayno impact anticipated
000416	Derries Wood pNHA	9.4km	Derries Wood is located south-west of Ballybrittas and is mainly a disturbed bog habitat of the former floodplain of the River Barrow. The site consists largely of Scots Pine *Pinus sylvestris* to newly planted Sitka Spruce *Picea sitchensis*, with native trees of Downy Birch *Betula pubescens*, Alder *Alnus glutinosa*, Ash *Fraxinus excelsior*, Hawthorn	- Old Bog habitat - *Criorhina ranunculi* - *Chrysops caecutiens*	Screened out - no pathway, no impact anticipated

			Crataegus monogyna and Holly *Ilex aquifolium* occur, beneath which Heather *Calluna vulgaris* and Purple Moor-grass *Molinia caerulea* grow. The site contains a large presence of rare invertebrate species including *Criorhina ranunculi* (Diptera, Syrphidae) in Beechwood and *Chrysops caecutiens* (Diptera, Tabanidae) on old bog habitats		
000574	Clonad Wood pNHA	14.7	Clonad Wood is an area of deciduous woodland situated 5km south of Tullamore. The woodland has a high canopy dominated by Pedunculate Oack *Quercus robur* with underplanting of Beech *Fagus sylvatica* and conifers along with a diversity of native species including the common species Holly *Ilex aquifolium*, Ash *Fraxinus excelsior*, Wych Elm *Ulmus glabra*, Hazel *Corylus avellana*, Spindle *Eunonymus europaeus*, Guelder-rose *Viburnum opulus* and Field-rose *Rosa arvensis,* along with the rarer species Alder Buckthorn *Frangula alnus*, Bird Cherry *Prunus padus* and Irish Whitebeam *Sorbus hibernica.*	- Deciduous woodland. - Fragments of relic broadleaf forest - Common and rare native tree species	Screened out - no pathway, no impact anticipated
000865	Emo Court pNHA	7.1km	Emo Court is an area within the Emo desmesne, 7km south of Portarlington, Co. Laois. It contains a large mixed woodland, a freshwater lake, parkland and amenity grassland which are surrounded by rich agricultural land and conifer plantations. Emo Lake is a medium sized, artificial, freshwater shallow lake. It has an extensive fringe of reedbeds, while having sparse aquatic flora, but rich bird and invertebrate fauna. A previous study indicated the presence of the *Cladocera* species *Scapholeberis mucronata* and *Disparalona rostrata*, and the *Copepoda* species, *Eudiaptomus gracilis*. The lake is surrounded on three sides by a semi-natural woodland comprised of a mix of native and non-native deciduous and coniferous species. On the south-west shore of the lake, large parkland and gardens occur. This area, known as the Grapery, is comprised of a collection of native and introduced species. Emo Court is one of the few remaining vestiges of mature climax forest in this region.	- Freshwater Shallow Lake - *Scapholeberis mucronata* - *Disparalona rostrata*, - *Eudiaptomus gracilis*	Screened out - no pathway, no impact anticipated
000867	Kilteale Hill pNHA	10.7km	Kilteale Hill is a small limestone outcrop located approximately 3km north-west of Stradbally. The site primarily consists of a Hazel (Corylus avellana) wood with Ash *Fraxinus excelsior*, Blackthorn *Prunus spinosa* and Elder *Sambucus nigra*. There are patches of gorse *Ulex* spp. and Bracken *Pteridium aquilinum* scrub also present throughout the site.	- Limestone outcrop - Remnants of old Hazel woodland	Screened out - no pathway, no impact anticipated
000876	Ridge of Portlaoise pNHA	3.3km	The ridge of Portlaoise is a highly wooded esker of sand and gravel originating from the last period of glaciation. Tree cover in this area contains a predomination of Scots Pine, Hazel *Corylus avellana* and Ash with other native species occasionally present. Ground flora of note within this area is the Nettle-leaved Bellflower *Campanula trachelium*, which was previously listed on the Flora Protection Order of 1987, however, is no longer present on the Flora Protection Order 2022. An additional rare floral species within this area is Blue Fleabane *Erigeron acer*, a plant of notable decline.	- Esker Habitat - Nettle-leaved Bellflower *Campanula trachelium* - Blue Fleabane *Erigeron acer*	Screened out - no pathway, no impact anticipated
000878	Rock of Dunamase	10.1km	The Rock of Dunamese is a fort located one location in a string of small prominent limestone outcrops within the region, located approximately 8km south of Portlaoise. In the surrounding grounds of	- Meadow grassland and shallow limestone soil vegetation	Screened out - no pathway, no impact

	pNHA		the fort are the common grass species including Crested Dog's-tail *Cynosurus cristatus*, False Oat-grass *Arrhenatherum elatius*, Cock's-foot *Dactylis glomerata* and Downy Oat-grass *Helictotrichon pubescens*. There are areas of large limestone bouldters on areas of very shallow limestone soil with higher grass diversity including Quaking-grass *Briza media*, Fern-grass *Catapodium rigidum* and Heath-grass *Danthonia decumbens* grow. This area also has non-grass species including Lady's Bedstraw *Galium verum* and Hedgerow Crane's-bill *Geranium pyrenaicum* and a rich bryophyte flora. A dense Hazel *Corylus avellana*, Hawthorn *Crataegus monogyna* and Beech *Fagus sylvatica* scrub surrounds the site	- Hazel Scrub	anticipated
000881	The Great Heath of Portlaoise pNHA	7.2km	The Great Heath of Portlaoise is an area of mainly acidic grassland with typical acidic tolerant species including Sweet Vernal-grass *Anthoxanthum odoratum*, Creeping Bent *Agrostis stolonifera*, Common Bent *Agrostis capillaris*, and Red Fescue *Festuca rubra,* with various herbs typical of acidic places, such as Heath Bedstraw *Galium saxatile*, Tormentil *Potentilla erecta* and Bitter-vetch *Lathyrus linifolius*.and mosses. There are two wetlands within the site, Bog Lough with various sedge species *Carex* spp, and a fen in the west of the site, with notable species of these areas including Few-flowered Spike-rush *Eleocharis quinqueflora* and Fen Bedstraw *Galium uliginosum.*	- Lowland acidic grassland - Few-flowered Spike-rush *Eleocharis quinqueflora* - Fen Bedstraw *Galium uliginosum*	Screened out - no pathway, no impact anticipated
000917	Raheen Lough pNHA	9.4km	Raheen Lough is located north of Mountmellick, set in pasture grazed by cattle and sheep with an inflowing stream present. This site is of interest for the numbers and variety of locally infrequent wildfowl and waders.	- Whooper Swans *Cygnus cygnus* - Goldeneye *Bucephala clangula* - Pochard *Aythya ferina* - Mallard *Anas platyrhynchos* - Shoveler *Spatula clypeata* - Pintail *Anas acuta* - Greenshank *Tringa nebularia* - Jack Snipe *Lymnocryptes minimus* - Purple Sandpipers *Calidris maritima* - Heron *Ardea cinerea* - Kingfisher *Alcedo atthis* - Great Crested Grebe *Podiceps cristatus* - Little Grebe *Tachybaptus ruficollis*	Screened out - no pathway, no impact anticipated
001494	Dunamase Woods pNHA	9.4km	Two prominent features of this woodland are the small, prominent hills with an underlying sheet of limestone. These areas are expected to be unconfirmed historical planted woodlands rather than ancient woodlands, but are a strong woodland habitat community of Pedunculate Oak *Quercus robur*.	- Healthy locally important woodlands	Screened out - no pathway, no impact anticipated
002355	Hawkswood Bog NHA	13.5km	Hawkswood Bog is located approximately 5km south of Tullamore, comprised of a raised bog of both high bog and cutover bog and adjoins Clonard Woods to the west. The raised bog is at the southern extreme of the range of raised bogs in the country, with pools present and is still wet and quaking in areas	- Raised Bog - Wet and quaking bogs - Hummock, Lawn and Pool habitats - Snipe *Gallinago gallinago*	Screened out - no pathway, no impact anticipated

			of little drainage and forestry. The bog has typical vegetation including hummocks of bog mosses *Sphagnum* spp present. The boglands adjoin an area of wet flush of Common Reed *Phragmites australis* and Heathers *Erica* spp. present, with some tree species Birch *Betula* spp. and *Scots Pine* encroaching the lands		
002357	Clonreher Bog NHA	2.5km	Clonreher Bog is located south of Mountmellick, comprised of both high bog and cutover bog, with typical Midland Raised Bog vegetation, including bog mosses *Sphagnum* spp, Heather *Calluna vulgaris*, Cross-leaved Heath *Erica tetralix*, Deergrass *Scirpus cespitosus*, Bog Asphodel *Narthecium ossifragum* and Bog Rosemary *Andromeda polifolia*.	- Peatlands - Bogland vegetation	Screened out - no pathway no impact anticipated

7.5.3 Other Designated Sites

No other designated sites, such as Ramsar sites, are present within the ZoI 15km of the proposed Scheme.

7.5.4 Protected Species

Records of protected fauna including birds, amphibians, fish and mammals collated from the National Biodiversity Data Centre (NBDC, 2023)[82] database, present within 10km of the flood relief scheme area since 2013 are listed in the Appendix 7.1. This table includes their level of protection, if they are red or amber listed on the International Union for the Conservation of Nature and Natural Resources (IUCN) Red List and the date of the last record of this species at this location. In addition to NBDC records, additional resources including Flora Protection Order mapping and BSBI mapping for endangered flora, i-Webs survey sites for wintering birds, NPWS for Badger, and Batlas for bat species were consulted. Relevant data from these sources is included in the Ecological Baseline survey section on protected species (see Section 7.5.10).

7.5.5 Invasive Non-native Species

The Records of Invasive Non-native Species (INNS) collated from the NBDC (2023) database, present within 10km of the proposed flood relief scheme since 2013 are listed in Appendix 7.2.

7.5.6 Catchment Water bodies

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 water body), while the River Pound (Barrow_040 water body) and the Clontygar Stream (Triogue_040 water body) will also be affected by the development. All three of these rivers drain into the main body of the River Barrow (Figure 7-5).

Other water bodies that are located within the vicinity of the proposed Scheme include 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.

[82] National Biodiversity Centre (2023) *Biodiversity Maps - Map Viewer* [online], National Biodiversity Data Centre Biodiversity

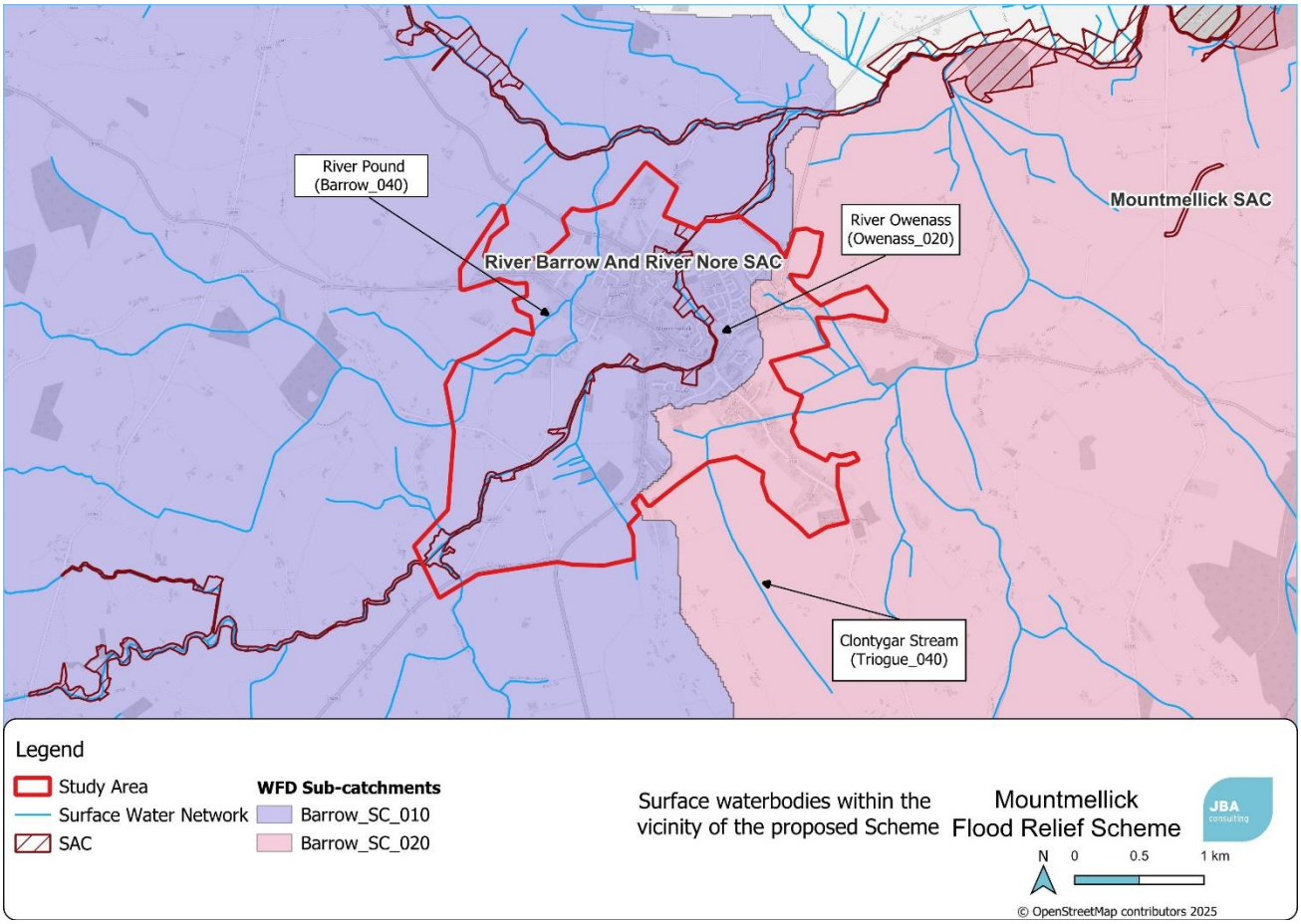


Figure 7-5: Surface water bodies within the vicinity of the proposed Scheme

7.5.7 Water Framework Directive

In response to the increasing threat of pollution and the increasing demand from the public for cleaner rivers, lakes and beaches, the EU developed the Water Framework Directive (WFD). This Directive is unique in that, for the first time, it establishes a framework for the protection of all waters including rivers, lakes, estuaries, coastal waters and groundwater, and their dependent wildlife/habitats under one piece of environmental legislation for all European member states.

The WFD (Directive 2000/60/EC) is a substantial piece of EU water legislation that came into force in 2000. The overarching objective of the WFD is for the water bodies in Europe to attain Good or High Ecological Status. The Environment Protection Agency (EPA) is the competent authority in Ireland responsible for delivering the WFD. River Basin Management Plans (RBMP) have been created which set out measures to ensure that water bodies in the country achieve 'Good Ecological Status'.

Good Ecological Status will depend on the quality of the individual quality elements on which the Ecological status is scored; namely the biological, chemical, and morphological condition in a particular water body. Any reduction in any of these elements will result in a reduction of the overall ecological status.

7.5.8 Water Framework Status and Objectives

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)[83]. Changes from previous RBMPs 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 first cycle of RBMPs included the Eastern River Basin District - RBMP 2009 – 2015 (WFD, 2010). The plan summarised the water bodies 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 plan 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; and
- Reduce chemical pollution of water bodies.

The River Basin Management Plan for Ireland (2018-2021) outlines the new approach that Ireland will take to protect our waters over the period to 2021. It builds on lessons learned from the first planning cycle in a number of areas:

- Stronger and more effective delivery structures have been put in place to build the foundations and momentum for long-term improvements to water quality: and
- A new governance structure, which brings the policy, technical and implementation actors together with public and representative organisations. This will ensure the effective and coordinated delivery of measures.

Ireland's third River Basin Management Plan 2022-2027 was out for public consultation until March 31st 2022. The Consultation report was published in July 2022 (DHLGH, 2022[84]). Following review of the submissions, Ireland's third River Basin Management Plan for Ireland - 'Water Action Plan 2024: A River Basin Management Plan' (DoHLGH, 2024[85]) was published. The Water Action Plan sets out the measures that are necessary to protect and restore water quality in Ireland. The overall aim of the plan is to ensure that our natural waters are sustainably managed and that freshwater resources are protected so as to maintain and improve Ireland's water environment. The 3rd cycle Catchment Reports were published in 2024. The Catchment Reports provide a summary of the water quality assessment outcomes for respective catchments, including status and risk categories, significant threats and pressures, details on protected areas and a comparison between cycle 2 and cycle 3.

The final 3rd cycle Catchment Reports published in May 2024 (EPA, 2024)[86]. The Catchment Reports provide a summary of the water quality assessment outcomes for respective catchments, including status and risk categories, significant threats and pressures, details on protected areas and a comparison between cycle 2 and cycle 3.

[83] DoHLGH (2018a) '*Draft River Basin Management Plan for Ireland 2018-2021'*, available: http://www.housing.gov.ie/water/water-quality/river-basin-management-plans/river-basin-management-plan-2018-2021 [accessed 28 Nov 2022].

[84] Department of Housing, Local Government and Heritage (2022) *Third Cycle Draft River Basin Management Plan 2022-2027 – Consultation Report*, available https://www.gov.ie/en/publication/56b71-third-cycle-draft-river-basin-management-plan-2022-2027-consultation-report/

[85] Department of Housing, Local Government and Heritage (2024), Water Action Plan 2024 A River Basin Management Plan for Ireland, available https://www.gov.ie/en/policy-information/8da54-river-basin-management-plan-2022-2027/

[86] EPA (2024) Third Cycle Catchment Assessments, available https://www.catchments.ie/data/#/?_k=u1izjj

The entirety of the proposed project is located within the WFD Barrow catchment and is split between the Barrow_SC_010 and Barrow_SC_020 sub-catchments (EPA, 2023)[87]. There are three watercourses located within the area of the proposed Scheme, being the Owenass_020 and Barrow_040 which flow north through the site, and the Triogue_040 which flows in from the south, before diverting to the east, and finally flowing north, while all three of these rivers drain into the main body of the River Barrow.

Other water bodies that are located within vicinity of the proposed Scheme include additional segments of the River Barrow (including Barrow_040 through to Barrow_060).

All of these water bodies, along with their WFD status (2016-2021) and current risk are listed in Table 7-7.

Table 7-7: WFD status and risk of local watercourses

WFD Sub-Catchment	WFD Watercourse	WFD Status	WFD Risk	Approx. Distance from proposed Scheme
Barrow_SC_010	Barrow_040	Moderate	At Risk	Within site
	Owenass_020	Moderate	At Risk	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

7.5.9 Groundwater

The majority of the site is located within the Portlaoise groundwater body, with a small section within the Rosenallis Gravels groundwater body (Figure 7-2). 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. The soil is derived of sections of Made Ground, till derived chiefly from limestone, and alluvial soils deposited along the banks of the river water bodies, while the areas around the town's boundary, along the east and north are listed to consist 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 7-2). 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% (GSI, 2023)[88].

The aquifer within the underlying bedrock of the entirety of the townland is considered to be a 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.

7.5.10 Ecological Baseline Surveys- Habitats

The initial ecological walkover was conducted on 26th of September 2019 by JBA Ecologists, with updated surveys carried out on the 28th of April and 11th of May 2022, and 12th of June 2023. Descriptions of habitats and associated species are provided in the sub-sections below.

[87] EPA (2023) EPA Maps [online], *Next Generation EPA Maps*. Available online at: https://gis.epa.ie/EPAMaps/

[88] GSI, 2023. Geological Survey Ireland Spatial Resources website. Available online at: https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c 228

Habitats recorded during the surveys are listed in Table 7 and descriptions are provided in the sections below. Habitats that have been assessed in the accompanying NIS are indicated. An overview of habitats found throughout the scheme is shown in Figure 7-6 (northern area of site) and Figure 7-7 (southern area).

Table 7-8: Habitats recorded during site visit

Habitat	Fossitt Code	Linked Annex Habitats and Species	Assessed in the NIS?
Arable crops	BC1	-	No
Stone walls and other stonework	BL1	-	No
Buildings and artificial surfaces	BL3	-	No
Other artificial lakes and ponds	FL8	Otter *Lutra lutra* [1355]	Impact regarding Otter - Yes
Depositing / lowland rivers	FW2	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 *Austropotamobius pallipes [1092]*	Yes
Drainage ditches	FW4	-	No
Improved agricultural grassland	GA1	-	No
Mosaic: Improved agricultural grassland / Scrub	GA1 / WS1	-	No
Amenity grassland (improved)	GA2	-	No
Dry meadows and grassy verges	GS2	-	No
Mosaic: Dry meadows and grassy verges / Scrub	GS2 / WS1	-	No
Mosaic: Wet grassland / Improved agricultural grassland	GS4 / GA1	-	No
(Mixed) broadleaved woodland	WD1	-	No
Mixed broadleaved / conifer woodland	WD2	-	No
Hedgerows	WL1	Otter *Lutra lutra* [1355]	Parts occurring within the SAC - Yes
Mosaic: Hedgerows / Scrub	WL1 / WS1	Otter *Lutra lutra* [1355]	Parts occurring within the SAC - Yes
Treelines	WL2	Otter *Lutra lutra* [1355]	Parts occurring within the SAC - Yes
Wet willow-alder-ash woodland	WN6	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0]	No
Scrub	WS1	Otter *Lutra lutra* [1355]	Parts occurring within the SAC - Yes

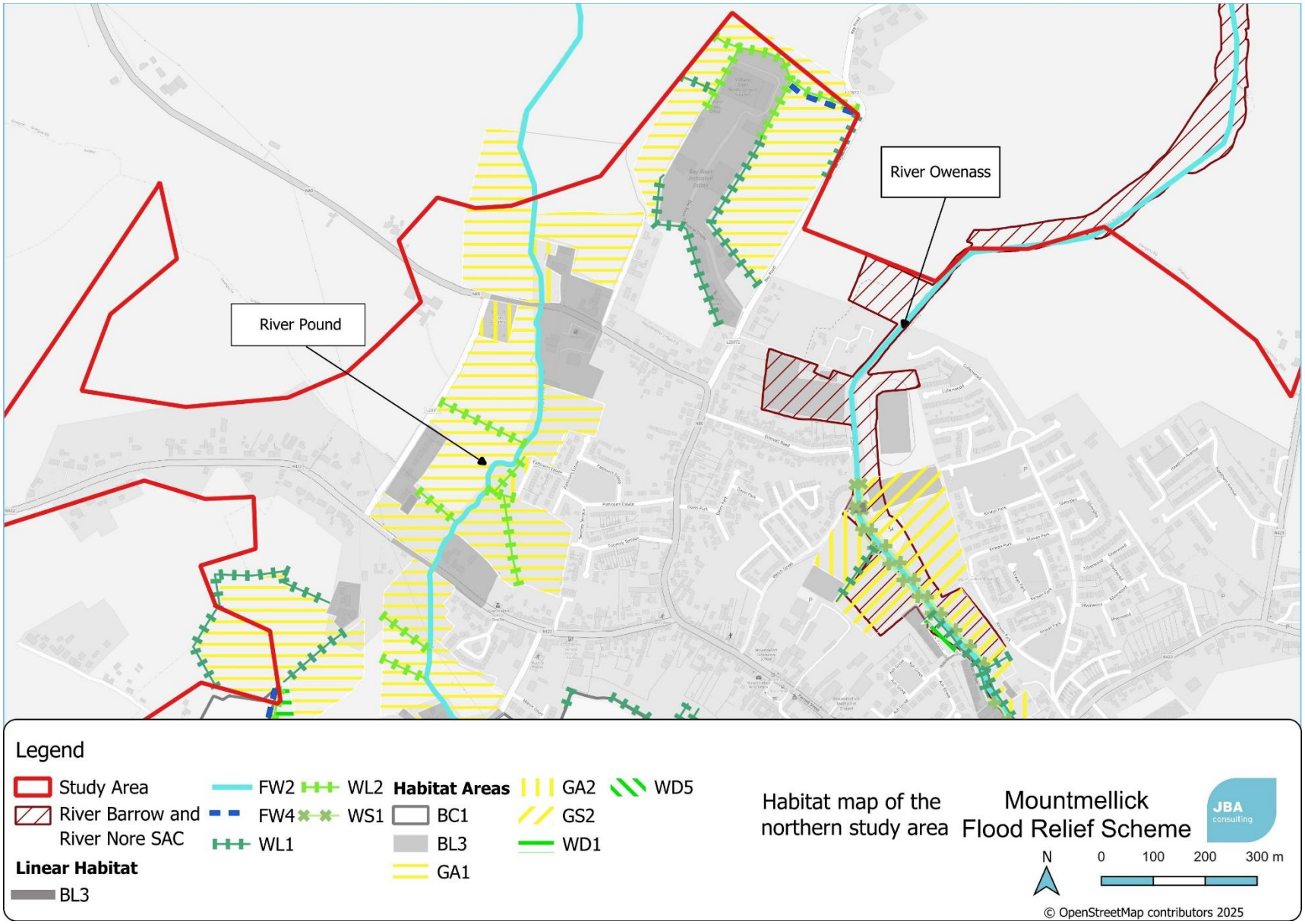


Figure 7-6: Habitat map of the northern study area

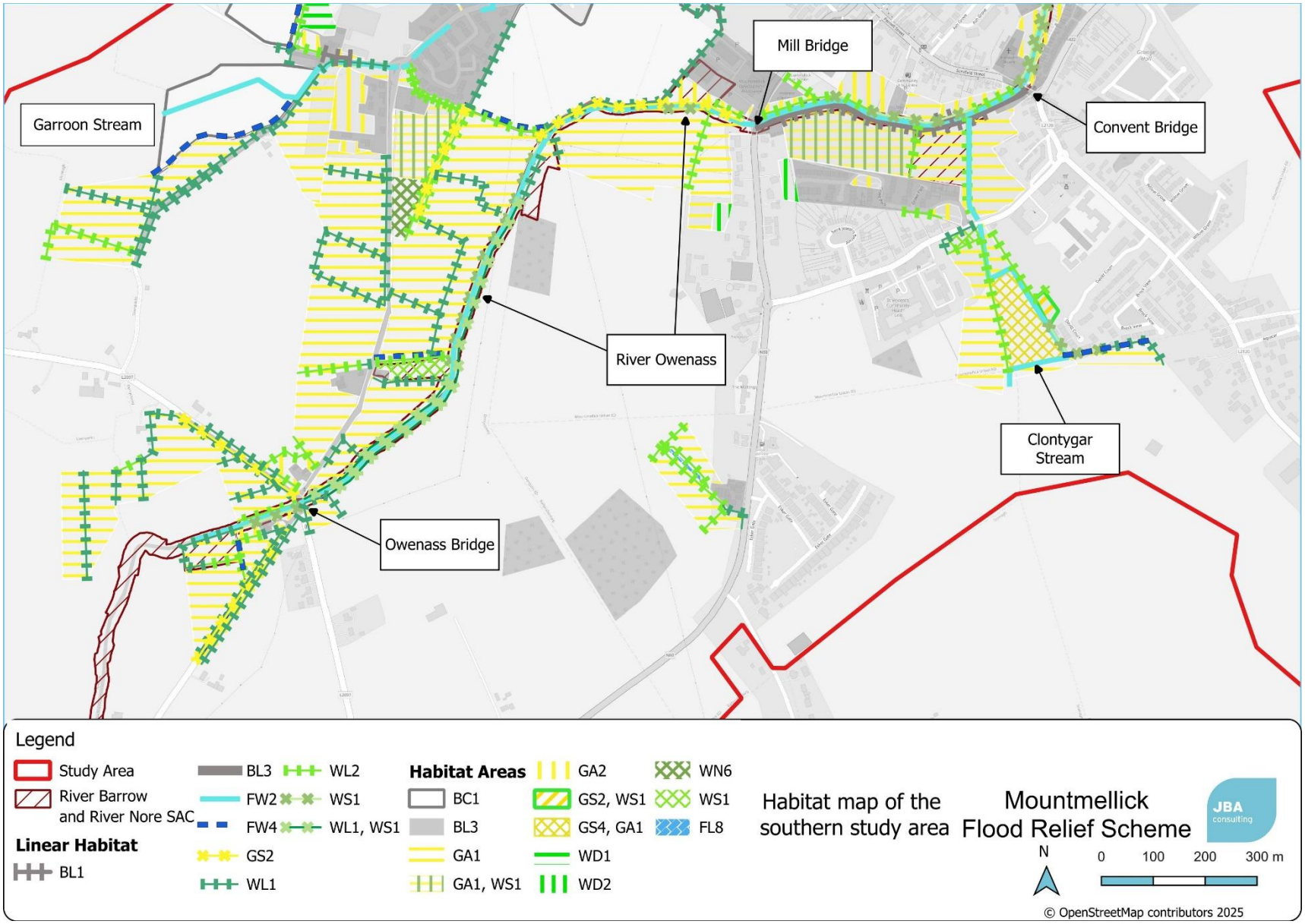


Figure 7-7: Habitat map of the southern study area

7.5.10.1 Arable crops (BC1)

Arable crops were recorded within the south-western outskirts of Mountmellick town, adjacent to the River Owenass and River Pound in the south.

These areas are considered to be of **less than lower local ecological importance** given the unsuitability of the of the areas to support ecological features due to the intensively managed and disturbed nature of the habitats.

7.5.10.2 Stone walls and other stonework (BL1)

The Owenass Bridge located in the south-west of the site is an old stone-work bridge. This bridge is not currently covered by vegetation.

Given the lack of species on the bridge wall the Owenass Bridge is considered to be of **less than local ecological importance**.

A section of River Owenass that runs between the Mill Bridge and Convent Bridge is bounded by a walkway and a stonewall (Plate 7-1). The stonewall supports a range of flora including moss species *Rachomitrium* spp., *Tortula* spp., *Fissidens* spp., *Thamnobrium* spp., *Andreaea* spp., as well as Maidenhair Spleenwort *Asplenium trichomanes*, Irish Ivy *Hedera hibernica*, Ivy-leaved Toadflax *Cymbalaria muralis*, Herb Robert *Geranium robertianium*, Cleavers *Galium aparine*, Ragwort *Jacobaea vulgaris*, Nipplewort *Lapsana communis*, Shiny Crane's-bill *Geranium lucidum*, Common Polypody *Polypodium vulgare*, Field Horsetail *Equisetum arvense*, False Oat-grass *Arrhenatherum elatius*, Creeping Cinquefoil *Potentilla reptans*, Bramble *Rubus fructicosus* agg,, Woody Nightshade *Solanum dulcamara*, Cock's-foot *Dactylis glomerata* and Rosebay Willowherb *Chamaenerion angustifolium*.



Plate 7-1: The vegetated stonewall along the River Owenass walkway

Given the diversity of the species within the wall and its uniqueness of the habitat within the area, the wall is considered to be of **high local ecological importance**.

7.5.10.3 Buildings and artificial surfaces (BL3)

This habitat refers to the man-made structures and artificial surfaces which occur throughout the proposed development area, such as pedestrian footpaths, cement bridges (Mill Bridge and Convent Bridge), cycleways, roads, car parks, buildings, and playground.

These areas lack natural, vegetated surfaces, provide minimal ecological function and are considered to be of **less than local ecological importance**.

7.5.10.4 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 (Plate 7-2).

This area is considered to be of **high local ecological importance** given uncommon presence of ponds allowing for a distinct vegetative community within the Scheme's study area.



Plate 7-2: A small linear pond enclosed by two bordering treelines

7.5.10.5 Depositing / lowland rivers (FW2)

The River Owenass displays a mixture of eroding and deposition characteristics within the study area. The in-stream 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 in-stream vegetation (Plate 7-3 and Plate 7-4).

Floral species present on the riverbanks include Hedge Bindweed *Calystegia sepium*; vetches *Vicia* spp.; Bramble; Herb Robert; Ribwort Plantain *Plantego 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; Thistle *Cirsium* spp.; Meadowsweet *Filipendula ulmaria*; Reed Sweet-grass *Glyceria maxima*; Dock *Rumex*

spp.; and the invasive non-native species Montbretia *Crocosmia x crocosmiiflora*; Snowberry *Symphoricarpos albus*; and Travelers Joy *Clematis vitalba*.

Tree species occur along the riverbanks, including Willow *Salix* spp.; Ash *Fraxinus excelsior*; Black Poplar *Populus nigra*; Alder *Alnus glutinosa*, and the invasive tree species Sycamore *Acer pseudoplatanus.*

The River Owenass is considered to be of **international level ecological importance** as it forms part of the main structure of the River Barrow and River Nore SAC, while facilitating the presence of QI species.



Plate 7-3: The River Owenass upstream of Owenass Bridge



Plate 7-4: 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 (Plate 7-5). In-stream vegetation is abundant and include Fool's-water-cress *Helosciadium nodiflorum*, Duckweed spp. and Starwort *Callitriche* spp. Riverbank vegetation comprises Dock spp.; 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.



Plate 7-5: The River Pound

The River Pound is considered to be of **county level ecological importance**, given its downstream links to the River Barrow and River Nore SAC, and the presence of species of international importance including the QI Otter, and the foraging potential for bat species including Daubenton's Bat *Myotis daubentonii*.

7.5.10.6 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 (Plate 7-6).

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



Plate 7-6: The low-energy, channelised section of the Clontygar Stream

The river is considered to be of **high local ecological importance**, given the downstream links to the River Barrow and River Nore SAC, and the potential of species of high importance including fish, and the foraging potential for bat species including Daubenton's Bat.

7.5.10.7 Drainage ditches (FW4)

There are additional smaller drainage ditches scattered along the southern half of the study area, all of which connect to either the River Owenass or River Pound. There is also one other drainage ditch along the northern border of the study area. The floral assemblage of these drainage ditches typically includes Duckweed spp.; Fool's-water-cress; Great Willowherb; Nettle; Hogweed and Cleavers.

These drains are considered to be of **high local ecological importance**, given the minor links to the River Barrow and River Nore SAC, local fish species, and the foraging potential for bat species including Daubenton's Bat.

7.5.10.8 Improved agricultural grassland (GA1)

The majority of the land within the study area is improved agricultural grassland. These habitats are dominated by species such as Perennial Rye-grass *Lolium perenne* and Yorkshire-fog *Holcus lanatus*, with occasional Meadow Foxtail *Alopecurus pratensis*; Cock's-foot; and Soft Rush *Juncus effusus*. Other floral species present include Creeping Buttercup *Ranunculus repens*; Dandelion *Taraxacum* spp.; Meadow Buttercup *Ranunculus acris*; Common Knapweed; Nettle; Ribwort Plantain; Ragwort; Dock spp.; Creeping Thistle *Cirsium arvense*; Greater Plantain *Plantago major*; Hogweed; Crosswort *Cruciata laevipes*; Pineappleweed *Matricaria discoidea*; Rosebay Willowherb; Daisy *Bellis perennis*; Meadowsweet; Cow Parsley; and some sporadic Gorse *Ulex europaeus* and Bramble.

These fields are considered to be of **less than local ecological importance**, given their primary function for agricultural resources and the few ecological features present.



Plate 7-7: Improved agricultural grassland bounded by stonewall and a walkway next to the river

7.5.10.9 Mosaic: Improved agricultural grassland, Scrub (GA1, WS1)

Scrub species were observed encroaching in some agricultural grasslands, with dense patches of Gorse; Bramble; Thistle spp.; Great Willowherb.

The scrub along these fields is considered to be of **high local ecological importance**, given the variability it adds in a landscape otherwise dominated by improved agricultural grassland, along with its provisions of nesting and foraging for birds, bats and mammals beside areas otherwise occupied by agriculture.

7.5.10.10 Amenity grassland (improved) (GA2)

Amenity grassland in the study area includes private gardens, sportsgrounds; cemetery lands; and public amenity areas such as children's playground. Floral species composition with these grassland habitats was typically comprised of Perennial Rye-grass; Yorkshire Fog; Cock's-foot; Nettles; Dandelion spp.; White Clover *Trifolium repens*; Daisy; Thistle spp.; and Dock spp. The invasive Japanese Knotweed *Reynoutria japonica* and Traveller's Joy *Clematis vitalba* were also recorded along the borders of two gardens.

These grassland areas are considered to be of **less than local ecological importance**, given their primary function for amenity resources and the few ecological features present.

7.5.10.11 Dry meadows and grassy verges (GS2)

Dry grassy verge habitat is relatively frequent within the southern section of the study area. These dry grass verge habitats contained a range of floral species including Cock's-foot; False Oat-grass; Perennial Rye-grass; Hogweed; Bramble; Broomrape *Orobanchaceae* spp., Field Horsetail;

Meadowsweet; Common Knapweed; Ribwort Plantain; Self-heal *Prunella vulgaris*; Guelder-rose *Viburnum opulus*; Dog-rose; Dogwood *Cornus sanguinea*; Bush Vetch *Vicia sepium*; Dandelion spp.; Ribwort Plantain; Cowslip *Primula veris*; Meadow Buttercup; Yarrow; Bird's-foot Trefoil *Lotus corniculatus*; Columbine *Aquilegia vulgaris*; Hairy Vetch *Vicia villosa*; Red Clover *Trifolium pratense*; Creeping Buttercup; Lords-and-Ladies *Arum maculatum*; Field Maple *Acer campestre* saplings; Cleavers; Nettle; Creeping Cinquefoil; and Cuckoo-flower.

Sporadic patches of the invasive non-native species Three-cornered Garlic *Allium triquetrum* were present in these grassy verges.

In the north-eastern section of the study area, an extensive dry meadow dominates the lands on the right bank (Plate 7-8). Floral species present within this habitat include Creeping Buttercup; Meadow Buttercup; White Clover; Silverweed *Potentilla anserina*; Ribwort Plantain; Smooth Bent *Agrostis capillaris*; Common Knapweed, Dock, Daisy, Yorkshire Fog, Lesser Stitchwort *Stellaria graminea*; Red Clover; Ragwort; Field Forget-me-not *Myosotis arvensis*; Hedge Mustard *Sisymbrium officinale*, Smooth Brome *Bromus racemosus*, Nettle, False Oat-grass, Ragwort, Cock's-foot, Greater Plantain, Hogweed, Red Fescue Fest*ucas rubra*, Clustered Dock *Rumex conglomeratus*, Cleaver, Perennial Ryegrass, Bramble, Silverweed, Thistle, Goat's-beard *Tragopogon pratensis*, Toothpick Weed *Visnaga daucoides*, Field Horsetail, Creeping Cinquefoil, Yarrow, Bramble, Creeping Thistle, Brome *Bromus* spp., Lesser Trefoil *Trifolium dubium*, Lady's Bedstraw *Galium verum*, Square-stalked St John's Wort *Hypericum tetrapterum*, and Dog Rose.

These fields are considered to be of **high local ecological importance**, given their increased floral diversity while additionally provide foraging opportunities for local bats, ground-dwelling mammals, birds and terrestrial invertebrates within the townland, in contrast to the agricultural areas that otherwise have little ecological value.



Plate 7-8: Large dry meadow in north-easternmost surveyed study area

7.5.10.12 Dry meadows and grassy verges / Scrub (GS2/WS1)

There is one section of scrub and dry meadow mosaic adjacent to the Clontygar Stream. The grassland species are similar to those mentioned in the above sub-section, while the scrub species consisted of Willow spp., Bramble, Great Willowherb, Blackthorn *Prunus spinosa*, and Alder.

The scrub along these grasslands are considered to be of **high local ecological importance**, the variability they add to the habitats present in the area, and given their provisions of nesting and foraging for birds, bats and mammals adjacent to areas of floral diversity which provides areas of foraging, nesting, and commuting.

7.5.10.13 Mosaic: Wet grassland / Improved agricultural grassland (GS4 / GA1)

West of the Clontygar Stream, as it flows north towards the River Owenass, lies a pastural grassland that contains similar species to the other improved agricultural grasslands, but it also contains patches of Soft Rush, Marsh Thistle *Cirsium palustre*, Meadowsweet and Marsh Marigold *Caltha palustris* (Plate 7-9) giving a wet grassland – improved agricultural grassland mosaic.

These areas of wet grassland are considered to be of **less than local ecological importance**, given their low species diversity and limited contribution to local wildlife.



Plate 7-9: Wet and improved agricultural grassland mosaic

7.5.10.14 (Mixed) broadleaved woodland (WD1)

A small mixed broadleaved woodland is located north of Manor Road, along the western boundary of the study area. This habitat is dominated by Beech *Fagus sylvatica*, with an understorey of Bramble; Ivy; Herb-Robert *Geranium robertianum*; Elder *Sambucus nigra*; and Nettle.

This small pocked of mixed broadleaved woodland is considered to be of **high local ecological importance presence** as the only broadleaved habitat located within the Scheme's boundary.

7.5.10.15 Mixed broadleaved / conifer woodland (WD2)

There are two small woodland patches in the centre of the study area, south of Mill Bridge. These woodland patches contain a mixture of broadleaved and conifer species including Hawthorn, Bramble, Honeysuckle *Lonicera periclymenum*, Beech, Scots Pine *Pinus sylvestris*, Leyland Cypress *Cupressus × leylandii*, Elder, and the invasive Sycamore and Cherry Laurel *Prunus laurocerasus*.

These small woodlands pockets are considered to be of **high local ecological importance** given the presence of a woodland community of trees not present within the rest of the Scheme's boundary, such as Scots Pine.

7.5.10.16 Hedgerows (WL1)

Hedgerows occur along roadsides, riverbanks, and field boundaries throughout much of the study area (Plate 7-10). 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* spp., Bramble, Meadowsweet, Blackthorn, Cleavers, Hogweed, Bush Vetch, and the invasive Sycamore and Snowberry.



Plate 7-10: One of the roadside hedgerows, which will run parallel to one of the proposed western embankments

These hedgerows contain strong communities of Hawthorn, Ash, Elm and Holly, while also providing links and connections within the ecological network and as such they are considered to be of **high local ecological importance**.

7.5.10.17 Mosaic: Hedgerows / Scrub (WL1 / WS1)

Mixed hedgerow and linear scrub sections 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., Common Field-speedwell *Veronica persica*, Creeping Cinquefoil, Holly, Meadowsweet, Harts-tongue Fern *Asplenium scolopendrium*, Nettle, Cleavers, Lesser Celandine *Ficaria verna* subsp. *verna*, Dandelion spp., Cow Parsley, Dock spp., Meadow Foxtail, Perennial Ryegrass, Cock's-foot, Snowberry, Common Sorrel *Rumex acetosa*, Hazel *Corylus avellana*, Meadow Buttercup, Creeping Buttercup, False Oat-grass, Yorkshire Fog, Creeping Thistle, Alpine Rose *Rosa pendulina*, Sycamore, Soft Shield-fern *Polystichum setiferum*, Great Willowherb, and Hedge Speedwell *Veronica chamaedrys*.

Within these verges White-tailed Bumblebee *Bombus lucorum* was recorded

These hedgerows and scrub communities contain both tree and floral diversity within the site and are are considered to be of **high local ecological importance**.

7.5.10.18 Treelines (WL2)

Treelines appear mainly along field boundaries (Plate 7-11) 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* spp., Sycamore, Bramble, Dog-rose, Elder, Nettle, Great Willowherb, Ragwort, Horse Chestnut, Creeping Thistle, Dock spp., Ivy, Hogweed, Downy Birch *Betula pubescens*, Meadowsweet, Marsh Marigold, Common Reed, Blackthorn, Cherry *Prunus* spp., 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.

These treeline communities contain both tree and undergrowth diversity throughout the site while also providing links and connections within the ecological network, and considered to be of **high local ecological importance**.



Plate 7-11: One of a number of treelines that border the agricultural grasslands

7.5.10.19 Wet willow-alder-ash woodland (WN6)

A small area in the south-west of the study area, between the Rivers Pound and Owenass, is covered with a wet willow-alder-ash woodland with both mature and young trees (Plate 7-12). The woodland is dominated by Ash, Willow spp., and Alder, with Sycamore and Hawthorn also present. The understory species included Guelder-rose, Bramble, Blackthorn, Dock spp., Ivy, Lords-and-ladies, Wood Avens *Geum urbanum* and Great Willowherb.

The wet willow-alder-ash woodland is a potentially linked with the Annex I habitat Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-padion, Alnion incanae, Salicion albae*) (91E0). Given this unconfirmed link to between what is on site, and an Annex I habitat, these woodlands are considered to be of **high local ecological importance.**



Plate 7-12: Wet willow-alder-ash woodland

7.5.10.20 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, Nettle, Hedge Bindweed, Hogweed, Creeping Thistle, Dock spp., and saplings of Ash, Sycamore and Willow spp., as well as the invasive Butterfly-bush *Buddleia davidii*; Montbretia; and Snowberry.

The scrub communities within the site are healthy and dense, with a diversity of young tree and shrub communities while also contributing to the within the site and as such these habitats considered to be of **high local ecological importance**.

7.5.11 Ecological Baseline Surveys - Species

7.5.11.1 Protected Flora

There were no plant species listed under the Flora (Protection) Order 2022 recorded during the surveys. Neither the Flora (Protection) Order Map Viewer or the FPO Bryophyte viewer list any protected species within the 10km square grid of Mountmellick (N40), or in any of the eight adjacent 10km square grids (N31, N41, N51, N30, N50, S39, S49, S59).

7.5.11.2 Protected Fauna

7.5.11.3 *Badger*

There was no sign of Badger foraging, commuting (tracks), latrines or any other form of habitation recorded during the ecological walkover survey of the site and its surrounds. However, on the night of the bat emergence survey (11th August 2023) a Badger was seen along the roadway north of Owenass Bridge. Previous reporting of Badger within the area of Mountmellick include the long-term surveying of

Badger setts by The Department of Agriculture, Food & the Marine (NBDC, 2024[89]). This dataset identifies setts in a 1km square grid located in the vicinity of Mountmellick. This dataset included four grid squares with Badger setts within the Strahard area, north-east of the townland,

Given the live sighting of a Badger, and the available resources for commuting and foraging throughout the proposed Scheme area, the site area is considered to be of **high local ecological importance** to this species.

7.5.11.4 *Otter*

Suspected Otter holts were recorded along River Owenass along the section between Mill Bridge and Convent Bridge. Two of the suspected holts 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 by Otter, 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 for sprainting (Plate 7-13). An analysis of the contents of the Otter spraints contributed to the identification of salmonid, European Eel, Stickleback and Minnow presence within the River Owenass.

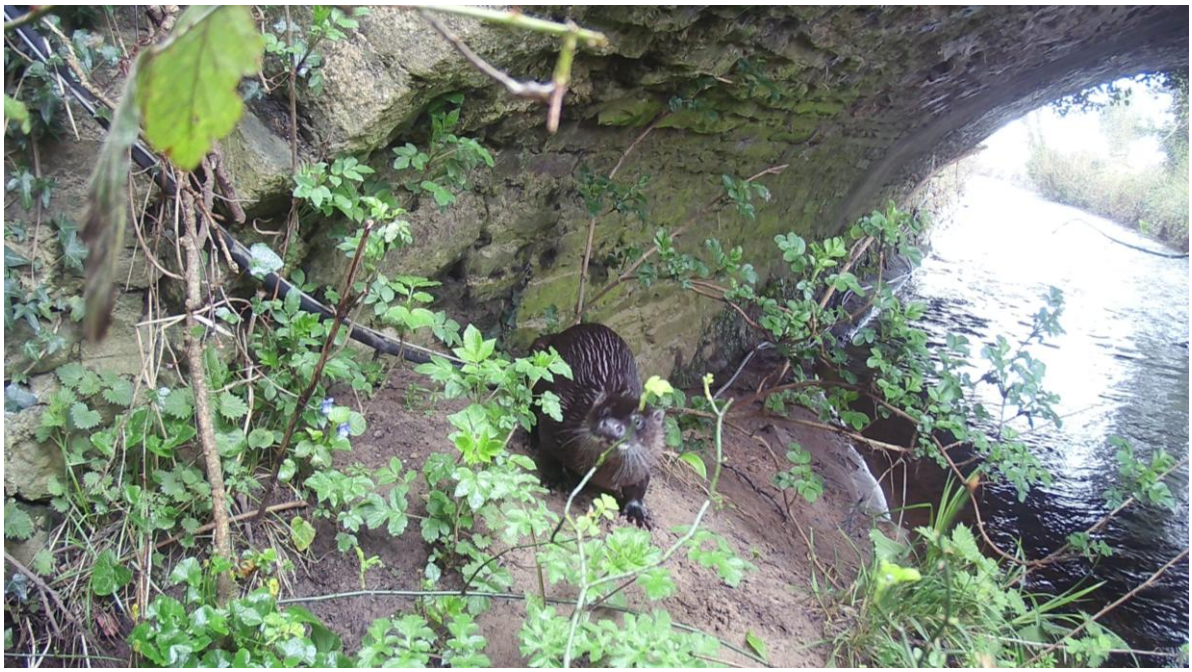


Plate 7-13: Otter spraint site under the River Owenass Bridge

During the deployment of the camera traps, the area under the bridge was recorded to be used as a sprainting site by local Otter. Evidence from these surveys confirm the presence of Otter along this section of the River Owenass is not particularly significant in the wider context of the river being infrequently used, however, given the importance of this species, the significance of the river as a

[89] *Badger Setts of Ireland Database* (NBDC, 2024), available https://maps.biodiversityireland.ie/Dataset/30 [accessed 05 May 2024]

commuting corridor and feeding resource, the connection downstream to the River Barrow and River Nore SAC, of which the Otter is of qualifying interest, the area around the proposed Scheme is considered to be of **international level importance to Otter**.

7.5.11.5 *Other mammals – Hedgehog, Pygmy Shrew, Red Squirrel, and Pine Marten*

Wooded areas are likely refuges for European Hedgehog *Erinaceus europaeus*, Pygmy Shrew *Sorex minutus*, Red Squirrell *Sciurus vulgaris* and Pine Marten *Martes martes*. While these species were not recorded during the site surveys, they have been recorded within an approximately 10km radius of the scheme's area (NBDC, 2023)

These species are protected under the Wildlife Acts 1976-2023, while the Pine Marten is afforded further protection under Annex II and V of the EU Habitats Directive. These species and the habitats within which they reside are considered of **high local ecological importance** in the context of this Scheme.

7.5.11.6 *Bats – Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat, Daubenton's bat & Brandt and/or Whiskered Bat*

Bat roost potential, emergence and bat activity surveys, as well as passive static surveillance, were carried out over the Scheme site.

7.5.11.7 Daytime Surveys – Bat Roost Potential

Bridges and older, mature trees can offer roosting opportunities for bat species. Inspection of the bridges along the River Owenass took place during the ecology surveys. No field signs of bats (staining etc) were recorded, and only one bridge, the Owenass Bridge, was recorded as having low bat roost potential initially due to Ivy growth which has since been removed from the structure. As this is a masonry bridge, there is a potential for bat roosting within the cracks of the brickwork, however, the brickwork of the Owenass Bridge had no such cracks present during the surveying.

The River Owenass provides an important linear waterway for commuting and foraging bats in the local area of Mountmellick. This is especially important in an urban setting, as often such linear waterways are the remaining dark conduit in an urban area where there is a large degree of street lighting. It provides landscape connectivity within the general environs of the river to green areas surrounding Mountmellick. None of the trees within the woodland habitats were recorded as having bat roost potential during the walkover surveys.

7.5.11.8 Passive Static Detection

During the deployment of the static detectors at three locations of Owenass Bridge, the area near Mill Bridge, and the in the meadow area downstream of Convent Bridge (Figure 7-8) a total of five confirmed species of bat were recorded, with a potential sixth given the possibility of both Brandt and Whiskered bat presence. Two/three of the species of bat recorded are light sensitive bat species (Daubenton's bat and Brandt/Whiskered bat *Myotis brandti/ mystacinus*) and these were recorded near Owenass Bridge and downstream of Convent Bridge, but not near Mill Bridge.

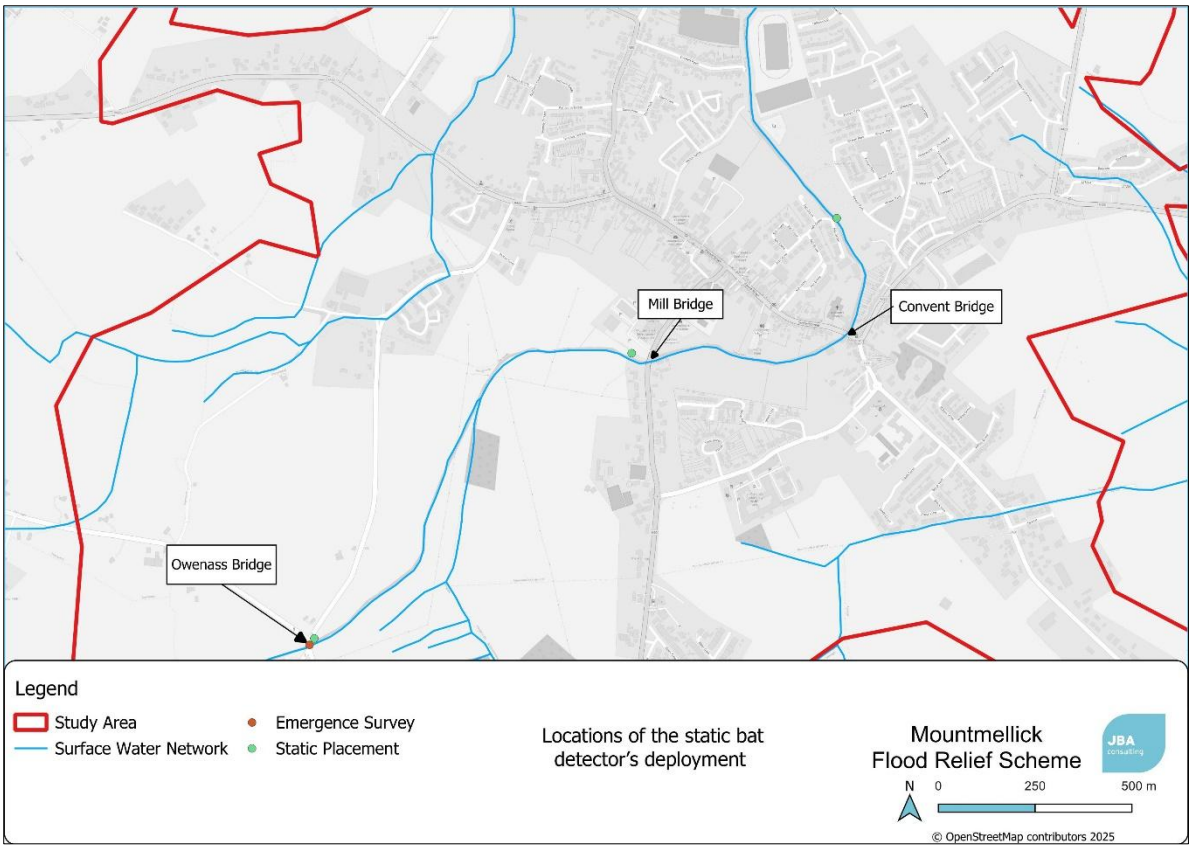


Figure 7-8: Locations of the static bat detector's deployment

The static surveillance results indicate that Soprano Pipistrelle *Pipistrellus pygmaeus* was the most frequently recorded bat species and was more consistently recorded throughout the survey area than the other species, followed by Common Pipistrelle *Pipistrellus pipistrellus*. The higher levels of bat activity for this species were along the Owenass Bridge and the field location in the north-east of the village, which reflected the foraging activity in both the adjacent fields and the local watercourse near to the static's placement. Daubenton's bats were recorded in high numbers in the area of the Owenass Bridge, but in low numbers in the rest of the site.

The daily passes for each of these sites are located in Table 7-9, Table 7-10, Table 7-11 and Table 7-12.

7.5.11.9 Emergence and bat activity Survey

During the emergence survey on the at the Owenass Bridge on the 11th August 2023, no bats were seen exiting from the bridge. However, bats were active in the area and four species of bat were recorded: Common Pipistrelle (two encounters), Soprano Pipistrelle (ten encounters), Leisler's Bat *Nyctalus leisleri* (nine encounters) and Daubenton's Bat (nine encounters). Soprano Pipistrelle was the most frequently encountered bat species during this emergence survey. There tended to be a greater level of bat activity downstream of the Owenass Bridge.

7.5.11.10 Summary

The key locations of importance that bats may use for commuting and foraging along the study area include watercourses, treelines, hedgerows, areas of woodland, scrub, and scattered trees, while there were some bat boxes observed on Poplar trees next to the children's playground during the ecological walkover. Following a bat emergence survey of the Owenass Bridge, it was deemed that the bats do not currently use the bridge for roosting.

Several bat species have been confirmed within the study area, which included Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat, and Daubenton's Bat. Additionally, there were also recordings of either Brandt's Bat *Myotis brandti* or Whiskered Bat, however, due to the similarity of their calls these two species cannot be differentiated, and this report will consider the presence of one and/or the other species present.

Daubenton's bat and Whiskered Bat are particularly sensitive to light. As the principal habitat within the survey area is the River Owenass, it is therefore expected to have a greater number of Daubenton's bat encounters. There is currently some lighting within the area of the townland near the Mill Bridge, and the field area downstream of Convent Bridge and the field area north-east of the town, and reduced numbers of *Myotis* species were present when compared to the Owenass Bridge.

Mountmellick and its associated aquatic and terrestrial habitats provide important dark corridors for commuting and foraging bats and are considered to be of **County level importance for bats.**

Table 7-9: Bat Static Passes at the field area downstream of Convent Bridge

Species	09-Aug	10-Aug	11-Aug	12-Aug	13-Aug	14-Aug	15-Aug	16-Aug	17-Aug	18-Aug	19-Aug	20-Aug	Total
Common Pipistrelle	75	88	73	108	120	126	153	139	126	0	216	189	1413
Soprano Pipistrelle	529	643	526	580	380	651	425	222	347	0	530	632	5465
Leisler's Bat	66	33	76	41	31	85	62	32	90	0	33	38	587
Daubenton's Bat	9	12	4	10	15	7	7	10	5	0	8	12	99
Brandt / Whiskered Bat	7	0	0	0	0	1	0	1	1	0	14	38	62
Total Count	686	776	679	739	546	870	647	404	569	0	801	909	7626

Table 7-10: Bat Static Passes at the Owenass Bridge (July)

Species	27-Jul	29-Jul	31-Jul	Total
Common Pipistrelle	26	85	0	111
Soprano Pipistrelle	753	1734	2	2489
Leisler's Bat	2	1	0	3
Daubenton's Bat	6	12	0	18
Brandt / Whiskered Bat	5	5	0	10
Total Count	792	1837	2	2631

Table 7-11: Bat Static Passes at the Owenass Bridge (August)

Species	21-Aug	22-Aug	23-Aug	24-Aug	25-Aug	26-Aug	27-Aug	28-Aug	29-Aug	Total
Common Pipistrelle	159	89	84	81	95	30	34	56	57	685
Soprano Pipistrelle	602	496	369	384	360	235	318	387	314	3465
Leisler's Bat	26	17	37	31	45	11	20	19	17	223
Daubenton's Bat	65	58	27	33	31	115	16	75	23	443
Brandt / Whiskered Bat	12	25	2	3	1	0	1	0	0	44
Total Count	864	685	519	532	532	391	389	537	411	4860

Table 7-12: Bat Static Passes at Mill Bridge

Species	27-Jul	28-Jul	29-Jul	30-Jul	31-Jul	Total
Common Pipistrelle	9	2	1	0	0	12
Soprano Pipistrelle	4	2	2	1	0	9
Total Count	13	4	3	1	0	21

7.5.11.11 *Breeding and Wintering Birds*

A dedicated riparian bird survey was conducted on the 9th of May 2025 simultaneous to the Otter survey that day. During this survey, Grey Wagtail *Motacilla cinerea* was recorded in two sections along the River Owenass, one north of Convent Bridge, and one west of Mill Bridge. Additionally incidental bird records were made throughout the various ecological surveys. During the ecological walkover and Otter surveys Grey Wagtail, Grey Heron *Ardea cinerea* and Dipper *Cinculus cinculus* were recorded. Grey Wagtail is an amber-listed species on the Birds of Conservation Concern Ireland (BoCCI), while the Grey Heron and Dipper are green-listed (Gilbert et al., 2021)[90].

On the 9th of May 2025, an Anabat Chorus wildlife recorder was deployed adjacent to the Owenass Bridge and left in-situ until the 15th of May and was set to record bird species present during the dawn hours of these days. Birds that were recorded during the deployment of this recorder include the green list species Grey Heron, Blackcap *Sylvia atricapilla* , Robin *Erithacus rubecula*, Blackbird *Turdus merula* , Wren *Troglodytes troglodytes* , Blue Tit *Cyanistes caeruleus* , Wood Pigeon, *Columba palumbus* Magpie *Pica pica*, Ring-necked Pheasant *Phasianus colchicus,* Bullfinch *Pyrrhula pyrrhula*, Song Thrush *Turdus philomelos*, Chiffchaff *Phylloscopus collybita*, Chaffinch *Fringilla coelebs*, Hooded Crow *Corvus corone*, Dunnock *Prunella modularis*, Rook *Corvus frugilegus*, Mistle Thrush *Turdus viscivorus* , Great Tit *Parus major*, Treecreeper *Certhia familiaris,* Pied Wagtail *Motacilla alba yarrelli* Redpoll *Acanthis flammea*, Rock Pigeon *Columba livia* and Goldfinch *Carduelis carduelis*. The wildlife recorder also recorded the amber-list species Goldcrest *Regulus regulus*, Swallow *Hirundo rustica*, Starling *Sturnus vulgaris*, Grey Wagtail, Kingfisher *Alcedo atthis,* House Sparrow *Passer domesticus*, Yellowhammer *Emberiza citrinella* and Willow Warbler *Phylloscopus trochilus*.

Several amber and red listed birds have been recorded on NBDC within 10km of the study area, some of which use the same type of habitats found on site, particularly scrub and hedgerow vegetation, for foraging and nesting and therefore the habitats on site provide resources for local bird populations. Wintering birds found within 10km of the site have all been reported within the NBDC records to be present found downstream of Mountmellick, and not within the boundary of the area of works. There is an i-Webs site (0Q003, River Barrow: Mountmellick (Clonterry)) located approximately 2.5km north-east of the Scheme's works. This site only contains data for the wintering period of 2014/2015. Of note within the records is 140 Lapwing *Vanellus vanellus* during this period however, this is reading was much lower than the 1% National population threshold as a site of importance of 850. The banks of the River Owenass and along the sections of the River Pound and the River Triogue do not contain any potential wading features with suitable substrate for wading species, nor large enough areas for ground-nesting species. Given the lack of suitable wading or winter foraging habitats within the proposed Scheme area, it is unlikely that wintering birds would commute to within the area of works. However, using the precautionary principle wintering birds such as Snipe and Lapwing may use areas of wet grassland.

Due to the potential suitability of the site for nesting, the site has been valued as being of **high local ecological importance** for breeding and wintering birds.

7.5.11.12 *Amphibians and Reptiles*

No amphibians or reptiles were recorded during the initial ecological walkover site surveys, however, the margins of the River Owenass and some of the drainage ditches, and wet habitats within the vicinity of the river offer suitable habitat for Smooth Newt and for Common Frog. Smooth Newt and sometimes Common Frog also use woodland areas for hibernation. The eDNA analysis of the pond south of the town returned a positive result for Smooth Newt.

[90] Gilbert, G., Stanbury, A., & Lewis, Lasley., (2021). *Birds of Conservation Concern in Ireland 4: 2020-2026*, Irish Birds 34:1-22

Common Lizard *Zootoca vivipara* may be present in drier, sunnier areas within the proposed scheme, and they have been recorded approximately 6.3km east in the Emo Court pNHA (NBDC, 2023), however, the habitat along the proposed scheme is considered less than optimal for this species.

Common Frog is protected under Annex V of the EU Habitats Directive and all three species are protected under the Wildlife Acts 1976-2017. The site area is considered to be of **higher local importance** to Common Frog and Smooth Newt and **less than local importance to Common Lizard.**

7.5.11.13 *Terrestrial Invertebrates*

A desk-study of invertebrate records within 10km of the proposed scheme was conducted. In regards to bees, the most recent NBDC (2023) records of Grey Mining Bee *Andrena (Melandrena) cineraria* are from 2019 within 10km of the proposed Scheme area and Large Red Tailed Bumble Bee *Bombus Melanobombus lapidarius* from 2023 within Mountmellick. Grey Mining Bee is listed as a vulnerable species, while Large Red Tailed Bumble Bees are near threatened.

There are 99 wild bee species in Ireland. 21 of these species are bumblebees, and more than half of these bumblebee species are in decline. Ireland has one native honeybee species. Most of the other 77 bee species in Ireland are solitary bees. More than half of the bee species in Ireland have undergone substantial decline and approximately 30% of species being threatened with extinction.[91]

Butterfly species of note within NBDC included records of Darg Green Fritillary *Argynnis aglaja*, Dingy Skiper *Erynnis tages*, Small Heath *Coenonympha pamphilus* and Wall Brown *Lasiommata meger,* however these species have not been within the immediate locality of Mountmellick.

The Scheme area is considered to be of **high local ecological importance** for terrestrial invertebrates, while there are low numbers of records present within the site, this may be due to an overall low survey effort, while there exists moderate floral availability.

7.5.11.14 *Aquatic Invertebrates – White-clawed Crayfish*

No signs of burrows or no incidental records of White-clawed Crayfish were seen during the surveys. A dedicated, White-clawed Crayfish survey was not conducted by JBA ecologists, however, during hydromorphology surveys 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 key habitat feature used by White-clawed Crayfish as refuge. Additionally, during four Otter surveys, whilst suitable refuge (boulders and banksides) was present, there were no incidental sightings of White-clawed Crayfish recorded, nor was there any evidence of White-clawed Crayfish presence within the Otter spraints assessed over the span of two years of surveys.

A desk-based assessment of White-clawed Crayfish was conducted which returned records of presence approximately 4.8km downstream of Mountmellick (NBDC, 2023), whilst it has also been recorded in River Barrow and River Owenass (NPWS, 2011)[92].

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)[93]. White-clawed Crayfish were also recorded in 2020 at this same

[91] All Ireland Pollinator Plan (2021)

[92] NPWS (2011) *Conservation Objectives: River Barrow and River Nore SAC 002162.* Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.EEA

[93] Gammell,M., McFarlane, A., Brady, D., O'Brien, J., Mirimin, L.,Graham, C., Lally, H., Minto, C. & O'Connor,I. (2021) *White-clawed*

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)[94]. The White-clawed Crayfish is on the IUCN Red List as 'Endangered' at a global level (Füreder et al., 2010)[95], and protected in Annex II and V of the E.U. Habitats Directive (Nelson, B et al., 2019)[96]. The species is protected in Ireland under the Wildlife Acts and is also a QI species for the River Barrow and River Nore SAC. Given the presence of preferable habitat for White-clawed Crayfish, the River Barrow is considered to be of **international level** importance to White-clawed Crayfish.

7.5.11.15 *Fish – Suitable Habitats*

A dedicated fish survey was not conducted by JBA ecologists. However, the JBA hydromorphology surveys by Emily Rick on the 8th and 31st January 2020 elucidated many key aspects of the river's structure and its provision of habitats for fish species. The hydromorphological condition of the watercourses within the proposed Scheme area are summarised and mapped below between Figure 7-11 to Figure 7-14, while a full assessment is expanded upon within Chapter 9 of the EIAR.

The Garroon Stream was noted to have a bed of sand and gravel.

Between the Owenass Bridge and Mill Bridge, the bed of the River Owenass was assessed to have a coarse gravel/cobble bed overlain by finer mobile gravels. The bed includes more sand content after the river turns eastwards. This channel was noted to have an absence of geomorphic diversity (riffles and pools etc.).

In the area between Mill Bridge and Convent Bridge, the bed of the River Owenass contains a coarse gravel/cobble bed overlain by finer mobile gravels and coarse sands. These sediments deposit predominantly as gravel bed features in locations that provides some localised hydraulic diversity in the channel.

Downstream of Convent Bridge exhibited a bed composed primarily of gravel and sand with some mid-channel bars (some vegetated) and sand deposits on the lower banks and on inside bends.

The River Pound was identified to have been channelised and straightened, evident by machinery markings, with a sand and gravel which is generally well sorted, with fine deposition evident on the inside of the limited meanders and around river crossing structure. Large materials such as boulders and bars lead to the creation of complex structures and pockets of slower river 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 utilised by ammocoetes (juvenile lamprey). Whilst no dedicated fishery survey took place, Brown Trout *Salmo trutta* was recorded within the River Pound, and the geomorphology survey highlighted plenty of available habitat for spawning.

Fish – Species Recordings

Crayfish Austropotamobius pallipes survey in designated SACs in 2017. Irish Wildlife Manuals, No. 131. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

[94] Swords. F and Griffin. B (2022) *The National Crayfish Plague Surveillance Programme, Ireland – 2020-2021*, Marine Institute, Rinville, Oranmore, Co. Galway for National Parks and Wildlife Service.

[95] Füreder, L., Gherardi, F., Holdich, D., Reynolds, J., Sibley, P. & Souty-Grosset, C. 2010. Austropotamobius pallipes. *The IUCN Red List of Threatened Species 2010*, available https://dx.doi.org/10.2305/IUCN.UK.2010-3.RLTS.T2430A9438817.en. [accessed 06th December 2023]

[96] Nelson, B., Cummins, S., Fay, L., Jeffrey, R., Kelly, S., Kingston, N., Lockhart, N., Marnell, F., Tierney, D. and Wyse Jackson, M. (2019) Checklists of protected and threatened species in Ireland. Irish Wildlife Manuals, No. 116. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.

While there were no fish surveys conducted within the River Owenass, an analysis of Otter spraint found within the sprainting site indicated the presence of salmonids, European Eel, Stickelback and Minnow present within the River Owenass.

Fishery surveys have been conducted by IFI (IFI 2017[97], IFI 2019[98], 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 7-9, Figure 7-10, Figure 7-11, and Figure 7-12. Details of IFI surveys are given below these figures. In direct communications with IFI (IFI, 2024[99]), the areas downstream of the Owenass Bridge and Convent Bridge have both been identified as important spawning habitats for salmonids and lampreys.

[97] Inland Fisheries Ireland 2017, *Catchment Wide Electro Fishing data for the River Barrow* – supplied by IFI

[98] Inland Fisheries Ireland 2019, *Catchment Wide Electro Fishing data for the River Barrow* – supplied by IFI

[99] *Inland Fisheries Ireland response to Mountmellick Flood Relief Scheme – Draft Drawings and Project Description*, sent to JBA and dated 26/02/2024.

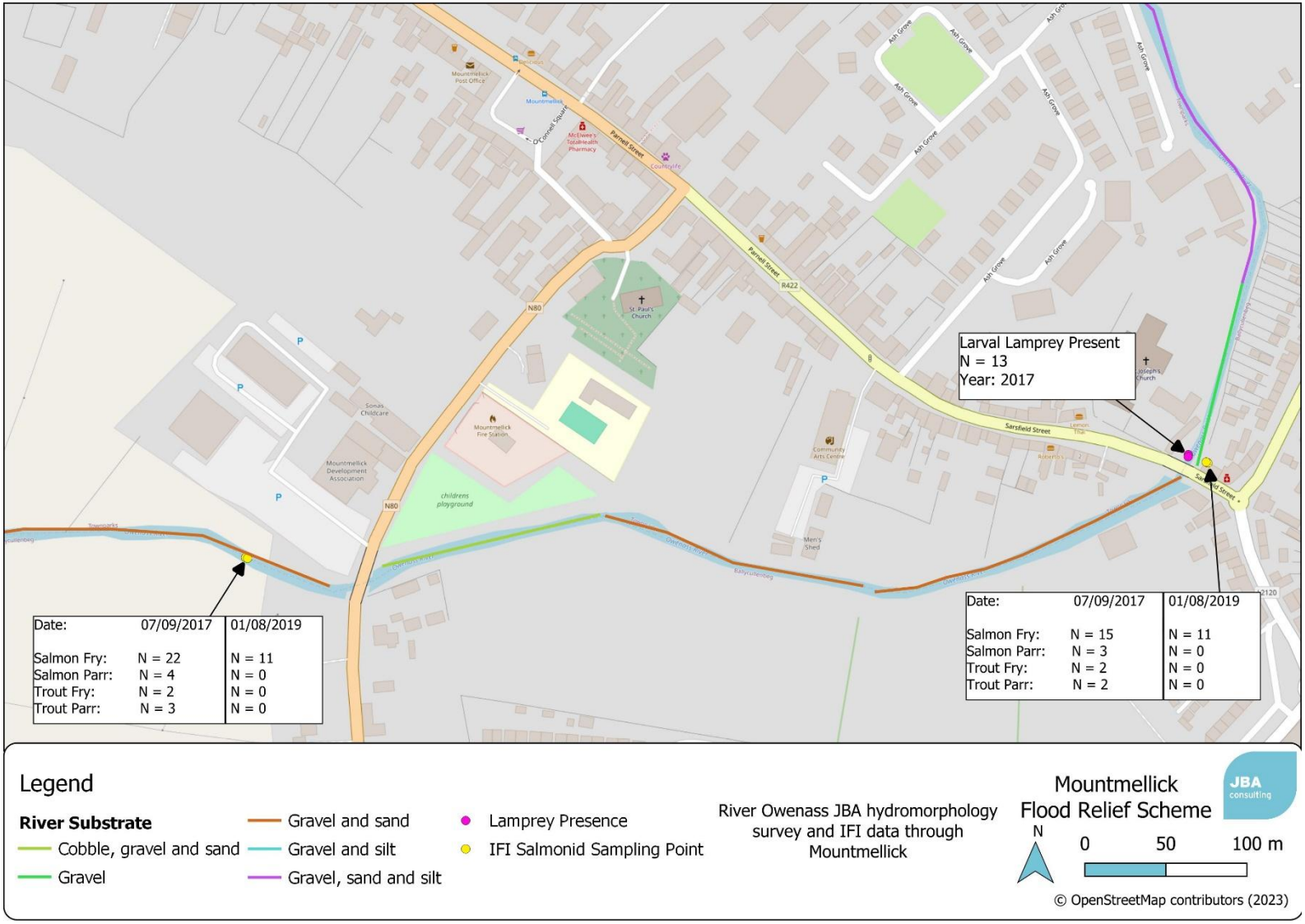


Figure 7-9: River Owenass JBA hydromorphology survey and IFI survey results through Mountmellick



Figure 7-6: River Pound JBA hydromorphology survey and IFI survey results

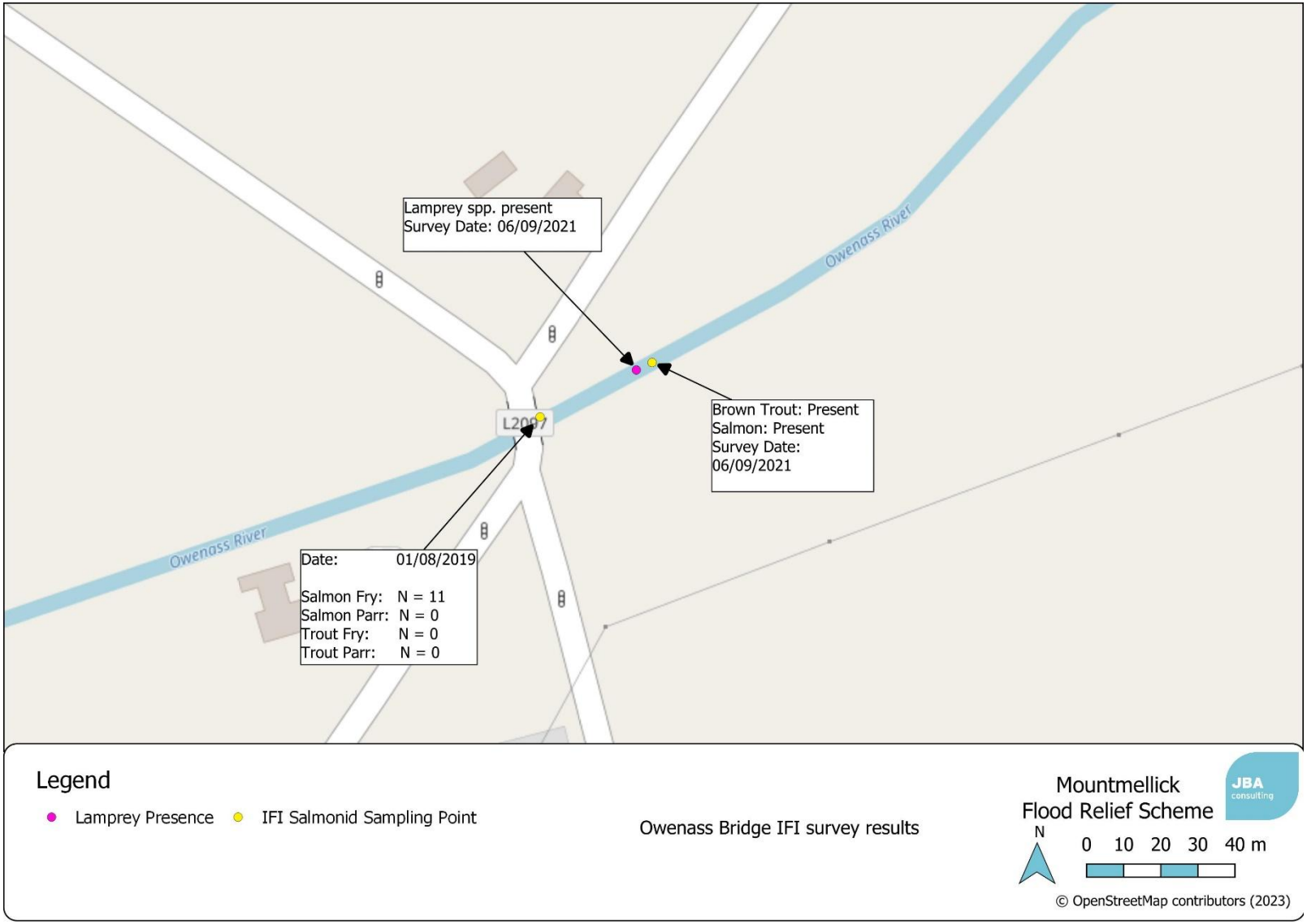


Figure 7-7: River Owenass Bridge IFI survey results



Figure 7-8: Garroon Stream JBA hydromorphology survey - River Substrates

A desktop review was carried out to identify the areas of importance for fish within the study area and the ZoI for downstream hydrological links. An electro-fishing survey took place in 2021 upstream of Mountmellick, near the Owenass Bridge. Fish within the river that were noted during the survey include Brown Trout; Dace *Leuciscus leuciscus*; Lamprey *Lampetra* spp.; Salmon; and Stone Loach *Barbatula barbatula*. An additional survey was conducted downstream of Mountmellick, in the River Barrow, which contained Lamprey spp.; Minnow *Phoxinus phoxinus* and Stone loach (IFI, 2024[100]).

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)[101]. Species present in the River Owenass include Brown trout *Salmo trutta*, Atlantic Salmon, lamprey spp., Three-spined Stickleback *Gasterosteus aculeatus*, Dace, Stone Loach and Minnow. 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 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 were 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.

Of the above fish species, the European Eel is on the IUCN Red List as 'Critically Endangered' (Freyhof, J & Kottelat, M. 2010)[102] and Atlantic Salmon has the Irish Red List status 'Vulnerable' (King et al., 2011)[103]. The Salmon is protected in Annex II and V of the E.U. Habitats Directive and the lamprey are listed in Annex II (River Lamprey also listed in Annex V) (Nelson, B et al., 2019).

Fisheries Surveys were conducted by IFI in 2019 at the Derrycloney Bridge, located upstream of Mountmellick. Brown trout; Dace; Lamprey sp.; Salmon and Stone Loach 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[104]). 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.

These Rivers are considered to be of **international importance**, within the Barrow WFD Catchment and the Owenass and Barrow Rivers to fish species of QI for the River Barrow and River Nore SAC, and of **County importance** for European Eel.

[100] Inland Fisheries Ireland, 2024 IFI Open Data Portal - *Water Framework Directive Rivers Fish Ecological Status 2008-2022*, available https://opendata-ifigis.hub.arcgis.com/datasets/1034e20d4cce499695a5bd020e594331_0/explore?location=53.108277%2C-7.341028%2C17.84

[101] Delanty, K., Kelly, F.L., McLoone, P., Matson, R., O'Briain, R., Gordon, P., Cierpal, D., Connor, L., Corcoran, W., Coyne, J., Feeney, R., Morrissey, E., (2017) *Fish Stock Assessment of the River Barrow Catchment 2015*. Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland.

[102] Freyhof, J. & Kottelat, M. 2010. Anguilla anguilla (Europe assessment). *The IUCN Red List of Threatened Species 2010*, available https://www.iucnredlist.org/species/60344/12353683 [accessed 06th December 2023.

[103] King, J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., FitzPatrick, Ú., Gargan, P.G., Kelly, F.L., O'Grady, M.F., Poole, R., Roche, W.K. & Cassidy, D. (2011) *Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

[104] WS Atkins Ireland Ltd (2019) *Owenass River Baseline Ecology Survey Report for Laois County Council* (unpublished)

7.5.11.16 Invasive Non-native Species (INNS)

Figure 7-15 below highlights where invasive non-native species were encountered during ecological surveys. As Sycamore is widespread throughout the scheme and is discussed in the habitat descriptions above, it has been excluded from this map.

below provides a list of invasive non-native species recorded during the ecological surveys. 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. Eight invasive non-native species were recorded, two of which are listed on the Third Schedule: Japanese Knotweed *Reynoutria japonica* and Three-cornered Garlic *Allium triquetrum.*

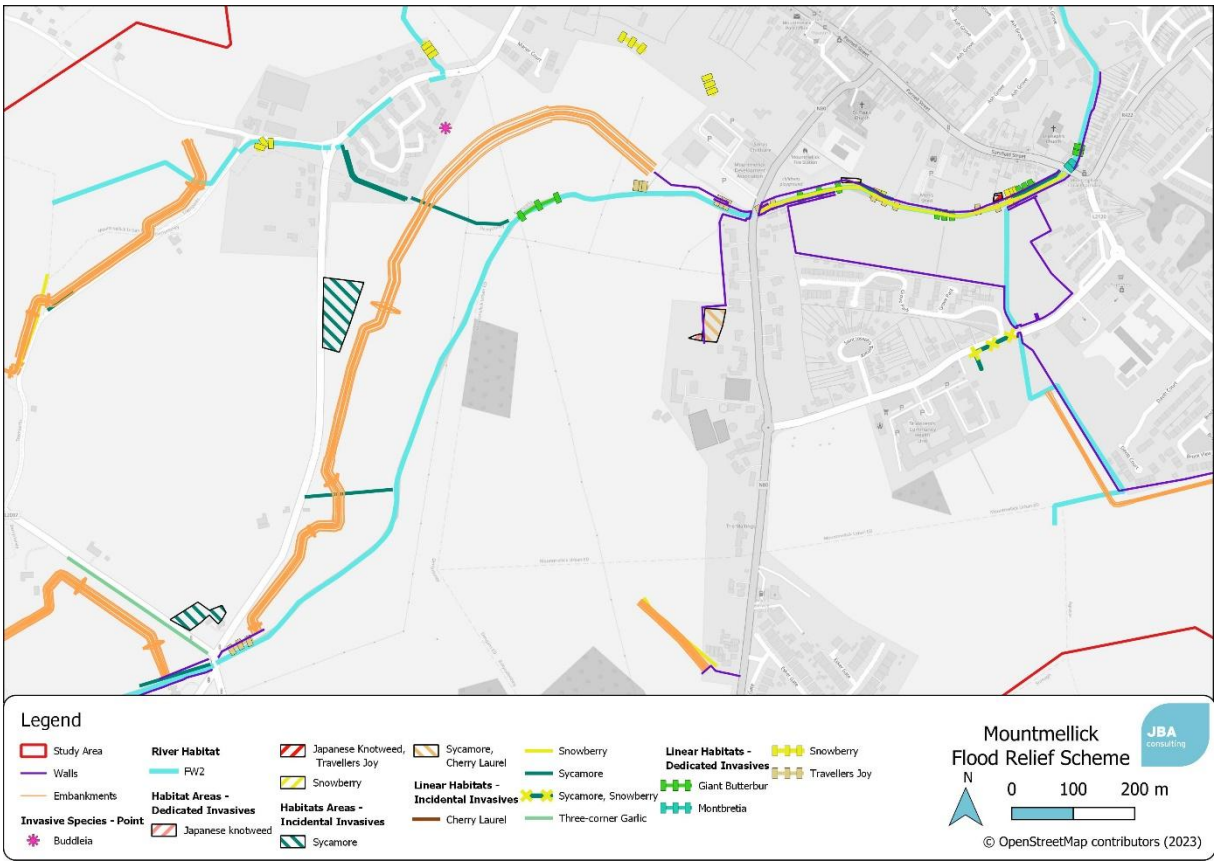


Figure 7-9: Invasive non-native species recorded within the site

Table 7-13: 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
Three-corner Garlic *Allium triquetrum*	Medium	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
Snowberry *Symphoricarpos albus*	Low	No
Montbretia *Crocosmia x crocosmiiflora*	Low	No

It is important to note that the Japanese Knotweed recorded during the initial 2019 ecological invasive non-native 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)[105] have recommended further treatment to ensure the remaining plants are eradicated. 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.

7.5.12 Screening of Ecological Receptors

The screening of ecological receptors is given in Table 7-14. Those receptors screened out are not considered further in this assessment. Ecological receptors carried forward are assessed for potential impact during construction and operation in the following sections.

Table 7-14: Summary of ecological receptors and the screening assessment

Ecological feature	Value	Screening	Reasoning
River Barrow and River Nore SAC	International	In	Contamination of the River during construction impacting both on-site and downstream, species, works done in-stream, alteration of the River's characteristics including contamination from pollutants **Assessed in the NIS**
Slieve Bloom Mountains SPA	International	Out	No further assessment required due to the lack of connectivity between the site and the works of the Scheme
Slieve Bloom Mountains SAC	International	Out	No further assessment required due to the lack of connectivity between the site and the works of the Scheme
Mountmellick SAC	International	Out	No further assessment required due to the lack of connectivity between the site and the works of the Scheme
Slieve Bloom Mountains pNHA	National	Out	No further assessment required due to the lack of connectivity between the site and the works of the Scheme
Derries Wood pNHA	National	Out	No further assessment required due to the lack of connectivity between the site and the works of the Scheme
Emo Court pNHA	National	Out	No further assessment required due to the lack of connectivity between the site and the works of the Scheme
Ridge of Portlaoise pNHA	National	Out	No further assessment required due to the lack of connectivity between the site and the works of the Scheme
The Great Heath of Portlaoise pNHA	National	Out	No further assessment required due to the lack of connectivity between the site and the works of the Scheme
Raheen Lough pNHA	National	Out	No further assessment required due to the lack of connectivity between the site and the works of the Scheme
Dunamase Woods pNHA	National	Out	No further assessment required due to the lack of connectivity between the site and the works of the Scheme

[105] All About Trees Ltd & NME Ltd (2023) *Japanese Knotweed Monitoring (Year 5) Mountmellick Flood Relief Scheme,* Mountmellick, Co Laois

Ecological feature	Value	Screening	Reasoning
Clonreher Bog NHA	National	Out	No further assessment required due to the lack of connectivity between the site and the works of the Scheme
Arable crops (BC1)	Less than Local	Out	Low ecological value
Stone walls and other stonework (BL1)	High Local	In	Diverse wall flora
Buildings and artificial surfaces (BL3)	Less than Local	Out	Low ecological value
Other artificial lakes and ponds (FL8)	High Local	In	Distinct habitat and vegetative community within the Scheme's study area
Depositing / lowland rivers (FW2)	International	In	Includes a section of the River Barrow and River Nore SAC, QI Fish species and Otter present. **Assessed in the NIS**
Depositing / lowland rivers / Drainage ditches (FW2 / FW4)	High Local	In	Short distance link with the River Barrow and River Nore SAC, potential for Fish species and Otter present, along with foraging potential for bats. **Assessed in the NIS**
Drainage ditches (FW4)	High Local	In	Links to the River Barrow and River Nore SAC, potential foraging for bats and spawning for amphibians
Improved agricultural grassland (GA1)	Less than Local	Out	Low ecological value
Mosaic: Improved agricultural grassland, Scrub (GA1/WS1)	High Local	In	Areas of higher floral diversity, foraging and commuting potential for bird and mammal species among agricultural land
Amenity grassland (improved) (GA2)	Less than Local	Out	Low ecological value
Dry meadows and grassy verges (GS2)	High Local	In	Areas of higher floral diversity, foraging and commuting potential for bird and mammal species
Dry meadows and grassy verges, Scrub (GS2/WS1)	High Local	In	Areas of higher floral diversity, foraging, nesting, and commuting potential for bird and mammal species
Wet grassland, Improved agricultural grassland (GS4/GA1)	Less than local	Out	Low ecological value
(Mixed) broadleaved woodland (WD1)	High Local	In	Woodland habitat with commuting, foraging and nesting resources
Mixed broadleaved / conifer woodland (WD2)	High Local	In	Woodland habitat with commuting, foraging and nesting resources
Hedgerows (WL1)	High Local	In	Facilitate the commuting, foraging, and nesting of various bird, mammals (including Otter) and Bats
Mosaic: Hedgerows / Scrub (WL1 / WS1)	High Local	In	Facilitate the commuting, foraging, and nesting of various bird, mammals (including Otter) and Bats
Treelines (WL2)	High Local	In	Facilitate the commuting, foraging, and nesting of various bird, mammals (including Otter) and Bats
Wet willow-alder-ash woodland (WN6)	High local	In	Unconfirmed association with Annex I habitat Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alnopadion, Alnion incanae, Salicion albae*) (91E0)
Scrub (WS1)	High Local	In	Facilitate the commuting, foraging, and nesting of various Bird and Mammal species. Areas of scrub are present within the SAC Boundary

Ecological feature	Value	Screening	Reasoning
			Assessed in the NIS
Mammals – Hedgehog, Pygmy Shrew, Red Squirrel, Pine Marten	High Local	In	Commuting, foraging, and nesting resources present on site
Badger	High Local	In	Commuting, foraging and sett creation resources present on site
Otter	International	In	Sprainting sites, holts, river access, connection to the River Barrow **Assessed in the NIS**
Bats: Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat, Daubenton's Bat, Brandt and/or Whiskered Bat	High Local	In	High foraging activity, commuting, roosting on site
Breeding Birds (Riparian birds utilising the River Owenass)	High Local	In	Commuting, foraging, and nesting resources present on site
Breeding Birds (Other, non-riparian)	High Local	In	Commuting, foraging, and nesting resources present on site
Wintering Birds	High Local	In	Available habitat within the site
Amphibians	High Local	In	Smooth Newt recorded within the pond, spawning, hibernating and commuting potential throughout site
Reptiles	Less than Local	Out	No records of reptiles in the area of the project, low potential for habitation
Terrestrial Invertebrates	High Local	in	Large spread of floral diversity for pollinators and other terrestrial invertebrates, providing support to threatened species
White-Clawed Crayfish	International	In	Crayfish recorded within the River Barrow, QI Species of the SAC **Assessed in the NIS**
Fish: Atlantic Salmon, Lamprey spp.,	International	In	Records of QI fish species of the River Barrow SAC present within the River Owenass **Assessed in the NIS**
Fish: European Eel	National	In	Eel recorded within the Barrow, downstream of the site
Invasive Non-native Species	-N/A	in	Third Schedule species present along scheme

7.6 Assessment of Impacts

The potential impacts from the measures of the Scheme on the valued designated sites and ecological receptors are assessed within this section. For clarity the defence measures and site compounds are shown in Figure 7-14.

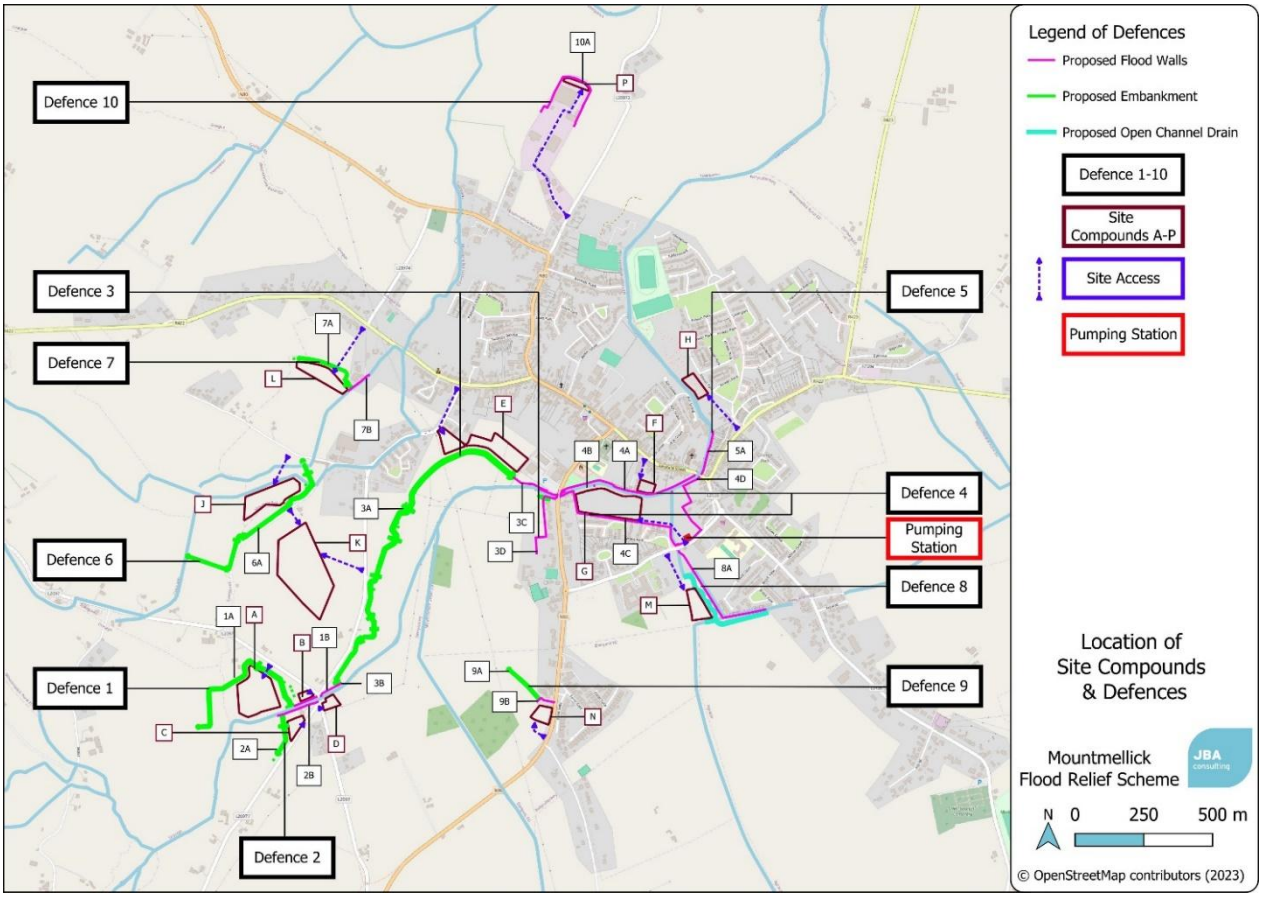


Figure 7-10: The location of proposed defences and site compounds for the Scheme

The impact assessment considers the construction and operational phase of the proposed Scheme and the anticipated effects in the absence of any mitigation. The accompanying NIS has assessed the impacts on the screened in Natura 2000 sites and their QIs and has applied mitigation measures to protect these features.

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

- Stone walls and other stonework (BL1)
- Other artificial lakes and ponds (FL8)
- Depositing / lowland rivers / Drainage ditches (FW2 / FW4)
- Drainage ditches (FW4)
- Mosaic: Improved agricultural grassland, Scrub (GA1/WS1)
- Dry meadows and grassy verges (GS2)
- Dry meadows and grassy verges, Scrub (GS2/WS1)
- (Mixed) broadleaved woodland (WD1)
- Mixed broadleaved / conifer woodland (WD2)
- Hedgerows (WL1)

- Mosaic: Hedgerows / Scrub (WL1 / WS1)
- Treelines (WL2)
- Wet willow-alder-ash woodland (WN6)
- Scrub (WS1)
- Mammals: Hedgehog, Pygmy Shrew, Red Squirrel, Pine Marten
- Mammals: Badger
- Bats: Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat, Daubenton's Bat, Brandt and/or Whiskered Bat
- Breeding and Wintering Birds
- Amphibians
- Terrestrial Invertebrates
- Fish: Eel

7.7 Do Nothing Scenario

If the proposed works were not to go ahead, it is likely that the current use of the land throughout the proposed scheme would undergo a gradual increase of flooding due to increased rainfall projections following climate change, and as such, many terrestrial habitats and species would undergo long-term impacts. Adverse impacts could occur through the increased spread of invasive non-native species, and increased water quality issues associated with flooding of urban land.

7.8 Predicted Impacts – Construction Phase

Impacts associated with the proposed Scheme have been defined and their significance assessed in relation to their implications on ecological receptors, defined in terms of their geographical extent (Table 7-1).

The key construction phase impacts assessed are:

- Habitat loss/disturbance.
- Habitat degradation
- Disturbance to faunal species.
- Reduction in water quality.
- Release of dust (impacting habitats and water quality)
- Spread of invasive non-native species

Potential direct and indirect impacts are discussed in detail below. Where potentially significant adverse impacts are identified, avoidance and mitigation measures are proposed to offset these impacts.

This section will assess all impacts common to the entire scheme (e.g. dust, disturbance), and for the purpose of providing clearly defined mitigation measures, the more precise mitigation to take place within select areas will be outlined. The following sections are split into impacts to ecological receptors, assessed by location of each element of the proposed Scheme as follows:

- Common impacts across the scheme (e.g. disturbance impacts, emissions)
- Impacts at Upper River Owenass (Defence No. 1 & 2)
- Impacts at Owenass Bridge
- Impacts of in-stream works 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 at Irish town Garden Centre (Defence 9)

7.8.1 Common Impacts across the Scheme

Some impacts will not be location specific and will affect certain ecological receptors throughout the construction phase. This is mainly related to disturbance of habitats, generation of noise, release of pollutants, spread of invasive non-native species, and the release of dust emissions during construction.

7.8.1.1 Dust and Emissions

A separate Air Quality assessment has been carried out for the EIAR (Construction Impacts Chapter 6). The volume of deposition due to demolition, earthworks, construction and the spread of dusty materials from the tires of machinery has the potential to affect sensitive habitats and plant communities. Dust could smother wet willow-alder-ash woodland habitat adjacent to the works. There is also a potential impact that any dust settling in the river, or watercourse/waterbody, could introduce pollutants which could impact fish and amphibian species.

Construction impacts for dust have been calculated as medium to high risk due to the sensitive ecological receptors that are located next to the works. Therefore, mitigation measures are required.

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

Therefore, the mitigation measures applicable to a High-Risk Site should be applied. Mitigation measures are provided in the EIAR (Construction Impacts Chapter 4) Section 1.6.2 of the Air Quality and Dust, and these will be applied throughout the works.

7.8.1.2 Release of Pollutants

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

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

7.8.1.3 Embankment Construction

The embankment footprint will cause the permanent loss of the underlying habitat. Furthermore, there is potential for accidental release of suspended solids, nutrients and pollutants into the streams and associated habitats over the construction period. Release of suspended solids, dust, hydrocarbons from construction activities associated with the embankment construction could impact through changes in water quality, turbidity, smothering etc. Polluting materials from accidental spills could enter the watercourses and have a deleterious effect on water quality which can affect surface water dependent habitats. Mitigation measures will be required to protect habitats from release of any sediment and impact water quality.

7.8.1.4 Wall Construction

During site preparation, removal of existing infrastructure and excavations for construction of defence walls, there is potential for release of dust, sediments and trapped nutrients. During the pouring of foundations, and construction of new walls there is potential for uncured concrete and cement dust to enter terrestrial habitats and waterways.

7.8.1.5 Depositing / lowland rivers & Drainage ditches

There are several areas of ditches and slow flowing rivers, such as the River Pound and Clontygar Stream not directly connected to the SAC that are scattered throughout the site boundary, with some of these ditches in the vicinity of the proposed embankments.

While not at risk of direct habitat loss, these lower valued aquatic habitats will also be vulnerable to surface water (run-off) polluting events (e.g. leaking, or spilled hydrocarbons), and spillages of excavated materials which may occur within the area, which will have a knock-on impact of disrupting or possibly damaging the quality of local vegetation

Therefore, in the absence of mitigation, **Short-term, Adverse** effects of **Slight** significance are anticipated for these aquatic habitats, due to potential infiltration of the water by excavated material or an accidental pollutant spill causing a deterioration in water quality.

The Clontygar Stream will undergo additional impacts under the realignment of the stream's course. Realignment, if performed incorrectly, will reduce the stream's suitability as an aquatic habitat through incorrect bedding or the river's flow being too linear.

Therefore, in the absence of mitigation, a **Long-term** effect of **Moderate, Adverse** significance is anticipated for this stream habitat, as it will have its effective functionality greatly reduced if the realignment is performed incorrectly.

7.8.1.6 Dry meadows and grassy verges

There are several areas of grassy verges scattered throughout the proposed Scheme area, with a meadow grassland located in the north-east of the site. Many of these grassy verges are in the vicinity of the proposed embankments and may be damaged through the movement of vehicles to the areas of embankment creation, and habitat will be lost via the access to the areas of embankment.

In addition to direct habitat loss, grassy verges will also be vulnerable to surface water (run-off) polluting events (e.g. leaking, or spilled hydrocarbons), and spillages of excavated materials which may occur within the area, which will have a knock-on impact of disrupting or possibly damaging the quality of local vegetation.

The large meadow grassland is not anticipated to deteriorate during the construction phase.

Therefore, in the absence of mitigation, **Short-term, Adverse** effects of **Slight** significance are anticipated for this habitat, due to direct habitat damage and potential infiltration of the water by excavated material or an accidental pollutant spill causing a deterioration in habitat quality.

7.8.1.7 Hedgerows, Scrub & Treelines

There are several areas of hedgerow, scrub and treelines that are within the proposed scheme and there will be some direct habitat removal during works is some select areas. Hedge and scrub removal are anticipated in the areas of Clontygar Stream, Midland Steel and around Irishtown Garden Centre, meanwhile the removal of hedge, scrub and tree vegetation are all anticipated within the areas of Garroon Stream, upstream of Owenass Bridge and downstream of Convent Bridge. In addition to confirmed vegetation removal works in these areas, nearby trees and vegetation are at a risk of mechanical limb damage due to the movement of machinery during the removal and associated works.

Additionally, due to their spread throughout the site, treelines, hedges, and scrub areas within the site will also be vulnerable to surface water (run-off) polluting events (e.g. leaking, or spilled hydrocarbons), and spillages of excavated materials, and increased airborne pollutants (dust and emissions) which may occur within the area, which will have a knock-on impact of disrupting or possibly damaging the quality of local habitats, and disrupting local breeding and wintering birds, mammals and bats that would utilise this habitat type for commuting, foraging, nesting, and sheltering.

Therefore, in the absence of mitigation, **Short-term, Adverse** effects of **Slight** significance are anticipated for these habitats, due to localised habitat removal and potential impact to the habitats through excavated material or accidental pollutant spill causing both a reduction in habitat spread due to direct removal, and a reduction in quality in areas suffering from pollutant spill.

7.8.1.8 Mammals – Pygmy Shrew, Red Squirrel, Pine Marten & Badger

A single live Badger was recorded within the area near the Owenass Bridge on the night of the bat emergence survey. While there were no setts recorded during the ecological surveys, the Badger Sett Database of Ireland (NBDC 2024) identifies setts present in the area of Strahard, north-east of Mountmellick and outside of the area of works. While there were no signs of Hedgehog, Pygmy Shrew, Red Squirrel, and Pine Marten during the ecological walkover, this does not necessarily mean these mammal other species do not occur locally and they may occasionally visit the site area for foraging.

Bearing this in mind, minor impacts may arise in the form of disturbance to foraging and commuting activities, as well as potential loss of life to individuals in the case of the accidents within the construction site (e.g. accidental trappings), after failure to exclude entry.

Therefore, in the absence of mitigation, during the construction phase, a **Short-term, Adverse** effect of **Slight** significance is anticipated for these mammal species due the disruption and reduction of foraging efficiency or from direct loss of life.

7.8.1.9 Bats - Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat, Daubenton's Bat & Brandt and/or Whiskered Bat

Construction works throughout the proposed Scheme area will generate noise and disturbance as a result of machinery operation and workforce movement during the expected 3-year duration of the project. Bats have been recorded commuting and foraging throughout the project area.

Works will not be conducted at night-time, when bats are active, and therefore it is not expected that construction of the Scheme will cause any impact to bats commuting between their roosts and foraging areas at watercourses, treeline and meadow habitats,

No roosts were confirmed in treelines/woodland or within the bridges. Under the precautionary principle, it is assumed that bats may be roosting in some trees to be removed. Any bats roosting in trees to be removed may be impacted through direct injury or death during the proposed works. Removal of trees may also result in the loss of roosting sites.

Any disturbance is unlikely to impact the local population, but interference to any bats and their roosts is an offence without a licence.

Therefore, mitigation measures will be required to protect bats from disturbance impacts and to designate bat-sensitive methods for tree removals.

Therefore, in the absence of mitigation, **Short-term, Adverse** effect of **Slight** significance are anticipated for bat species due to the removal of hedgerow and treeline vegetation and disruption of foraging activities during the construction phase which will cause a reduction in commuting and foraging habitat

7.8.1.10 Breeding Birds (Riparian Species)

The activities that take place within the River Owenass could disrupt the foraging activities of local riparian breeding bird species, while the removal and pollution of bankside vegetation could disrupt nesting riparian birds. This would have an adverse impact on riparian bird species such as Dipper and Grey Wagtail.

Therefore, in the absence of mitigation during the construction phase, there is likely to be a Short-term, Adverse effect of Slight significance due to the disruption of riparian bird activities during the works from the reduction of suitable vegetation habitat for nesting and foraging.

7.8.1.11 Breeding Birds (Non-riparian species) and Wintering Birds

The removal of vegetation and the disruption of habitats throughout the Scheme could directly impact local bird species, through the removal and pollution of vegetation that is utilised for foraging, nesting, and commuting. This would have an adverse impact on common breeding birds found within the scheme, such as Robin or passerine, as well as wintering birds such as Snipe.

Therefore, in the absence of mitigation during the construction phase, there is likely to be a **Short-term, Adverse** effect of **Slight** significance due to the disruption of bird activities during the works from the reduction of suitable vegetation habitat for nesting and foraging.

7.8.1.12 Terrestrial Invertebrates

The removal of vegetation and the disruption of habitats throughout the scheme could directly impact local terrestrial invertebrate species by reducing the availability of foraging and refuge resources.

Therefore, in the absence of mitigation during the construction phase, there is likely to be a **Short-term, Adverse** effect of **Slight** significance due to the disruption of terrestrial invertebrate activities during the works due to the reduction of suitable floral resources for foraging.

7.8.1.13 Invasive Species

Japanese Knotweed and Three-cornered Garlic are Third Schedule species under Regulations 49 & 50 in the European Communities (Birds and Natural Habitats) Regulations 2011 (Note: Regulation 50 not yet enacted). Regulations 2011 restricts the dispersal, spread and transportation of these invasive non-native species and due diligence must be given to the facilitation of the spread of the spread of invasive non-native species.

Mitigation measures are required to control the spread of these invasive species during the construction of the scheme. Monitoring measures to ensure the effectiveness of the control is also required.

7.8.2 In-stream Works

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

1. Downstream of Convent Bridge:
   In-stream works and works within the riparian corridor will be necessary for the construction of flood defence wall along the riverbanks on the River Owenass. 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 in-stream works will be required. As noted, temporary works will be required to create a dry working space for operatives. A coffer dam 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, in-stream 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:
   In-stream 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 including will be installed as part of the culvert works.
4. Owenass Bridge replacement:
   In-stream works will be necessary for the demolition of the existing bridge, the excavations and construction of foundations and wing walls of new bridge, and associated walls directly upstream.

The proposed in-stream works could impact on the River Owenass from construction-based emissions, along with the physical in-stream sheet piling that may disrupt the fish species and the riverine habitats associated with the Natura 2000 site. Impacts associated with the River Barrow and River Nore SAC and its QI species including Otter, Crayfish, lamprey and salmonid species are expanded upon in the accompanying NIS (JBA, 2024), meanwhile, European Eel, and riparian birds which are not QI of the River Barrow and River Nore SAC will also be impacted by these works.

The impacts of this section of the Scheme anticipated for the QI species of the River Barrow and River Nore SAC, and non QI European Eel and riparian birds are summarised as:

- The dewatering of the sections of the river during the in-stream works during the demolition and reconstruction of the Owenass bridge, and any further dewatering that occurs during the sheet piling for the walls;
- Reduction of suitability for Otter, Crayfish and QI fish species, and non QI European Eel and riparian birds utilising the river due to the spread of polluting substances entering the riverine system (construction-based emissions)
- Disturbance of ammocetes of spawning species, reduced fry abundance and reduced availability of juvenile habitats for fish and Crayfish species
- Introduction and spread of Crayfish Plague into local waters.
- These impacts on fish species and Crayfish would have additional further knock-on impacts on Otter due to reduced suitability of the river for prey species

Therefore, in the absence of mitigation, the in-stream works of the scheme will result in a **Short-term, Adverse** effect of **Moderate** significance on local Eel and the Riparian Birds subset of Breeding Birds populations and **Very Significant, Short-term, Adverse** effect on the River Owenass riverine habitat which is associated with the River Nore and River Barrow SAC.

7.8.3 Impacts between Owenass Bridge and Mill Bridge (Defence No. 3)

7.8.3.1 Mixed broadleaved / conifer woodland & Wet willow-alder-ash woodland

The westernmost of the two mixed broadleaved / conifer woodlands located in the centre of the scheme boundary, and the wet willow-alder-ash woodland located in the west of the scheme are both in the vicinity of the creation of embankments. The creation of embankments will involve the stripping of topsoil, excavations, the creation of the embankment and associated risk of damage to local ecological receptors through mechanical impacts of damage from machinery access, and spillage of excavated material. No trees are scheduled for removal at these locations, however, 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. There are no trees scheduled for removal from this area.

In addition to potential mechanical impacts on the woodland, they also will be vulnerable to surface water (run-off) polluting events. (e.g., leaking, or spilled hydrocarbons), spillage of excavated materials, and increased airborne pollutants (dust and emissions) which may occur within the area, which will have a knock-on impact of disrupting or possibly damaging the quality of local vegetation.

Therefore, in the absence of mitigation, **Short-term Adverse** effects of **Slight** significance are anticipated for these habitats, due to potential impact on local vegetation in the form of mechanical damage, or damage to the habitat through excavated material or accidental pollutant spillage.

7.8.4 Impacts between Owenass Bridge and Mountmellick Mill Bridge (Defence No. 4)

7.8.4.1 Stone Walls and other stonework

The stone wall that runs along the walkway between Mill Bridge and Convent Bridge is in the access path for waters to enter and leave the floodplain, as such, in the absence of mitigation, there will be a **Permanent, Adverse,** effect of **Moderate** significance due to the loss of biodiversity associated with the wall as it gets cleared for water to access the flood plain.

7.8.5 General Positive Impacts

Once operational, the proposed Scheme will reduce the flood risk in parts of Mountmellick, reducing the likelihood of pollutants being mobilised and entering the watercourse during flood events. Point sources which will be protected from flooding include houses, roads, cars and parking areas, and sewers. Additionally, emergency use of sandbags and other emergency measures will be reduced, which can cause additional sources of sedimentation. This is expected to have a positive impact on the water quality of the River Owenass and the habitats and species it supports.

7.8.5.1 Connection to foul water services

Foul water from Mountmellick currently undergoes treatment through the Mountmellick Wastewater Treatment Plant. A foul water pipe currently flows into the River Owenass downstream of the scheme. Any disruptions to services will be agreed with the relevant service providers and will be communicated in advance to the relevant property owners. Further mitigation measures for utilities are not required.

Mitigation measures outlined in Chapter 9 for the protection of surface and groundwater will further reduce potential for impacts on Mountmellick Wastewater Treatment Plant.

With these mitigation measures in place the potential impact on these utilities during construction will be **Imperceptible**.

7.8.6 Realignment of the Clontygar Stream

The Clontygar Stream is to be realigned to accommodate 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 greatly reduce the habitat's suitability for local fish species.

As such, in the absence of mitigation and of effective realignment strategies, there will be a **Permanent, Adverse** effect of **Moderate** significance due to the large-scale reduction in the stream's suitability for local fauna and loss of riverine resources and processes.

7.8.7 Impacts at Irish town Garden Centre (Defence 9)

7.8.7.1 Other artificial lakes and ponds & Amphibians

The main works being undertaken in the vicinity of this habitat include the creation of an embankment. This will involve the stripping of topsoil, excavations, the creation of the embankment and associated risk of damage to local ecological receptors through mechanical impacts of damage from machinery access, and spillage of excavated material. Along with this, there is a proposed site compound in the field south of the embankment area, temporary traffic measures, demolition of existing walls, construction of a new concrete wall, and clearance of vegetation before the reinstatement of the fields, removal of temporary access roads and removal of the site compound.

The pond will not be directly impacted or removed nor is it at risk of any reduction of habitat footprint, however, it will be vulnerable to surface water (run-off) and groundwater polluting events (e.g., leaking, or spilled hydrocarbons), spillage of excavated materials, and increased airborne pollutants (dust and emissions) which may occur within the area, which will have a knock-on impact of disrupting or possibly

damaging the quality of local habitats, which will have a knock-on impact of disrupting the local Smooth Newt population confirmed within this pond.

Therefore, in the absence of mitigation, **Short-term, Adverse** effect of **Slight** significance are anticipated for this pond habitat and the Smooth Newt population within it, due to potential infiltration of the water by excavated material or accidental pollutant spillage.

7.8.8 Summary of Construction impacts on Ecological Receptors

Impacts have been identified for the River Barrow and River Nore SAC Natura 2000 site, along with the site's QIs and local habitats and fauna within the vicinity. The impacts and their mitigations for the Natura 2000 site and its QIs will be addressed further within the accompanying NIS, Table 7-15 lists the ecological receptors and impacts to be addressed further within this report.

Table 7-15: Summary of assessment of effects to local ecological receptors resulting from the construction phase

Ecological Feature	Value	Impacts from Construction	Effect without Mitigation
Stone walls and other stonework (BL1)	High Local	Dismantling of the wall between Mountmellick Bridge to Convent Bridge	Permanent adverse effect of moderate significance due to the loss of this locally high value habitat
Other artificial lakes and ponds (FL8)	High Local	Pollutant infiltration into the pond through embankment works near Irishtown Garden Centre	Short-term temporary effect of moderate significance due to deterioration of water quality from pollutants
Depositing / Lowland rivers (FW2)	County level	Pollutant infiltration throughout the scheme and in-stream works at identified locations	Short-term temporary effect of moderate significance due to deterioration of water quality from pollutants
Depositing lowland rivers / Drainage ditches (FW2/FW4)	High level	Pollutant infiltration throughout the scheme and in-stream works at identified locations Improper realignment of the Clontygar Stream	Short-term temporary effect of moderate significance due to deterioration of water quality from pollutants Permanent adverse effect of moderate significance due to improper realignment of the Clontygar Stream
Drainage ditches (FW4)	High Local	The spread of dust, excavation material and pollutants from works throughout the site in the vicinity of this habitat	Short-term temporary effect of moderate significance due to deterioration of water quality from pollutants
Mosaic: Improved agricultural grassland, Scrub (GA1/WS1)	High Local	The spread of dust, excavation material and pollutants from works throughout the site in the vicinity of this habitat	Short-term temporary effect of slight significance due to direct habitat damage or pollutant infiltration
Dry meadows and grassy verges (GS2)	High Local	The spread of dust, excavation material and pollutants from works throughout the site in the vicinity of this habitat Direct habitat loss on a local scale	Short-term temporary effect of slight significance due to direct habitat damage or pollutant infiltration
Dry meadows and grassy verges, Scrub (GS2/WS1)	High Local	The spread of dust, excavation material and pollutants from works throughout the site in the vicinity of this habitat	Short-term temporary effect of slight significance due to direct habitat damage or pollutant infiltration
(Mixed) broadleaved woodland (WD1)	High Local	The spread of dust, excavation material and pollutants from works throughout the site in the vicinity of this habitat. Direct removal of vegetation in select areas to accommodate works	Short-term temporary effect of slight significance due to the mechanical damage or destruction of habitat during works
Mixed broadleaved / conifer woodland (WD2)	High Local	The spread of dust, excavation material and pollutants from works throughout the site in the vicinity of this habitat. Direct removal of vegetation in select areas to accommodate works	Short-term temporary effect of slight significance due to the mechanical damage or destruction of habitat during works
Hedgerows (WL1)	High Local	The spread of dust, excavation material and pollutants from works throughout the site in the vicinity of this	Short-term temporary effect of slight significance due to direct

Ecological Feature	Value	Impacts from Construction	Effect without Mitigation
		habitat. Direct removal of vegetation in select areas to accommodate works	habitat removal and potential pollutant spill
Mosaic: Hedgerows / Scrub (WL1 / WS1)	High Local	The spread of dust, excavation material and pollutants from works throughout the site in the vicinity of this habitat. Direct removal of vegetation in select areas to accommodate works	Short-term temporary effect of slight significance due to direct habitat removal and potential pollutant spill
Treelines (WL2)	High Local	The spread of dust, excavation material and pollutants from works throughout the site in the vicinity of this habitat. Direct removal of vegetation in select areas to accommodate works	Short-term temporary effect of slight significance due to direct habitat removal and potential pollutant spill
Wet willow-alder-ash woodland (WN6)	High Local	The spread of dust, excavation material and pollutants from works throughout the site in the vicinity of this habitat. Direct removal of vegetation in select areas to accommodate works	Short-term temporary effect of slight significance due to direct habitat removal and potential pollutant spill
Scrub (WS1)	High Local	The spread of dust, excavation material and pollutants from works throughout the site in the vicinity of this habitat. Direct removal of vegetation in select areas to accommodate works	Short-term temporary effect of slight significance due to direct habitat removal and potential pollutant spill
Mammals – Badger, Hedgehog, Pygmy Shrew, Red Squirrel, Pine Marten	High Local	Localised hedge and tree removal Accidental introduction of pollutants into the habitats utilised by local mammal populations, reducing their ability to provide refuge, safe commuting routes and foraging opportunities. Physical, visual, and audible disturbance from construction works. Accidental entrapment and/or injuries caused by on-site machinery or supplies.	Short-term, slight adverse effect due to disruption of activity from habitat deterioration or entrapment
Otter	International	Habitat degradation Accidental introduction of pollutants into the habitats utilised by local mammal populations, reducing their ability to provide refuge, safe commuting routes and foraging opportunities. Physical, visual, and audible disturbance from construction works. Accidental entrapment and/or injuries caused by on-site machinery or supplies.	Short-term, slight adverse effect due to disruption of activity from habitat deterioration, species entrapment, enaction of in-stream works

Ecological Feature	Value	Impacts from Construction	Effect without Mitigation
		Disruption of Otter sprainting sites	
Bats	County	Localised tree and hedge removal Accidental introduction of pollutants into the habitats utilised by local bat populations, reducing their ability to provide refuge, safe commuting routes and foraging opportunities. Physical, visual, and audible disturbance from construction works.	Short-term, slight adverse effect due to reduction of commuting and foraging potential
Breeding (non-riparian species) and Wintering Birds	High Local	Accidental introduction of pollutants into the habitats utilised by local bird populations, reducing their ability to provide refuge, nesting, and foraging opportunities. Physical, visual, and audible disturbance from construction works.	Short-term, slight adverse effect due to disruption of activity from habitat deterioration
Breeding Birds (Riparian species)	High Local	Accidental introduction of pollutants into the water course utilised by riparian birds reducing their ability to provide refuge, safe commuting routes and foraging opportunities. Physical, visual, and audible disturbance from construction works.	Short-term, moderate adverse effect due to disruption of activity from habitat deterioration, enaction of in-stream works
Amphibians	High Local	Accidental introduction of pollutants into the pond habitat, degrading its condition and its ability to support the protected species associated with the habitat on site.	Short-term, slight adverse effect due to disruption of activity from habitat deterioration
Freshwater White-clawed Crayfish	International	Habitat degradation Accidental introduction of pollutants into the habitats utilised by local mammal populations, reducing their ability to provide refuge, safe commuting routes and foraging opportunities. Physical, visual, and audible disturbance from construction works. Accidental entrapment and/or injuries caused by on-site machinery or supplies.	Short-term, slight adverse effect due to disruption of activity from habitat deterioration, species entrapment, enaction of in-stream works
Terrestrial Invertebrates	High Local	Direct removal or accidental introduction of pollutants into the habitats utilised by terrestrial invertebrates, reducing their foraging opportunities.	Short-term, slight adverse effect due to disruption of activity from habitat deterioration
QI Fish: Salmon, Brook Lamprey, River Lamprey	International	Habitat degradation Accidental introduction of pollutants into the habitats utilised by local fish populations, reducing their ability to provide foraging and spawning opportunities. Physical, visual, and audible	Short-term, slight adverse effect due to disruption of activity from habitat deterioration, species entrapment, enaction of in-stream works

Ecological Feature	Value	Impacts from Construction	Effect without Mitigation
		disturbance from construction works. Accidental entrapment and/or injuries caused by on-site machinery or supplies.	
Fish: Eel	County	Habitat degradation Species foraging, commuting, and breeding disruption (in-stream works) Accidental introduction of pollutants into the habitat, degrading its condition and its ability to support the protected species associated with the habitat on site and downstream.	Short-term, moderate adverse effect due to disruption of activity from habitat deterioration, species entrapment, enaction of in-stream works

7.9 Predicted Impacts - Operational Phase

7.9.1 Habitats and Species

7.9.1.1 Depositing / lowland rivers, Otter, Crayfish, Fish (Eel), Riparian Birds

As the flood defence walls are permanent structures, and the embankments will be revegetated, the operation of the proposed Scheme will generally not result in any additional discharges into the River Owenass or the surrounding streams.

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.

Therefore, in the absence of mitigation not already designed into the project, **No Effects** are anticipated for these faunal groups during operational phase of the Owenass Bridge due to the Scheme not resulting in discharges into the River Owenass or the surrounding streams, and the in-built design preventing the disruption of Otter passage.

7.9.1.2 Stone walls and other stonework

Given the nature and extent of the project's operations, adverse impacts for this habitat and its species are not anticipated during the operational phase given their location and the expected scope of operational impacts. The deconstructed stone wall and wall vegetation will be reinstated in another location. This relocation is to be determined at a later design stage.

7.9.1.3 Dry meadows and grassy verges, Treelines, Hedgerows, Scrub & Woodlands

Given the nature and extent of the project's operations, direct adverse impacts for these habitat types are not anticipated during the operational phase given their habitat dependency location and the expected scope of operational impacts. However, deteriorated and depleted resources as a result of the construction phase will continue to impact local faunal species throughout the operational phase until recovery stage is reached. In the event of required maintenance work access by machinery may contribute to occasional short term habitat degradation.

Therefore, in the absence of mitigation, **Short-term, Adverse** effects of **Slight** significance are anticipated for these habitats, during operational phase due to the reduced habitat coverage.

7.9.1.4 Other artificial lakes and ponds, Amphibians

Given the nature and extent of the project's operations, adverse impacts for this habitat and this species group are not anticipated during the operational phase given their location and the expected scope of operational impacts.

7.9.1.5 Ground-dwelling Mammals, Bats, Breeding and Wintering Birds & Terrestrial Invertebrates

Due to the removal of trees and shrubs during the construction process, there will be a reduction in potential nesting and roosting availability for birds and bats in the scheme during the operation phase

Therefore, in the absence of mitigation, **Short-term, Adverse** effects of **Slight** significance are anticipated for these faunal groups during operational phase of the Scheme due to the reduced bat and bird roosting/nesting habitat within the Scheme's area.

In general, given the nature and extent of the project's operations, direct adverse impacts for these species groups are not anticipated during the operational phase throughout the majority of the Scheme given their habitat dependency location and the expected scope of operational impacts, however, deteriorated and depleted resources as a result of the construction phase will continue to impact them throughout the operational phase while the habitats and resources regenerate. In the event of required maintenance work access by machinery may contribute to occasional short term habitat degradation. Therefore, in the absence of mitigation, **Short-term, Adverse** effects of **Slight** significance are anticipated for faunal groups in other areas of the operational phase due to the temporary reduction in habitat and resource availability.

7.9.1.6 Invasive Species

Following the completion of the scheme, the ongoing inspection works are not anticipated to contribute to the spread of INNS.

7.9.2 Summary of Operational impacts on Ecological Receptors

Impacts have been identified for the River Barrow and River Nore SAC Natura 2000 site, along with the site's QIs and local habitats and fauna within the vicinity. The impacts and their mitigations for the Natura 2000 site and its QIs will be addressed further and within the accompanying NIS, Table 7-16 lists the ecological receptors and impacts to be addressed further within this report.

Table 7-16: Summary of impacts to local ecological receptors during the operation phase

Ecological Feature	Value	Effect from Operation	Effect without Mitigation
Stone walls and other stonework (BL1)	High Local	Short term, adverse effect after the reinstatement of wall plants to reestablish	n/a
Other artificial lakes and ponds (FL8)	High Local	No effect during operational phase	n/a
Depositing / Lowland rivers (FW2)	County level	Pollutant infiltration throughout the scheme and in-stream works at identified locations	n/a
Depositing lowland rivers / Drainage ditches (FW2/WFW4)	High level	No effect during operational phase	n/a
Drainage ditches (FW4)	High Local	No effect during operational phase	n/a
Mosaic: Improved agricultural grassland, Scrub (GA1/WS1)	High Local	No effect during operational phase	n/a
Dry meadows and grassy verges (GS2)	High Local	Deteriorated through vehicular access and potential maintenance works causing occasional short term habitat degradation.	Short term, slight adverse effect
Dry meadows and grassy	High Local	Deteriorated through vehicular access	Short term, slight adverse

Ecological Feature	Value	Effect from Operation	Effect without Mitigation
verges, Scrub (GS2/WS1)		and potential maintenance works causing occasional short term habitat degradation.	effect
(Mixed) broadleaved woodland (WD1)	High Local	Deteriorated through vehicular access and potential maintenance works causing occasional short term habitat degradation.	Short term, slight adverse effect
Mixed broadleaved / conifer woodland (WD2)	High Local	Deteriorated through vehicular access and potential maintenance works causing occasional short term habitat degradation.	Short term, slight adverse effect
Hedgerows (WL1)	High Local	Deteriorated through vehicular access and potential maintenance works causing occasional short term habitat degradation.	Short term, slight adverse effect
Mosaic: Hedgerows / Scrub (WL1 / WS1)	High Local	Deteriorated through vehicular access and potential maintenance works causing occasional short term habitat degradation.	Short term, slight adverse effect
Treelines (WL2)	High Local	Deteriorated through vehicular access and potential maintenance works causing occasional short term habitat degradation.	Short term, slight adverse effect
Wet willow-alder-ash woodland (WN6)	Low Regional	Deteriorated through vehicular access and potential maintenance works causing occasional short term habitat degradation.	Short term, slight adverse effect
Scrub (WS1)	High Local	Deteriorated through vehicular access and potential maintenance works causing occasional short term habitat degradation.	Short term, slight adverse effect
Mammals – Badger, Hedgehog, Pygmy Shrew, Red Squirrel, Pine Marten	High Local	Deteriorated through vehicular access and potential maintenance works causing occasional short term habitat degradation.	Short term, slight adverse effect
Mammals - Otter	International	In built design of an Otter pass on Owenass Bridge will prevent any effects during operation phase	Neutral. In build mitigation
Bats	County	Deteriorated and depleted resources for bats through vehicular access for maintenance	Short-term, slight adverse effect
Breeding (Non-riparian) & Wintering Birds	High Local	Deteriorated and depleted resources for birds through vehicular access for maintenance	Short-term, slight adverse effect
Breeding Birds (Riparian Birds)	High Local	Deteriorated and depleted resources for birds through vehicular access for maintenance	Short-term, slight adverse effect
Freshwater White-clawed Crayfish	International	No effect during operational phase	n/a
Amphibians	High Local	No effect during operational phase	n/a
Terrestrial Invertebrates	High Local	Deteriorated and depleted resources for terrestrial invertebrates through vehicular access for maintenance	Short-term, slight adverse effect
QI Fish: Salmon, Brook Lamprey, River Lamprey	International	No effect during operational phase	n/a
Fish: Eel	County	No effect during operational phase	n/a

7.10 Mitigation Measures - Construction Phase

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 ecological receptors

of high local ecological importance outlined in Table 7-15 and Table 7-16. All prescribed mitigation measures will be strictly adhered throughout the length of the construction and operational phases, ensured through the measures outlined in this section.

Measures to reduce siltation and pollution will be discussed and agreed with IFI to ensure that they meet their required standards. For works in the salmonid spawning reach downstream of Convent Bridge, specifications for the instream work environment will be advised by Inland Fisheries Ireland (IFI). IFI have outlined monitoring requirements for the first phase on instream construction works that will determine the instream methodology throughout the project – see EIAR Section 9.4.4 Monitoring.

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. The CEMP will incorporate the mitigation measures listed here. The proposed development's principal contractor, as well as all other construction contractors, will be required to comply with all the mitigation details outlined within the CEMP.

All of the works and mitigation measures will be monitored by a suitably qualified Environmental Clerk of Works (ECoW) during the construction period, with findings reported to the competent authority. The ECoW will be appointed by the Contractor. For roles and responsibilities of the ECoW, refer to Section 4.4 of the CEMP.

The Project Ecologist will be appointed by Laois County Council. For roles and responsibilities of Project Ecologist refer to Section 4.5 of the CEMP.

7.10.1 Standard Environmental Best Practice

The activities required for the proposed development's construction phase shall 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 will also strictly adhere 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); and
- Inland Fisheries Ireland: A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, In-stream Rehabilitation, Climate / Flood Risk and Recreational Planning (IFI, 2020).

These guidelines are also present within the accompanying NIS.

7.10.2 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 for the 11 locations).

The below list of measures will be incorporated into site compound environmental management:

- Site compounds will not be located within core foraging areas utilised by QI species.
- 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 (canteen, toilets, drying rooms, etc.).
  - 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 the 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 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 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 the ECoW.
- Stockpiling of spoil and spoil-like materials will be appropriately located within the compounds 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 ADR trained personnel will be permitted to operate fuel bowsers.

These guidelines are also present within the accompanying NIS.

7.10.3 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 be required to develop and implement a Surface Water Management Plan, Pollution Control Plan and Dust Management Plan. The minimally required list of mitigation measures outlined below will be incorporated into these plans.

7.10.3.1 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 the European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988).

- Oil booms and oil soakage pads will 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.
- 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 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 impermeable area with waste control facilities.
- Pre-cast concrete bridge 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 between the contractor and the Project Ecologist 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 watercourse that flow into the SAC.
- Temporary stockpiles will be monitored for leachate generation. These stockpiles will be placed within designated areas and not located within the vicinity of watercourses, wetlands, 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 contaminated soils will then be classified as clean, inert, non-hazardous, or hazardous in accordance with the EC Council Decision 2003/33/EC. Furthermore, the contractor will ensure that no cross-contamination with clean soils happens elsewhere throughout the development site.
- Silt fencing will be installed prior to the commencement of any construction works in order to enhance the protection of identified water features (along the embankments of the River Owenass). 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 (Section 7.10.5) 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.

7.10.3.2 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.

7.10.3.3 Dust Management Plan

The following measures will be implemented to prevent excavation- and cement-based dusts entering the local surface water network and supporting foraging habitats:

- Breaking of topsoil/earth stripping will be minimised during dry and windy weather where possible.

- 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.

These guidelines are also present within the accompanying NIS

7.10.4 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 during the pouring process in order to avoid leakages or spills of concrete.
- Washout of concrete plant will occur 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 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.

These guidelines are also present within the accompanying NIS.

7.10.5 Construction of the Walls

7.10.5.1 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.

7.10.5.2 Bankside Construction

There are proposed walls running sections of either bank of the River Owenass, or on land 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 lightweight 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.

7.10.6 In-stream Works

There will be scheduled in-stream works along the River Owenass, impacting the river habitat's health, and the species within it. The 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, Crayfish and Otter, and non-QI species, such as Eel. As such, the following measures will be incorporated within both this biodiversity chapter and the accompanying NIS 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 in-stream works will be approved by IFI and overseen by the Project Ecologist for its duration. IFI have outlined monitoring requirements for the first phase of instream construction works that will determine the instream methodology throughout the project – see EIAR 9.4.4 Monitoring. These will be detailed in CEMP and Construction Methodology Report.

All in-stream 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 in-stream 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.

7.10.6.1 River pumping during dry cell works

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 dry cell works or stream diversion will be overseen by the Project Ecologist who will monitor all stages of in-stream 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 will be necessary in order to maintain flow within the natural course of the river. If in-stream works require dry celling of sections of the stream width to create a dry bed for construction works, river connectivity will 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

7.10.6.2 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. 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 scheme's 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. 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. Another method is implementation of a combination of sedimentation tanks, silt bags and percolation areas. 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 enter the dewatering system or become trapped in the dry cell area, the contractor's 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 in select areas of flood walls, culverts and headwalls within 10m of all water bodies 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 in-stream works will be conducted between July and September inclusive as per IFI recommendations.

7.10.7 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)'. IFI is to check the area during lower water levels of May and June 2024 for further information which will lead to concessions prior to works. This would include both species and gravel bed mapping to establish the extent of the utilisation of the rivers by local fish. Given the salmonid spawning areas 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 riverbed 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 side, 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** steps1-6 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 fish, 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.

7.10.8 Fish

Fish salvage and translocation works will be undertaken by the electrofishing specialist 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 also require translocation, as described in the NIS. While the mitigations below are applicable to the QI fish species of the River Barrow and River Nore SAC and will be listed within the accompanying NIS, they are also listed here to mitigate any effects on non-QI fish species (such as Eel),

Translocation efforts will follow guidelines for standard electrofishing surveys as set out in Harvey and Cowx (2003)[106]. To successfully translocate fish (and lamprey ammocoetes), this work should 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 licence - 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 by 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. Others that may be caught during fishing efforts must

[106] Harvey J & Cowx I (2003). *Monitoring the River, Brook and Sea Lamprey, Lampetra fluviatilis, L. planeri and Petromyzon marinus.* Conserving Natura 2000 Rivers Monitoring Series No. 5, English Nature, Peterborough.

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 it 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 should be approved by IFI in advance of works.

7.10.9 Culvert and Headwall Design

There will be installation of new culverts along the River Pound, and there will be realignment of the Clontygar Stream, along with a series of temporary culverting along the land drains throughout the scheme and 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 IFI and Loughs Agency Documents:

- IFI (2016) - Guidelines on protection of fisheries during construction works in and adjacent to waters.
- Loughs Agency (2011) - Guidelines for Fisheries Protection during Development Works (Foyle and Carlingford areas)

Culverts within the Scheme 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 will 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 will 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). Fish are reluctant to pass through dark waterways and consequently fish migration may be impeded should the culvert be inappropriately designed.

7.10.10 Realignment of the Clontygar Stream

Along the existing Clontygar Stream where realignment is proposed, 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.

Investigations must be conducted along the proposed stream realignment.

Sediment types along the lengths of the affected and proposed channel will 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 will 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. Surveys must be conducted in the summer months as normal flow conditions will be most susceptible to the impacts of surface-groundwater disconnection.

The alignment of the stream will follow the guidelines listed within IFI (2016) to be designed to replicate an existing natural watercourse which includes measures such as having 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. 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.

7.10.11 Mitigation for works near trees and hedgerows.

7.10.11.1 Protection from nearby works

In areas where works are anticipated to be adjacent to trees, but not directly involving their removal (such as works along the banks of the River Owenass), there are a set of mitigations within the Arboricultural Impact Assessment (Arbor-Care Ltd., 2023) 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:

7.10.11.2 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.

7.10.11.3 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.
- 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.
- If 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.
- If Ivy removal uncovers a potential bat roost, an inspection of the roost and assessment of impact will be required. If a roost is present a derogation licence is required in advance of tree removal.
- If Ivy removal uncovers a potential roost, an inspection of the roost and assessment of impact will be required. If a roost is present a derogation licence is required in advance of tree removal.
- In the absence of potential roost features, the tree can be removed. Removal will take place outside of the breeding bird season (1st of March to 31st of August inclusive).
- A silt trap (as described above) will be placed along the bank of the stream to prevent any sediment resulting from excavations entering the stream. A geotextile sealed lining should be placed within trenches and piled excavations before any concrete is poured for foundations.

7.10.11.4 Direct scheduled removal

In areas with the scheduled removal of trees, hedges and scrub throughout the Scheme, protective measures mentioned above regarding limb clearance and root protection will be repeated for neighbouring trees. Trees, hedges, and scrub scheduled for removal will be conducted in the months of September-October; a time that is outside of the breeding bird and summer mammal season (March – August inclusive), and mammal hibernation window.

Where this seasonal restriction cannot be observed, a check for active roosts, hibernating mammals and nests will be carried out immediately prior to any site clearance by an appropriately qualified ecologist/ ornithologist and repeated as required to ensure compliance with legislative requirements. If nests are found, they will be safeguarded, with an appropriate buffer, until the chicks have successfully fledged.

7.10.12 Stone Wall Preservation

The stone wall identified that runs between the Mill and Convent Bridge is to have its flora preserved as much as possible through the manual dismantling of the wall prior to works in the area, and the reinstatement of the wall at the identified location set further back from the banks and out of the proposed footprint of the embankments.

If the stones are to be stored during the time between the dismantling and reinstatement of the wall, the stones will have their original orientation in the sun maintained, to allow the established communities to retain their tolerated growth conditions.

7.10.13 General Avoidance Measures

Although it has been identified that there will be no permanent impact through disturbance to wildlife during the work, general avoidance measures will be undertaken to protect wildlife while the works are being carried out.

General avoidance measures that will be incorporated by the contractors working on site include:

- Limit the hours of working to daylight hours, to limit disturbance to nocturnal and crepuscular animals.

- Due to the potential presence of; Red Squirrel, Hedgehog, Pygmy Shrew and the confirmed presence of Otter, Badger and bats, the use of lighting at night must be avoided. If the use of lighting is essential, then a directional cowl will be fitted to all lights to prevent light spill and to be directed away from all treelines / wooded areas.
- 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 will be covered overnight to prevent animals from falling and getting trapped. If that is not possible, a strategically placed plank will be placed to allow animals to escape.

7.10.14 Site Lighting Design

There are no new lighting installations anticipated from the implementation of this scheme. However, as the proposed Scheme is anticipated to take place for a duration of 3 years, some lighting guidelines are included in the event that working at night takes place.

7.10.14.1 Hours of illumination during works and operational phases:

Any of the lighting that is to be utilised during the construction phase will be controlled by photocells which go on/off at sunrise and sunset as per set lux levels. Additionally, Virtual Midnight dimming will also be incorporated on-site, which automatically dims the lights by 33% between midnight and 6am.

7.10.14.2 Light levels and type:

Construction site lighting that meets the lowest light levels permitted under health and safety would be preferable for bats in the vicinity. The specification and colour of light treatments, such as single bandwidth lights and no UV light are essential. LED luminaires are ideal and will be used where possible due to their sharp cut-off, lower intensity, and dimming capability. A warm white spectrum (3000K) must be used in the lighting located along the boundaries of the site to reduce the blue light component.

7.10.14.3 Column heights of lamp posts:

As bats most likely forage in the unlit areas within and around the scheme area, the introduction of new lighting as a result of the new development, with accompanying light spillage, is anticipated to result in the bats becoming averse to commuting and foraging within the proposed site and potentially the adjacent habitats also. In order to reduce the amount of light spillage where it is not needed, the height of lamp columns must be restricted. A height of 6m or less is necessary to avert lighting impacts. The Project Ecologist will monitor the site lighting with appropriate lux meter device to ensure that there is no excessive light spillage/pollution into immediately adjacent unlit areas utilised by nocturnal wildlife.

7.10.15 Biosecurity Mitigations

The adherence to a set of biosecurity measures, including fencing off/demarcating invasive non-native species, communicating the location, risk and hazards associated with invasive non-native 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.

Prior to where clearance of vegetation is necessary to form access routes and work areas, Three-cornered Garlic will be removed and appropriately disposed 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 farm tracks between fields, and it is recommended that uprooting the patches is the preferred option to prevent its spread.

Following the recommendations outlined by All About Trees Ltd. & NM Ecology Ltd. (2023), should the works be begun prior to 2024, it is recommended that the remaining Japanese Knotweed within the footprint is excavated and sent off-site. This will require the application of a derogation license through NPWS.

7.10.16 Flood Plain of the Owenass: Baker's Field

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

IFI have indicated (see Table 5-4 in EIAR) 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. Exact details to be confirmed after IFI complete a survey in low flows (May/June 2024).

7.10.17 NIS-specific Mitigations

Mitigation measures on the River Barrow and River Nore SAC, its respective QIs (Otter, fish species and Crayfish) and associated river habitats have been addressed in the accompanying NIS.

7.10.17.1 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) will be placed to allow animals to escape.

7.10.17.2 Crayfish

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 removed and left on site.
- It then will be thoroughly cleaned with disinfectant or hot water (over 60ºC).
- Equipment must then undergo a 48hr drying period. If complete drying is not possible, the equipment will be soaked, sprayed or wiped down with a disinfect and such as Virkon Aquatic Virasure tablets.

7.11 Mitigations and Remedial Measures for the Operational Phase

Due to the nature of the operation of the project, the ongoing works will need to follow some of the previously mentioned mitigation measures for works which includes:

7.11.1 Reseeding of grassy verges

In the areas where grassy verges are damaged from the access of machinery, reseeding of flora using locally sourced wildflower mixes will rejuvenate the damaged habitat after the works.

Proposed embankments will have slopes sown with an indigenous wildflower mix that suits the precise location.

7.11.2 Remedial Tree and Scrub Planting

Any trees or scrub that are removed or damaged will be replaced after the works with native plant species, such as Alder, Birch and Scots Pine that currently exist throughout the Scheme area. Any replacement trees will help enhance floral diversity within the site and improve the area for terrestrial invertebrates, mammals, bats, and birds. The selection of tree species when planting new trees will consider their value for wildlife and similarity to the existing native vegetation.

This measure is included in the NIS, in particular in the areas of scrub removal within the SAC boundary.

7.11.3 Bat Boxes

In the interest of enhancing the site for the local bats (i.e., Pipistrelles and Leisler's Bat that display high site fidelity), it is recommended that a series of bat boxes are installed on-site in areas where remedial tree planting is to take place. These bat boxes will be south-facing and at least 4m off the ground. If erecting on a mature tree, the placement must be free from Ivy with no branches within a 1m radius around the location of the box.

Within the Irish context, it is recommended that bat boxes be installed in dark areas. Examples of suitable bat boxes include the 1FF Schwegler Bat Box with Built-in Wooden Rear Panel and the 2F Schwegler Bat Box (General Purpose).

Guidance on installing bat boxes can be found here: https://www.bats.org.uk/our-work/buildingsplanning-and-development/bat-boxes/putting-up-your-box.

Simple bat boxes suitable for Pipistrelle's and Leisler's bats can be bought online or constructed by local community groups e.g., Men's Sheds. Note that some bat box designs (that are enclosed at the base) require annual cleaning out, which must be carried out by a Bat Specialist or NPWS Ranger.

Guidance on installing bat boxes is detailed in the following resource document: http://www.batcon.org/images/InstallingYourBatHouse_Building.pdf. A summary on installing bat boxes can be summarised as:

- Suggested locations include areas with mature trees within treelines.
- All bat boxes will be mounted at least 3-4 metres above the ground.
- Mount on the south facing side of the tree where the box exposed to the sun for part of the day.
- Do not install bat boxes on a tree that is near any lighting column.

These suggestions are generalised for the improvement of a site to become more bat friendly. As such, it is recommended that if there are intended to be bat enhancements on site, that a bat specialist provides more definitive advice on how and where to appropriately facilitate bat boxes.

In addition to bat boxes installed on trees throughout the Scheme, the new bridge over the River Owenass is planned to have two Bat Roost Tubes / Boxes integrated into the stone façade of either side of the bridge which will add additional potential roosting features for bats. It is recommended that additional Bat Roost Boxes are bolted onto the side of Mill Bridge to facilitate additional bat roosting within the scheme.

7.11.4 Bird boxes

It is recommended that bird nesting boxes be installed in the areas of replanting of the trees located within the scheme area to enhance the site for nesting bird species.

Bird nesting boxes come in a range of entrance sizes that are suitable for different species dependant on their size. For every 10m of hedgerow removed, one of each of the following will be constructed:

- 25mm hole for Blue Tit and smaller birds.
- 32mm hole for Great Tit and slighting larger small birds.

- Open-fronted nest box for Robins.
- 45mm hole for Starlings and larger birds.

In addition to bird boxes to be installed on trees throughout the Scheme, the new bridge over the River Owenass is planned to have a Dipper / Grey Wagtail Nest Box will be bolted to the underside of the bridge which will add additional potential nesting features for these riparian birds.

7.11.5 Reinstatement of the stone wall

During the reinstatement of the stone wall, the stones will need to retain their original orientation in the sunlight and growth conditions, which will allow the vegetation on it to continue its established growth.

7.12 Monitoring

To determine the effectiveness of proposed measures, the site will be monitored prior to, during and for at least 5 years post construction. This is to determine how measures are performing and if management strategies are effective at maintaining the function of the area, and its ecological benefits. Suggested monitoring procedures are presented in the following sub sections, targeted toward different habitats and organisms. Monitoring methods must be approved by the relevant competent authority, have clearly defined objectives, and reports submitted to the competent authority and refined following their guidance. Data collection will be carried out in a systematic and standardised manner to allow for inter survey comparison and following established procedures to feed into national databases (e.g. EPA for water quality, I-WeBS for wintering birds, Breeding Bird Survey for bird monitoring, IFI for fish monitoring).

A copy of all data on species will be uploaded to the NBDC within 4 weeks of a survey being carried out, and all data will be made available in a public repository, in line with the Open Data Directive[107]. Data on sensitive species will have a restricted availability (e.g. Badger setts). Monitoring procedures must be carried out for a sufficient length of time (minimum 1 year) in order to assess effectiveness of the measures. At the end of the monitoring period, a review of the findings will be carried out, and if necessary, monitoring will be prolonged.

Monitoring methodology will be based on the following methodologies/guidance and adapted as necessary:

- Monitoring of disturbed habitats to determine condition using indicators of disturbance and assessment of vulnerabilities, including invasive species.
- Bird monitoring using I-WEBs methodology for winter birds, and countryside bird survey methodology for breeding birds, with a walk through of suitable habitat to determine presence/absence of breeding ground-nesting or non-calling birds.
- Monitoring will be carried out until it is established that the ecosystems are functioning well, and of good condition – this will allow for adjustment of management until such conditions are achieved.
- Annual post construction monitoring for a minimum of 1 to 5 years depending on ecological receptor, and to be reviewed at the end of each term until adequate outcomes are achieved.
- Water quality monitoring in conjunction with Laois Co. Co. standard water quality monitoring standards.
- Data to be submitted to National Biodiversity Data Centre (NBDC) 4 weeks post survey.

[107] EU, "*Directive (EU) 2019/1024 of the European Parliament and of the Council of 20 June 2019 on Open Data and the Re-Use of Public Sector Information (Recast),"* L 172/56 § (2019)

Otter monitoring will also take place to ensure the proposed works have not impacted the local population and to resurvey potential holts. Surveys will be carried out once per year for two years after the construction works are complete.

All post construction monitoring will be devised and conducted by a suitably qualified ecologist in consultation with NPWS, IFI and the local county council's Biodiversity Officer.

7.13 Residual Effects

Residual ecological impacts are those that remain once the development proposals have been implemented. The main aim of ecological mitigation, is to minimise or eliminate residual impacts

7.13.1 Construction Phase

The enabling and construction works will potentially result in the disturbance of local breeding and wintering birds, commuting mammals, spawning amphibians, water quality impacts on fish and riparian habitats, direct disturbance to fish species, loss of trees and the spread of invasive species.

Implementation of mitigation measures during the construction phase, along with good site management and construction practices will help to minimise any significant and/or permanent impact on the environment. This will be included in a Construction Environmental Management Plan (CEMP) and monitoring by suitably qualified, contractor-supplied ECoW in all sensitive locations.

Included in this will be mitigation measures for timing of works, avoidance of sensitive habitats, biosecurity measures, protective measures for local fish, mammals, birds and bats as well as control of surface water, and dust which will negate any residual effects on the local surface water networks, and associated habitats and species.

7.13.2 Operational Phase

The proposed development is anticipated to generate minor residual impacts from the loss of habitats (scrub, trees and grasslands), which will be compensated for during the operation phase through remedial planting and the supply of resources for birds and bats during the operation phase.

The loss of trees from the scheme will cause a **Slight** to **Imperceptible, Adverse** residual impact from loss of individual trees that are locally important with **Medium-term** effect while trees establish.

No other adverse residual effects are anticipated.

7.14 Summary of Assessment of Impacts

Table 7-17 summarises the potential impacts on the important ecological receptors, mitigation measure employed, and significance of residual effects during construction and operational phases of the scheme.

Table 7-17: Significance of effects after mitigation is applied during Construction and Operational phases of the Scheme

Ecological Feature	Value	Potential Impact	Effect Without Mitigation	Mitigation	Significance of effects of residual impacts after mitigation
Construction Phase					
River Barrow and River Nore SAC	International	Disruption to QI Species Otter, White-clawed Crayfish, Brook Lamprey, River Lamprey, Atlantic Salmon and to QI Habitat Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	Expanded upon in the NIS	Expanded upon in the NIS	Expanded upon in the NIS
Stone Walls and Other Stonework	High Local	Habitat removal	Permanent adverse effect of moderate significance due to the loss of this locally high value habitat	Strict adherence to: - The mitigations outlined in sub-section 4.1.12 regarding the deconstruction and relocation of the local stone wall	Neutral effect given the relocation of the habitat and the retention of the wall flora
Other artificial lakes and ponds Amphibians	High Local	Accidental introduction of pollutants into the habitat, degrading its condition and its ability to support the protected species associated with the habitat on site.	Short-term temporary effect of moderate significance due to deterioration of water quality from pollutants, leading to lower suitability of the habitat for local amphibians	Strict adherence to: - The mitigations outlined in sub-sections 7.10.1 and 7.10.2 outlining environmental best practise for the project and the management of the site compounds - The mitigations outlined in sub-sections 7.10.3 and 7.10.4 ensuring the protection of the pond habitat site from the introduction of pollutants (surface water, groundwater, dust, and concrete) -The mitigations outlined in sub-section 7.10.5 regarding the procedure for construction of walls near the pond	Neutral residual effect due to protection of habitats and species from pollution

Ecological Feature	Value	Potential Impact	Effect Without Mitigation	Mitigation	Significance of effects of residual impacts after mitigation
Depositing / lowland rivers White-clawed Crayfish Fish species: Salmon & Lamprey	International (River Owenass) County (River Pound)	QIs expanded upon in the NIS. Accidental introduction of pollutants into the habitat, degrading its condition and its ability to support the protected species associated with the habitat on site and downstream.	Short term, moderate adverse effects due to the reduction of water quality and the habitat's suitability for species.	Strict adherence to: - The mitigations outlined in sub-sections 7.10.1 and 7.10.2 outlining environmental best practise for the project and the management of the site compounds - The mitigations outlined in sub-sections 7.10.3 and 7.10.4 ensuring the protection of the river site from the introduction of pollutants (surface water, groundwater, dust, and concrete) -The mitigations outlined in sub-section 7.10.5 and 4.1.6 regarding the procedure for construction of walls near or within the river	Neutral residual effect due to protection of aquatic habitat from pollutants
Depositing/ Lowland rivers and Drainage ditches (Clontygar Stream classified as both)	High local	Accidental introduction of pollutants into the habitat, degrading its condition and its ability to support the protected species associated with the habitat on site and downstream. Incorrect realignment of the Clontygar stream	Short-term temporary effect of moderate significance due to deterioration of water quality from pollutants	Strict adherence to: - The mitigations outlined in sub-sections 7.10.1 and 7.10.2 outlining environmental best practise for the project and the management of the site compounds - The mitigations outlined in sub-sections 7.10.3 and 7.10.4 ensuring the protection of the river site from the introduction of pollutants (surface water, groundwater, dust, and concrete) -The mitigations outlined in sub-section 7.10.5 and 4.1.7 regarding the procedure for construction of walls and works on the Owenass Bridge near or in the river - The mitigations outlined in sub-section 7.10.6 regarding the method of conducting in-stream works, minimising the impact on local aquatic fauna	Neutral residual effect due to protection of aquatic habitat from pollutants
European Eel	County	Habitat degradation Species foraging, commuting, and breeding disruption (Culvert creation, in-stream works)	Short-term, slight adverse effect due to disruption of activity from habitat deterioration, species entrapment, enaction of in-stream works	Strict adherence to: - The mitigations outlined in sub-sections 7.10.1 and 7.10.2 outlining environmental best practise for the project and the management of the site compounds - The mitigations outlined in sub-sections 7.10.3 and 7.10.4 ensuring the protection of the river site	Neutral residual effect due to protection of habitats and species from pollution

Ecological Feature	Value	Potential Impact	Effect Without Mitigation	Mitigation	Significance of effects of residual impacts after mitigation
		Accidental introduction of pollutants into the habitat, degrading its condition and its ability to support the protected species associated with the habitat on site and downstream.		from the introduction of pollutants (surface water, groundwater, dust, and concrete) -The mitigations outlined in sub-section 7.10.5 and 4.1.7 regarding the procedure for construction of walls and works on the Owenass Bridge near or in the river - The mitigations outlined in sub-section 7.10.6 regarding the method of conducting in-stream works, minimising the impact on local aquatic fauna	
Drainage Ditches	High Local	Accidental introduction of pollutants into the habitat, degrading its condition and its ability to support the protected species associated with the habitat.	Short-term temporary effect of moderate significance due to deterioration of water quality from pollutants	Strict adherence to: - The mitigations outlined in sub-sections 7.10.1 and 7.10.2 outlining environmental best practise for the project and the management of the site compounds - The mitigations outlined in sub-sections 7.10.3 and 7.10.4 ensuring the protection of the river site from the introduction of pollutants (surface water, groundwater, dust, and concrete) -The mitigations outlined in sub-section 7.10.5 regarding the procedure for construction of walls near the ditch habitats	Neutral residual effect due to protection of habitat
Dry meadows and grassy verges	High Local	Accidental introduction of pollutants into the habitat, degrading its condition and its ability to support the protected species associated with the habitat. Deterioration through vehicular access and nearby works	Short-term temporary effect of slight significance due to direct habitat damage or pollutant infiltration	Strict adherence to: - The mitigations outlined in sub-sections 7.10.1 and 7.10.2 outlining environmental best practise for the project and the management of the site compounds - The mitigations outlined in sub-sections 7.10.3 and 7.10.4 ensuring the protection of the grassy verges from the introduction of pollutants (surface water, groundwater, dust, and concrete) -The mitigations outlined in sub-section 7.10.5 regarding the procedure for construction of walls near local habitats - The mitigations outlined in sub-section 7.10.14 regarding the reseeding of damaged grassy verges	Neutral residual effect due to protection of habitats, and rejuvenation of any damage

Ecological Feature	Value	Potential Impact	Effect Without Mitigation	Mitigation	Significance of effects of residual impacts after mitigation
Mixed broadleaved / conifer woodland Wet willow-alder-ash woodland	High Local	Accidental introduction of pollutants into the habitat, degrading its condition and its ability to support the protected species associated with the habitat. Deterioration through vehicular access and nearby removal works	Short-term temporary effect of slight significance due to the mechanical damage or destruction of habitat during works	Strict adherence to: - The mitigations outlined in sub-sections 7.10.1 and 7.10.2 outlining environmental best practise for the project and the management of the site compounds - The mitigations outlined in sub-sections 7.10.3 and 7.10.4 ensuring the protection of the woodlands from the introduction of pollutants (surface water, groundwater, dust, and concrete) -The mitigations outlined in sub-section 7.10.5 regarding the procedure for construction of walls near local habitats - The mitigations outlined in sub-section 4.1.11 regarding the avoidance of root compaction, limb damage and removal of local trees	Neutral residual effect due to protection of habitats and species from pollution
Hedgerows Treelines Scrub	High Local	Localised habitat removal Accidental introduction of pollutants into the habitat, degrading its condition and its ability to support the protected species associated with the habitat. Deterioration through vehicular access and nearby removal works	Short-term temporary effect of slight significance due to direct habitat removal and potential pollutant spill	Strict adherence to: - The mitigations outlined in sub-sections 7.10.1 and 7.10.2 outlining environmental best practise for the project and the management of the site compounds - The mitigations outlined in sub-sections 7.10.3 and 7.10.4 ensuring the protection of the local hedges and trees from the introduction of pollutants (surface water, groundwater, dust, and concrete) -The mitigations outlined in sub-section 7.10.5 regarding the procedure for construction of walls near local habitats - The mitigations outlined in sub-section 4.1.11 regarding the avoidance of root compaction, limb damage and removal of local trees	Slight to negligible residual impact due to loss of localised trees and protection of the wider habitats and species from pollution
Mammals - Hedgehog, Pygmy Shrew, Red Squirrel, Pine Marten &	High Local	Localised hedge and tree removal Accidental introduction of pollutants into the	Short-term, slight adverse effect due to disruption of activity from habitat deterioration or	Strict adherence to: - The mitigations outlined in sub-sections 7.10.1 and 7.10.2 outlining environmental best practise for the project and the management of the site compounds	Slight adverse residual effect due to loss of localised trees and protection of the

Ecological Feature	Value	Potential Impact	Effect Without Mitigation	Mitigation	Significance of effects of residual impacts after mitigation
Badger		habitats utilised by local mammal populations, reducing their ability to provide refuge, safe commuting routes and foraging opportunities. Physical, visual, and audible disturbance from construction works. Accidental entrapment and/or injuries caused by on-site machinery or supplies.	entrapment	- The mitigations outlined in sub-sections 7.10.3 and 7.10.4 ensuring the protection of the habitats that local mammals utilise from the introduction of pollutants (surface water, groundwater, dust, and concrete) -The mitigations outlined in sub-section 7.10.5 regarding the procedure for construction of walls near local habitats - The mitigations outlined in sub-section regarding the avoidance of root compaction, limb damage and removal of local trees - The mitigations outlined in sub-section 7.10.13 in relation in relation to the prevention of disturbance and/or entrapment of local mammals. - The mitigations outlined in sub-section 7.11.1 regarding the reseeding of damaged grassy verges for replenishing of resources for mammals.	wider habitats and species from pollution
Mammals - Otter	International	Localised hedge and tree removal Accidental introduction of pollutants into the habitats utilised by local mammal populations, reducing their ability to provide refuge, safe commuting routes and foraging opportunities. Physical, visual, and audible disturbance from construction works. Accidental entrapment and/or injuries caused by on-site machinery or supplies.	Very significant, medium-term adverse effect due to the disruption of Otter through visual, physical and audible disturbance, entrapment and/or injury and disruption of spraining	Strict adherence to: - The mitigations outlined in sub-sections 7.10.1 and 7.10.2 outlining environmental best practise for the project and the management of the site compounds - The mitigations outlined in sub-sections 7.10.3 and 7.10.4 ensuring the protection of the river site from the introduction of pollutants (surface water, groundwater, dust, and concrete) -The mitigations outlined in sub-section 7.10.5 regarding the procedure for construction of walls near the river - The mitigations outlined in sub-section 7.10.6 regarding the method of culvert construction, minimising the impact on local aquatic fauna - The mitigations outlined in sub-section 7.10.13 in relation in relation to the prevention of disturbance and/or entrapment of local mammals. As expanded upon in the accompanying NIS	Slight adverse residual impact due to loss of localised trees and protection of the wider habitats and species from pollution

Ecological Feature	Value	Potential Impact	Effect Without Mitigation	Mitigation	Significance of effects of residual impacts after mitigation
		Disruption of Otter sprainting sites			
Bats - Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat, Daubenton's bat & Brandt and/or Whiskered Bat	County	Localised tree and hedge removal Accidental introduction of pollutants into the habitats utilised by local bat populations, reducing their ability to provide refuge, safe commuting routes and foraging opportunities. Physical, visual, and audible disturbance from construction works.	Short-term, slight adverse effect due to reduction of commuting and foraging potential	Strict adherence to: - The mitigations outlined in sub-sections 7.10.1 and 7.10.2 outlining environmental best practise for the project and the management of the site compounds - The mitigations outlined in sub-sections 7.10.3 and 7.10.4 ensuring the protection of the habitats that local mammals utilise from the introduction of pollutants (surface water, groundwater, dust, and concrete) -The mitigations outlined in sub-section 7.10.5 regarding the procedure for construction of walls near local habitats - The mitigations outlined in sub-section 4.1.11 regarding the avoidance of root compaction, limb damage and removal of local trees - The mitigations outlined in sub-section 7.10.13 and 7.10.14 in relation in relation to the prevention of disturbance and/or entrapment of local mammals. - The mitigations outlined in sub-section 7.11.1 regarding the reseeding of damaged grassy verges for replenishing of resources for mammals - The mitigations outlined in Section 4.2.3 regarding to the installation of bat boxes on trees throughout this scheme, and on the new bridge over the River Owenass.	Slight adverse residual impact due to loss of localised trees and protection of the wider habitats and species from pollution
Breeding Birds (Non-riparian species)	High Local	Localised tree and hedge removal Accidental introduction of pollutants into the habitats utilised by local	Short-term, slight adverse effect due to disruption of activity from habitat deterioration	Strict adherence to: - The mitigations outlined in sub-sections 7.10.1 and 7.10.2 outlining environmental best practise for the project and the management of the site compounds - The mitigations outlined in sub-sections 7.10.3	Slight adverse residual impact due to loss of localised trees and protection of the wider habitats and species from

Ecological Feature	Value	Potential Impact	Effect Without Mitigation	Mitigation	Significance of effects of residual impacts after mitigation
		bird populations, reducing their ability to provide refuge, nesting, and foraging opportunities. Physical, visual, and audible disturbance from construction works.		and 7.10.4 ensuring the protection of the habitats that local birds utilise from the introduction of pollutants (surface water, groundwater, dust, and concrete) -The mitigations outlined in sub-section 7.10.5 regarding the procedure for construction of walls near local habitats - The mitigations outlined in sub-section regarding the avoidance of root compaction, limb damage and removal of local trees - The mitigations outlined in sub-section 7.10.13 in relation in relation to the prevention of disturbance and/or entrapment of local birds. - The mitigations outlined in sub-section 7.11.1 regarding the reseeding of damaged grassy verges for replenishing of resources for birds - The mitigations outlined in Section 4.2.4 regarding to the installation of bird nesting boxes on trees throughout this scheme, and under the new bridge over the River Owenass	pollution
Breeding Birds (Riparian species)	High Local	Localised tree and hedge removal In-stream works occurring within the River Owenass Accidental introduction of pollutants into the habitats utilised by local bird populations, reducing their ability to provide refuge, nesting, and foraging opportunities. Physical, visual, and audible disturbance from	Short-term, slight adverse effect due to disruption of activity from habitat deterioration	Strict adherence to: - The mitigations outlined in sub-sections 7.10.1 and 7.10.2 outlining environmental best practise for the project and the management of the site compounds - The mitigations outlined in sub-sections 7.10.3 and 7.10.4 ensuring the protection of the habitats that local birds utilise from the introduction of pollutants (surface water, groundwater, dust, and concrete) -The mitigations outlined in sub-section 7.10.5 regarding the procedure for construction of walls near local habitats - The mitigations outlined in sub-section 7.10.6 in relation to the in-stream works - The mitigations outlined in sub-section regarding the avoidance of root compaction, limb damage and removal of local trees	No residual Impact

Ecological Feature	Value	Potential Impact	Effect Without Mitigation	Mitigation	Significance of effects of residual impacts after mitigation
		construction works.		- The mitigations outlined in sub-section 7.10.13 in relation in relation to the prevention of disturbance and/or entrapment of local birds. - The mitigations outlined in Section 4.2.4 regarding to the installation of bird nesting boxes on trees throughout this scheme, and under the new bridge over the River Owenass	
Terrestrial Invertebrates	High Local	Localised tree and hedge removal Accidental introduction of pollutants into the habitats utilised by terrestrial invertebrates, reducing their foraging opportunities.	Short-term, slight adverse impact	Strict adherence to: - The mitigations outlined in sub-sections 7.10.1 and 7.10.2 outlining environmental best practise for the project and the management of the site compounds - The mitigations outlined in sub-sections 7.10.3 and 7.10.4 ensuring the protection of the habitats that local terrestrial invertebrates utilise from the introduction of pollutants (surface water, groundwater, dust, and concrete) -The mitigations outlined in sub-section 7.10.5 regarding the procedure for construction of walls near local habitats - The mitigations outlined in sub-section 7.11.1 regarding the reseeding of damaged grassy verges for replenishing of resources for terrestrial invertebrates	Slight adverse residual effect due to loss of localised trees and protection of the wider habitats and species from pollution
Invasive Non-native Species	Third schedule INNS	Spread of INNS inside and outside of the area of works	Medium-term, moderate adverse impact	Strict adherence to: - The mitigations outlined in sub-section 7.10.15 ensuring the minimised spread of INNS	Neutral residual impact given the measures to reduce INNS spread
Operation Phase					
River Barrow and River Nore SAC	International	No impact during operational phase	n/a	n/a	n/a

Ecological Feature	Value	Potential Impact	Effect Without Mitigation	Mitigation	Significance of effects of residual impacts after mitigation
Stone Walls and Other Stonework	High Local	Vegetation will take time to recolonise after the reinstatement of the stone wall	Short term, minor adverse effect as vegetation experience a slag phase of growth directly after relocation	Strict adherence to: - The mitigations outlined in sub-section 7.10.5 ensuring the correct orientation of the stones during the reconstruction of the walls	Neutral residual effect given the translocation and retention of the stone wall
Other artificial lakes and ponds Amphibians	High Local	No impact during operational phase	n/a	n/a	Neutral residual impact due to protection of habitats and species from pollution
Depositing / lowland rivers White-clawed Crayfish Fish species: Salmon & Lamprey	International (River Owenass) County (River Pound)	No impact during operational phase	n/a	n/a	n/a
European Eel	County				
Drainage Ditches	High Local	No impact during operational phase	n/a	n/a	n/a
Dry meadows and grassy verges	High Local	Occasional degradation of habitat during access for inspection/maintenance of flood defence measures	Short term, slight adverse effect as the grasslands will experience stunted recolonisation from operational disturbance	Strict adherence to: - The mitigations outlined in sub-section 7.11.1 regarding the reseeding of local grasslands and flora	Neutral residual effect due to protection of habitats, and rejuvenation of any damage
Mixed broadleaved / conifer woodland Wet willow-alder-ash woodland	High Local	Occasional degradation of the habitat during access for inspection/maintenance of flood defence	Short term, slight adverse effect as the habitats will experience stunted recolonisation from	Strict adherence to: - The mitigations outlined in sub-sections 7.11.2 in relation to the replanting of removed or damaged trees with native species	Neutral residual effect due to remedial planting resulting in the retention of overall

Ecological Feature	Value	Potential Impact	Effect Without Mitigation	Mitigation	Significance of effects of residual impacts after mitigation
		measures	operational disturbance		tree cover
Hedgerows Treelines Scrub	High Local	Occasional degradation of the habitat during access for inspection/maintenance of flood defence measures	Short term, slight adverse effect as the habitats will experience stunted recolonisation from operational disturbance	Strict adherence to: - The mitigations outlined in sub-sections 7.11.2 in relation to the replanting of removed or damaged trees with native species	Neutral residual effect due to remedial planting resulting in the retention of overall tree cover
Mammals - Hedgehog, Pygmy Shrew, Red Squirrel, Pine Marten & Badger	High Local	Occasional degradation of foraging habitats during access for inspection/maintenance of flood defence measures	Short term, slight adverse effect as the disruption of activities during the construction phase will linger into the early stages of the operational phase	Strict adherence to: - The mitigations outlined in sub-sections 7.11.1 and 7.11.2 ensuring the replenishment of any damaged foraging or commuting habitats	Neutral residual effect due to remedial planting resulting in the retention of resource availability and ongoing awareness of local faunal activity
Mammals - Otter	International	In built design of an Otter pass on Owenass Bridge will prevent any effects during operation phase	n/a	n/a	Neutral. In build mitigation
Bats - Common Pipistrelle, Soprano Pipistrelle, Leisler's Bat, Daubenton's bat & Brandt and/or Whiskered Bat	Low Regional	Occasional degradation of foraging habitats during access for inspection/maintenance of flood defence measures	Short term, slight adverse effect as the disruption of activities during the construction phase will linger into the early stages of the operational phase	Strict adherence to: - The mitigations outlined in sub-sections 7.11.1 and 7.11.2 ensuring the replenishment of any damaged foraging or commuting habitats - The mitigations outlined in sub section 7.11.3 in relation to the installation of artificial bat roost within the site	Slight positive residual effect due to remedial planting resulting in the retention of resource availability and ongoing awareness of local faunal activity, and increased roosting in the form of installed bat boxes

Ecological Feature	Value	Potential Impact	Effect Without Mitigation	Mitigation	Significance of effects of residual impacts after mitigation
Breeding (non-riparian) & Wintering Birds	High Local	Occasional degradation of foraging habitats during access for inspection/maintenance of flood defence measures	Short term, slight adverse effect as the disruption of activities during the construction phase will linger into the early stages of the operational phase	Strict adherence to: - The mitigations outlined in sub-sections 7.11.1 and 7.11.2 ensuring the replenishment of any damaged foraging or commuting habitats - The mitigations outlined in sub-section 7.11.4 in relation to the installation of bird boxes throughout the scheme	Slight positive residual effect due to remedial planting resulting in the retention of resource availability and ongoing awareness of local faunal activity and the installation of breeding bird boxes within the site
Breeding Birds (riparian birds)	High local	No impact during operational phase	n/a	n/a	n/a
Terrestrial Invertebrates	High Local	Occasional degradation of foraging habitats during access for inspection/maintenance of flood defence measures	Short term, slight adverse effect as the disruption of activities during the construction phase will linger into the early stages of the operational phase	Strict adherence to: - The mitigations outlined in sub-sections 7.11.1 and 7.11.2 ensuring the replenishment of any damaged foraging	Neutral residual effect
Invasive Non-Native Species	n/a	n/a	Spread of third schedule high impact species	Strict adherence to : - The mitigations outlined in sub-section 7.10.15 ensuring the correct management of invasive species of both the construction and operation phase of the project	No spread of invasive species

7.15 Interactions with other Environmental Effects

Other chapters interaction with biodiversity are:

- Land and soil;
- Construction Impacts: Air quality and Dust;
- Water; and
- Landscape and visual amenity

Construction of the proposed development could potentially increase the sediments which lead to surface water impacting the aquatic life. Furthermore, during construction air quality is impacted during as a result of dust emissions. These impacts have been assessed in each Chapter.

7.16 Cumulative Effects

The site of the proposed works is situated on a major river (River Owenass) in the village of Mountmellick. Projects within the village environs that could have a cumulative or in-combination effects are listed in Chapter 15 of this EIAR, which generally include new housing developments. None of their associated Environmental reports indicate significant cumulative effects.

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) with the proposed flood relief scheme are listed in Table 7-18, along with rationale for excluding cumulative effects. Locations are seen in Figure 15-1 in Chapter 15.

As there are no significant residual effects on ecological receptors covered within this report (following mitigation measures) from this development, there is therefore no potential for other plans or projects to act in combination with it. Therefore, significant cumulative effects are not expected to occur on the ecological receptors within the proposed site.

Table 7-18: Other projects within the locality which may have a cumulative effect on the development of the project

Planning Reference	Location	Description	Application Status	Rationale
2460060	Horan Bus Hire, Irishtown Ballycullenbeg, Mountmellick	to erect a 24m high lattice tower together with antennas, dishes and associated telecommunications equipment, all enclosed by security fencing	Lodged 13/02/2024. Decision due 08/04/2024.	Lack of connection between the project and Owenass River and no cumulative impacts are anticipated
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 include 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 cumulative effects.
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 measures will prevent any cumulative effects.
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 cumulative effects
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 project and Owenass River. No cumulative effects 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 cumulative effects.
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 project and Owenass River. No cumulative effects 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 project and Owenass River. No cumulative effects 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 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.	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 cumulative effects
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 cumulative effects.
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.	Decision will be granted 11/11/2024.	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 cumulative effects.
	Townlands			

321064	Barranaghs, Garryhinch, Annamore in County Offaly and Forest Lower, Coolnavarnoga, Coolaghy, Kilbride, Ballymorris, Cooltederry and Bracklone Co. Laois.	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 increased traffic from construction along the R423. Mitigation measures including a stop and go traffic system will reduce any cumulative impacts.

8 Land and Soil

8.1 Introduction

This chapter of the EIAR comprises an assessment of the likely significant effects of the proposed development with respect to land, geology, and soil. This chapter should be read in conjunction with Chapter 9 Water due to overlapping impacts and mitigation measures.

The following legislation was consulted during the preparation of this chapter:

- Environmental Impact Assessment (EIA) Directive (2011/92/EU) as amended by (2014/52/EU);
- Water Framework Directive (2000/60/EC);
- Groundwater Directive (2006/118/EC);
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010);
- European Union Environmental Objectives (Groundwater) (Amendment) Regulations, 2016 (S.I. No. 366 of 2016);
- Waste Management Act 1996, as amended;
- Habitats Directive (92/43/EEC).
- Classification of waste material that may be taken off-site for disposal is based on the Commission Decision of 18th December 2014, amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European parliament and Council (2014/955/EEC) [the List of Waste (LoW)].

8.2 Methodology

8.2.1 Methodology

The methodology for assessment of the impacts on soil and geology has been undertaken in accordance with the following guidance documents and recommendations:

- Environmental Protection Agency (EPA) (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Institute of Geologists of Ireland (2013) Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements;
- Department of Housing, Planning and Local Government (DHPLG) (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment; and
- National Roads Authority (NRA) (2008) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.

The following sources of information were also used in this assessment:

- EPA Maps – gis.epa.ie;
- GSI maps – gsi.ie;
- Teagasc soil and subsoil database and mapping keys;
- Laois County Council County Development Plan (2021- 2027);
- Aerial photography;
- Google Earth;
- Google Maps;
- Site investigation report - Priority Geotechnical Limited (PGL) conducted a site investigation in October 2020. A draft report was first issued on the 5th of March 2021; and
- Site walkover January 2024.

8.2.2 Assessment Criteria

The significance or sensitivity of receptors and assessment of environmental effects have been described following criteria outlined in the EPA guidelines.

In accordance with the Institute of Geologists of Ireland (IGI) Guidelines (2013), the study area has been set as a 2km radius from the site boundary, which is the recommended minimum distance for assessment. The lack of karstic or other sensitive subsurface features within the area and the scale and nature of the development have been considered.

Table 8-1: Criteria for Rating Site Attributes: Estimation of Importance of Soil and Geological Attributes (NRA,2009)

Importance	Criteria	Typical Examples
Very High	Attribute has a high quality, significance or value on a regional or national scale Degree or extent of soil contamination is significant on a national or regional scale Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale*	Geological feature rare on a regional or national scale (NHA) Large existing quarry or pit Proven economically extractable mineral resource
High	Attribute has a high quality, significance or value on a local scale Degree or extent of soil contamination is significant on a local scale Volume of peat and/or soft organic soil underlying route is significant on a local scale*	Contaminated soil on site with previous heavy industrial usage Large recent landfill site for mixed wastes Geological feature of high value on a local scale (County Geological Site) Well drained and/or highly fertility soils Moderately sized existing quarry or pit Marginally economic extractable mineral resource
Medium	Attribute has a medium quality, significance or value on a local scale Degree or extent of soil contamination is moderate on a local scale Volume of peat and/or soft organic soil underlying route is moderate on a local scale*	Contaminated soil on site with previous light industrial usage Small recent landfill site for mixed wastes Moderately drained and/or moderate fertility soils Small existing quarry or pit Sub-economic extractable mineral resource
Low	Attribute has a low quality, significance or value on a local scale Degree or extent of soil contamination is minor on a local scale Volume of peat and/or soft organic soil underlying route is small on a local scale*	Large historical and/or recent site for construction and demolition wastes Small historical and/or recent landfill site for construction and demolition wastes Poorly drained and/or low fertility soils Uneconomically extractable mineral resource

Several walkover surveys, and the installation of trial pits and boreholes as part of site investigations have furnished relevant information on geology at the site.

The methodology for assessment of the impacts on the soil and geology will be undertaken in accordance with recommendations in "Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements" by the Institute of Geologists of Ireland (2013). The Directive requires EIA practitioners to consider the sustainable use of soil and land.

A Conceptual Site Model for the site was developed based on the site investigations undertaken, the information on groundwater levels in the boreholes and the proposed flood relief scheme. The impacts of the scheme on geology, groundwater and hydrogeology and water dependant habitats and species were assessed and any significant impacts will be mitigated.

The interaction between geology/soils and hydrology/hydrogeology on water dependant ecology is discussed in Chapter 14 of the EIAR dealing with interactions of the foregoing.

8.3 Receiving Environment

Table 8.2 below shows a summary of the land, geology, and soils features identified, and their importance rankings. These are further discussed in the following sections.

Table 8-2: Site Features Identified and Ranked by Importance

Feature		Ranking	Comment
Land/land take	Residential/urban areas	Medium	Some excavation will be in residential or urban areas, however, majority of excavation works for embankments are in rural locations. There will be some temporary and permanent land take to complete the works.
	SAC	High	The Owenass River is part of the River Barrow and River Nore (SAC). Some works taking place in or near the Owenass River will be in stream. Additional instream works will take place in various locations throughout the study area on several watercourses which are tributaries of the Owenass River and are therefore indirectly linked to the SAC.
Soil and subsoil	Made ground	Low	A monitoring program will be implemented during construction in order to detect the presence of any contaminants in excavated material in or adjacent to urban areas.
	Topsoil	Medium	Topsoil is predominantly peaty gleied alluvium that is wet with poor stability. The site investigation found ground conditions to be poor throughout most of the study area with the potential for unforeseen ground conditions to arise in locations of the proposed flood measures. Specific site assessments may be required before undertaking some of the works. Some topsoil may be repurposed on site, however, the soil is generally considered of low value.
	Till, Alluvium, Peat	Low	Low value cut blanket peat and limestone till. Alluvium more fertile but not dominant.
Geological Heritage sites	None	n/a	A sinuous vein of basic esker sands and gravels is present along the eastern edge of the scheme area, which become the Ridge of Portlaoise further south. The deposit is not a designated geological heritage site.

8.3.1 Land-use

Mountmellick is a service town located in the north of County Laois. The county includes parts of the River Nore and River Barrow catchments. The Owenass River enters the town from the west, passing under Owenass Bridge, Mill Bridge on the N80 and Convent Bridge on Sarsfield Street, flowing north to its confluence with the River Barrow at Strahard to the northeast of Mountmellick.

Mountmellick lies in a flat, rural landscape of productive agricultural land and surrounded by a number of upland areas including the Slieve Bloom Mountains in the northwest. Mountmellick has good transport links; the N80 National Secondary route bisects the town from north to south and connects Mountmellick to Portlaoise, Carlow, Waterford, and Rosslare to the south and Tullamore, Mullingar and Athlone to the north. Portarlington is located approximately 10km to the northeast on the R423. There is easy access to the M7 and M8 Motorway interchanges at Portlaoise which provides excellent access to the south and west of the country, the Greater Dublin Area, Dublin Port and Airport.

As the largest and most important service town in the county, Mountmellick is a hub of vital retail, residential, service, amenity, and support services to the surrounding hinterland, while supporting the upper tier of the urban hierarchy outlined in the Laois CDP.

Development is relatively compact around the town centre with radial expansion evident along N80, R422, and L2120. Corine data shows urban and residential development took place in northeastern areas between 1990 and 2006. Since then, land use in Mountmellick has been subject to little change.

The eastern half of the study area is dominated by discontinuous urban fabric which shares a border with pastures and a small area of non-irrigated arable land to the south.

The town has a history of flooding. Most recently, severe flash flooding occurred in November 2017 following heavy rain causing the Owenass River and several streams in the vicinity to break their banks. Lands to the south, southwest, and west were impacted the most which is reflected in the location of the proposed flood measures. These areas are predominantly pastures interspersed with single rural dwellings.

8.3.2 Bedrock Geology

The underlying bedrock of the site is composed of dark muddy limestone and shale (Ballysteen formation). A band of massive, unbedded limestones (Waulsortian limestones) lies to the east and a narrow vein of sandstone, mudstone and thin limestone lies to the west. Fault lines are identified at the borders between bedrock units.

All site compounds and proposed works will be located in areas of dark muddy limestone bedrock.

8.3.3 Karst

No karst features were identified within the study area during the desktop survey or the site investigation.

8.3.4 Quaternary Sediment

In the centre of the site, the underlying subsoil is predominantly limestone till (carboniferous), alluvium along the Owenass River, [random soil association], peat, and made ground. A thick vein of basic esker sands and gravels is mapped from the north along the eastern edge of the proposed scheme which becomes the county geological heritage site of the Ridge of Portlaoise further south.

For a summary of the site investigation, soil sample analysis and detailed description of the subsoil environment across the site see Section 8.4.

Proposed embankments, walls and site compounds will be situated in locations of alluvium, cut peat, and limestone till.

8.3.5 Topsoil

Topsoil varies across the scheme area. Alluvial soils border the Owenass River, extending further inland in some parts. Peat is present throughout the scheme area in large patches often bordering with alluvium and the Mylerstown soil association which is characterised by Groundwater Gleys and Peat soils. Urban soils underlie Mountmellick Town. Soils of other associations fall within the borders of the scheme area but are not in the location of proposed flood relief works or site compounds.

Proposed embankments, flood walls, and site compounds are in areas of all four major soils identified during the desktop study.

Table 8-3: Summary of topsoil within the study area

Soil Association	Great Groups	Description
05RIV	Alluvial	Loamy, silty, clayey, sandy
0650a	Groundwater Gley, Ombrotrophic, Luvisol	Fine and coarse loamy with limestone drift or gravels, some peat
1000c	Luvisol, Brown Earth, Groundwater Gley, Minerotrophic	Fine and coarse loamy with limestone and siliceous drift, some peat
1150a	Brown Earth, Luvisol, Rendzina	Fine and coarse loamy with limestone drift and calcareous gravels
1xx	Peat	Peat
Urban	Urban	Made Ground

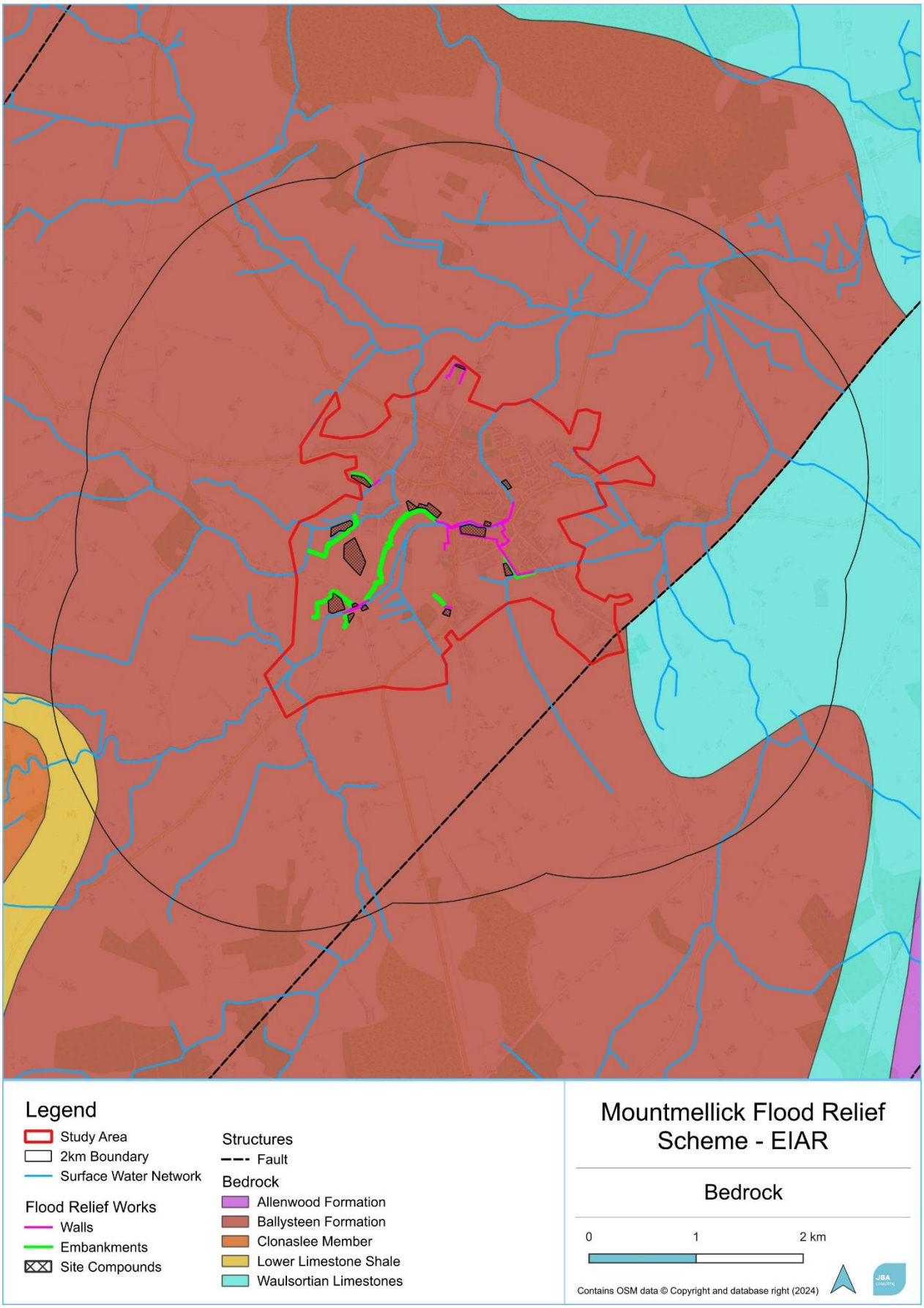


Figure 8-1: Bedrock geology of Mountmellick

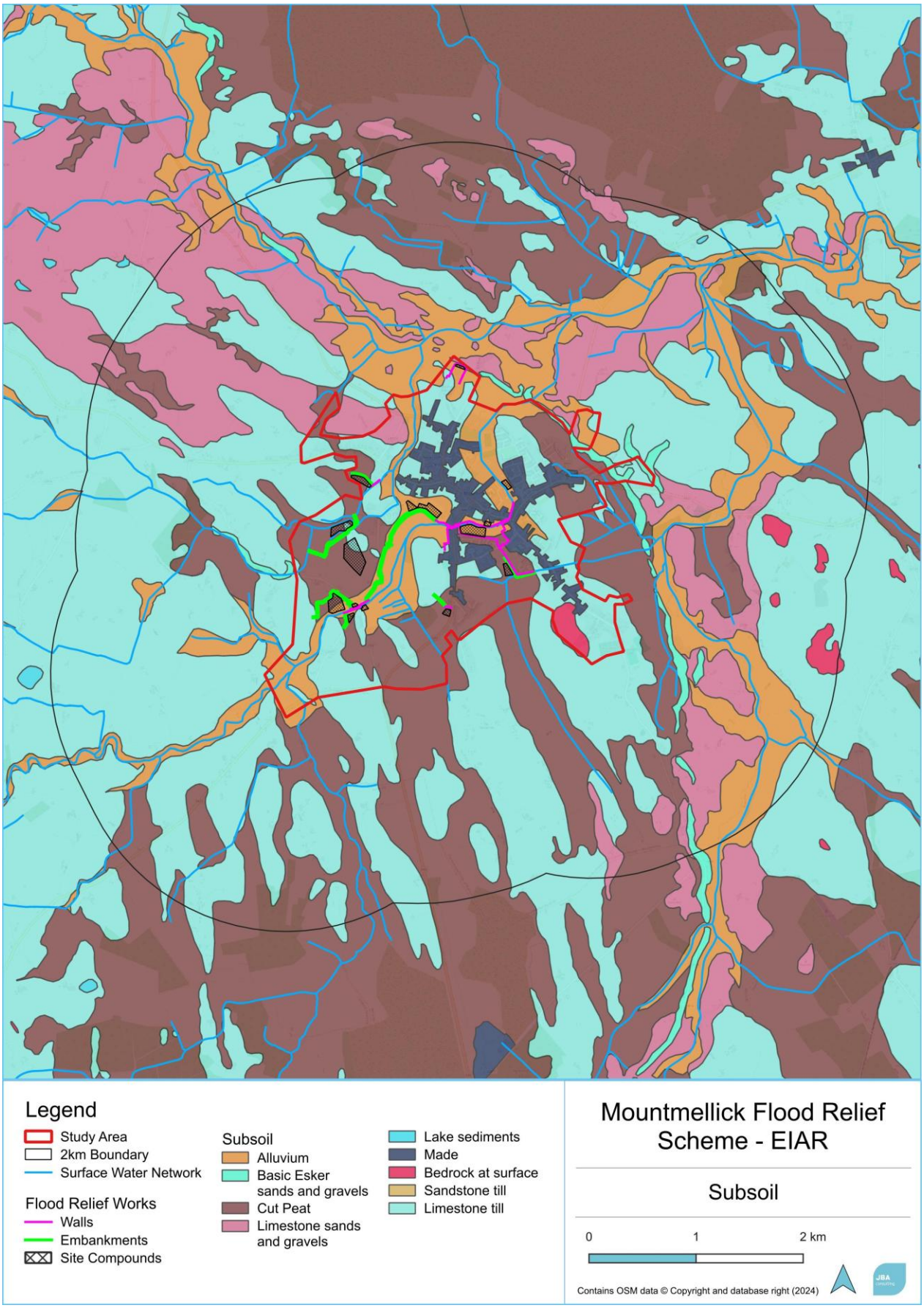


Figure 8-2: Subsoil of Mountmellick

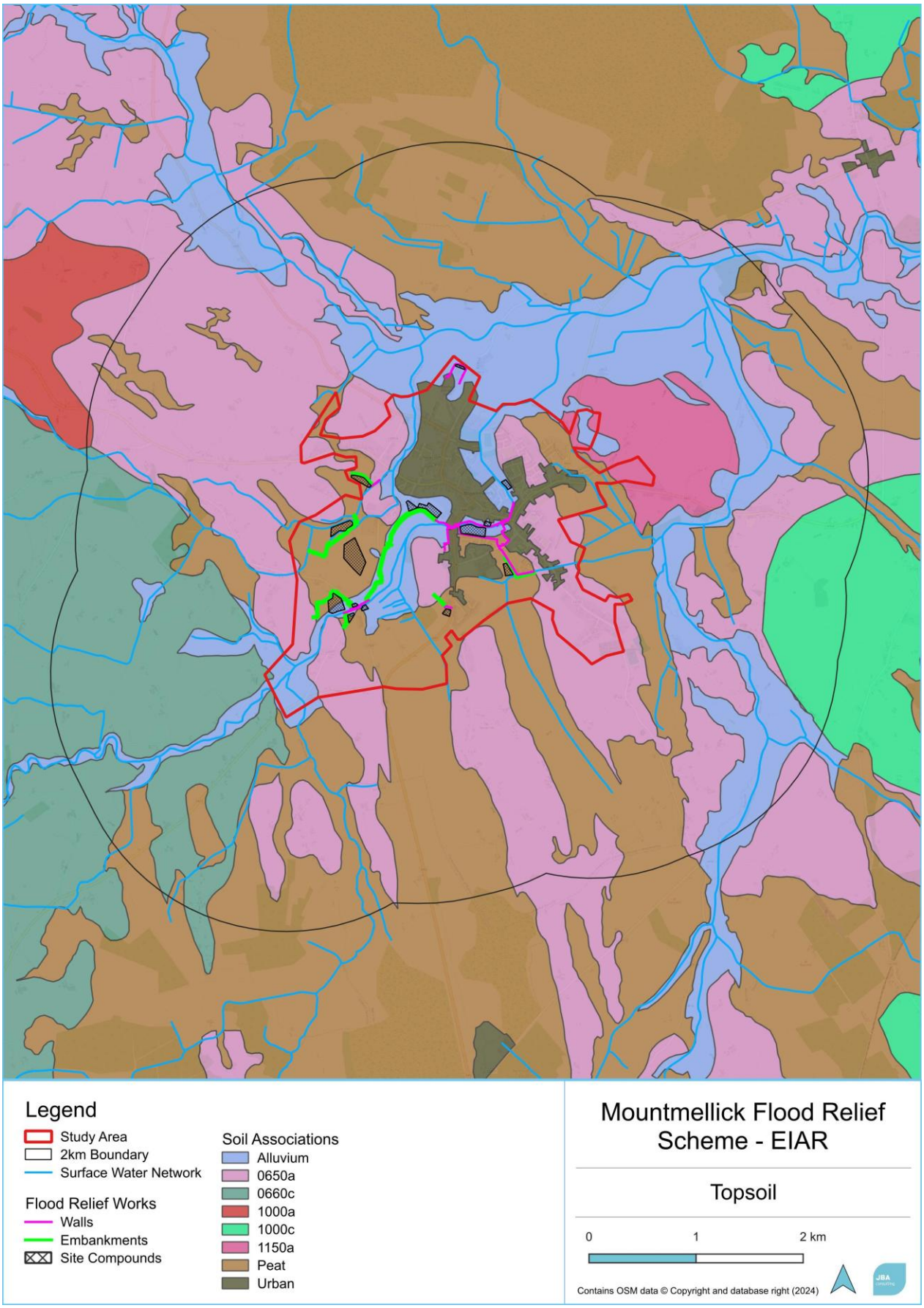


Figure 8-3: Topsoil of Mountmellick

8.3.6 Geohazards

Mountmellick is an area of medium radon risk, 1 in 10 homes is likely to have high radon levels. The area is not susceptible to landslides and no earthquakes have been recorded within 5 km. No other geohazards were identified during the desktop survey.

8.4 Site Investigation

A site investigation was undertaken by Priority Geotechnical Ltd. (PGL) in October 2020. A factual report [108]was published on the 28th of September 2021. The site operations included:

- 18 No. Cable Percussive Boreholes (CP),
- 16 No. Rotary Core Boreholes (RC),
- 17 No. Dynamic Probes (DP),
- 18 No. Window Samples (WS),
- 32 No. Trial Pits (TP),
- Two Hand Pits (HP),
- One Slit Trench (ST),
- 17 No. Groundwater Monitoring standpipes installation,
- Groundwater monitoring,
- Associated sampling, and
- Associated in-situ testing:
  - Two Falling head permeability tests,
  - 132 No. Standard Penetration Tests (SPT),

Geotechnical laboratory testing:

- 101 No. Natural Moisture Content,
- 93 No. Atterberg Limits,
- 132 No. Particle Size Distribution,
- 40 No. Grading by hydrometer on fines,
- Four Dry Density/Moisture Content relationship tests (Proctor),
- Nine Point Load index tests,
- Six. Unconfined compressive strength (UCS) tests,

Chemical laboratory testing:

- 24 No. pH,
- 24 No. Sulphate – SO4 soluble,
- 13 No. Organic matter.

The purpose of the site investigation was to provide geotechnical and environmental information that would inform the design and construction of a proposed flood relief scheme.

[108] Priority Geotechnical. 2021. *Mountmellick Flood Relief Scheme Site Investigation Contract Factual Report*

8.4.1 Ground Conditions

Based on the findings of the site investigation carried out by PGL, a ground investigation report[109] was prepared to assist with the initial design of the proposed defences. Three distinct ground models were developed to illustrate ground conditions across the scheme area. The ground models developed were not applied to the most western and most northern areas.

The first ground model comprises topsoil over alluvium underlain by cohesive glacial till and granular glacial till followed by limestone bedrock. Alluvium consists of a wide variety of material types: clays, silts, sand, and gravels. In discrete locations, topsoil is replaced by made ground. This ground model represents areas Upstream of Owenass Bridge and between Owenass Bridge and Mill Bridge where flood relief measures are proposed including embankments, flood walls and replacement of Owenass Bridge.

The second ground model is characterized by presence of made ground directly below or replacing topsoil. Topsoil and made ground are underlain by alluvium over cohesive glacial till over granular glacial till over limestone bedrock. This ground model represents the area between Mill Bridge and Convent Bridge an area of proposed flood walls, footpath raising, and creation of a formalised flood plain.

The third ground model is characterized by a lack of cohesive glacial till, so it comprises topsoil over alluvium over granular glacial till with limestone bedrock beneath. This model characterises the area around the Garroon Stream where a single embankment and adjoining flood wall area proposed.

[109] JB Barry & Partners Consulting Engineers. 2023. *Mountmellick Flood Relief Scheme Ground Investigation Report*

Table 8-4: Ground Model One

Stratum	Description	Depth to top (m BGL)/Level to top (m OD)	Thickness (m)	Design ground model depth (m BGL)/Level (m OD)	Design ground model thickness (m)
Topsoil	Slightly sandy SILT or CLAY	0.0 / 74.59-76.83	0.2-0.7	0.0 / 74.59	0.4
Alluvium	Organic slightly gravelly sandy SILT Or Slightly sandy gravelly CLAY or brown clayey gravelly SAND or Loose to medium dense sandy clayey GRAVEL	0-0.4 / 76.63-74.48	1.0-3.0	0.4 / 74.19	1.5
Cohesive glacial till (CGT)	Firm to stiff sandy gravelly CLAY or firm to stiff sandy gravelly SILT	0-4.0 / 74.87 – 70.89	1.3-3.5	1.9 / 72.69	3
Granular glacial till (GGT)	Medium dense to dense, grey sandy clayey/silty GRAVEL or gravelly clayey/silty SAND	0.3-7.0 / 76.1-67.83	1-3.5	4.9 / 69.69	1.9
Limestone	Strong blue-grey fossiliferous LIMESTONE	4.5-9.5 / 71.37-65.33	-	6.8/67.79	-

Table 8-5: Ground Model Two

Stratum	Description	Depth to top (m BGL)/Level to top (m OD)	Thickness (m)	Design ground model depth (m BGL)/Level (m OD)	Design ground model thickness (m)
Topsoil	SILT Or Slightly sandy SILT	0/75.19-73.62	0.2-0.7	0.0 / 73.62	0.4
Made Ground	SILT with pieces of wood Or GRAVEL Or bituminous surfacing Or Silty SAND and GRAVEL	0-0.2 / 80.12-74.33	0.1-1.0	0.4 / 73.22	0.5
Alluvium	Soft to firm organic, sandy gravelly SILT Or Soft slightly sandy slightly gravelly CLAY Or Gravelly, clayey/silty SAND Or Very clayey, sandy GRAVEL	0-1.9 / 75.12-72.56	0.6-3	0.9 / 72.72	1.5
Cohesive glacial till (CGT)	Soft to firm sandy gravelly SILT Or Firm to stiff sandy gravelly CLAY	0-3.8 / 79.12-70.32	0.2-5.25	2.4/71.22	2.2
Granular glacial till (GGT)	Medium dense to dense gravelly silty/clayey SAND with cobbles Or Medium dense to dense clayey/silty sandy GRAVEL with cobbles	0.2-5.5 / 78.12-68.06	0.5-4.3	4.6 / 69.02	1.8
Limestone	Strong to very strong blue grey to dark grey LIMESTONE	6.0-9.8 / 67.56-65.32	-	6.4 / 67.22	-

Table 8-6: Ground Model Three

Stratum	Description	Depth to top (m BGL)/Level to top (m OD)	Thickness (m)	Design ground model depth (m BGL)/Level (m OD)	Design ground model thickness (m)
Topsoil	-	0.0 / 74.37-75.85	0.5-0.8	0.0 / 74.37	0.65
Alluvium	Slightly gravelly very silty peaty SAND	0.0-73.88	1.0	0.65 / 73.72	1.0
Granular glacial till	Medium dense clayey, gravelly SAND Or Medium dense to dense silty/clayey sandy GRAVEL Or Dense slightly clayey sandy gravelly COBBLES	0.5-2.9 / 75.35-72.95	2.2-6.5	1.65 / 72.72	6.45
Limestone	Strong to very strong, dark grey, bioclastic fossiliferous, banded muddy LIMESTONE	8.1 / 65.78	-	8.1 / 66.27	-

Trial pits show very poor stability. Only 5 out of 32 pits showed Moderate to Good stability with the remainder having stability characterised as Poor or Very Poor. Conditions resulting in a poor or very poor score were collapsing pit walls or complete pit collapse, respectively.

The ground investigation report is based on the exploratory investigation locations. For the ground conditions in the locations between the exploratory locations is recommended that additional site-specific investigations will be carried out, at detailed design stage, to reduce the risk of unforeseen ground conditions. Such locations are areas around Davitt Road, Irishtown Road, and southern sections of the N80 near Irishtown Garden Centre, where flood embankments and flood walls are proposed.

8.4.2 Contaminated Ground

The site investigation found no evidence of contamination across the area of study. Made ground was encountered in 2 no. of the trial pits and both hand-dug pits. A full suite of chemical testing was not performed on samples, and a monitoring program will be implemented during the construction phase to test excavated soil.

8.4.3 EPA Licensed Facilities and Waste Facilities

Mountmellick UWWTP (Reg No. D0152) is located at the northern boundary of the town adjacent to the Owenass River which flows east of the plant. There are two emission points located beside the plant, stormwater overflow (Emission ID - TPEFF1600D0152SW002) and primary effluent (Emission ID - TPEFF1600D0152SW001). The closest flood defence works are those proposed for Midland Steel which lies approximately 570m to the northeast of the UWWTP.

Two additional storm water overflow points (Emission ID - TPEFF1600D0152SW004, TPEFF1600D0152SW005) are located at Mill Bridge and Convent Bridge respectively. These two emission

points are located in an area where significant flood relief works are to take place. Protection of these services will be necessary for the duration of the works through mitigation measures outlined in the Construction Environment Management Plan (CEMP).

Kyletalesha Landfill (W0026-03) and Advanced Environmental Solutions (Ireland) Ltd waste transfer facility (W0194-02) are both located just beyond the 2km boundary to the south. There are no Seveso sites or other licensed facilities within 2km of Mountmellick.

8.4.4 Minerals/Quarries/Mines

Mineral deposits data noted from GSI show general limestone deposits within 2km of the scheme area. One deposit falls within the southeast boundary of the scheme area and is historical notes show this deposit was undeveloped due to unsuitability for lime production. An active sand and gravel quarry is located just outside of the 2km boundary to the south within the Kyletalesha townland.

8.4.5 Geological Heritage

There is no geological heritage site falling within the 2km boundary from the study area. The northern most point of the Ridge of Portlaoise (Site code: LS029) is approximately 3.5km south of the study area boundary. A long, sinuous accumulation of sands and gravels deposited both under the ice sheet and at its margin as the ice withdrew northwards across central Laois at the end of the last Ice Age.

8.4.6 Protected Structures

A significant number of protected structures, architectural sites, and archaeological sites are present within the town centre. Flood relief works are to take place along the Owenass River at the locations of three bridges, one of which is listed on the NIAH. Convent Bridge (Reg No. 12900359)

8.5 Characteristics of the Proposed Development

The full description of the Proposed Development is provided in Chapter 4 of the EIAR.

The proposed Flood Relief Scheme will employ a combination of different flood relief measures across the scheme area to defend properties from flooding originating from the Owenass River, the Garroon Stream, the Pound River and the Clontygar River.

The 10 no. continuous defences are flood walls, flood embankments and culverts, one bridge (a replacement of the Owenass Bridge), and one pumping station. The Clontygar Stream will also be diverted to a new channel and current surface water drainage networks will be upgraded and protected where necessary.

Several site compounds and welfare sites will be erected at appropriate locations to facilitate the works and transport and storage of material. Enabling and preparatory works for all flood defence features will involve some vegetation clearance and some tree removal at areas around the Garroon Stream, Upstream of Owenass Bridge and Downstream of Convent Bridge as well as most works located within the riparian zone of watercourses.

An estimated 3,160 linear metres of flood walls will be constructed as part of the scheme. Flood wall heights vary considerably throughout the scheme depending on topography and required level of protection. The Owenass Bridge replacement will be constructed using reinforced concrete material and a combination of precast and in-situ elements. The bridge will have a masonry finish reusing existing stone where possible, to match existing masonry finish and to provide a similar capping.

Flood embankment height will vary between 1.2 – 3.0m above the surrounding ground level. Embankments will be grass seeded or sewn with an indigenous wildflower mix to suit the location. Trees will not be allowed within a minimum distance of two metres from the base of the embankment as this would compromise their structural integrity.

Excavation and backfilling will be required to allow for flood and embankment construction. Suitable excavated material for backfilling will be required in locations where excavated material is not suitable.

- At the western boundary of Midland Steel, strip topsoil and excavation will be required for the flood wall, surplus excavated material will be removed
- At the southern field adjacent to Garroon Stream there is expected unsuitable excavated material, which will be removed. Suitable engineered clay fill will be imported to replace unsuitable indigenous material. Most of the excavated material, deemed unsuitable (e.g., alluvium), will be taken off-site.
- At the greenfield lands adjacent to the Clontygar Stream and Irishtown Road, excavation is needed for the drainage network and pumping station construction. Backfilling at this location will be with Class 808 material or excavated indigenous clay. Imported materials that will be used is well-graded granular material and potentially precast sections for manholes.
- At the South bank of the Owenass River, excavation for flood defence wall; foundation depth depends on bearing stratum. The surrounding area will be backfilled after wall construction. For precast section potential imported material will be used.
- In both banks of the Owenass River between Mill Bridge and Convent Bridge excavation is required for flood walls construction and raised footpaths, with variable excavation depth depending on the stratum. Backfilling is expected to be with imported suitable engineered clays.
- Works adjacent to Davitt Road and surrounding areas will require excavation for the realignment of stream channel and flood defence walls. Excavated material from the stream diversion is expected to be removed. Imported material is potentially required for lining the stream channel and backfilling the flood wall.
- For the works between Owenass Bridge and Mill Bridge excavation for flood defence embankments and walls will be required. Backfilling will be done with suitable clay material, potentially imported and unsuitable material will be taken off-site
- Works for the replacement of Owenass Bridge will require excavation for bridge abutment. The removed bridge materials and excavated soil will not be used for backfilling and will be taken off site. Imported material for bridge foundation will be required.

8.6 Potential Impact of the Proposed Development

It is likely that potential impact on the geological aspects will arise from construction activities including excavation and disposal of earthworks and/or accidental spillage. Additional soil will be imported into the site for the construction of the raised embankment, which has potential to impact on geology and soils for the site.

8.6.1 Construction Phase

Most impacts will be from the import and export of soil, contamination, soil exposure, erosion, instability, and soil compaction. Impacts on hydrogeology and groundwater are discussed in Chapter 9 Water – Surface and Groundwater.

Construction activities can pose a risk to land and soils. The key civil engineering works which could impact land and soils are:

- Establishment and operation of temporary site and welfare compounds for the duration of the works, including storage of potential pollutants such as fuels, oils, etc.;
- Excavations for the construction of embankments, flood walls, and installation of culverts;
- The storage and use of heavy machinery and construction equipment;
- Import of material for the construction of flood embankments; and
- Export of material from excavations.

Of the 32 no. preliminary trial pits dug during the site investigation, 27 showed poor to very poor stability whereby poor stability described wall collapse and very poor described complete pit collapse. As a result of poor ground stability, the risk of collapse of excavated trenches for embankments and walls is higher. It is anticipated that battering of trenches will be employed by the appointed contractor.

Due to the high volumes of soil to be imported for embankments and exported due to very poor stability, it is anticipated that construction will take place in phases spanning approximately 4 years.

Excavation and Export of Soil

Changes to the soil and geological environment as a result of the scheme will arise predominantly through the excavations required for flood wall and flood embankment construction which will also require subsequent infilling. The total material to be excavated will be approximately 77,000m^3, if excavated material can be reused a backfill then the volume of material to be disposed of from site will be in the region of 56,000m^3.

Works located at Garroon Stream, between Owenass Bridge and Mill Bridge, Irishtown Garden Centre, Upstream of Owenass Bridge, and Manor Road will include the construction of embankments. These works are situated in areas of wet and unstable ground conditions. Seasonal waterlogging is evident from the site investigation.

Excavation depths are not proposed further than 2m as shown in Sections 19105-JBB-XX-XX-DR-C002751-02759, however the stability issues such as spalling, and collapse noted in the majority of trial pits may require deeper excavation locally to remove unsuitable material. Without mitigation the effects of excavation on topsoil would be **Temporary, Slight, Adverse**. Due to the shallow excavation depths, effects on subsoils are not anticipated to be significant.

Topsoil will be reused where possible and exact volumes to be retained will be provided by the appointed contractor. Subsoils unsuitable for the construction of embankments will be exported off-site and disposed of at a suitable licensed facility. Temporary storage of soil will be carefully managed in such a way as to prevent any potential adverse impact on the receiving environment and the material will be stored away from any surface water drains. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust.

Imported Fill

The total material imports for construction of embankments and a new channel for the Clontygar Stream will be approximately 105,000m^3 which may be reduced to 85,000m^3 if the opportunity arises that excavated material can be classified as suitable for reuse as backfill. Suitable topsoil removed during excavation will be retained and used to dress embankments which will be seeded once construction is complete.

The importation of infill material may introduce contamination to the site if sourced from inadequate facilities. Responsible sourcing will ensure this impact does not arise. Clean soil will be imported to the site, and the contractor will be required to source the soil from areas that are free of invasive species, i.e., containing no Japanese Knotweed seed or legumes. Without mitigation, the effects of importing soil would be **Long-term, Slight, Adverse**.

An indirect impact of the soil import to the site during the construction phase will be the increase in truck movements to the site which are discussed in the next section. This will have a subsequent impact on air quality, noise and nuisance. These impacts are further described in Chapter 13.

Site Compounds

Due to the large area over which the proposed works are spread, construction and welfare compounds are proposed at 16 no. locations, shown in Figure 4-7 in Chapter 4.

- The largest is situated in an empty greenfield site between Mill Bridge and Convent Bridge and it will be developed in agricultural lands to the south of the Owenass River. It will involve stripping topsoil and constructing temporary access roads.
- Midland Steel site compound will be established on existing industrial land and temporary roads will be constructed through existing industrial storage.

- Garroon Stream site compound will be established within agricultural lands with potential use of geotextile and hardcore bases.
- Davitt Road pumping station site compound will be established within agricultural lands to the south of the Owenass River and east of Grove Park. It will include welfare and storage facility and potential ground improvement if require.
- Site compound downstream the Convent Bridge will be developed within green space downstream the works area and west of Kirwan Park.
- Clontygar Stream site compound will be installed in agricultural land and potentially include ground improvement.
- Owenass Bridge to Mill Bridge site compound will be installed in fields west to the Owenass Bridge and will serve as material storage area.
- Irish town garden centre site compound will be located in a field in its south.
- Manor Road site compound will be placed in agricultural lands southwest of Manor House and temporary access road will be constructed with potential ground improvements.

Due to the temporary nature of the site compounds, impacts on soil and geology are expected to be **Temporary, Slight, Adverse**.

Movement of vehicles and construction machinery to and from these sites could potentially impact soils locally through compaction or contamination through stored materials as discussed in the following sections.

Accidental Spills and Leaks

There is a risk of localised accidental pollution incidences from the following sources:

- Spillage or leakage of temporary oils and fuels stored on site;
- Spillage or leakage of oils and fuels from construction machinery or site vehicles;
- Spillage of oil or fuel from refuelling machinery on site;
- Run-off from in-situ concrete casting; and
- Release of pollutants from contaminated excavated material.

The risk of accidental pollution is highest where oils and fuels are stored. All site and welfare compounds are proposed for areas where subsoil permeability is low, and the average groundwater recharge is between 1 – 150 mm/year.

Accidental spillages may result in localised contamination of soil, geology, and groundwater underlying the site, should contaminants migrate through the subsoils. In less permeable soil, contamination of surface water run-off. The significance of effects of pollution on soil and geology would depend on the type of contaminant and extent of the spill. The significance of the effect arising from spills without mitigation measures would be **Temporary, Moderate, Adverse**.

Construction Machinery and Transport

During the construction phase the import, use, and movement of construction machinery could pose a potential impact to the pedological environment through soil compaction. Typical construction machinery and vehicles will be used. Specific site machinery requirements will be identified by the appointed contractor.

In addition, the import and export of material will elevate vehicle activity posing a potential risk to air quality which is discussed further in Chapter 13. The total number of truck movements is estimated to be approximately 7,389 throughout the estimated 48-72 month construction period, see Chapter 12 for a detailed discussion of construction related traffic.

Without mitigation measures pertaining to the use and storage of machinery and equipment, the significance of the effect would be **Temporary, Slight, Adverse**.

8.6.2 Operational Phase

Embankments

In the operational phase, the soils are expected to be stabilised and grass rooted, and the problem of suspended solids run-off from the embankments will lessen. The impact of this on water quality will not be significant and will be short-term. In the long-term no significant impacts on water quality are anticipated. In accordance with the methodology, the overall effects from embankments during the operational phase are expected to be **Short-term, Slight, Adverse**.

Stream Diversion

The Clontygar Stream will be diverted into a new channel with a length of 385m and average width of 6m. The existing stream will be decommissioned. The new channel will be lined with an engineered clay material and geotextile membrane. This will impact the exchange between ground and surface water through mechanisms occurring at the stream bed. In accordance with the methodology, the overall effects from stream diversion on soils and geology during the operational phase are expected to be **Permanent, Imperceptible, Adverse.**

Formalised Floodplain

Existing walls along the southern bank of the Owenass River between Mill Bridge and Convent Bridge will be removed to allow flood flows to spill into the field located south of the riverbank. During a flood event, the river will burst from the open channel and flood waters will be retained by new flood walls to be constructed at the rear of Grove Park estate and along the western boundary of properties along Davitt Road. The storage area starts to be inundated in events greater than the Q2 event. Based on the model, for most of the flood events, the onset of flooding in the storage area is at 9hrs and flood extents do not decrease before the model time finishes at 20hrs. Flood depths vary depending on the event from 0.16 to 1.34 m. The second ground model derived from the site investigation represents this area where silty topsoil overlies made ground followed by alluvium. Trial pit stability in this area was described as poor. The soil may be periodically waterlogged as there is evidence of grey and orange mottling in images of trial pits suggests. This effect will be intermittent. The overall effects of storage at these locations will be **Temporary, Slight, Adverse**.

Walls

Flood walls are proposed for areas bordering the SAC which is an area particularly sensitive to environmental changes. Removal of fertile alluvial topsoil to accommodation foundations and walls may have a short-term, imperceptible, adverse impact. Approximately 21,000m^3 of excavated material will be returned as backfill. Foundations have been designed so as not to have a significant impact on groundwater flow patterns in the area, although there may be some impact depending on the water table height at specific locations. However, the impact is not expected to be significant. Impacts during the operational phase will be **Long-term, Imperceptible, Adverse**.

8.7 Mitigation Measures

8.7.1 Construction Phase

- A Construction Environmental Management Plan (CEMP) has been prepared for the proposed development. The site-specific mitigation measures outlined in the CEMP are summarized below, however, the CEMP should be read in full in conjunction with this report;
- The Contractor will be required to install a Soil Management Programme for the operations at the site. The Programme will contain as a minimum, ways to minimise truck movements across the site to avoid soil compaction, and re-use of suitable material on-site to minimise the quantities that need to be imported;
- Temporary pathways and roads will be constructed to allow for the movement of heavy machinery and minimise the risk of soil compaction;
- Temporary storage of soil will be carefully managed in such a way as to prevent any potential adverse impact on the receiving environment. Covering of topsoil stockpiles with rapid vegetation or other means

is proposed as part of the construction methodology. The material will be stored away from any surface water drains. Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust;
- Stripping of earth and topsoil will not be undertaken during dry and windy weather if possible;
- Fill material will be tested and imported from a licensed facility to ensure no external contamination is introduced to the soil and geological environment;
- Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal;
- Re-fuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles, will take place in a designated area (or where possible off the site) which will be away from any existing surface water gullies or drains, or exposed ground or excavations;
- An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in any refuelling areas and site compounds. All relevant personnel will be fully trained in the use of this equipment;
- A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated stormwater to the underlying subsoil;
- The pouring of concrete will take place within a designated area remote from any drains ore waterbodies. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility off site; and
- The contractor will be required to carry out a waste characterisation of the material that will be taken off site for disposal. A waste acceptance criteria (WAC) analysis and asbestos levels will be determined on any material that will be taken off site for disposal. All wastes in the European Waste Catalogue are classified by a unique 6-digit code. In this case (waste soil/stones), two List of Wastes (LoW) Codes are applicable to material that may be taken off site for disposal during the construction phase:
  - 17 05 03* - Soil and stones containing hazardous substances
  - 17 05 04 - Soils and stones other than those mentioned in 17 05 03.

Any soil samples that are found to contain contaminants will be subjected to full quantification analysis. If the waste soil is sent to a waste licenced soil recovery facility, the chemical analysis of the soil must meet the requirements given in EPA Waste Guidance[110]. The acceptance of this material at a licenced soil recovery facility will be subject to the approval of the facility operator.

8.7.2 Accidental Spills and Leaks

A Pollution Control Plan will be implemented to minimise the release of pollutants into pedological, geological, and hydrological environments. This will include:

- Spill kits containing absorbent pads, granules and booms will be stored in the site compound with easy access for delivery to site in the case of an emergency.
- No bulk chemicals will be stored within the active construction areas. Temporary oil and fuel storage tanks will be kept in the material storage area in suitable containers and will be appropriately bunded as required. Refuelling of vehicles and the addition of hydraulic oils or lubricants to vehicles will take place in designated areas of the site, where possible, which will be kept away from surface water drains.
- Oil booms and oil soakage pads will be maintained on-site to enable a rapid and effective response to any accidental spillage or discharge. These shall be disposed of correctly and records will be maintained by the environmental manager of the used booms and pads taken off site for disposal.

[110] Environmental Protection Agency, 2020. *Guidance on waste acceptance criteria and development of soil trigger values for EPA-Licenced Soil Recovery Facilities* Table 3.3 (Summary of Soil Trigger Levels for Soil recovery Facilities). EPA

- Spill protection equipment such as absorbent mats, socks and sand will be available to be used in the event of an accidental release during refuelling. Training will be given to appropriate site workers in how to manage a spill event.
- The following mitigation measures will be taken at the construction site in order to prevent any spillages to the ground of fuels during machinery activities and prevent any resulting soil and/or groundwater quality impacts:
  - Refuelling will be undertaken off site where possible
  - Where mobile fuel bowsers are used the following measures will be taken:
    - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use
    - The pump or valve will be fitted with a lock and will be secured when not in use
    - All bowsers must carry a spill kit
    - Operatives must have spill response training
  - Portable generators or similar fuel containing equipment will be placed on suitable drip trays

8.7.3 Embankments

The construction of embankments will require the use of impermeable clay and a reinforced geogrid for stability. This will ultimately change the soil environment in these areas to a hard-standing area, with the consequential change in rainwater soakage and storage. Topsoil and subsoil in these areas are generally peaty with high clay content and do not have a high value. The change in environment will therefore be imperceptible.

8.7.4 Operational Phase

By the time when the operational phase starts, retainment of silt fences on soil banks will be considered if suitable growth conditions have not been reached which will be overseen by the Project Ecologist who will liaise with IFI. No other significant effects are anticipated during the operational phase. Therefore, no other mitigation measures have been proposed.

8.8 Predicted and Residual Impacts

8.8.1 Construction Phase

Through the implementation of the proposed mitigation measures, the residual effect of the proposed development on land, soil, and geology will be minimised. Therefore, the significance of the impact during construction will be **Short-term, Slight, Adverse** to **Imperceptible**.

8.8.2 Operational Phase

The design of the scheme has been such that no impacts to land, soil, and geology are expected during the operation phase. The significance of the impact will be **Long-term, Neutral**.

8.9 Monitoring

8.9.1 Construction Phase

Implementation of mitigation measures will be monitored, to ensure works are being delivered in the appropriate way. In the event of any potential contamination, such as hydrocarbon or concrete spillages, these incidents will be immediately investigated and appropriately remedied to prevent environmental harm.

8.9.2 Operational Phase

Direct discharge to the underlying geological environment during the operational phase is not anticipated and will require no further monitoring.

8.10 Interactions

Surface and Groundwater

Soils and geology share direct links with groundwater and surface water. Soil quality and characteristics such as granularity, pore space, moisture content and texture have effects on the rate of groundwater recharge, infiltration, percolation, transmissivity, and run-off. Similarly, surface water run-off can affect soil quality and condition through deposition or withdrawal of chemicals, suspended solids, and nutrients. Proposed flood relief measures are located at downstream points along the Owenass River, the Garron, Pound River and the Clontygar Streams. These waterbodies have a Moderate water quality status for the last WFD reporting period (2016-2021). All waterbodies in the area of proposed works are also 'At Risk' of failing to meet WFD objectives. It is therefore imperative that proposed flood measures do not cause a reduction in water quality status.

Effects arising from surface water run-off are further discussed in Chapter 9 of this EIAR. Without mitigation, the interaction between effects on Hydrology and Soils and Geology could result in a **Short-term, Significant, Adverse** effect. Through implementation of mitigation measures outlined in this chapter and Chapter 9 of the EIAR, the potential impact through interaction is reduced to **Short-term, Slight, Adverse**.

Biodiversity

Interactions between soils, geology, and biodiversity can occur through surface, groundwater, and air pathways. The proximity of the River Barrow and River Nore SAC poses a significant risk for the entry of contaminants via surface water run-off, dewatered groundwater, and soil erosion. Introduction of contaminants and suspended solids could lead to habitat degradation of the reefs and have an adverse impact on the sediment community complexes present throughout the SAC.

Without the implementation of mitigation measures outlined in this chapter and Chapter 7, potential impacts through interaction would be **Short-term, Significant, Adverse**. With the implementation of appropriate mitigation measures, these combined effects would be reduced to **Short-term, Imperceptible, Adverse.**

Material Assets

A large proportion of proposed flood relief measures and site compounds are proposed in urban areas adjacent to houses or along roads. The temporary use of public roads and private lands will be required during the construction phase. Access to private properties will require appropriate liaison with owners. Diversions, temporary disruptions and increased traffic volume are anticipated given the estimated 4,286 number of truck movements required for the movement of materials.

No new storm water sewers or drains will be installed as part of the works and appropriate protection and mitigation measures will be implemented for existing services in the vicinity of any of the proposed works. It is likely that there will be interaction with utility networks such as ESB substations and networks, underground and overhead electric cables and masts, sewer networks, and streetlights which fall within the footprint of works proposed across the proposed development area. Without mitigation, the resulting interaction effects could be **Short-term, Significant, Adverse**. Through the implementation of appropriate mitigation measures these effects will be **Short-term, Imperceptible, Neutral**.

Climate

Works where excavation of soil is proposed occur in areas of seasonal waterlogging and peat. Anaerobic conditions in soils can lead to an increase in carbon dioxide. Excavation of is 50,136m^3 of material across the scheme area will release sequestered carbon increasing greenhouse gas levels in the air. These effects are further discussed in Chapter 13. The interaction of these effects will be **Long-term, Imperceptible, Not Significant.**

Air quality and dust

Works including excavation, export and import of soil during construction interact with air quality, noise and vibration impacts. The total site area where earthworks will occur is 18,000 – 110,000m^2, which is estimated to have a medium impact during construction, as provided in Chapter 13. With mitigation measures in place these effects will be **Short-term, Imperceptible, Adverse.**

8.11 Potential Cumulative Impacts

Cumulative effects are the result of several minor or insignificant effects combining to create larger, more significant effect. The assessment of cumulative effects considers existing stresses on the baseline environment as well as developments that are in planning or are underway.

Developments within 5km of the proposed development that are in planning or have been granted permission are fully outlined in Chapter 15.

9 Water – Surface and Groundwater

9.1 Introduction

This chapter assesses surface water and groundwater aspects of the proposed FRS. This chapter should be read in conjunction with Chapter 7(Biodiversity) and Chapter 8 (Land and Soil) due to overlapping impacts and mitigation measures.

The following legislation was consulted during the preparation of this chapter:

- The Water Framework Directive (WFD) (2000/60/EC) that established a framework for the protection of groundwater, surface water and transitional waters;
- The European Communities Environmental Objective (Surface Water) Regulations 2009 as amended (S.I. No. 792 of 2009);
- European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2019 (S.I. No. 77 of 2019);
- European Communities (Quality of Salmonid Waters) Regulations (S.I. No. 293 of 1988);
- The European Communities (Water Policy) Regulations (S.I. No. 722 of 2003);
- The EU Floods Directive 2007/60 EC;
- Groundwater Directive (2006/118/EC); and
- The European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010).

9.2 Methodology

The methodology used for the assessment follows current Irish guidance as outlined above in Chapter 2 and in the following:

- OPW / DoECLG planning guidance (2011), "The Planning System and Flood Risk Management";
- Environmental Protection Agency (2022) 'Guidelines on the Information to be contained in Environmental Impact Statements';
- Department of Housing, Planning and Local Government (DHPLG) (2018) 'Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment';
- National Road Authority (NRA) (2009) 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the National Roads Authority';
- Institute of Geologists of Ireland (2013) 'Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements'; and
- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU) as amended by 2014/52/EU). European Union 2017.

9.2.1 Assessment criteria

The criteria for assessment of impacts in the receiving environment are explained in the first chapter of this report. In addition to the EPA (2022) Guidelines, the NRA (2009) criteria for assessing the importance of surface water and hydrogeological attributes is useful (Table 9-1 and Table 9-2). These criteria have been used to assist in rating the importance of features, which is then combined with the description of effects as shown in the matrix of significance (EPA, 2022).

Table 9-1: Criteria for Rating Impact Significance of Hydrological Attributes (NRA, 2009)

Importance	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international scale	River, wetland or surface water body ecosystem protected by EU legislation e.g., 'European sites designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.
Very High	Attribute has a high quality or value on a regional or national scale	River, wetland, or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes Quality Class A (Biotic Index Q4, Q5) Flood plain protecting more than 50 residential or commercial properties from flooding Nationally important amenity site for wide range of leisure activities
High	Attribute has a high quality or value on a local scale	Salmon fishery Locally important potable water source supplying >1000 homes Quality Class B (Biotic Index Q3-4) Flood plain protecting between 5 and 50 residential or commercial properties from flooding Locally important amenity site for wide range of leisure activities
Medium	Attribute has a medium quality or value on a local scale	Coarse fishery Local potable water source supplying >50 homes Quality Class C (Biotic Index Q3, Q2- 3) Flood plain protecting between 1 and 5 residential or commercial properties from flooding
Low	Attribute has a low quality or value on a local scale	Locally important amenity site for small range of leisure activities Local potable water source supplying <50 homes Quality Class D (Biotic Index Q2, Q1) Floodplain protecting 1 residential or commercial property from flooding Amenity site used by small numbers of local people

Table 9-2: Criteria for Rating Impact Significance of Hydrogeological Attributes (NRA, 2009)

Importance	Criteria	Typical Examples
Extremely High	Attribute has a high quality or value on an international scale	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation e.g., SAC or SPA status
Very High	Attribute has a high quality or value on a regional or national scale	Regionally Important Aquifer with multiple well fields Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes Inner source protection area for regionally important water source
High	Attribute has a high quality or value on a local scale	Regionally Important Aquifer Groundwater provides large proportion of baseflow to local rivers Locally important potable water source supplying >1000 homes Outer source protection area for regionally important water source Inner source protection area for locally important water source
Medium	Attribute has a medium quality or value on a local scale	Locally Important Aquifer Potable water source supplying >50 homes Outer source protection area for locally important water source
Low	Attribute has a low quality or value on a local scale	Poor Bedrock Aquifer Potable water source supplying <50 homes

Note: "Extremely high", "very high", and "high" in Table 9-1 and Table 9-2 will all correspond to "high" significance or sensitivity of a feature in the effects significance matrix (EPA, 2022).

9.3 Existing Environment

9.3.1 Baseline desk Assessment

This assessment was considered in the context of the available baseline information, potential impacts, consultations with statutory bodies and other parties, and other available relevant information. In collating this information, the following sources of information and references were consulted:

- Latest EPA water quality monitoring data for watercourses in the area, available on www.epamaps.ie;
- EPA Catchment website (www.catchments.ie);
- The Mountmellick Local Area Plan 2018 – 2024, and the Draft County Development Plan 2023-2029;
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW));
- CIRIA (2011). Environmental good practice on site: Construction Industry Research Industry and Information Association publication C692 (3rd edition- an update of C650 (2005). (I. Audus, P. Charles and S. Evans), 2011;
- Office of Public Works flood mapping data (www.floodmaps.ie);
- Classification (regionally important, locally important) and extent of aquifers underlying the site perimeter area (www.gsi.ie);
- Natural hydrogeological/karst features in the area and potential for increased risk presented by the activities at the site (www.gsi.ie);
- National Parks and Wildlife Services (NPSW) www.npws.ie on-line database; Protected Register; and
- Draft River Basin Management Plan 2022-2027.

9.3.2 Surface water: hydrological environment

The proposed site lies just south of the River Barrow, with the Owenass River and several other Barrow tributaries in the area. The site is located in the Barrow WFD catchment, Barrow_SC_010 and Barrow_SC_020 sub-catchments and the BARROW_040, OWENASS_020, and TRIOGUE_040 river sub-basins. The proposed site is largely affected by the Owenass River and other tributaries of the River Barrow. Figure 9-1, Figure 9-2 and Figure 9-3 show the waterbodies and sub-basins included in the site area.

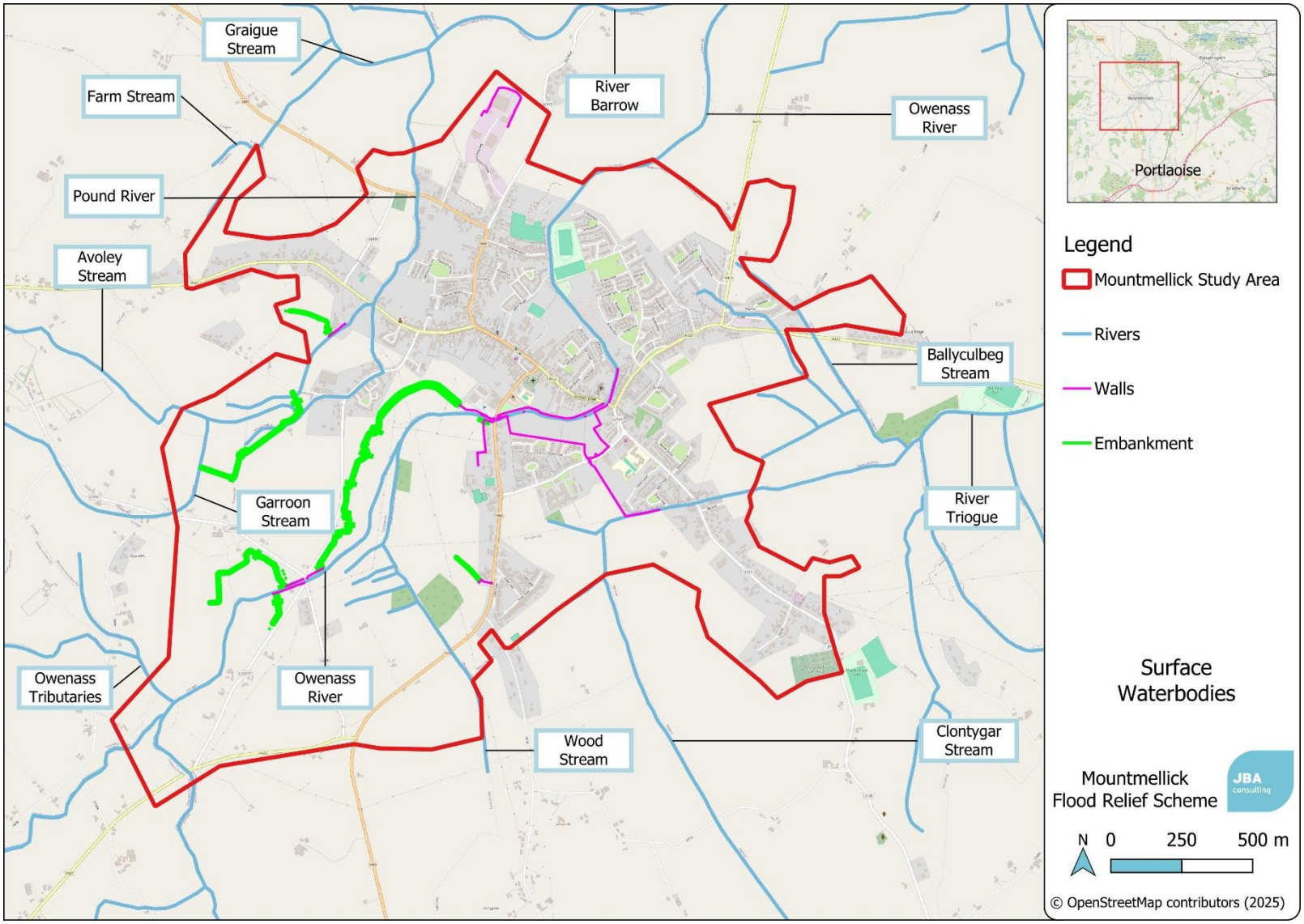


Figure 9-1: Surface watercourses in the area

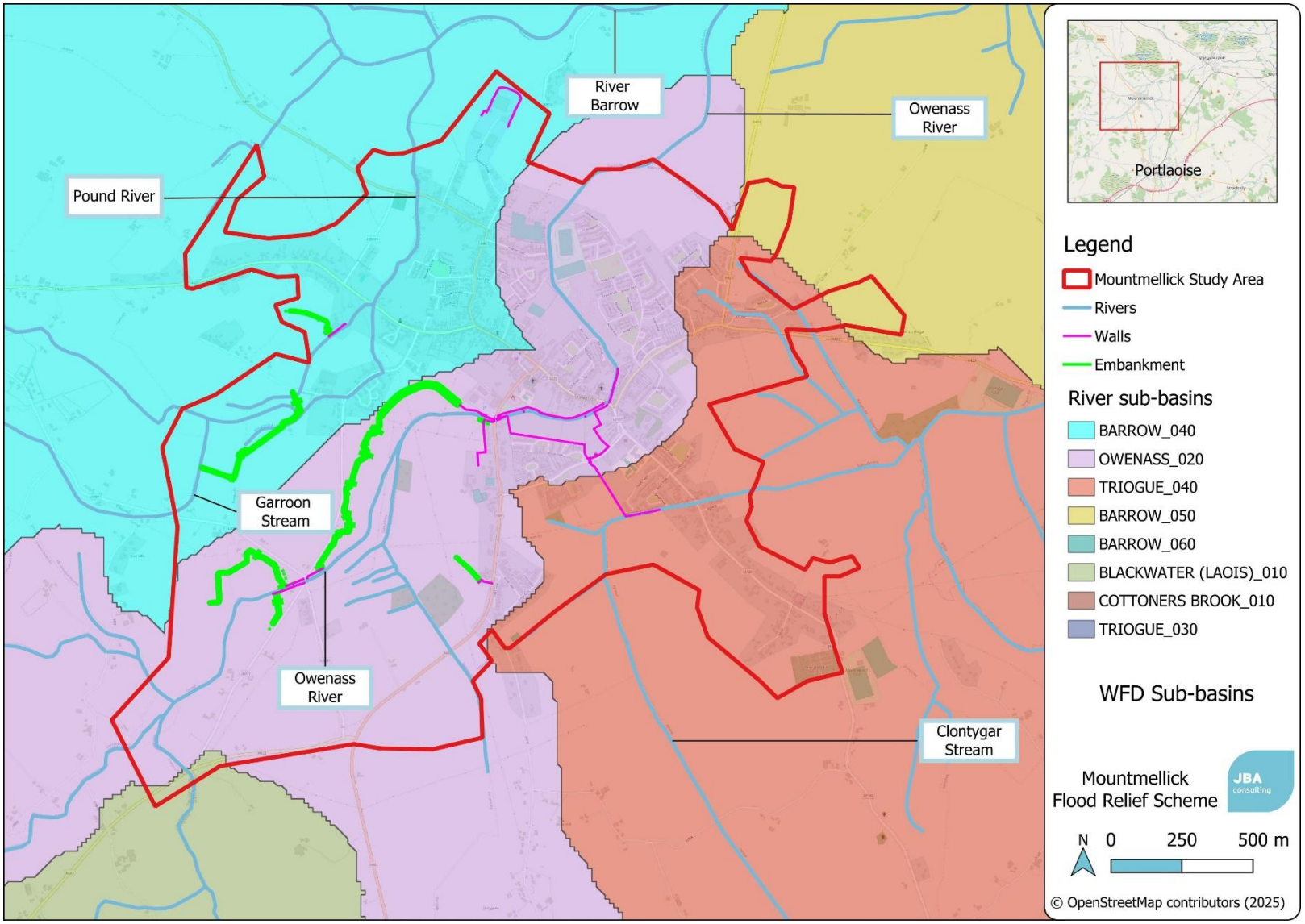


Figure 9-2: Sub-basins in the catchment

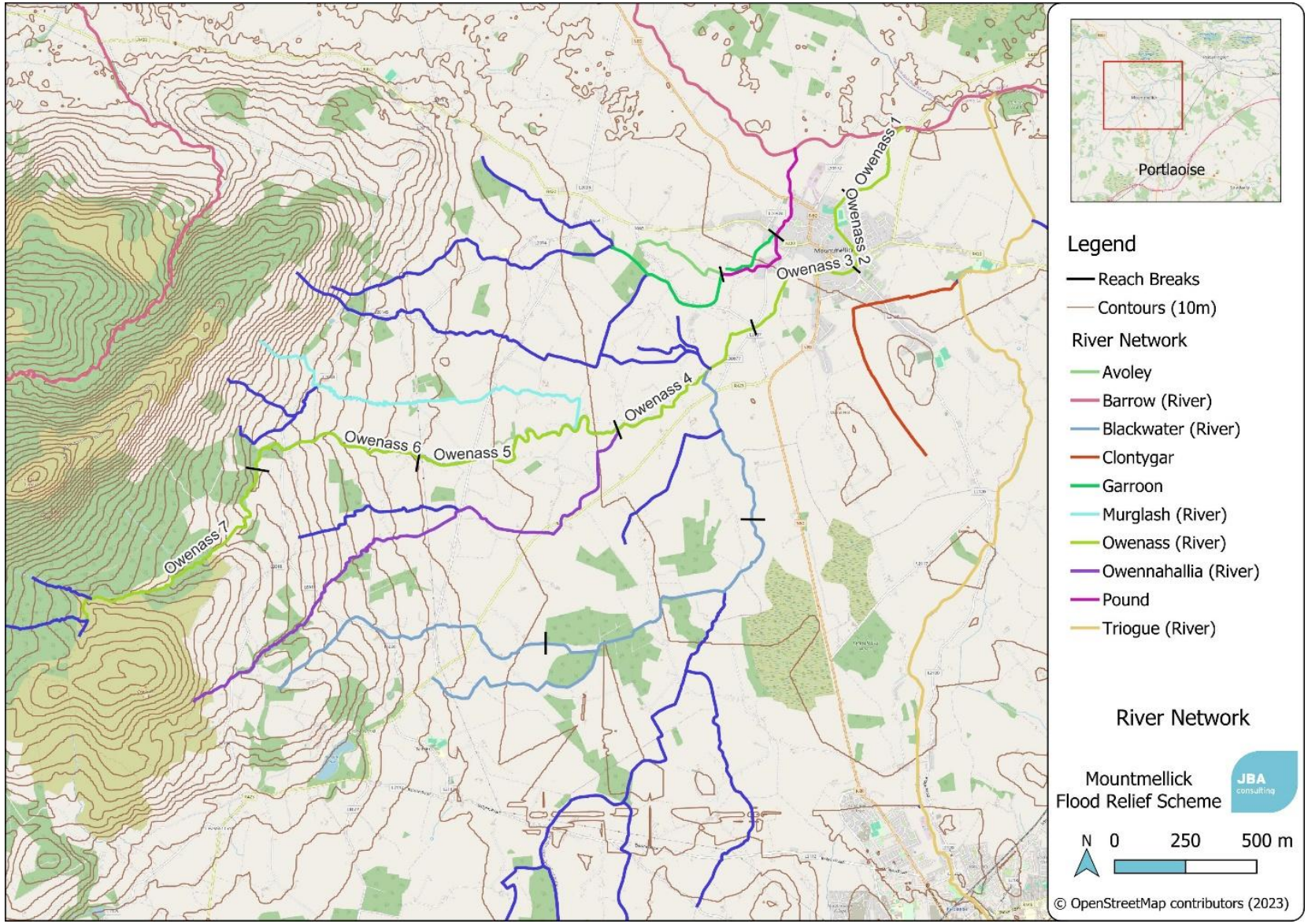


Figure 9-3: River network in the Flood Relief Scheme Area

9.3.2.1 Owenass River

The Owenass River originates southwest of Mountmellick, in the Slieve Bloom Mountains. It enters Mountmellick from the southwest, flowing to the north under the Portlaoise Road and Sarsfield Street at Covent bridge, curving around the eastern side of the town before merging with the River Barrow at Strahard (approx. 1.3 km northeast of Mountmellick). Owenass River tributaries are Cloncannon stream (south-west), Wood stream (south), and Clontygar Stream (south-east). The river serves as a blue green space as it runs through the centre of Mountmellick, providing essential recreation and leisure amenities. It Is used for angling, walking and water-based activities for the local community (Mountmellick Local Area Plan, 2018)[111]. It is the receiving waterbody of the Mountmellick Wastewater Treatment Plant (WWTP) discharges in the north. The WWTP treats wastewater from the Mountmellick river catchment area with a capacity of 7,000 PE (population equivalent) and 0.85 hectares in size.

9.3.2.2 Clontygar Stream

The Clontygar Stream is located southeast of the centre of Mountmellick flowing through a mixture of agricultural and wet grasslands. This stream has been notably channelised and widened resulting in a low energy watercourse. It is split in two distinct streams; the Cloncanon and Sronagh, disconnected hydrologically form each other[112]. Both are small streams mostly receiving stormwater runoff from the built-up areas. The Cloncanon flows into the Owenass River downstream the Mountmellick in the South, while the Sronagh flows into the River Triogue, just outside the FRS area to the East.

9.3.2.3 The River Pound and tributaries

The River Pound is a low-energy, relatively small lowland river. It flows in the northern part of the proposed development area until its confluence with the River Barrow. This channel flows through a mix of land from forestry in its upper reaches to agricultural land and residential in its lower reaches, with several drains along its length. It becomes heavily channelized and culverted closer to Mountmellick town around Manor Grove Estate. Other tributaries flowing southeast of the River Pound are the Garroon, Avoley, and Caroon.

9.3.2.4 River Barrow

The River Barrow flows in the northern part of Mountmellick. It is Ireland's second longest river approx. 192 km long covering a diverse catchment of mountains, bogs, agricultural (pasture and tillage) and urban areas. It emerges from the Slieve Bloom Mountains, Co. Laois and flows through four counties. The Pound, Owenass and Triogue Rivers confluence with River Barrow.

9.3.2.5 Flooding

There is a history of flooding in Mountmellick with the most significant events recorded in 1954, 1968, 1990, 2008 and 2017. Large parts of Mountmellick are located within Flood Zones A and B (Figure 9-4), with most of the are falling to Zone A and small areas in the north to Flood Zone B. In terms of traditional planning implications, most types of development are considered inappropriate for this zone of flooding. OPW Guidelines for Planning Authorities (2009) recommend that development in this zone should be avoided or only considered in exceptional circumstances.

[111] Mountmellick Local Area Plan (2018), *Mountmellick Local Area Plan 2018-2024*. Available at: https://laois.ie/departments/planning/development-plans/mountmellick-local-area-plan-2018-2024/

[112] EPA (2025) EPA Maps. Available at: https://gis.epa.ie/EPAMaps/

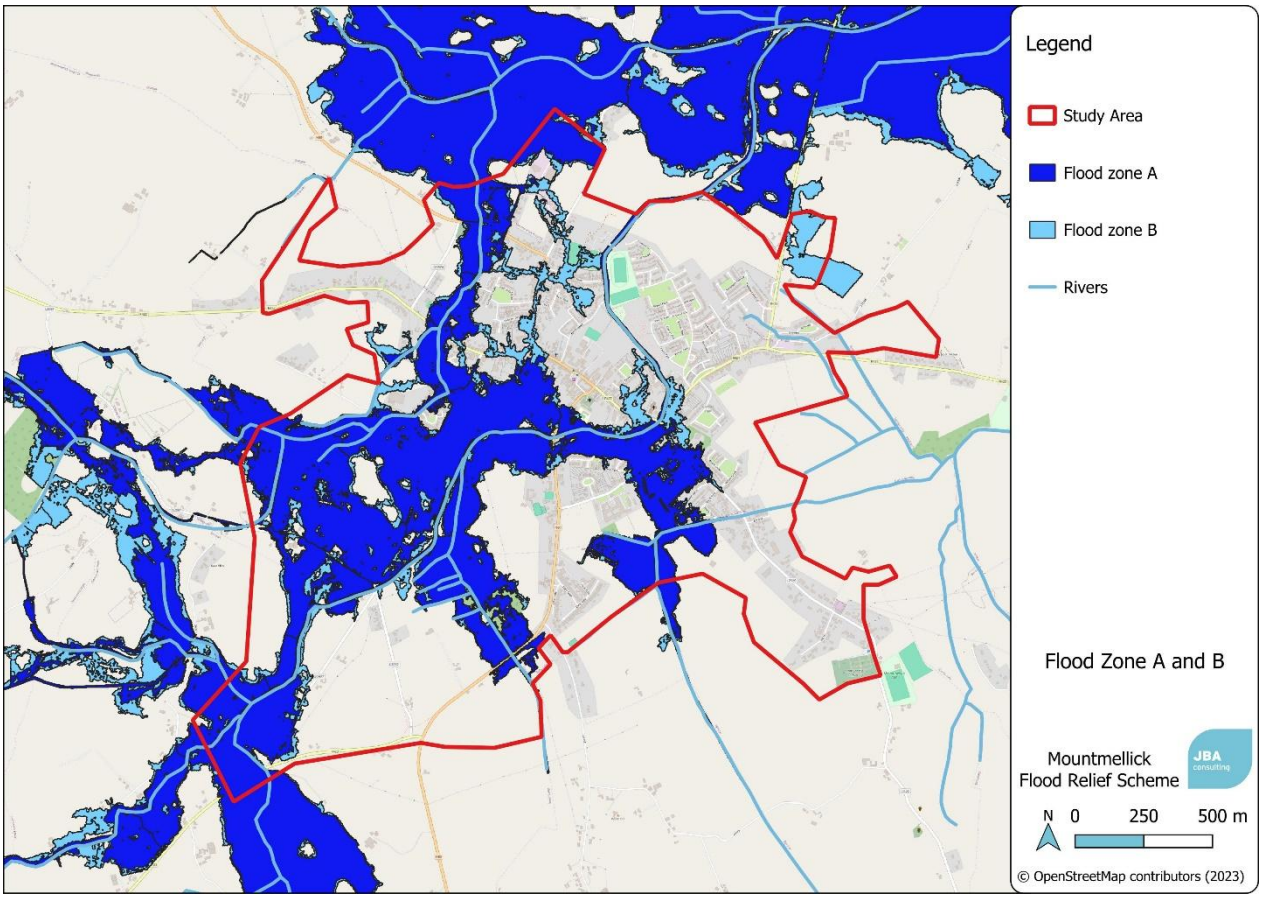


Figure 9-4: Mountmellick Flood Zone A and B

9.3.2.6 Overall evaluation of Hydrological and Hydrogeological Features

According to the WFD assessment of water-related features, the surface water bodies in the Mountmellick area are classified as being of Extremely High Importance. This classification is because of the designation of the River Barrow and River Nore as Special Area of Conservation (SAC), along with the visual amenity that it provides. Impacts on hydrogeological features, are classified as extremely high due to the role of groundwater in supporting the ecosystems associated with the River Barrow and River Nore SAC.

Water Framework Directive Assessment Status and EPA Q value

The site is situated within the Barrow Water Framework Directive (WFD) catchment (14) with a total area of 3,025km² (EPA, 2023). The WFD sub-catchments of interest are the Barrow_SC_010, Barrow_SC_020 and Barrow_SC_030. The sub-catchments are additionally subdivided into river sub-basins, the OWENASS_020, BARROW_040, and TRIOGUE_040. According to the WFD assessment 2016-2021 OWENASS_020 and BARROW_040 have a Moderate status and the sub-basins are at Risk. The TRIOGUE_040 has a Poor WFD status and is at Risk. Main pressure on the watercourses includes agriculture and urban wastewater (EPA, 2023).

The EPA's biological river water quality classification (Q values) is based on macroinvertebrate biological sampling at water monitoring stations[113].

[113] EPA river quality surveys: Biological Available at: https://epawebapp.epa.ie/qvalue/webusers/

The Biological Water Quality Assessment took place in accordance with prescribed EPA methodology on such Biological Assessments (Environment Efficiency,2023). Five sampling locations and corresponding Q values, situated on the Owenass River, the Pound River, and Mountmellick Mill Bridge were considered as part of this assessment, illustrated in Figure 9-5, and summarized in Table 9-3.

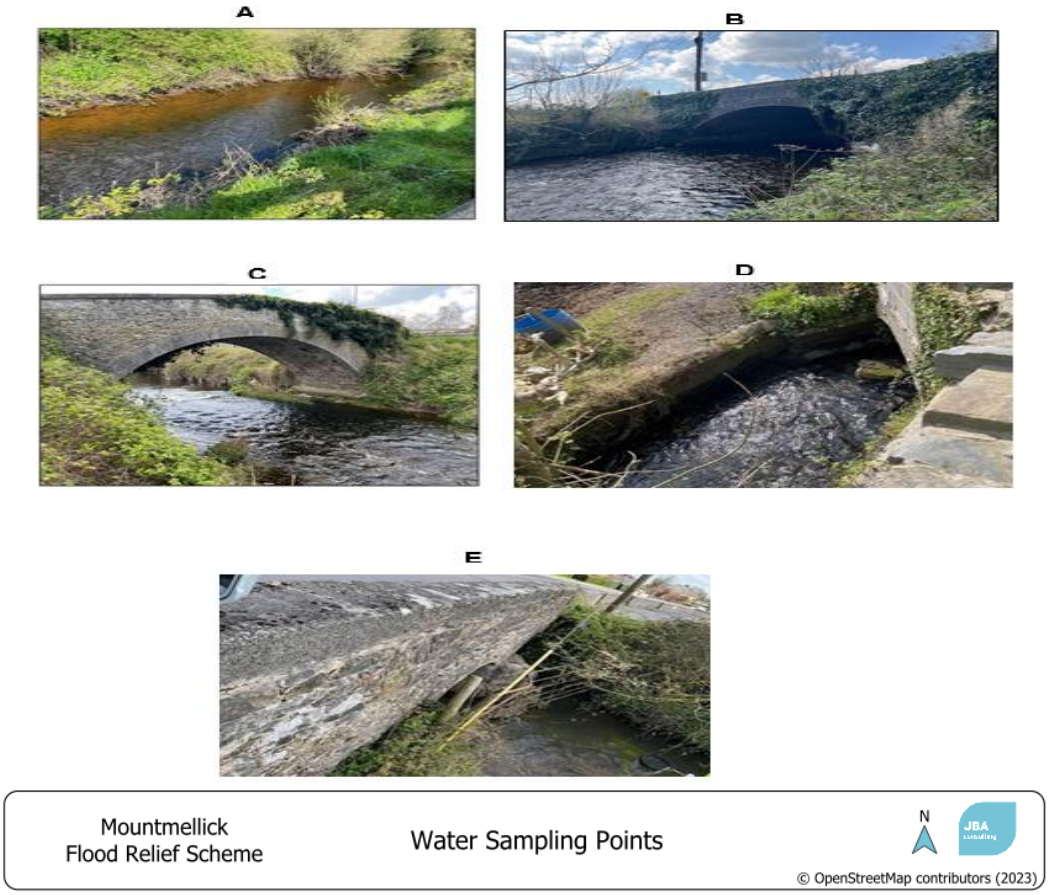


Figure 9-5: Sampling Point pictures: A (SW-L1), B(SW-L2), C (SW-L3), D(SW-L4), E(SW-L5)

Table 9-3: Q values of water samples in Mountmellick

Location I.D.	Location Description	Q-Value
SW-L1(Upstream Owenass Bridge)	Upstream Owenass River.	4
SW-L2 (Mountmellick Mill Bridge)	Mountmellick Mill Bridge	4
SW-L3 (Downstream Owenass Bridge)	Downstream Owenass River	3-4
SW-L4 (Pound River, upstream)	Upstream of Pound River	3
SW-L5 (Pound River, downstream)	Downstream of Pound River	3

According to the Q values results water quality upstream Owenass Bridge and Mountmellick Mill Bridge (4), is “Good”, downstream Owenass Bridge “Moderate” (3-4) and “Poor” at Pound River, upstream and downstream.

9.3.3 Groundwater and Hydrogeological environment

The groundwater body underlying the site area is the Portlaoise (IE_SE_G_107). According to the last assessment 2016-2021 (EPA), the groundwater body has a Good status, and is Not at Risk.

The site is underlain by bedrock belonging to the Ballysteen Formation, which is characterized by dark, muddy limestone and shale. The subsoil directly beneath the site comprises limestone till (Carboniferous), alluvium, peat, and areas of made ground. According to the Geological Survey of Ireland (GSI) dataset, there are no karst features identified in the GSI karst features database (GSI, 2023). The overall subsoil permeability at the site is classified as 'Moderate'.

9.3.3.1 Aquifer Classification and Groundwater Vulnerability

The GSI mapping services (GSI, 2023) indicate that the scheme is situated above a Locally Important Aquifer, where bedrock is moderately productive but only in specific local zones. This aquifer aligns with the Ballysteen Formation. The groundwater aquifers within the proposed development area are illustrated in Figure 9-6 (GSI, 2023).

Groundwater vulnerability in the Mountmellick area is generally moderate. However, there is a small section of high vulnerability beneath the Bay Road Business Park. This is depicted in Figure 9-7 (GSI, 2023). Estimated groundwater recharge rates in the area vary from 20mm/year in regions with peat to 120mm/year in areas with more permeable subsurface materials. Given the depth to bedrock, the overall contribution of groundwater to flood risk in the area is considered minimal.

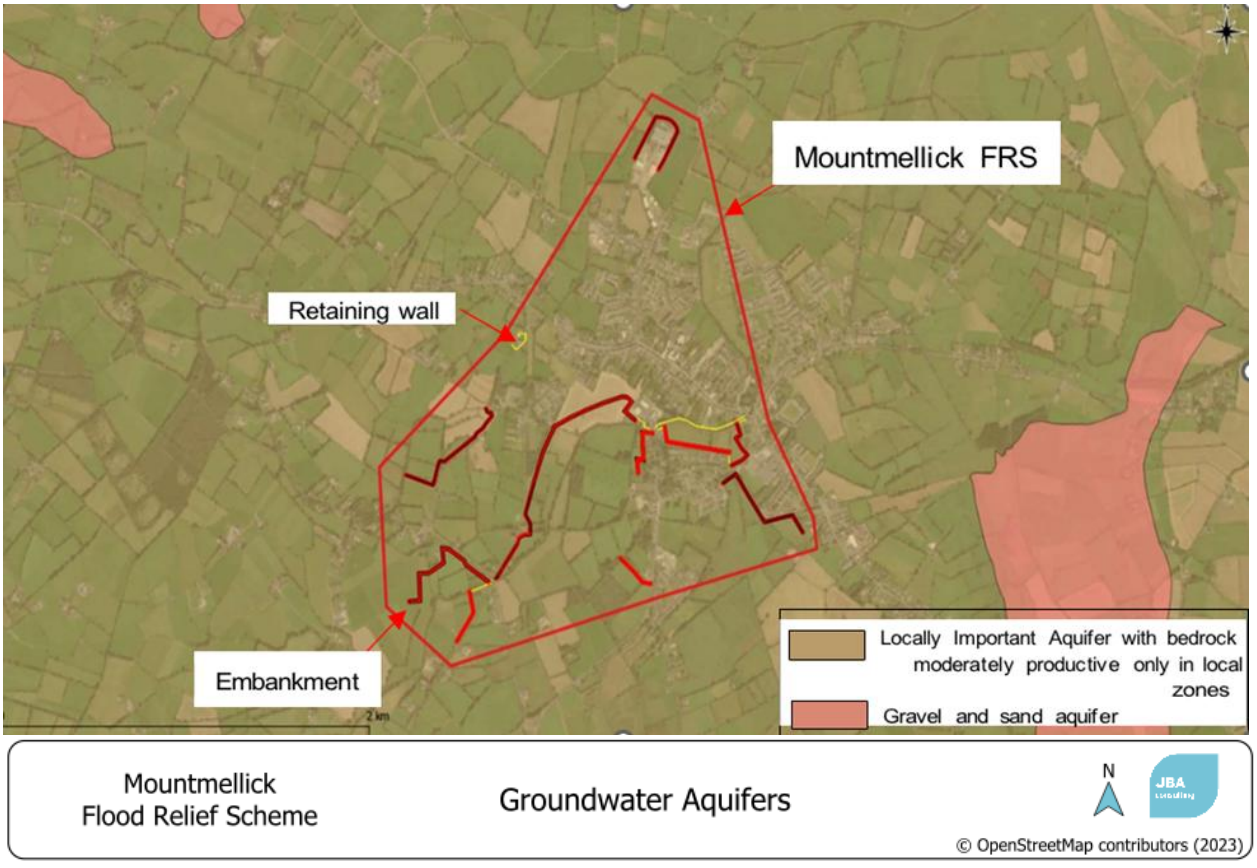


Figure 9-6: GSI Groundwater Aquifers within the Mountmellick FRS (GSI, 2023)

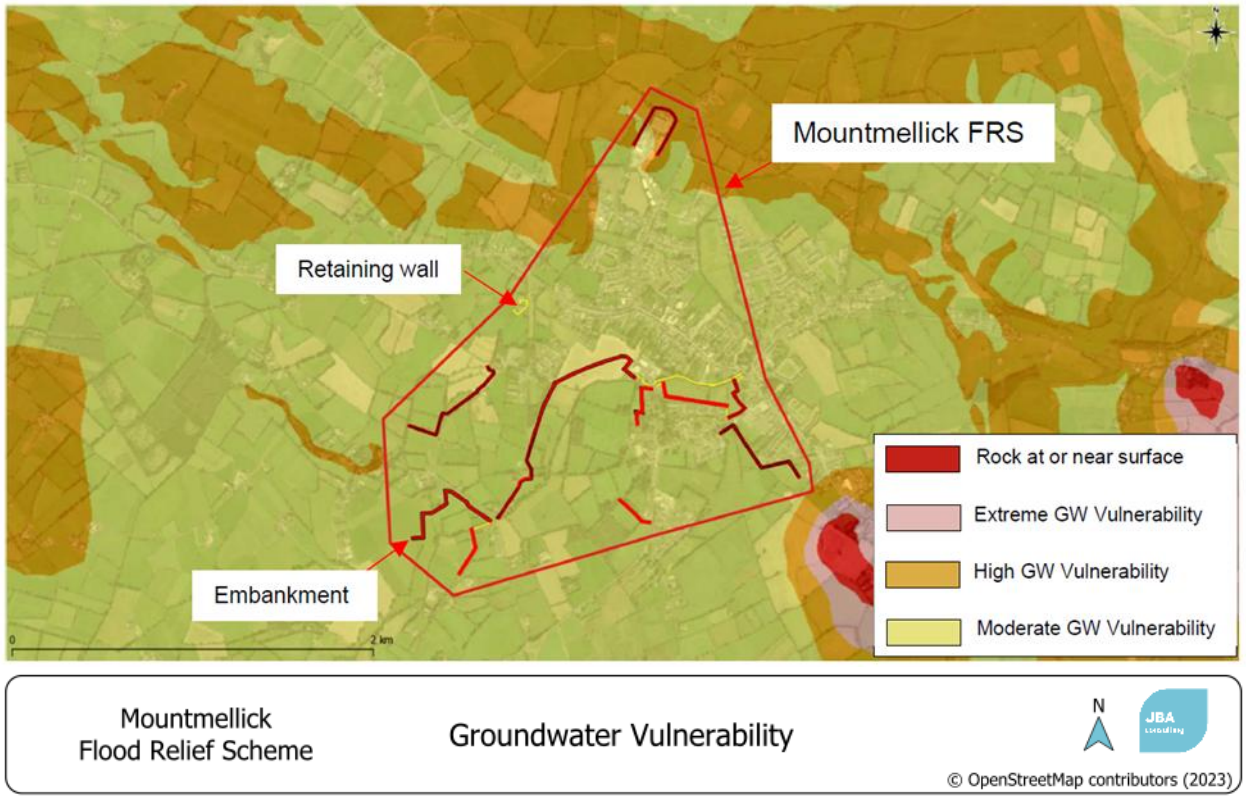


Figure 9-7: GSI Groundwater Vulnerability within the Mountmellick FRS (GSI, 2023)

9.3.3.2 Groundwater Testing (Site Investigation)

Groundwater testing was conducted in 2021 by PGL throughout the site area groundwater through Borehole (BH), Rotary Core Boreholes (RC), Trial Pits (TP) excavations. Results showed that deeper groundwater levels were recorded 145 m upstream of Mountmellick Mill Bridge at respectively 4.8 and 10.6 metre depth below level of ground. In addition, 154 m upstream of Owenass River was encountered a groundwater level of 3.1 m depth below ground level.

9.3.4 Hydromorphology

For the purposes of the hydromorphological assessment, river reaches have been defined by grouping proposed flood relief measures in construction areas based on the anticipated method of construction. (Figure 9-8). Sub-division of the overall WFD waterbodies into these construction-related reaches is necessary to provide a reach-scale hydromorphological assessment of the proposed scheme as follows:

- BARROW_040 includes Bay Road Business Park, Garron Stream and Manor House.
- OWENASS_020 includes upstream of Owenass Bridge, Owenass Bridge, Owenass Bridge to Mountmellick Mill Bridge, Mountmellick Mill Bridge to Convent Bridge, and downstream of Convent Bridge.
- TRIOGUE_040 includes Clontygar Stream and Davitt Road.

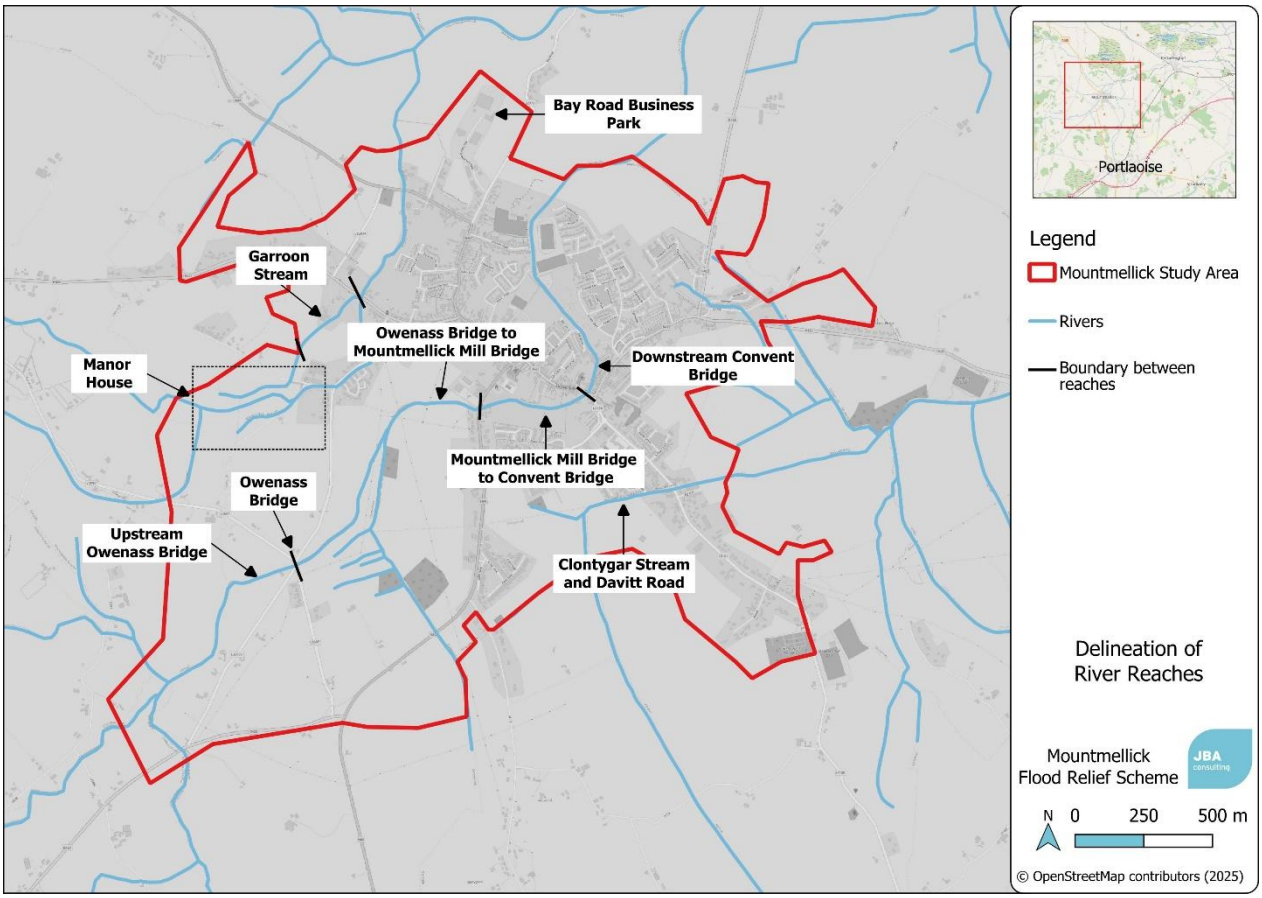


Figure 9-8: Delineation of river reaches for the hydromorphology assessment of the proposed scheme

For the OWENASS_020 river sub-basin, hydromorphological condition status under the WFD for 2016-2021 is Good[114]. In the absence of a full fluvial audit, limited field observations (31/01/2020[115], 07/03/2024) identified the reach **between Owenass Bridge and Mountmellick Mill Bridge** as a uniform channel with little in-channel geomorphic diversity (i.e., an absence of features like riffles, pools etc.). However, Inland Fisheries Ireland (IFI) have identified the channel **downstream of Owenass Bridge** as important spawning habitat for salmonids (IFI, 2024)[116], which may indicate more diversity of depositional gravel features than was evident during the field visits. The coarse gravel/cobble bed is overlain by finer mobile gravels, and this mobile bed includes more sand content after the river turns eastward. This may indicate enhanced depositional character relative to the upstream part of the reach or a slight change in bed and bank material. Modifications/pressures include: i) remnants of an old concrete weir in-channel, ii) some hard bank protection (concrete and rock armour) in places, iii) multiple land drains discharging into the channel, and iv) evidence of historic and modern bank poaching although fencing efforts were in place to restrict stock access in some locations. **Towards Mountmellick Mill Bridge**, there is a right bank in-channel feature providing some localised hydraulic diversity - though whether this is a consolidated instream sediment feature that has vegetated or a deposit resulting from minor bank slumping is unclear.

[114] *WFD Status Tables* (Excel) (All Waterbodies) 2016-2021 - Oct 2023 available online at: https://gis.epa.ie/GetData/Download
[115] *JBA Hydromorphology Baseline Survey*, dated 31/01/2020.
[116] *Inland Fisheries Ireland response to Mountmellick Flood Relief Scheme – Draft Drawings and Project Description,* sent to JBA and dated 26/02/2024.

Between Mountmellick Mill Bridge and Convent Bridge, the coarse gravel/cobble bed is overlain by finer mobile gravels and coarse sands that deposit as predominantly gravel bed features in some locations and provide localised hydraulic diversity in the channel. Bank materials are a mixture of natural materials (composition unknown) and man-made materials linked to the urban development of the town. Immediately **downstream of Mountmellick Mill Bridge** there is some undercutting of the right-hand bank[115]. Remnants of at least two old check weirs remain in-channel, composed of boulders approximately 0.2 - 0.3 m in size. These structures are providing hydraulic diversity to an otherwise fairly uniform channel and are followed by small sections of shallower, faster flow downstream. In proximity to these structures the bed was well sorted compared to other reaches, with sand bars observed on the inside of a slight meander. Two drains were noted on the right bank towards the downstream end of this reach: (1) immediately upstream of the bridge with some fine sediment build up and macrophyte growth, with a foul smell (suggesting that it may be sewage), and (2) an agricultural drain was observed further upstream adjacent to a field containing cattle.

Downstream of Convent Bridge, the bed was primarily composed of gravel and sand with some mid-channel bars (some vegetated) and sand deposits on the lower banks and on inside bends. This reach has been historically modified/channelised but despite this has heterogeneity in its flow and depths (similar to riffle-pool sequence). IFI have identified the channel downstream of Convent Bridge as important spawning habitat for salmonids (IFI, 2024).

Overall, field observations of the Owenass River within the visited extent suggests a healthy, balanced sediment regime through erosion, deposition, and transportation processes.

Hydromorphological condition is not assessed for the 2016-2021 WFD assessment[114] for the other sub-basins BARROW_040 and TRIOGUE_040 referring to the. Aerial imagery shows many straight river courses through these catchments, suggesting historical modification of natural drainage systems. For the BARROW_040 sub-basin, the Pound River upstream of Wolfe Tone Street is channelised and straightened, with evidence of previous channel excavation (slick, steep banks with machinery markings). Other modifications/pressures include: i) bank poaching, and ii) numerous land drains discharging into the channel. Bed materials were predominantly sand and gravel and is generally well sorted, with fine deposition evident on the inside of the limited meanders and around river crossing structures. The river is culverted in stone and concrete within the urban area of Manor Grove Estate. These field observations suggest there may be excessive fine sediment supply to the Pound River, relative to what might be expected in the absence of the pressures listed.

9.4 Predicted Impacts

Predicted impacts are discussed under the 'do nothing' scenario, during construction of the scheme, and during operation of the scheme. This EIA focused on likely significant effects.

9.4.1 Do Nothing Scenario

Large parts of Mountmellick lie within Flood Zone A, meaning there is a medium to high probability of recurring floods affecting homes and businesses. If a flood occurs without adequate protection, the risk of contamination to surface and groundwater is significant. This contamination would likely happen as floodwaters inundate roads and possibly polluted land, then recede into the River Owenass and Pound.

Hydrological and hydraulic modelling indicates that flood risk will increase with climate change. In a do-nothing scenario, no change in hydromorphological conditions is expected under the current climate. However, with climate change, more intense rainfall is anticipated to alter flow and sediment dynamics.

The effect of the do-nothing scenario is **Long-term, Significant, Adverse.**

9.4.2 Construction phase

During construction, the water environment can be at risk from contaminated water entering the waterbody (either surface or groundwater) or changes to watercourse morphology and flow patterns. The potential

construction phase effects on the water environment will be outlined in the sections below, without mitigation. Mitigation measures will be discussed following this.

Construction will take place adjacent to several watercourses. Excavation of soil and consequently the removal of the soil layer that protects the groundwater body has the potential to cause pollution of surface water and groundwater during construction.

The key civil engineering and associated works which have potential to impact on the surface and groundwater environment are described in 4 and briefly listed below:

- Instream works will be necessary to divert flows to the realigned Clontygar Stream and to facilitate the installation of the new flow controls. Channel and adjoining embankment reinstatement;
- Instream works involve use of cofferdam sheet pile to create a temporary dry working area up to half channel width within the existing river;
- installation of piling platform (hardcore base) in the river banks where sheet piling is used as a method of installation;
- Instalment of the new culvert sections and headwall precast at the upstream end of the channel diversion to transfer flows from the existing outlet to the new stream channel;
- Excavation for the foundation proposed flood defence wall up to the required foundation depth. The final excavation depth is dependent on the depth of the suitable in-situ bearing stratum;
- In-situ concrete casting for the construction of the reinforced concrete flood walls;
- The northern tie-in points for the proposed construction of new flood defence walls adjoining the existing property boundaries of Davitt Road, Brockview, Davitt Court, St. Joseph's National School, Mountmellick Boys National School and Irishtown Road, is to an existing culvert which traverses Irishtown Road to the north. A vertical water bar detail will be included at this point;
- Backfilling of the excavated area surrounding the flood walls in accordance with material notes in the design specification in several areas of the scheme: Midland Steel, Garroon Stream, Mill Bridge to Convent Bridge, Clontygar Stream, Owenass Bridge to Mill Bridge, Upstream of Owenass Bridge, and Irishtown Garden Centre;
- Reinstation of existing lands, in the vicinity of the Clontygar stream, immediately surrounding the proposed flood defence walls to match surrounding pasture. and
- Some bankside vegetation clearance may be undertaken to enable works.

The potential impacts of these works and their magnitude to the water environment are summarised in Table 9-4 and described in the sections below.

Table 9-4: Summary of the activities during construction works, their location and potential impacts and their magnitude

Aspects considered	Details of works	Location of works	Potential Impacts	Magnitude of Impact	Likelihood
Excavation and Infilling	Excavation of material and import of fill material, foundation excavation, backfilling, installation of flood defence walls	Owenass and Pound Rivers, Clontygar, Garroon, Carron Streams	Increased suspended solids in water, sedimentation, pollution of streams/rivers	Medium – Moderate, Temporary, Adverse	Possible
Accidental Spills and Leaks	Risk of localised accidental pollution incidences	Site-wide	Contamination of surface/groundwater, harm to aquatic life	Medium – Moderate, Temporary, Adverse	Possible
Surface Water Runoff	Surface water runoff with increased silt levels, potential contamination from imported materials	Owenass and Pound Rivers, Clontygar, Garroon, Carron Streams	Sediment deposition, alteration of water quality, impact on aquatic habitats	Medium – Moderate, Temporary, Adverse	Possible
Groundwater Pumping	Groundwater pumping interventions, foundation works, alteration of groundwater levels	Owenass Bridge, Mountmellick Bridge, Convent Bridge, Davitt Court, Irish town Garden Centre, Midland Steel	Alteration of groundwater levels, potential contamination	Low – Slight, Temporary, Adverse	Unlikely
Instream Works and Works Near Water	Instream works including flow diversion, culvert installation, embankment reinstatement, cofferdam sheet piling, flood wall construction, bankside vegetation clearance	Mill Bridge, Convent Bridge, Clontygar Stream, and adjacent watercourses	Destruction of habitats, altered hydraulic conditions, erosion, temporary habitat loss due to vegetation clearance	Medium – Moderate, Temporary, Adverse	Possible
Changes to the Surface Water Drainage Network	Modification of existing surface water network, drainage system upgrades, pipe relocation, headwall installation	Midland Steel area, surface water network at southwest area	Disruption to existing drainage, potential for increased flooding	Low - Slight,Temporary, Adverse	Unlikely

9.4.2.1 Excavation and Infilling

The excavation of material and import of fill material will increase the potential availability of suspended solids in surface water runoff from the site. The runoff, if improperly managed, would impact on the water quality in the Owenass and Pound Rivers, and the Clontygar, Garroon, and Carron Streams or other minor drains, by increasing suspended solid levels in the water. Increased suspended sediment concentrations have the potential to be detrimental to wildlife and consequently impact the River Barrow and River Nore SAC. The potential effects on groundwater will be due to temporary exposure of bare ground during excavation for new flood walls, resulting in potential groundwater pollution or groundwater level alterations.

According to the significance of effects matrix (EPA,2022), the magnitude of potential impacts on water will be medium, leading to an overall **Moderate, Temporary, Adverse** effect on water due to excavation and infilling.

9.4.2.2 Accidental Spills and leaks

During construction, there is a risk of localised accidental pollution incidences from the following sources:

- Spillages or leakage of temporary oils and fuels stored on site;
- Spillages or leakage of oils and fuels from construction machinery or site vehicles;
- Spillages of oil or fuel from refuelling machinery on site;
- Run-off from concrete and cement during the construction of flood walls; and
- Accidental spillage of masonry and demolition material during removal of the Owenass Bridge

Accidental spillages would result in localised contamination of surface water, or groundwater underlying the site should contaminants migrate through the subsoils to the underlying aquifer. As stated in the AA, pollution spill events or leachates from stockpiles could lead to adverse impacts on River Barrow and River Nore SAC. Soil stripping and foundation construction have the potential to further reduce the thickness of subsoils and the natural protection they provide to the underlying aquifer. Concrete (specifically, the cement component) is highly alkaline and any potential spillages migrating through subsoil can be detrimental to groundwater quality. Changes in pH of the waterbody resulting from spills of concrete material would have a consequent effect on aquatic species. Machinery on site during the construction phase have the potential to contaminate the surface water. In addition, the compaction of the soils and subsoils by construction machinery will impact on the drainage function of the soil and hence could increase surface water runoff. The compacted soil will create a pathway for a source, in this case oil/contaminated soil, to enter a watercourse (receptor). During demolition of the Owenass Bridge, masonry or other materials could fall and enter the watercourse.

According to the significance of effects matrix (EPA, 2022), the magnitude of potential impact on water will be medium, leading to an overall **Moderate, Temporary, Adverse** effect on water due to accidental spills and leaks.

9.4.2.3 Surface Water Runoff

Surface water run-off during the construction phase will contain increased silt levels because of the exposure of bare ground and presence of imported and excavated soil stockpiles. The potential risk of excavated and imported soils being contaminated will Adversely impact the existing surface water quality and consequently affect water downstream. Runoff containing large amounts of silt can cause damage to groundwater underlying the site. Silt-laden water can arise from exposed ground and soil stockpiles (prior to reinstatement). Excessive quantities of suspended material entering and depositing in the watercourses have the potential for short term impacts on the hydromorphology of the Owenass and Pound rivers, or the Clontygar, Garroon, or Carron Streams, for example fine sediment deposition over existing gravel beds prior to flushing flows to clear the sediment from sensitive gravel beds. Therefore, this is a relevant risk for all reaches defined for the hydromorphology assessment.

According to the significance of effects matrix (EPA,2022) the magnitude of potential impact on water will be medium, leading to an overall **Moderate, Temporary, Adverse** effect on water due to surface water runoff.

9.4.2.4 Groundwater pumping

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.

According to the significance of effects matrix of effects matrix (EPA,2022), the magnitude of potential impact on groundwater will be low, leading to an overall **Slight, Temporary, Adverse** effect on water due to groundwater pumping.

9.4.2.5 Instream Works and Works Near Water

Instream works could affect both the in-channel and riparian environments. Within the channel, destruction of coarse sediment bed features (e.g. gravel riffles) through direct movement (surface smoothing) or compaction by heavy machinery can alter their suitability as instream habitat. The reaches downstream of Mill Bridge and downstream of Convent Bridge serve as salmonid spawning grounds, meaning mitigation of these risks are particularly important. Temporary channel narrowing due to cofferdam emplacement may also create localised changes in hydraulic conditions that alter local sediment dynamics (e.g. promote winnowing of riverbed fines or bankside erosion). Interaction between machinery and the riparian environment may promote localised fine sediment supply to the channel and temporarily affect water quality locally, however this is unlikely to downgrade any WFD hydromorphology status at the much larger WFD waterbody scale. Aquatic species, dependent on bankside vegetation as their habitat, will be adversely affected due to restricted access and the disruption of continuous riparian zones while during construction. Vegetation clearance during works may temporarily reduce localised bank stability depending on the nature of the existing bank material and the stabilising effect of the local specific vegetation. However, banks would be expected to naturally revegetate after works are completed.

According to the significance of effects matrix of effects matrix (EPA,2022), the magnitude of potential impact on water will be medium, leading to an overall **Moderate, Temporary, Adverse** effect on water due to instream works and works near water.

9.4.2.6 Changes to the surface water drainage network

There will be modifications to the existing surface water network (SW) because of the proposed development. These changes will include:

- An existing block boundary wall on the south-western part of Midland Steel area Reinforcement Supplies at the site will be replaced along with the localized upgrades to the surface water drainage;
- The surface water drainage network on the south-western area (servicing the four buildings adjacent to existing land drain) might need to be diverted or protected during the proposed construction works;
- Minor instream works will be required during the construction works to protect the existing surface water drainage regime including relocation or diversion of existing pipework; and
- During the works and where embankments encroached into existing drainage systems; a headwall, culvert and non-return valve will be installed to maintain the existing flow regime.

A CCTV drain survey was undertaken at Davitt Road to evaluate drain conditions, and identify any related problems such as damaged joints, cracks, deformities, obstructions or issues with pipe gradient (McBreen Environmental, 2023). During the construction phase, continuous monitoring will take place to ensure that

the existing surface water drainage system remains undamaged. This approach aims to minimize the risk of spills or leaks occurring, as well as reduce the potential for disruptions to services.

According to the significance of effects matrix of effects matrix (EPA,2022) the magnitude of potential impact on water will be low, leading to an overall **Temporary, Slight, Adverse** effect on water due to changes to the surface water drainage network.

Based on the assessments of potential impacts above, the overall impact on the surface and groundwater environments during construction will be **Temporary, Moderate, Adverse**, according to the EPA 2022 assessment criteria. Mitigation measures will be put in place in order to reduce them to **Temporary, Slight, Adverse.**

9.4.3 Operation Phase

The potential impacts on the water environment during the operation phase refer to both the static ongoing operation of the scheme and to any specified maintenance requirements.

According to the anticipated method of construction, inspection of all proposed flood defence walls is planned from a 2m wide access path from the dry side of all proposed defences. No instream access is identified for inspection, or any maintenance works subsequently required. No maintenance of channels, banks or riparian zones is proposed as part of the operation of the scheme.

9.4.3.1 Hydromorphology

The scheme doesn't include maintenance to instream, riverbank or riparian areas, except the maintenance of the proposed flood relief scheme structures. Also, it excludes maintenance of existing flood defences structures that are not part of the proposed scheme. Therefore, no impacts are identified to hydromorphology from maintenance. However, should maintenance inspections or subsequent works identify a need for instream works in the future, then the same mitigations outlined for the construction phase will apply.

Assessment of the static operation of the proposed scheme is based on two key considerations. Firstly, the potential impact of proposed flood relief measures on hydromorphology at reach-scale, which informs assessment of the impact on the relevant water body and any resultant potential change in water quality elements and ecological status. Secondly, any notable changes in river flow velocities with and without the proposed scheme. This allows potential changes to in channel sediment dynamics to be inferred because of changing scour and erosion dynamics with repeated high flow events over time.

Table 9-5 summarises the reach-scale potential impacts from each measure. The table also includes several potential opportunities to improve hydromorphology at some locations via instream and/or minor floodplain works. These represent opportunities to demonstrate synergies between the Floods Directive and Water Framework Directive to provide benefits for both the local community and the environment, therefore they are included in the hydromorphology assessment table below. However, these opportunities are not part of the scheme.

Table 9-5: Hydromorphology assessment of proposed flood relief measures

Reach	Proposed flood relief measure	Hydromorphology assessment
Upstream Owenass Bridge	Flood walls (left and right bank)	Flood walls are proposed to be set back from the bank top and riparian zone. Existing bank shape and material will remain. **No Impact.**
	Embankments (left and right floodplain)	Embankments are set well back from channel edge and riparian zone. **No Impact.**
Owenass Bridge	Replacement bridge	Replacement bridge design is clear span, but a wider opening. This will increase the hydraulic capacity of the structure. **No Impact.**
Owenass Bridge to Mountmellick Mill Bridge	Flood wall (left bank)	Flood walls are proposed to be set back from the bank top and riparian zone. At the upstream end, the existing natural bank material will remain. At the downstream end, the existing hard bank material will remain. **No Impact.**
	Embankment (left floodplain)	Embankment is set well back from channel edge and riparian zone. **No Impact.**
	Culverted crossings for land drain and stream locations traversing the embankment	Culvert design maintains the existing bed level, however the inclusion of the no return valve may restrict longitudinal sediment transport under normal flow conditions. Such an impact would be short term given high flow events (such as approximately bankfull) should mobilise any accumulated material downstream, however monitoring will be required to observe the impact of these structures on downstream sediment transport (see Table 9-9). Any impacts to downstream sediment would affect the watercourse that the structure is placed on, and the immediate downstream reach of the receiving watercourse. Due to uncertainty around how sediment dynamics will interact with these structures, the potential impacts are identified as **Adverse, Significant (at reach scale), Short-term**.
Habitat opportunity included in the scheme:		
Instream and minor floodplain works in the reach alongside Bakers Field focusing on improving the diversity of in-channel hydraulic conditions e.g. via inset berm features or a riffle-bar sequence. This will improve sinuosity under normal flow conditions. Efforts to improve lateral connectivity between the channel and the floodplain under normal flow conditions (such as a typical winter flow) e.g., via an inset floodplain feature could also be explored to support fine sediment deposition and creation of wetland habitat. *This opportunity will not compromise the flood risk performance of the proposed flood relief scheme. It will improve instream and riparian habitats, support sediment processes and increase the resilience of the proposed project to a number of climate change impacts.*		

Mountmellick Mill Bridge to Convent Bridge	Flood walls (left and right bank)	Left bank flood walls are proposed to be set back from the bank top and riparian zone. On the right bank the existing wall is the be lowered to ground level and retained in situ. A new flood defence wall will follow in front of the existing fence line perimeter. This is well set back from the channel and riparian zone. On the left bank, the existing combination of natural and man-made bank material will remain. On the right bank, the existing hard bank protection will remain. **No Impact**.
	Embankment (right floodplain)	Embankment is set well back from channel edge and riparian zone and follows the existing wall edge. **No Impact**.
	Flow control measure on right floodplain ditch	The ditch on the right bank floodplain currently enters the Owenass river via a concrete culvert, and therefore this proposed measure represents a like-for-like replacement with the existing structure. **No Impact**.
Habitat opportunity included in the scheme:		
There is a potential opportunity to improve the hydromorphology of the right bank floodplain ditch to create a feature of more amenity and habitat value, by improving sinuosity and lateral connectivity with the floodplain under normal flow conditions. *This opportunity would not compromise the flood risk performance of the proposed flood relief scheme. It could improve instream and riparian habitats, support sediment processes and increase the resilience of the proposed project to a number of climate change impacts.*		
Downstream Convent Bridge	Flood wall (right bank)	Flood wall is proposed to be set back from the bank top and riparian zone. On the right bank, the existing hard bank protection will remain. **No Impact**.
Manor House, Manor Court, Manor Road	Culverted crossings for land drain and stream locations traversing the embankment	Culvert design maintains the existing bed level, however the inclusion of the no return valve may restrict longitudinal sediment transport under normal flow conditions (e.g. during a typical winter high flow). Such an impact would be short term given high flow events (such as approximately bankfull) should mobilise any accumulated material downstream, however monitoring will be required to observe the impact of these structures on downstream sediment transport (see Table 9-9). Due to uncertainty around how sediment dynamics will interact with these structures, the potential impacts are identified as **Adverse, Moderate, Short-term**.
Clontygar Stream and Davitt Road	Flood wall (left bank)	Flood walls are proposed to be set back from the bank top and riparian zone. **No Impact.**
	Stream realignment	The proposed realignment follows a sinuous channel planform that is an improvement on the current straightened and modified condition. There is no proposed use of a geogrid or geotextile due to the slope. Natural bed and bank materials are proposed. **No Impact**.

		Some design elements will need to be resolved at detailed design e.g., final planform and channel geometry (see below habitat opportunity). Site investigations are required to establish the natural bed and bank material at the realigned channel (see Table 9-9). There is no evidence to support lining of the realigned channel (e.g., use of a geosynthetic clay liner or natural clay), should this be considered at detailed design stage. Lining of the channel is not recommended because it would restrict local connectivity between the surface water body and the groundwater, potentially impacting the flow regime within the reach especially under low normal flow conditions.
Habitat opportunity included in the scheme:		
Stream realignment will improve overall hydromorphology by creating a feature of more amenity and habitat value e.g. by improving sinuosity and diversity of in-channel hydraulic conditions under normal flow conditions[117]*.* *This opportunity will not compromise the flood risk performance of the proposed flood relief scheme. It could improve instream and riparian habitats, support sediment processes and increase the resilience of the proposed project to several climate change impacts*[118]*.*		
Garroon Stream	Flood wall (left bank)	Flood walls are proposed to be set back from the bank top and riparian zone. **No Impact.**
Bay Road Business Park	Flood wall	Flood walls are proposed to be set back from the bank top and riparian zone. **No Impact.**

[117] IFI (2020) *River Restoration Works - Science based Guidance centred on Hydromorphological Principles in an Era of Climate Change*. Fish and Habitats: Science and Management, Vol. 2

[118] IFI (2020) *Planning for Watercourses in the Urban Environment*. IFI Urban Watercourses Planning Guide.

The scheme has the potential to change the hydromorphological regime of the watercourses where works will take place by altering flow patterns. This can cause changes in sediment dynamics with knock-on effects to habitats and species. The hydraulic modelling undertaken for the proposed scheme resulted in the in-channel velocities (averaged across the model cross-section) as displayed in Table 9-6, Table 9-7 and Table 9-8 under a range of flow conditions:

i) Normal flow conditions (output from the 50% AEP hydraulic model at a timestep prior to the rising limb of the hydrograph so that it is not representing flood conditions and not subject to any instability in the hydrodynamic model).
ii) Approximately bankfull, defined as the 50% Annual Exceedance Probability (AEP), and also referred to as the 2-year event.
iii) Design flow event for the scheme, defined as the 1% AEP.

The node locations are shown in Figure 9-9.

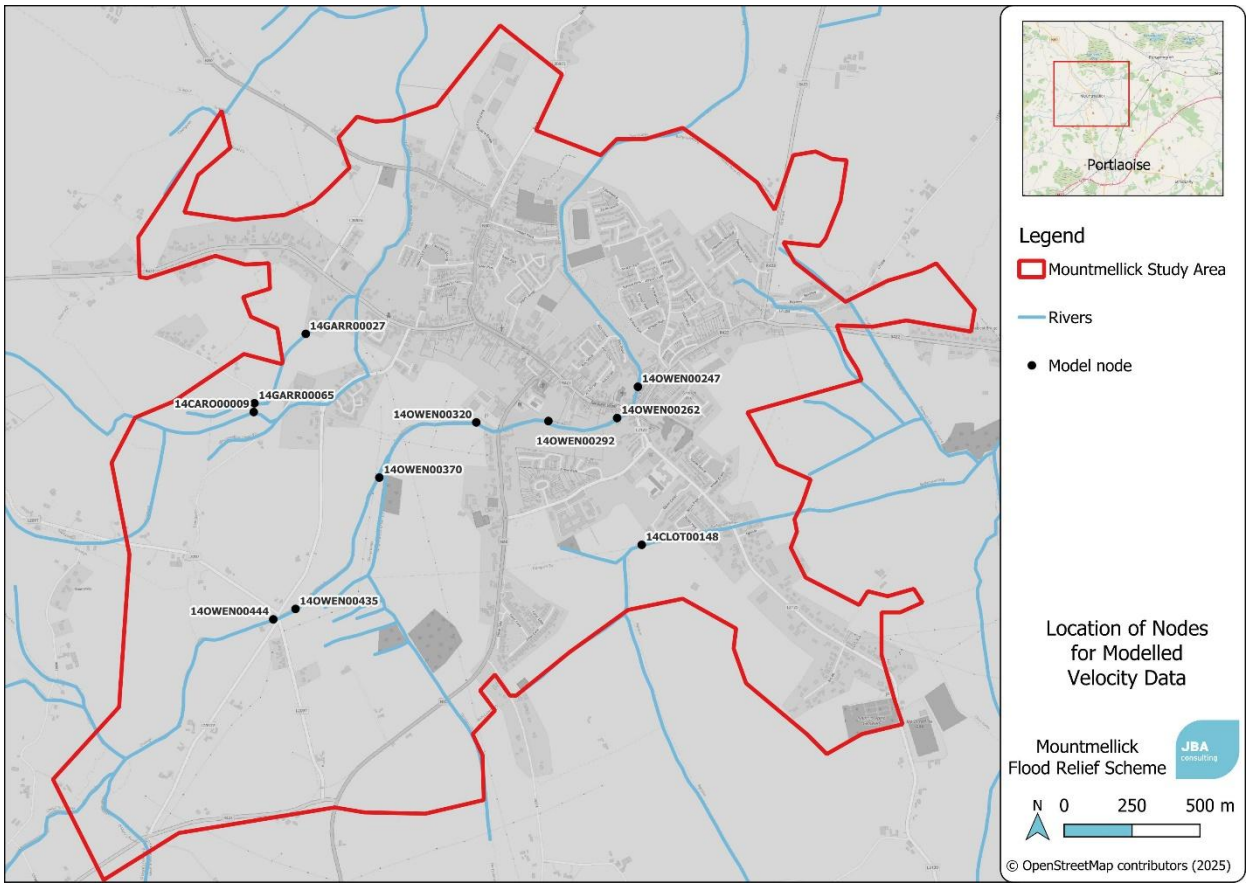


Figure 9-9: Location of model nodes used to extract modelled velocity data

Model nodes relate to the hydromorphology reaches as follows:

- 14OWEN00444: Upstream Owenass Bridge
- 14OWEN00435: Owenass Bridge to Mountmellick Mill Bridge
- 14OWEN00370: Owenass Bridge to Mountmellick Mill Bridge
- 14OWEN00320: Owenass Bridge to Mountmellick Mill Bridge
- 14OWEN00292: Mountmellick Mill Bridge to Convent Bridge
- 14OWEN00262: Mountmellick Mill Bridge to Convent Bridge
- 14OWEN00247: Downstream Convent Bridge
- 14CARO00009: Manor House

- 14GARR00065: Manor House
- 14GARR00027: Garroon Stream
- 14CLOT00148: Clontygar Stream and Davitt Road

Table 9-6: Peak velocities without and with the proposed scheme under normal flow conditions

Normal flow peak velocities (m/s)			
Node	Undefended velocity	Defended velocity	Difference
14OWEN00444	0.87	1.03	0.16
14OWEN00435	1.26	1.23	-0.03
14OWEN00370	0.96	0.96	0.00
14OWEN00320	1.00	1.02	0.02
14OWEN00292	0.76	0.77	0.01
14OWEN00262	0.78	0.81	0.03
14OWEN00247	1.01	1.01	0.00
14CARO00009	0.37	0.33	-0.04
14GARR00065	0.34	0.35	0.01
14GARR00027	0.55	0.55	0.00
14CLOT00148	0.13	0.13	0.00

Table 9-7: Peak velocities without and with the proposed scheme under approximately bankfull conditions (50% AEP)

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

Table 9-8: Peak velocities without and with the proposed scheme under the design flow (1% AEP)

1% AEP event peak velocities (m/s)			
Node	Undefended velocity	Defended velocity	Difference
14OWEN00444	1.43	2.2	0.77
14OWEN00435	2.16	3.1	0.94
14OWEN00370	1.41	1.48	0.07

14OWEN00320	1.57	1.7	0.13
14OWEN00292	1.22	1.3	0.08
14OWEN00262	1.49	1.87	0.38
14OWEN00247	1.71	1.67	-0.04
14CARO00009	0.47	0.16	-0.31
14GARR00065	0.71	0.96	0.25
14GARR00027	0.65	0.74	0.09
14CLOT00148	0.21	0.28	0.07

Model results demonstrate very little change to in-channel velocity dynamics with the proposed scheme. Differences are negligible under normal flow conditions up to a bankfull event suggesting the scheme will have limited impact on sediment dynamics under the most common flow conditions. There are some changes for the 1% AEP as the movement of flood water are controlled by the proposed defences. Although it is unlikely that the scheme will cause significant changes in flow velocities or affect the pattern of sediment scour or deposition, there are uncertainties about how these minor velocities changes will interact with bed and bank materials during extreme high flow events (such as the 1% AEP).

According to the significance of effects (EPA,2022), the magnitude of potential impact on hydromorphology will be medium**,** leading to an overall **Moderate, Short-Term, Adverse** effect. While there are no major concerns raised over the operation of proposed flood walls and embankments, there is uncertainty around the possible impingement on downstream sediment transport by the culvert no return valves. See Monitoring section further in this Chapter for recommended actions.

9.4.3.2 Groundwater Recharge

Potential impacts to recharge during the operation phase are related to ground hardening due to access creation for trucks and vehicles for maintenance purposes, by reducing the infiltration capacity. There is the potential of alkaline water entering the watercourse and infiltrating to the groundwater. Increased drainage could occur due to compaction of surfaces and increased hard standing has the potential to reduce infiltration and groundwater recharge.

According to the significance of effects matrix (EPA,2022), the magnitude of potential impact on groundwater recharge will be low, leading to an overall **Slight, Long-Term, Adverse** effect.

Based on the assessments of potential impacts above, the overall impact on the water environment during operation will be **Slight** to **Moderate, Long-Term, Adverse**, according to the EPA (2022) Guidelines. Mitigation measures will be put in place in order to reduce them to **Temporary, Slight, Adverse.**

9.5 Mitigation Measures

In the impact assessment discussed above, a range of potential effects on water were identified. Mitigation measures in the construction and operational phase of the proposed scheme will be implemented to reduce these adverse effects. Most measures are required during the construction phase as it will pose the greatest level of risks due to the construction activity on site, plant construction and use of construction materials and the soil on site. In the sections below the mitigation measures for the do-nothing scenario, construction phase and operation phase are discussed.

9.5.1 Do Nothing Scenario

In the do-nothing scenario, no mitigation measures will be required.

9.5.2 Construction Phase

To reduce the predicted impacts to surface water as a result of excavation and infilling, accidental spills and leaks, and surface water runoff during the construction phase of the scheme, the following mitigation measures are proposed.

9.5.2.1 Best Practice Construction Methods

A preliminary Construction Environmental Management Plan (CEMP) has been prepared for the proposed scheme and will be put in place by the appointed contractor. The preliminary CEMP was prepared in accordance with the following:

- National and International Legislation;
- Environment Liability Regulations; and
- Best Management Guidelines.

The CEMP will be used by the contractor to prevent and minimise environmental effects during construction.

9.5.2.2 Surface Water Runoff and Silt Control

Mitigation measures for the protection of surface and groundwater quality from silt and suspended solids on site involve silt control. They include proper planning of works, site compound construction, storage management and excavation plans, as following:

- Planning of works will be done based on weather conditions forecast and monitoring to minimise risk of run-off form the site;
- The contractor will construct a site compound at a location remote from any drains;
- Storage locations and topsoil piles will be placed in appropriate places, distant to existing drains/sewerage within site;
- All soil stockpiles shall be covered (i.e., with a tarpaulin) to minimise the risk of rain/wind erosion. Vegetation will be established as soon as possible on all exposed soils;
- In the event of an extended dry periods, stockpiles will be dampened using a water to minimise the risk of airborne particles entering watercourses;
- Excavations will remain open for as little time as possible before the placement of fill to minimise the potential of water ingress into excavations;
- A Storm Water Management Plan will be completed to address sediment control during the construction works and address the potential risk to release of sediments and various pollutants into local watercourses;
- Management/Response plans will be implemented to identify mobilisation of soil particles/pollution and initiate the interception and treatment of pollution/silt run-off;
- Silt fencing or other appropriate measures shall be put in place downstream of exposed soils or soil stockpiles. Silt fences will also be put in place around the newly constructed embankments.

9.5.2.3 Accidental Spills and Leaks

To avoid and manage accidental spills and leaks a series of measures listed below will be implemented. The Main Contractor and sub-contractors will be responsible to ensure their implementation:

- An Emergency Plan for the site will be established by the Main Contractor prior to work commencing at the site. As a minimum the Emergency Plan will contain contact details for statutory bodies such as the NPWS and IFI. All site workers will be made aware of the plan and its location in the site offices;
- There will be no refuelling of machinery within or near the river channel. Refuelling will take place at designated locations at distances of greater than 30 metres from the watercourse;
- No vehicles will be left unattended when refuelling and a spill kit including an oil containment boom and absorbent pads will be on site at all times;
- Any fuel needed to be stored on the site will be stored appropriately and at a location that is set back from the river. All other construction materials will be stored in this compound. The compound will also

house the site offices and portable toilets. This compound will either be located on ground that is not prone to flooding or will be surrounded by a protective earth bund to prevent inundation;
- All vehicles will be regularly maintained and checked for fuel and oil leaks;
- All liquids, solids and powder containers will be clearly labelled and stored appropriately in sealable containers. Storage of fuels and oils will be in the main contractor's compound only;
- Spill protection equipment such as spill kits, absorbent mats, oil booms, and sand will be available for use in the event of an accidental spill. These will be disposed of correctly if used and replaced with new ones immediately. Disposal records for used absorbent materials will be retained by the Site Manager;
- The contractor shall implement measures for the regular inspection of bunds and emptying of rainwater (when uncontaminated). Bunding must have a minimum capacity of 110% of the volume of the largest tank or 25% of the total storage capacity, whichever is the greater. Bunding shall be impermeable to the substance that is being stored in the tank;
- The use of settling lagoons, settling tanks, or equivalent, with outflow control measures may be used for the interception of surface water or groundwater pumped from an active working area;
- If a spillage of a hazardous material to groundwater occurs, the groundwater will be contained and pumped to a tank or holding vessel prior to shipment off site for disposal. The contractor will maintain disposal records. The contractor will identify the cause of the spillage and mitigation measures and controls will be put in place to prevent a repeat. The CEMP for the site will be updated and contractors and sub-contractors will be made aware of the amendments;
- The Contractor will clean equipment prior to delivery to the site. The Contractor will avoid using any equipment which leaks fuel, hydraulic oil, or lubricant. The Contractor will maintain equipment to ensure efficiency and to minimise emissions;
- No excavation shall take place below the water-table on the site;
- Management/Response plans will be implemented to identify mobilisation of soil particles/pollution and initiate the interception and treatment of pollution/silt runoff; and
- Precast elements must be maximised to avoid wet concreting in close proximity to water. In particular, the Installation of the precast culvert that will provide connection from land drain onto Pound Stream at Manor Road will be mitigated.

9.5.2.4 Demolition and replacement of the Owenass Bridge

During demolition and replacement of the Owenass Bridge, the following specific mitigation measures will be put in place. A heavy-duty tarpaulin will be secured across the length of the Owenass Bridge, in order to prevent any wall fragments falling into Owenass River. The installation points to secure the tarpaulin will include the underside of the bridge; existing and/or temporarily installed fixtured points on either bank side. The tarpaulin will be upright (0.5m above the height of the wall) and tight to the wall so as to ensure that demolished wall fragments fall back towards the centre of the bridge. Fragments of the wall are to be removed by hand in order to prevent and accidental piercing of the tarpaulin by the demolition machinery. Additional silt fences will need to be installed at all bank access points from the sides of the bridge to ensure no sediment runoff into the Owenass River. Following the demolition of the Owenass bridge, the extension works need to prioritise the utilisation of pre-cast concrete elements, in order to safeguard the Owenass River from any concrete leachate. The heavy-duty tarpaulin is to be extended outward to cover the expanse of the new section of the bridge until completion. The Project Ecologist will be present for the entirety of these works.

9.5.2.5 Instream Works

To reduce the potential impacts from instream works the following mitigation measures are proposed:

- All works will be supervised by Project Ecologist, and safe concreting measures during wall construction will also be implemented;
- Silt fencing will be installed prior to the commencement of any construction works in order to enhance the protection of identified water features (along the embankments of the River Owenass). Shallow interceptor trenches will be installed in front of these silt fences where possible. Silt fences will be repaired and/or replaced as necessary by the principal contractor as part of the on-going environmental monitoring programme. 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;
- Protection of watercourse from cement leachate, so the flood wall and foundations will be built with poured cement;
- Pools must be formed at each end of the culvert to provide transition from the shape of the opening to the shape of the river downstream, this mitigation will be compliant with the "Guidelines for the crossing of watercourses during the construction of national road schemes" (NRA, 2008)[119];
- 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;
- During culvert construction, flow velocity will be as slow as possible with water depth through the culvert kept as deep as possible. Maximum flow velocities during standard flow will not exceed 1.2m/sec. Power densities will not exceed 150Wm3; and
- To mitigate impacts to any fauna or flora as a result of instream works, refer to Chapter 7 Biodiversity.
- For works in the salmonid spawning reach downstream of Convent Bridge, Inland Fisheries Ireland (IFI) will advise on the required specification for the instream. This may include details such as the laying of geotextile materials on the existing river bed to spread the load from machinery to reduce impact to underlying gravel bed habitat. Design advice will be incorporated into instream working downstream of Owenass Bridge given this has also been identified as a salmonid spawning area. IFI have also outlined monitoring requirements for the first phase on instream construction works that will determine the instream methodology throughout the project – see Section 9.4.4 Monitoring.

9.5.2.6 Flooding during construction

There is a possibility that a flood will occur during the construction phase. To ensure that Mountmellick does not become vulnerable to floods during construction, the contractor will be required to monitor conditions that may cause inundation. In the event of a storm event, temporary flood barriers can be erected at the exposed locations. All works undertaken near the banks will be fully consolidated to prevent scour and run-off of silt. Consolidation may include use of protective and biodegradable matting or geotextiles on the banks and the sowing of grass seed on bare soil. Earth works will be aimed to take place during the driest season to ensure that any flooding during the wet season does not result in mobilisation of significant quantities of unconsolidated material.

9.5.3 Operation phase

Impacts to groundwater during the operation phase of the scheme are negligible and no mitigation is needed. However, given the uncertainty over how some design elements may interact with the hydromorphology of the receiving environment, several recommendations to source additional information and to monitor operation of the scheme are required (see Section 9.4.4 Monitoring).

9.5.4 Monitoring

The site-specific CEMP will set out the monitoring requirements for the scheme during the construction stages. Monitoring will ensure the implementation of mitigation measures during construction. The frequency and reporting procedures will be agreed with the NPWS and IFI before commencement of the work. All monitoring records will be maintained by the Project Manager or his nominated assistant. The monitoring will include:

- Records of regular inspection, on bunds, vehicles oil storage on site according to the CEMP;

[119] NRA (2008) *Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes*. Available at: https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Crossing-of-Watercourses-during-the-Construction-of-National-Road-Schemes.pdf (Accessed 12 March 2024).

- Records of silt fencing conditions and placement; and
- Records of any water ingress during excavation.

Monitoring of surface water and groundwater on quantitative and qualitative parameters during construction will be carried out. As a minimum the following parameters will be recorded in surface waters: pH, conductivity, chemical oxygen demand, suspended solids and total dissolved solids. Parameters for groundwater will include as a minimum, total petroleum hydrocarbons, pH, conductivity, suspended solids and total dissolved solids. If monitored levels exceed the recommended threshold, mitigation measures to protect surface and groundwater will be reviewed by the environmental manager acting on behalf of the contractor.

Table 9-9: Recommended monitoring to mitigate potential impacts on the water environment during construction and operation of the scheme

Proposed measure	Monitoring recommendation
Detailed design	
Stream realignment	At Clontygar Stream, investigations to establish the prevailing bed and bank material will be conducted to inform realignment design. This includes: 1. Visual survey of the existing riverbed and bank material, **and** 2. 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 will 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 will be conducted by a geomorphologist and/or hydrogeologist and expert judgement must be considered during detailed design. Survey must be conducted in summer months.. The following design requirements apply: 1. Lining of the channel is not recommended i.e., the natural connectivity between surface and groundwater will be maintained. 2. The flow regime must not be altered by the proposed realignment.
Construction	
Flood walls	Following a site visit on 06 March 2024, IFI advised the following monitoring will be required *prior to* and *during* construction to inform the construction methodology of the proposed flood relief measures downstream of Convent Bridge: 1. IFI initially proposed to carry out a low flow inspection in May/June 2024 to examine gravel bed habitat likely to be used by salmonids for spawning. Due to the change in position of the flood wall design, the survey was not needed. 2. IFI has agreed to carry out the riverbed survey prior to construction to establish how the river is responding to the instream works and determine whether the instream works can be retained during the winter period when construction work will pause. These recommendations as well as any other recommendations that come as a result of consultation with IFI will be detailed in an updated CEMP and referred to in an updated Construction Methodology report prior to any works recommencing.

	Other actions are also recommended *during* construction to monitor potential impacts, including: 3. Monitoring via visual observation by contractor of the presence of any surface water runoff and sediment plume. If observed to inform IFI immediately to consider the need for any remedial measures, subject to proximity to sensitive gravel beds. 4. Monitoring via visual assessment of channel response to cofferdam emplacement for any reach where this construction method is applied. This will focus on how river flows are interacting with the temporary flow constriction in terms of the potential for, or evidence of, geomorphic effects such as increased scour. Bed or bank scour could potentially require mitigation should it indicate a risk to important bankside infrastructure such as public paths or to the flood scheme itself. This survey will be conducted by a geomorphologist **and** a civil engineer so that practical and effective measures can be put in place. 5. Monitoring via visual assessment of any existing surface water connections that may be temporarily protected or diverted during the works. This assessment will ensure downstream connectivity of flows is maintained at all times. This survey will be conducted by a civil engineer. 6. Monitoring via visual assessment by contractor of fine sediment plumes that may be entering the channel from the works – both during local works and the decommissioning of any instream work. The presence, or absence, should be recorded in daily site logs. Any recommendations resulting from these monitoring activities will be detailed in an updated CEMP and referred to in an updated Construction Methodology report prior to any continuation of construction activities. Consultation with relevant authorities and IFI will be undertaken as appropriate.
Operation	
Culverted crossings for land drain and stream locations traversing the embankment	Along any existing watercourse where a new or replacement culvert is proposed, monitoring of sediment dynamics via visual assessment will occur. This will involve three rounds of site visits: i) during summer (representing low normal flow conditions), ii) during winter (representing high normal flow conditions), and iii) following recession of a high flow event (bankfull or greater). Channel sections immediately upstream and downstream of the culvert will be examined for evidence of coarse sediment deposition and scour. This survey will be conducted by the local authority, who will judge the impact of the culverts on sediment dynamics **after all three rounds** of monitoring have been conducted. This will enable an understanding of any impingement on the flushing capacity of the watercourses with these new structures in place to be established.
General in-channel environment	Following large flood events, the in-channel environment will be examined for any obvious new scour. Further development of bed or bank scour could potentially require mitigation should it indicate a risk to important bankside infrastructure such as public paths or to the flood scheme itself. This survey will be conducted by the local authority.

Maintenance involving instream works	Should maintenance inspections reveal a requirement for works that require operating within, or adjacent to, the river channel environment then all relevant guidance must be followed. This includes, but is not limited to: Inland Fisheries Ireland – Planning for watercourses in the urban environment: A Guide to the Protection of Watercourses through the use of Buffer Zones, Sustainable Drainage Systems, Instream Rehabilitation, Climate / Flood Risk and Recreational Planning. Inland Fisheries Ireland – Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters, IFI/2016/I-4298. Inland Fisheries Ireland - Science based Guidance centred on Hydromorphological Principles in an Era of Climate Change. Fish and Habitats: Science and Management, Vol. 2 Inland Fisheries Ireland - Planning for Watercourses in the Urban Environment. IFI Urban Watercourses Planning Guide. OPW – Environmental Guidance: Drainage Maintenance and Construction. Environment Protection Agency (UK) – Channel Management Handbook, Report SC110002. Environment Protection Agency (UK) – Aquatic and Riparian Plant Management: Controls for vegetation in watercourses, Report SC120008/R1. Environment Protection Agency (UK) – Aquatic and Riparian Plant Management: Controls for vegetation in watercourses, Technical guide, Report SC120008/R2.

9.6 Residual Impact

Following the implementation of the recommended mitigation measures and the final design and layout of the scheme, the magnitude and significance of the residual impacts is discussed in the following sections.

9.6.1 Construction Phase

Provided that mitigation measures are followed closely during the construction phase of the scheme, the residual impact to surface water and groundwater bodies will be reduced to **Temporary, Slight, Adverse** to **Imperceptible.**

9.6.2 Operation Phase

During the operation phase of the project, considering the design factors benefitting surface and groundwater bodies, the residual impact will be **Long-term** and **Slight**, with a **Neutral** impact on quality, i.e., an effect which causes noticeable changes the character of the environment without affecting its sensitivities.

9.6.3 Monitoring

Table 9-9 outlines key information that is required: i) to inform detailed design, ii) during construction to refine the construction methodology and monitor potential impacts, and iii) during operation to monitor potential impacts. These are informed by a number of uncertainties including but not limited to:

- Baseline understanding of the spatial distribution of important gravel bed habitat in the Owenass River;
- Baseline understanding of the sediment dynamics of land drainage and tributary streams where new/replacement culverts will be installed;
- How minor velocity changes will interact with riverbed and bank materials during extreme high flow events;
- How channel hydraulics will respond to temporary flow constrictions due to cofferdam emplacement;
- Riverbed and bank materials of streams proposed for realignment; and
- Confidence in the modelled velocities used for normal flows in Section 9.3.3 given the model was developed for flood modelling purposes.

Monitoring of water quality during operation is carried out by the EPA through their National River Monitoring Programme including physical and chemical parameters (Dissolved oxygen, Nutrients, hazardous substances, Temperature, PH) and biological parameter (Invertebrates, aquatic plants, diatoms) and Fish by IFI. For the purpose of this project JBA undertook a biological assessment in 5 points for the baseline assessment according to EPA methodology, provided in Section 9.

9.7 Interactions with other Environmental Effects

Impacts to surface and groundwater have the potential to interact with the following environmental factors:

Biodiversity, discussed in Chapter 7 The River Owenass through Mountmellick is part of the River Barrow And River Nore SAC, which is valuable habitat for a number of significant and protected species. Impacts on waterbodies are related to the ability of the physical habitat conditions and water quality to support aquatic species.

Land and Soil, discussed in Chapter 8: Groundwater and aquifer characteristics and activity are largely dictated by geology and overlying soils. Impacts such as soil compaction, water infiltration into soil, and alteration of groundwater flow are directly related to both soil and geology, and surface and groundwater.

Population and Human Health, discussed in Chapter 6: Surface water and groundwater interact with impacts on population and human health either impacts related to drinking water or water use for different recreational activities.

9.8 Potential Cumulative Impacts

In this section, only proposed sites that met the following criteria were assessed: appropriate size, proximity to the watercourse and potential hydrological impact (downstream and upstream to Mountmellick FRS). The following projects were examined:

- Erection of 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 (Application Ref. 16536).
- Construction of a 10 years a Solar PV Energy Development comprising installation of photovoltaic panels on ground mounted frames/ support structures (Application Ref. 16505).
- Construction of a new build 50 bed capacity unit (hospital) for the replacement of existing beds including support services, associated site works, reconfiguration/ upgrade landscaping works and associated minor works (Application Ref. 20208).
- Demolishment of an existing building: build 32 two-bedroom apartments, bin bays and cycle shelters, 61 parking spaces, site entrance and all associated site works. 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 (Application Ref. 22569).

The projects mentioned are expected to have impacts during both the construction and operational phases. However, these impacts are anticipated to be minor and will be effectively mitigated. As a result, the overall cumulative effect on the proposed development is considered to be **Not Significant, Adverse** and **Temporary**.

10 Cultural Heritage

10.1 Introduction

This chapter describes the proposed flood alleviation measures for the Mountmellick Flood Relief Scheme (FRS) and assesses the potential impact on archaeological, architectural heritage and cultural heritage assets.

10.2 Methodology

The methodology has been designed so a full understanding of the potential effects on the character of the historic landscape can be assessed. A detailed archaeological and historical background has been included which describes the character and context of the immediate and wider historic landscape, as well as the individual designated and undesignated heritage assets, and highlights the potential to reveal subsurface archaeological features. The methodology used is based on the EPA Guidelines (EPA 2022[120]), and both direct physical effects, as well as impacts to the setting of individual heritage assets, have been assessed. The assessment of the proposed scheme includes a comprehensive consideration of the potential direct, indirect, residual and cumulative impacts and includes, where applicable, an assessment of visual impacts on cultural heritage constraints.

10.2.1 Defining Cultural Heritage

The EPA (2022[121]) includes under the heading of Cultural Heritage;

Archaeology
- Known archaeological monuments;
- Areas of archaeological potential (including unknown archaeology);
- Underwater archaeology;

Architectural heritage
- Designated architectural heritage;
- Other significant architectural heritage;

Folklore and history
- Designations or sensitivities

Cultural heritage as set out in the Environmental Protection Agency (EPA) Guidelines on Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA 2022[122]) includes archaeology, architectural heritage, folklore and history. It is a broad term that includes a wide range of tangible and intangible cultural considerations. Cultural heritage can relate to settlements, former designed landscapes, buildings and structures, folklore, townland and placenames, and historical events, as well as traditions (e.g. mass paths and pilgrim ways) and traditional practices (e.g. saints' pattern days).

Cultural heritage is part of our cultural identity and contributes to defining a sense of place. The value of a strong sense of place is likely to become more important as the world grows increasingly homogenised. Recognising the unique sense of place in our towns and villages, whilst also respecting the individual heritage assets, is critical.

[120] EPA (Environmental Protection Agency) (2022) *'Guidelines on the information to be contained in Environmental Impact Assessment Reports'.* EPA.
[121] EPA (Environmental Protection Agency) (2022) op. cit.
[122] EPA (Environmental Protection Agency) (2022) op. cit.

Cultural heritage assets are valued for the important contribution they make to the understanding of the history of a place, an event or people. Sites of cultural heritage interest are often afforded protection either as national monuments, recorded archaeological monuments (on the Record of Monuments and Places (RMP)/Sites and Monuments Record (SMR)) or as protected structures (on the Record of Protected Structures (RPS) in the relevant City or County Development Plan), or as structures within the National Inventory of Architectural Heritage (NIAH) (the various designations[123] are defined in Appendix 10.3 in Table 10-3.

Each of these provides a unique cultural record and acts as a carrier of memory, meaning and cultural value. When considered in its wider context, they can form an essential component in the mechanism for analysing the broader cultural character and context of an area. Together, these can assist in mapping the changes that have led to the development of the modern environment. Such analysis provides insight into the communication, trade, transport, growth and associations of past societies.

As part of the reporting process, the chapter assessed and collated information from archaeological and conservation assessments and investigations conducted to inform this scheme these are summarised in the text below with more detail provided in Volume 3 Appendixes.

The Appendices contain the following:

- Appendix 10.1 - Legislation, Standards and Guidelines
- Appendix 10.2 - Local Authority Policies in Relation to Cultural Heritage
- Appendix 10.3 - Glossary of Effects and Assessment Methodology
- Appendix 10.4 - Inventory of Cultural Heritage Sites Within 100m of the Proposed FRS
- Appendix 10.5 - Underwater Survey Report
- Appendix 10.6 - Geophysical Survey Report
- Appendix 10.7 - Method Statement and Specification – Structural Conservation

10.2.2 Relevant Guidelines, Policy and Legislation

This EIAR chapter will be guided by the methodologies and recommendations outlined in 'Archaeology and Flood Relief Schemes: Guidelines' (NMS 2023[124]). These guidelines have been prepared by the National Monuments Service (NMS) of the Department of Housing, Local Government and Heritage (DHLGH) to provide a framework for the integration of archaeology in Flood Relief Schemes (FRS).

A full list of legislation, standards and guidelines that were consulted to inform the assessment are contained in Appendix 10.1 in Volume 3 of this EIAR along with excerpts from the principal legislation governing archaeology, the National Monuments Acts 1930-2014. The Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023 was enacted in October 2023 and this this Act is now law. The Minister for DHLGH commenced certain provisions in May 2024 (S.I. No. 252/2024); however, until the Act is fully commenced, the National Monuments Acts have therefore not yet been repealed and remain in force.

The Laois County Development Plan (CDP) (2021-2027[125]) outline specific policies and objectives for the archaeological heritage in the county, local objectives in relation to cultural heritage are outlined in the

[123] World Heritage Properties, National Monuments, Recorded Monuments, Protected Structures, Architectural Conservation Areas, NIAH and Undesignated Sites
[124] NMS (National Monuments Service) 2023. '*Archaeology and Flood Relief Schemes: Guidelines'*. Department of Housing, Local Government and Heritage.
[125] Laois County Council (2022) '*Laois County Development Plan 2021-2027'.* Laois: Laois County Council.

Mountmellick Local Area Plan (2018-2024[126]), these are summarised in Appendix 10.2 in Volume 3 of this EIAR. A pre-draft Local Area Plan 2027-2030 consultation is currently underway.

10.2.3 Desk Study

The desk study availed of the following sources relevant to the cultural heritage study area:

- UNESCO World Heritage Sites (WHS) and Tentative World Heritage Sites and those monuments on the tentative list;
- National Monuments in State care, as listed by the National Monuments Service (NMS) of the Department of Housing, Local Government and Heritage (DHLGH);
- Sites with Preservation Orders;
- Sites listed in the Register of Historic Monuments;
- Record of Monuments and Places (RMP) and the Sites and Monuments Record (SMR) from the Archaeological Survey of Ireland; The statutory RMP records known upstanding archaeological monuments, their original location (in cases of destroyed monuments) and the position of possible sites identified as cropmarks on vertical aerial photographs. Archaeological sites identified since 1994 have been added to the non-statutory SMR database of the Archaeological Survey of Ireland (National Monuments Service, DHLGH), which is available online at www.archaeology.ie and includes both RMP and SMR sites. Archaeological sites identified since 1994 are placed on the SMR and are scheduled for inclusion on the next revision of the RMP;
- Record of Protected Structures (RPS) listed in the Laois County Development Plan (2021-2027);
- County Councils Architectural Conservation Areas (ACAs) and their statements of character;
- National Inventory of Architectural Heritage (NIAH) Building Survey (NIAH ratings are international, national, regional, local and record, and those of regional and above are recommended for inclusion in the RPS);
- National Inventory of Architectural Heritage (NIAH) Garden Survey (paper survey only);
- A review of artefactual material held in the National Museum of Ireland 'topographical files';
- Archaeological Inventory of County Laois[127];
- Cartographical Sources, OSi Historic Mapping Archive, including early editions of the Ordnance Survey including historical mapping (such as Down Survey 1656 Map);
- The Irish archaeological excavations catalogue i.e., Excavations bulletin and Excavations Database;
- Place names; Townland names and toponomy (loganim.ie);
- National Folklore Collection (Duchas.ie);
- Local Authority surveys of vernacular heritage and industrial heritage (Architectural Recording and Research 2007), Hamond (2004[128]; 2005[129]; 2009[130]);
- Laois County Development Plan (2021-2027): A Summary of relevant Laois County Council Policies in relation to Cultural Heritage is provided in Appendix 10. 2.1 in Volume 3 of this EIAR;
- Mountmellick Local Area Plan (2018-2024[131]) and Draft Local Area Plan (2024-2030): A summary of relevant Mountmellick LAP Policies in relation to Cultural Heritage is provided in Appendix 10.2.2 in Volume 3 of this EIAR;
- A review and interpretation of aerial imagery (OSI Aerial Imagery 1995, 2000, 2005, Aerial Premium 2013-2018, Digital Globe 2011-2013, Google Earth 2001–2023, Bing 2023) to be used in combination with historic mapping to map potential cultural heritage assets;
- Collation of information from similar or other infrastructure projects in proximity to the proposed scheme, for example EISs, SEAs, conservation plans, archaeological test assessments and excavations;

[126] Laois County Council (2018) '*Mountmellick Local Area Plan 2018-2024'*. Laois: Laois County Council.

[127] Archaeology Survey of Ireland (1995) *'Archaeology Inventory of County Laois'*. Dublin: The Stationery Office.
[128] Hamond, F. (2004) '*Industrial Heritage Survey of County Laois'*. Laois County Council.
[129] Hamond, F. (2005) '*Mills of Co. Laois: An Industrial Heritage Survey'*. The Heritage Council.
[130] Hamond, F. (2009) '*Bridges of County Laois: An Industrial Heritage Review'*. Laois County Council.
[131] Laois County Council (2018) '*Mountmellick Local Area Plan 2018-2024'*. Laois: Laois County Council.

- A review of existing guidelines and best practice approaches.

A bibliography of sources used is provided in the References section.

10.2.4 Field Survey and Archaeological Investigation

Mountmellick was visited on a number of occasions for the assessment, a field walkover survey was undertaken on 23rd and 24th of November 2023 and on the 7th of March 2024 by Dr Clare Crowley, Max McConnell and Siobhán Deery of Courtney Deery Heritage Consultancy. The aim was to assess the character and setting of the recorded cultural heritage features and to identify undesignated cultural heritage features to assess the potential impact from the proposed FRS.

An underwater archaeological survey, which included wade (visual inspection) and metal detection survey within the Owenass River, Pound River and Garroon Stream, was carried out by ACAS in April 2024. The survey focused on four in-water areas that will be directly impacted by the construction of flood relief walls and the replacement of the Owenass Bridge. It was carried out under licence to the National Monuments Service (NMS) DHLGH under Dive Licence Ref. No. 23D0148, ensuring a thorough understanding of the project's environmental impact.

A geophysical survey was carried out by 12th and 15th of February 2024 by Terradat under Detection Device Consent Licence No. 24R0053, issued by the NMS. The survey, which comprised seven areas were the flood embankments and compound areas are proposed, identified previously unknown areas of archaeological potential within the FRS measures.

The surveys were carried out to inform the decision-making process and provide greater certainty as to the below-ground and instream archaeological potential throughout the scheme. The underwater and geophysical survey reports are summarised in this chapter, and the full reports are provided in Appendices 10.5 and 10.6, respectively. The fieldwork is included in the inventory of cultural heritage sites in Appendix 10.4.

10.2.5 Data Analysis and Mapping

Previous phases of the proposed FRS involved the compilation and mapping of available cultural heritage data sets (O' Brien 2019[132]; 2022[133]). The outputs of the project included GIS layers and the creation of a database for archaeology, architectural heritage and as far as possible, cultural heritage, as well as associated mapping. This formed a permanent renewable database that can be utilised by multiple specialist users to provide information for the project design and the EIA process. This phase of the project has updated the GIS and mapping for the project with the latest data from statutory authorities and the design team, as well as additional features identified through further desk-based study and fieldwork.

The locations for all archaeological and cultural heritage assets identified in the course of the assessment have been mapped and are shown on map figures throughout this chapter. The coordinates for each asset are provided in Irish Transverse Mercator (ITM) in the inventory of archaeological and cultural heritage sites in Appendix 10.4 in Volume 3 of this EIAR.

10.2.6 Appraisal Method for the Assessment of Impacts

Archaeological and cultural heritage sites are considered to be a non-renewable resource and cultural heritage material assets are generally considered to be location sensitive. In this context, any change to their environment, such as construction activity, ground disturbance works and changes to setting, could

[132] O' Brien, Y. (2020) '*Mountmellick Flood Relief Scheme, Mountmellick, Co. Laois. Cultural Heritage Constraints Study'.* Unpublished report: Courtney Deery Heritage Consultancy Ltd. For JBA Consulting on behalf of Laois County Council.
[133] O' Brien, Y. (2023) '*Cultural Heritage Options Assessment Report. Mountmellick Flood Relief Scheme, Co. Laois'*. Unpublished report: Courtney Deery Heritage Consultancy Ltd. For JBA Consulting on behalf of Laois County Council.

adversely affect these sites. Similarly, architectural heritage is a unique and irreplaceable material asset which is given value by its design, setting, quality of workmanship and use of materials. In this context, any change to the architectural heritage fabric, structure and setting, resulting from construction and operation activity, may adversely affect these sites.

The likely significance of all effects is determined in consideration of the magnitude of the impact and the baseline rating upon which the impact has an effect (i.e., the sensitivity or value of the cultural heritage asset). Having assessed the potential magnitude of effect with respect to the sensitivity/value of the asset, the overall significance of the effect is then classified as not significant, imperceptible, slight, moderate, significant, very significant, or profound as per the EPA guidance (2022).

A glossary of impact assessment terms, including the criteria for the assessment of effect significance, is contained in Appendix 10.3 in Volume 3 of this EIAR.

10.2.7 Consultation

Consultation has been undertaken with the wider Project Team, including designers and landscape/visual specialists to ensure that cultural heritage considerations have been duly considered in the design and assessment phases.

An EIAR Scoping Study Report was submitted on 22nd of December 2023 to the Development Applications Unit (DAU) of the National Monuments Service (NMS) the Department of Housing, Local Government and Heritage (DHLGH) and a request for a meeting (NMS Ref: G Pre00307/202). An online introductory presentation of the scheme was given to the Underwater Archaeological Unit of the NMS and the National Built Heritage Unit (NBHS) on the 18th of January 2024. This was followed by an onsite meeting on the 7th of March 2024, which included the OPW Project Archaeologist where each flood measure location was visited and reviewed. The subject of these meetings is outlined in detail in Chapter 5 of the EIAR. The main recommendation was that a conservation engineer review and develop the best practice conservation-focused design details for the flood measures on built heritage structures or features impacted by the project. Consequently, design mitigation measures have been developed in collaboration with the project's conservation engineers Southgate Associates. This includes construction method statements and specifications in relation to the stone cladding of flood walls and the replacement Owenass Bridge (Appendix 10.7). Additionally, archaeological assessments comprising an underwater wade and metal detection survey as well as a geophysical survey was undertaken where possible, in accordance with the recommendations of the NMS.

10.2.8 Limitations or difficulties encountered

The geophysical survey team encountered access issues during the geophysical survey, where some of the fields proposed for the survey could not be surveyed. In addition, due to the fast flow and depth of water of the Owenass River at the time of the underwater archaeological survey, the Downstream of Convent Bridge FRS measure section was confined to the banks and the central river channel was avoided; it was not possible to survey the most northerly section of the survey area due to the water depth and strength of the flow. No other limitations were noted during the compilation of this chapter.

10.3 Receiving Environment

10.3.1 Archaeological and Historical Background

10.3.1.1 Introduction

The following provides a chronological account of the development of the study area spanning from the prehistoric to modern period. It illustrates the archaeological, architectural and cultural heritage character, as well as context and archaeological potential, of the study area. Additional detailed historical and cartographic background and descriptions for specific archaeological sites and historic properties within 100m of the FRS measures are provided in Appendix 10.4.

The Geological Survey Ireland (GSI) indicates that alluvium underlies the central study area with cutover raised peat in the west and southeast. The bedrock geology across consists of dark, muddy limestone and shale of the Ballysteen Formation.

10.3.1.2 Prehistoric Period (c. 7000 BC - AD 400)

While there are no recorded prehistoric sites in the vicinity of Mountmellick, the discovery of a bronze dagger (NMI ref.: 1933:1249) from the townland of Debicot northeast of the town should alert us to the potential for further Bronze Age discoveries in the vicinity. A bronze macehead was identified in Drinagh (NMI ref.: 1983:14)

In particular, the rivers and the extensive bogland in this area are of archaeological potential related to ritual deposition at fording points and wetlands and are consistent with the type of land in which *fulachta fiadh* or Bronze Age cooking sites are often found.

It has been noted in other locations of esker ridges in Offaly and Westmeath that these well-drained features have revealed evidence of Bronze Age settlement, as they provided a well-drained area of light soils suitable for early agricultural activities (O' Brien 2017[134]). It is therefore possible that similar settlement patterns may have existed on the Portlaoise-Mountmellick Esker which runs to the northeast and east of the town.

10.3.1.3 Early Medieval/ Early Christian Period (c. AD 500 to 1100) and Medieval Period

In early historic times the entire region of Laois formed part of the provincial kingdom of Leinster[135] and by the first century AD Laois was part of the Kingdom of Ossory. It was divided into seven septs, or clans, to form the territory of *Laígis*, the people who gave the present county its name. Although there are no recorded monuments or sites of this period in the study area, the prevalence of Gaelic Irish placenames indicates that the area was occupied by Gaelic Irish speakers (see Section 10.2.3 below). The placename evidence suggests the area was densely wooded, with references to *cluain* (pastures) indicating some agricultural activity. The *Uí Riagáins* would have been the ruling Gaelic of the region, as noted in the Cotton Augustus map of Leis and Offalie (Figure 10-1).

The *Laígis* territory is notable for the number of early monastic sites located within its borders, outside of Mountmellick, Early Christian and medieval sites are recorded in the wider area of Rosenallis, Portnahinch, Tinnakill, Dangans and Kilmainham (including cross-slabs, Sheela-na-gigs, a church and monastic establishment).

It is likely that if there was activity dating to the early medieval period in the Mountmellick area, it would have been limited to small scale agricultural activity between areas of woodland, with the majority of settlement dispersed around the areas noted above.

The Anglo-Norman colony in central Laois began to fail in the early 14th century, with a resurgence of Gaelic control that continued until the mid-16th century when the first of the Plantations commenced. The English conquest of Laois and Offaly was initiated under the rule of the Tudor Queen Mary in 1546/48; it was not completed until the early 17th century after the dispossessed Gaelic ruling clans (the O'Moores and O'Connors) were finally subdued[136].

[134] O' Brien, Y. (2017) *Negotiating the Landscape: Prehistoric and Early Medieval Movement in a Landscape of Esker and Bog.* Unpublished PhD thesis: National University of Ireland, Galway.
[135] Feehan, J. (1983) *Laois an Environmental History*. Stradbally, County Laois : Ballykilcavan Press,.
[136] Lennon, C. (1994). *Sixteenth Century Ireland - the Incomplete Conquest*. Dublin: Gill and Macmillan.

It was not until 1440 that Mountmellick became a garrison for the soldiers of Henry VI who were defending the Pale from the pressure of the Gaelic chieftains and the town later developed out of this site[137].

Maps of County Laois from the 1560s show vast woods and bogs, and little clearings (Loeber 1999, pg. 385, Figure 10-1). The county was rural with small villages, and in the barony of Upper Ossory its northern part was heavily wooded with high boggy mountain. Between the late 16th and mid-17th centuries large portions of woodland were cut down.

10.3.1.4 Post-Medieval Period

There is no town indicated in the Cotton Augustus map of Leis and Offalie dated 1563 (Figure 10-1), however a 1607 inquisition references 'the quarter of *Mointaghemylicke*'. The town was granted a Royal Licence to Sir Robert Loftus in 1631 to hold a Saturday market and two annual fairs.

The Civil Survey of 1654-56 describes the boundaries of the Barony of Tinehinch. It specifically names the 'Iron Mill that the Lord Viscount Ely built' located on the River *Ownasta* (Owenass) (Simington 1961). This mill is depicted on the Down Survey Map (1656-58, Figure 10-3) and include a large mill pond, watermill and an iron furnace to the north of the village. The aforementioned surrounding dense woodland may have provided the timber used to make the charcoal to fuel the iron furnaces.

In 1659 William Edmundson (a former Cromwellian soldier and first Quaker in Ireland) settled in Mountmellick with five other Quakers (Richard Jackson, John Edmundson, Joh Thompson, William Moon and John Pim) where they established a Quaker settlement amongst the English colony. The census of c. 1659 gives the number of homes in Mountmellick as 175, comprising 95 English (Protestant) and 80 Irish (Catholic) (Pender 1939, 505). It was the third largest town in Co. Laois after Mountrath (population 223) and Maryborough (now Portlaoise, population 198). The settlement grew into a thriving industrial centre in the midlands and the Quakers played a significant role in this expansion. Their tradition of industriousness had allowed the town to develop into a significant industrial centre.

A Church of Ireland chapel of ease (LA008-032001) in the town can be traced back to 1665, and its location is occupied by the present Church of Ireland building and graveyard (RMP no. LA008- 032001-2) off Pearse Square, to the south of Market Street and Parnell Street. This chapel was repaired in 1736 and again in 1807. The Church of Ireland building located on the site of the seventeenth century church and graveyard.

In an entry dated 1669 in the diary of William Penn it is stated that Mountmellick was originally an English colony set up alongside a frontier garrison, which had been situated on the bank of the Owenass River. In 1691 there was a Williamite garrison in Mountmellick consisting of 300 infantry and 50 cavalry, along with about 120 local militia. The nature and exact location of this garrison is unknown, however the south of the river is referred to as Irishtown, which suggests that the garrison was on the northern banks of the Owenass inside the town.

10.3.1.5 Industrial Heritage

As mentioned above the town is noted for its industrial heritage, which is evident from sources as early as the mid-17th century Down Survey (Figure 10-2) which depicts an enormous mill pond east of the town and an area known as the 'Iron Mills' in the vicinity of Strahard townland. Many of the mills and factories in Mountmellick, which operated into the 18th-20th centuries, were run by descendants of original Quaker settlers.

The population of the town had increased to 4,577 inhabitants by 1837 (Lewis 1837), when Mountmellick functioned as the chief town of the county thanks to its trade and manufacturing enterprises. It was known

[137] Laois County Council (2018) '*Mountmellick Local Area Plan 2018-2024'*. Laois: Laois County Council.

for its textile industry with Lewis (1837[138]) noting that the weaving of cotton employed about 2,000 people. A cotton factory set up by John Bewley at O' Connelly Square in 1789 would have provided some of this employment. Wool was also produced, with a large woollen mill known as 'New Mills' just west of the study area on the Owenass River and a woollen factory in O' Connelly Square (formerly the cotton factory) operated by James Millner.

Milling activity was powered by the rivers in the area, and several mill races would have been in operation, but by the mid-19th century, steam power was also in use. One example of note is the Mountmellick Steam Mill (RPS no.: 703; NIAH no.: 12900360; now the National Training and Development Centre). It was constructed in the 1840s by Samuel Sheane and was one of the first steam power flour mills in the country (Hammond 2005, 15[139]). The Ballycullenbeg / Irishtown Maltings (RPS no.: 705; NIAH no.: 12800881) was established by James Sheane in the 1850s, south of the town in lands formerly associated with the Irishtown Demesne. It had initially been the site of a woollen mill. Eugene Codd took over the operation in the 1880s and converted the now disused steam power flour mill into another malt house (Hammond 2005, 24).

New Mill (LAIAR-007-003), located outside the town was a large wool spinning and fulling mill and weaving factory. The adaptability of the mill infrastructure was illustrated continuously by the repurposing of mills for the production of other goods. The New Mills was converted into a corn mill later in its life. Within the town, at Milner's Yard (LAIAR-008-080), a cotton weaving factory was established by John Bewley around 1790. It was converted to wool production in the early 1800s. This mill employed over 400 weavers, and unlike the other mills mentioned, it was powered by a steam engine.

Mountmellick Lace is a craft particular to Mountmellick in which white motifs are embroidered onto a white cotton. It was developed by Joanna Carter in 1825 and taught to girls in the Quaker school before it became an industry in the form of an Industrial Association to give employment to 'distressed gentlewomen' (Mountmellick Development Association 2023[140]).

Mountmellick was at the fore of the brewing and malting industries in the late 18th century, and six breweries are recorded in the town in 1800. At least two were powered by water, one established by Samuel Sheane, and another called Thomas and Samuel Pim's off Market Street. Lewis (1837) also lists three breweries, and these can be seen on the first edition Ordnance Survey map of 1841. Pim's was the only brewery to have remained in operation after the famine (Hammond 2005, 20). The area was drastically affected by the famine, with 3,300 people dependent on the Mountmellick Relief Committee for food by 1847. In an effort to feed people, the Beale family converted their textile mill at Barkmills (LAIAR-007-007) to grind imported Indian corn, but they too eventually were forced to emigrate (Williams 2008[141]).

Lewis notes several other industries including an iron and brass foundry of Messrs. J. and D. Roberts, a tanyard, soap manufactories and potteries for the production of tiles and earthenware. Many of those industries are evident from the cartographic sources.

The town was well served by transport infrastructure, with the development of the Mountmellick Branch of the Grand Canal on the east side of town between 1827 and 1831, and the Mountmellick Branch of the Great Southern and Western Railway on the west side of town in 1885. It was envisioned that the line would be extended further north to join the Great Southern & Western's line from Portarlington to Athlone. This was never built.

[138] Lewis, S. (1837) *A Topographical Dictionary of Ireland.*
[139] Hamond, F. (2005) '*Mills of Co. Laois: An Industrial Heritage Survey'*. The Heritage Council.
[140] Mountmellick Development Association (2023) '*Mountmellick Embroidery – The History'*. Available at https://www.mountmellickdevelopment.com/craft-museum.html
[141] Williams, M. A., *(2008). The Mountmellick Canal.* Laois County Council.

10.3.2 Cartographic Sources

10.3.2.1 Leix and Offaly, c. 1563 (the Cotton Map)

The earliest available map of the area is the Cotton Augustus map of the counties of Laois and Offaly which dates to approximately 1563 (Figure 10-1). This Elizabethan map is remarkably detailed for its time, showing topographic features, placenames and settlement depictions, and is a rarity in the Irish cartographic record (Andrews 1988[142]). Territorial divisions are depicted, marking boundaries that probably pre-date the Plantations and brown linear features are shown connecting settlements, probably indicating major routeways (in some cases crossing areas of bog, thus representing toghers). Mountmellick is not depicted, the townland of Acragar is labelled, to the south of this is 'Kilungay' which is marked with the depiction of a two-storey gable ended structure which may represent the Ivy Church in Acragar (RMP LA008-008). The map records the names of the dominant Gaelic families in the area, with the *Uí Riagáins* shown as the ruling Gaelic family of the region. The topographical detail on this map shows that County Laois was at that time covered in substantial areas of woodland, which confirms the placename evidence.

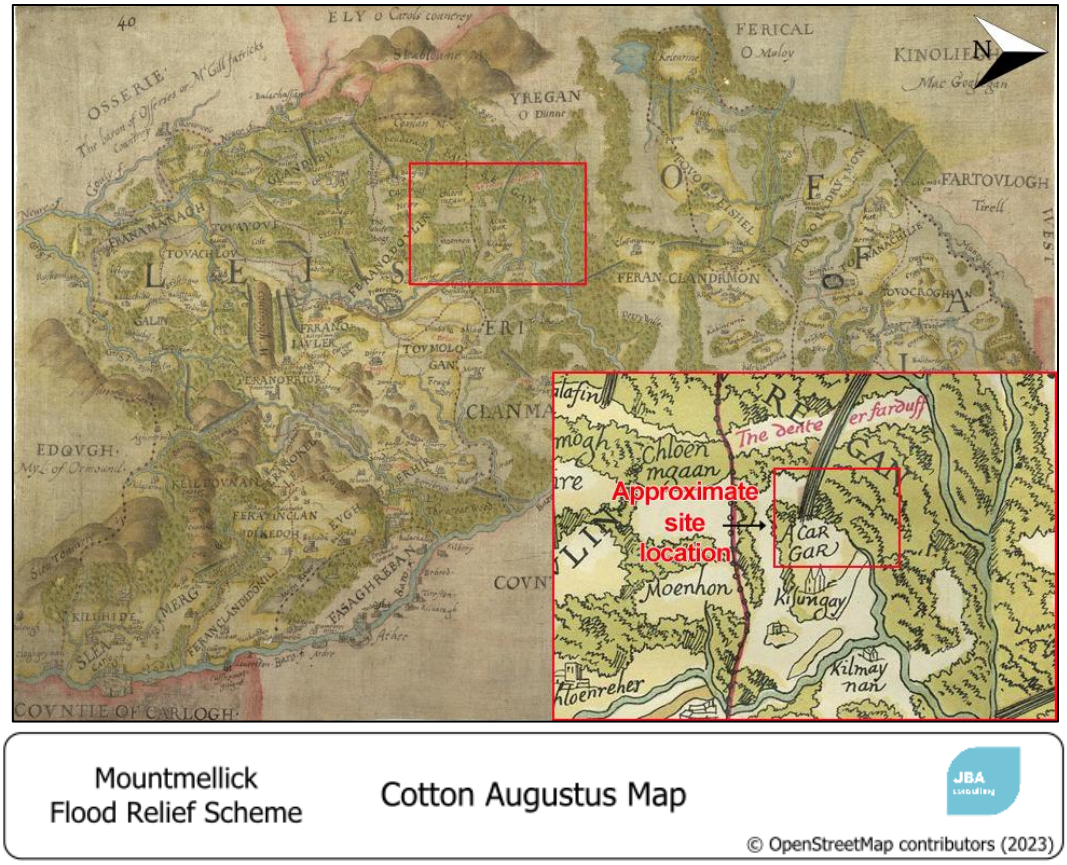


Figure 10-1: Cotton Augustus map of Leix and Offaly, c. 1563

[142] Andrews, J. H. (1988). *An Elizabethan map of Leix and Offaly: cartography, topography and architecture*. In W. a. Nolan, Offaly History and Society. Dublin: Geography Publications.

10.3.2.2 Petty's Down Survey, c. 1656

The Down Survey was at the time the most detailed cartographic survey ever undertaken. It was intended to measure land forfeited by the Catholic Irish to be redistributed to English soldiers and merchant adventurers, and depict significant settlements and structures, as well as noting landscape features and the profitability of the land. The map of County Laois (1656-1658) depicts '*Mountmelick*' (Mountmellick) along the '*Onassa Flu'* (Owenass River) (Figure 10-2) with its distinctive curve clearly indicated. A bridge is shown crossing the river at this location and it is clear that there was considerable bogland in the surrounding area.

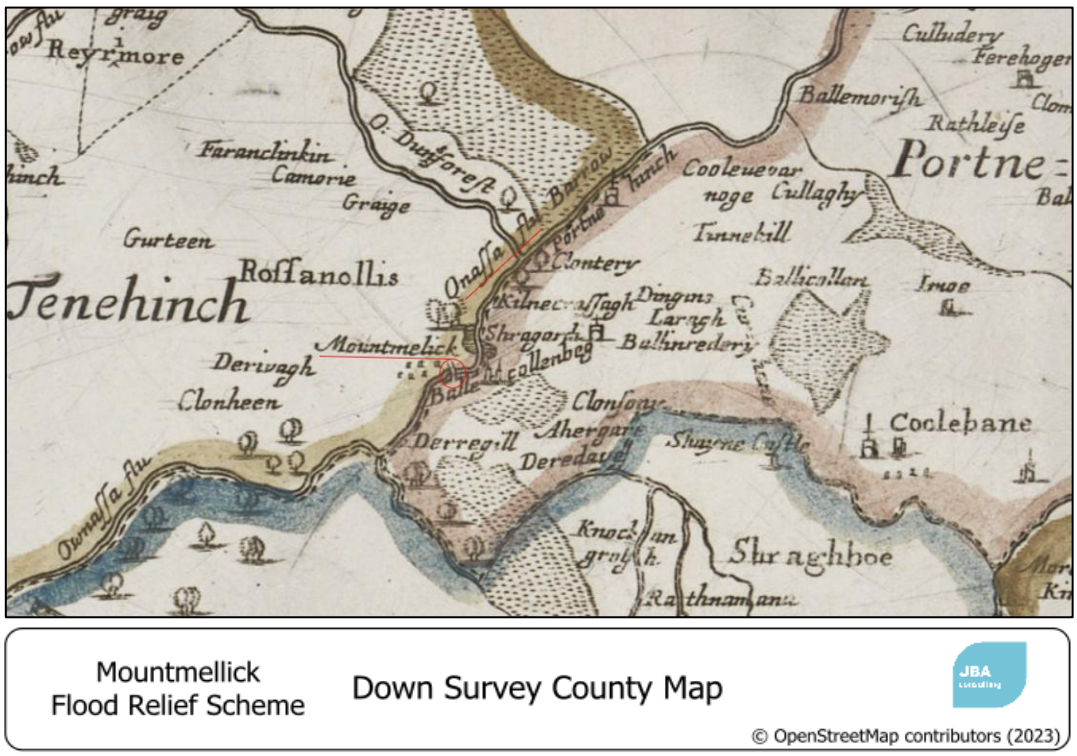


Figure 10-2: Down Survey County map, c. 1656-1658

The map of the barony of Tinahinch[143] (west of the River Owenass) provides more detail of 'Mountmellicke Towne' (Figure 10-3). Three or four substantial buildings either side of a street orientated northeast by southwest (perhaps the present-day Park Street), indicating the location of the town on the west side of the river. It is clear that a bridge was located in approximately the same location as the existing Convent Bridge on Sarsfield Street (RPS no.: 701; NIAH no.: 12900359). East of the river, a very large mill complex is depicted with a large mill pond and structures noted as 'The Iron Mills' depicted in the vicinity of Strahard at the northern edge of the Mill Pond and two apparent mill races in the townland of Ballycullenbeg. As mentioned above these iron mills were built by the Lord Viscount Ely (Simington 1961[144]). The mill pond is unlikely to have been as large as that depicted in the Down Survey but it is interesting that in the Ordnance Survey Maps century maps, this area of Strahard is recorded as being 'liable to floods', and a lane that runs through the area is named 'Pond Lane' (Figure 10-9).

[143] https://downsurvey.tchpc.tcd.ie/down-survey-maps.php#
[144] Simington, R. C. (1961). *The Civil Survey 1654-6*, Vol. X. The Stationary Office, Dublin.

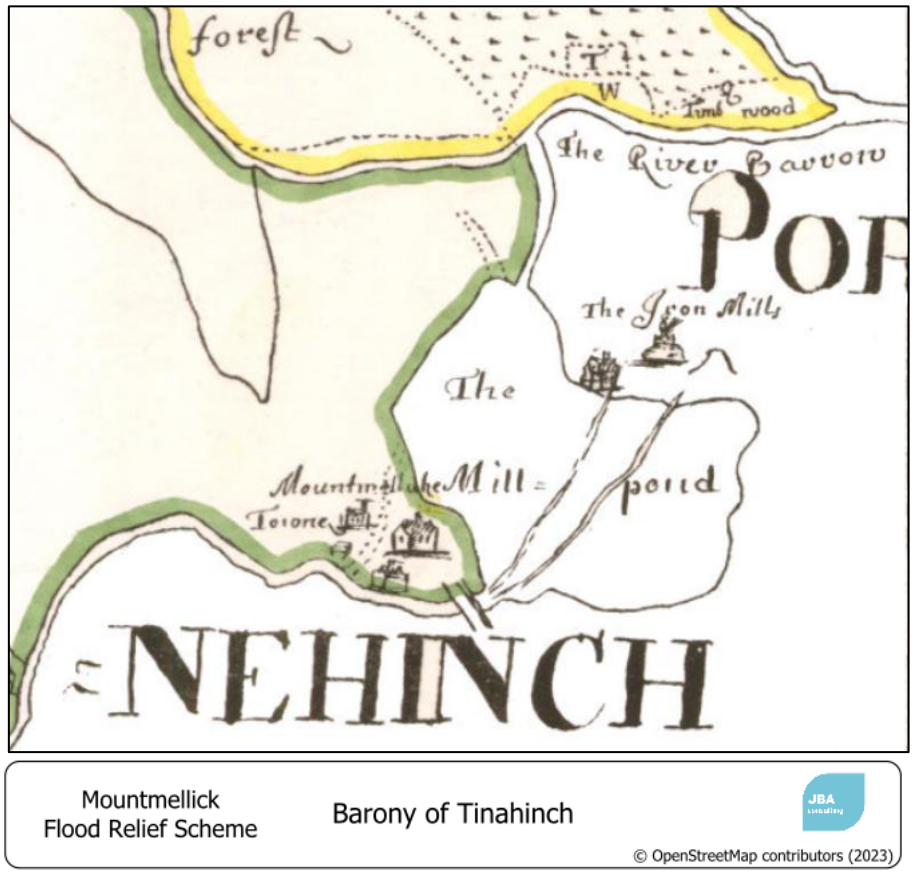


Figure 10-3: Down Survey map, Barony of Tinahinch c. 1656-1658

The map of the barony of Portnahinch[145] (east of the River Owenass) does not depict the milling activity, but additional structures are noted in Ballycullenbeg, including a church (Figure 10-4).

[145] https://downsurvey.tchpc.tcd.ie/down-survey-maps.php#

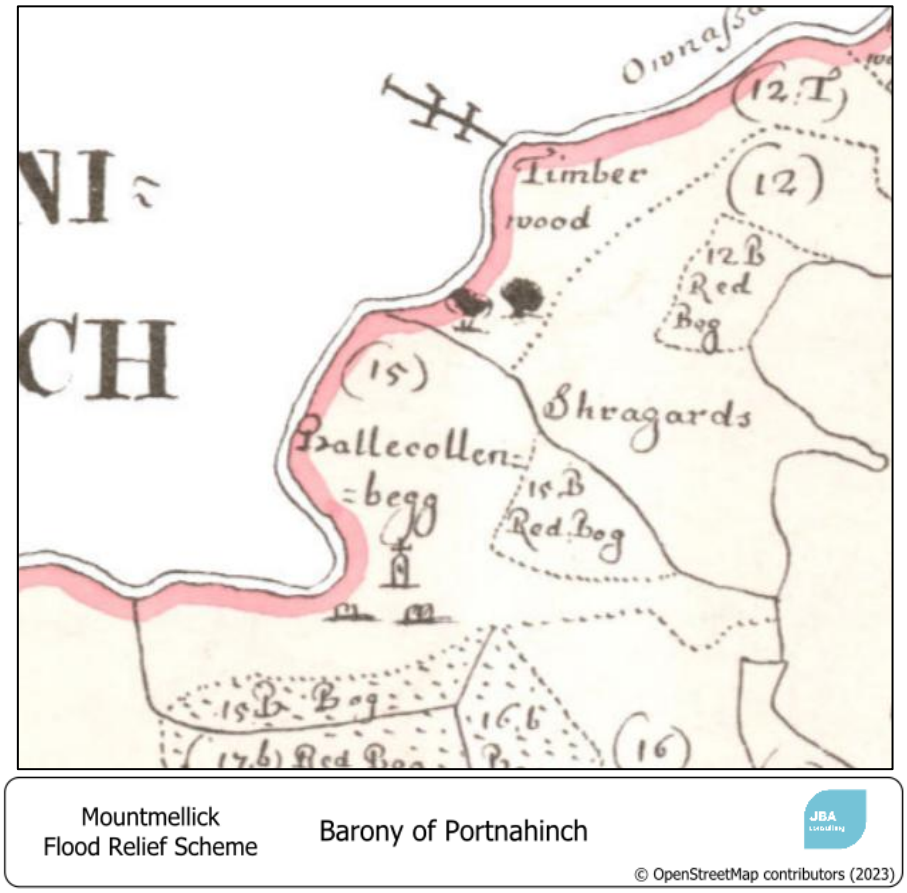


Figure 10-4: Down Survey map, Barony Map of Portnahinch c. 1656-1658

King's County, Queens County and Kildare County by H. Moll (1728) and Rocque's 'Map of the Kingdom of Ireland' (1790)

No additional information can be gleaned from H. Moll's map[146] (not shown). Mountmellick and the 'Owen Nas' is labelled; a symbol indicate that Mountmellick as a borough. It is similar in appearance to John Rocque's 'Map of the Kingdom of Ireland' (1790) which indicates that Mountmellick is a market town.

Mountmellick in Queens [Leix] County (c.1770-1840), by John Longfield, John Brownrigg, Thomas Murray et al, Land Surveyors

An early plan created between 1770 and 1840 shows the extent of the town in the late 18th century; it included names of tenants and acreage of holdings (Figure 10-5). The map shows the buildings fronting Market Street and Bridge Street (now Sarsfield Street), with some of the houses on the southern side of the street having long rear garden plots running to the river. To the rear of several structure the rear gardens are much shorter and there is a rectangular area indicated on the map as a tan yard occupying the largest site fronting the river with a long avenue providing access from the main street. When compared to the first edition OS Maps the long property plots were further subdivided in the years to come, and a brewery constructed in the yard (Figure 10-8). Pearse Square is shown, but notably Park Street (the road that runs north-south over the current Mountmellick Bridge), has yet to be developed. An open meadow, 'Church Meadow,' is shown to the rear of Saint Paul Church of Ireland Church. Details of the south side of the river

[146] King's County, Queen's County and Kildare County / By H. Moll Geographer | Gallica (bnf.fr) *Bibliothèque nationale de France, département Cartes et plans*, GE DD-2987 (2664)

are not illustrated or annotated, at this time the land to the south of the river was parkland associated with Irishtown house.

There is a footbridge shown at the location of the present-day Mountmellick Mill Bridge. With the exception of a wall that runs across the rear of two property plots at a distance from the river, walls are not indicated as defining the river banks. One property boundary wall is shown but it is stepped back from the river's edge. There does not appear to be any access to or a footpath on the southern banks of the river. There is a bridge indicated at the exact location as Convent Bridge. At this time, a brewery is shown at the site of the later St. Joseph's Catholic Church (RPS 002), and the Presentation Convent (RPS 001) has not been constructed.

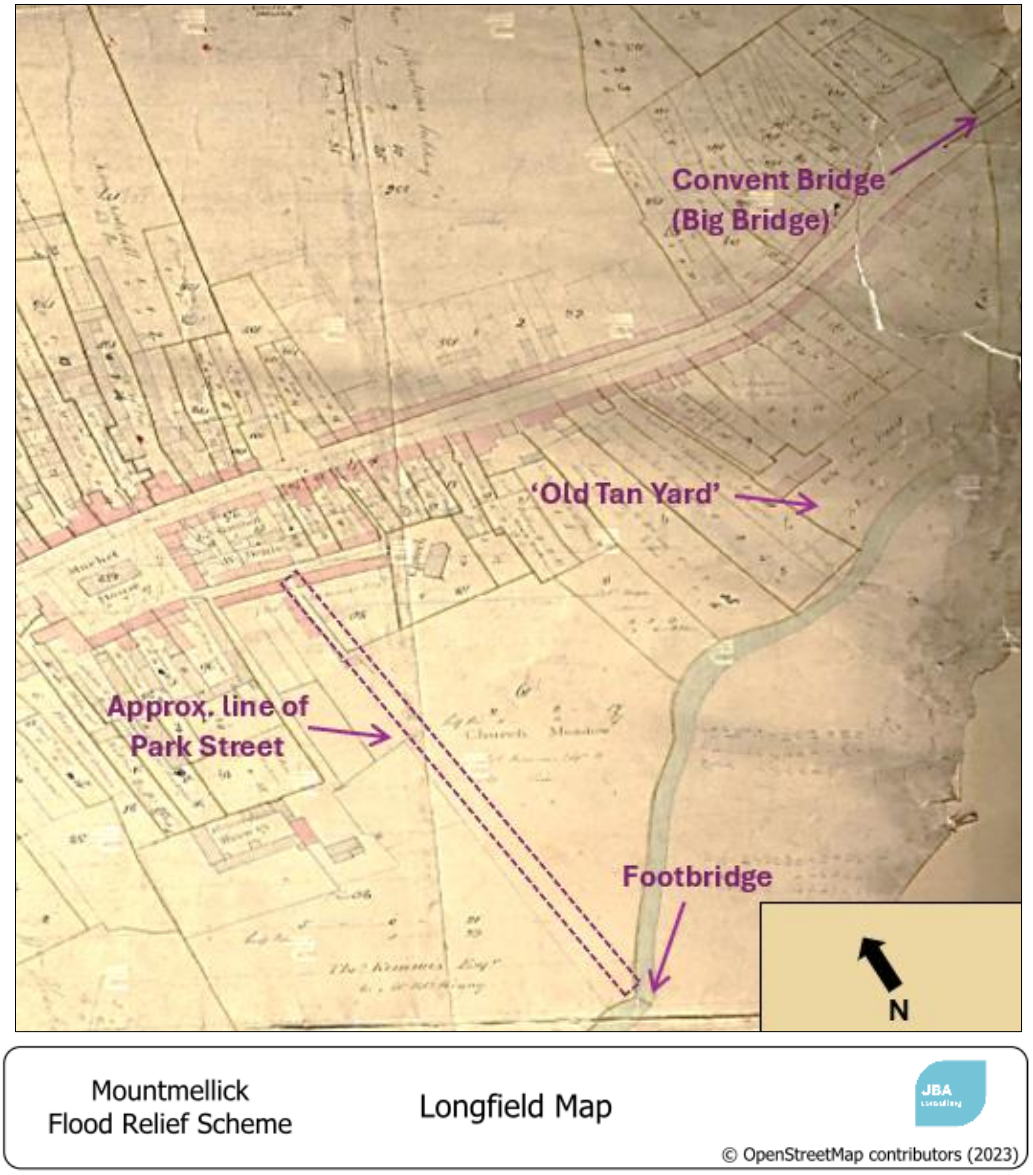


Figure 10-5: Longfield Map of c.1770-1840

10.3.2.3 'A map of the Queens County' 1805, Grand Jury Map, Daniel Cahill

The Grand Jury Map by Daniel Cahill (Figure 10-6) depicts the main streets of Mountmellick lined by buildings, with Market Square / Pearse Square and the church (RMP no.: LA008-032001) clearly indicated. South of the Owenass River, Irishtown is depicted as extensive parkland with two large houses, one of

which is Irishtown House. It is clear from this map that Owenass Bridge (LAIAR-007-004) was in existence at that time. Mountmellick Mill Bridge and Park Street had yet to be developed.

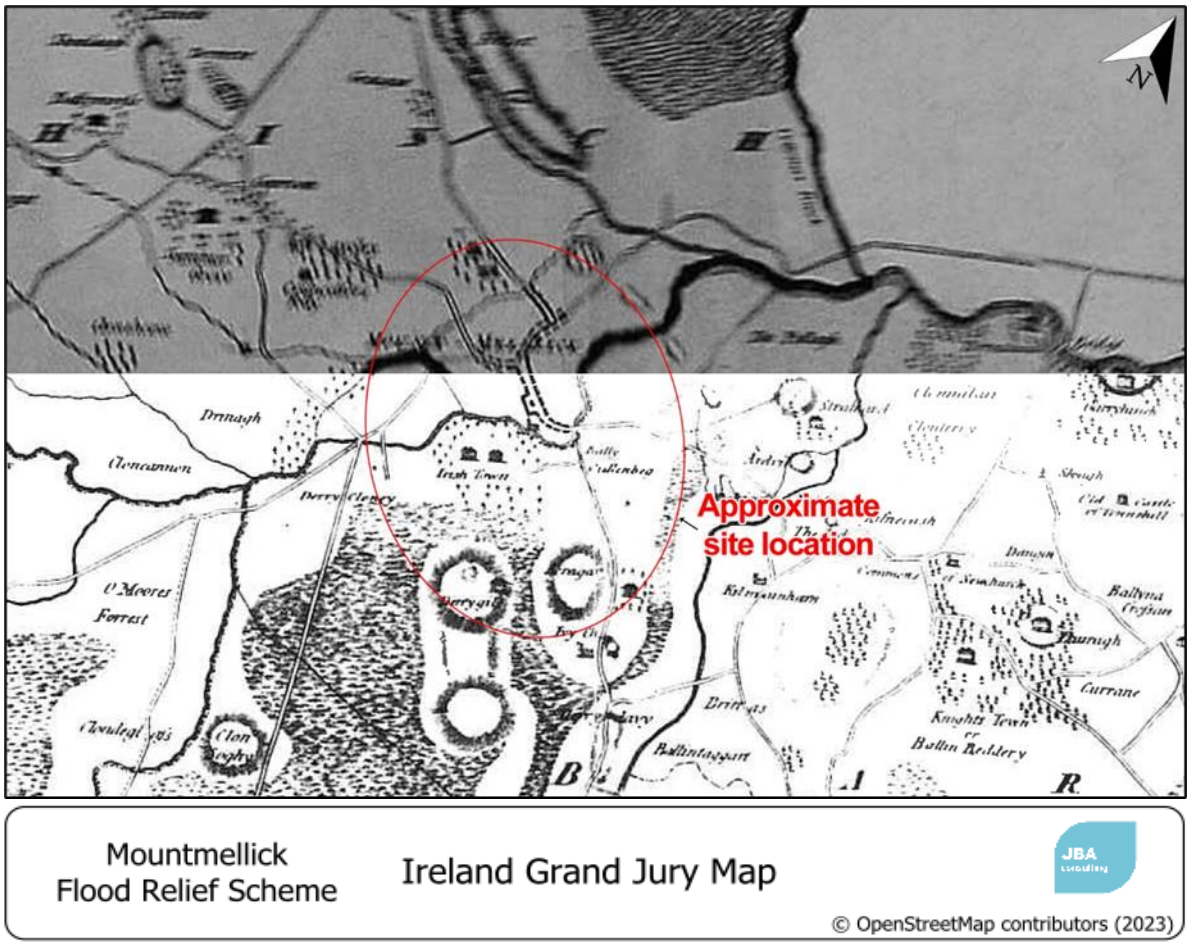


Figure 10-6: Ireland Grand Jury Map (Daniel Cahill, 1805)

10.3.2.4 Bog Commissioner's Map (Richard Griffith, 1810)

The area of Mountmellick is illustrated in a map produced by Richard Griffith for the Bog Commissioner of Ireland in 1810 (Map of part of the Bog of Allen situated in the Kings and Queens County being Part No. 2 of the Western Division of District No. 1; Figure 10-7).

It is apparent that much of the existing street pattern was well established by this time. The street pattern in the town centre is essentially unchanged from this time. The church (RMP no.: LA008-032001) is shown adjacent to Pearse Square, with Pearse Street extending as far as the River Owenass. Irishtown House is shown south of the river as a three-bay, two-storey house with southwest aspect and two chimney stacks on an elevated area of parkland. A bridge, perhaps the aforementioned footbridge shown on the Longfield map (Figure 10-5) is shown connecting the Church 'meadow lands' to Irishtown House in a similar location as the Mountmellick Mill Bridge.

Manor Street can be seen curving towards the River Owenass where it crosses the Owenass Bridge (LAIAR-007-004). The road has seen successive realignments since then.

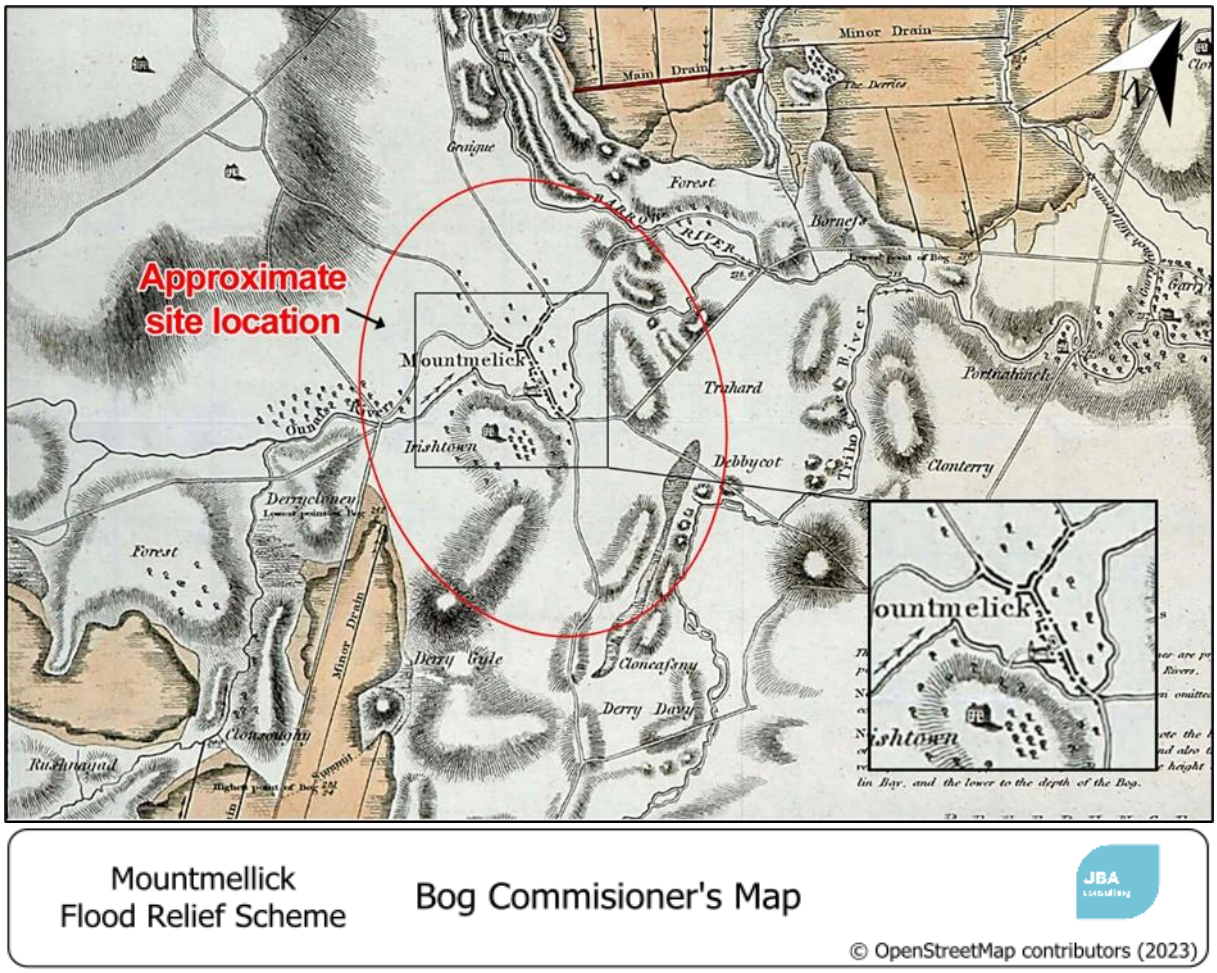


Figure 10-7: Bog Commissioner's Map (Richard Griffith, 1810)

10.3.2.5 First edition 6-inch Ordnance Survey (OS), 1838-41, revised 1888-91 edition (scale of 1:10,560) and 1906-08 25-inch survey.

Ordnance Survey was an extremely detailed survey undertaken first in 6-inches-to-the-mile scale and later in 25-inches-to-the-mile in the 19th and early 20th centuries.

The First Edition 6-inch OS map was surveyed from 1838-41; the map captures the industrial elements of the town prior to the famine (Figure 10-8). Thanks to the industrious nature of the Quaker families, the town was known as the 'Manchester of Ireland' since the mid-1700s (Williams 2008[147]). Several of the town's industries are depicted, including the distillery north of Big Bridge (now Convent Bridge).

Outside the town, a flour mill to the southwest is named 'Mill Lands' (later named Manor Mills). Owenass Bridge is named and is at the convergence of five roads, there are at least four structures on the crossroads in proximity of the bridge.

To the south of the river, the former demesne of Irishtown House was broken up, a new road which runs south from the town on the western side of Saint Pauls Church and crosses the river at the present-day Mountmellick Mill Bridge divides the Irishtown Demesne. At this time the lands were associated with a

[147] Williams, M. A., 2008. *The Mountmellick Canal.* Laois County Council

'Woollen Factory' owned by William Beale and his son Joseph. A new path between both Mountmellick Bridge and Convent Bridge has been developed (CH3).

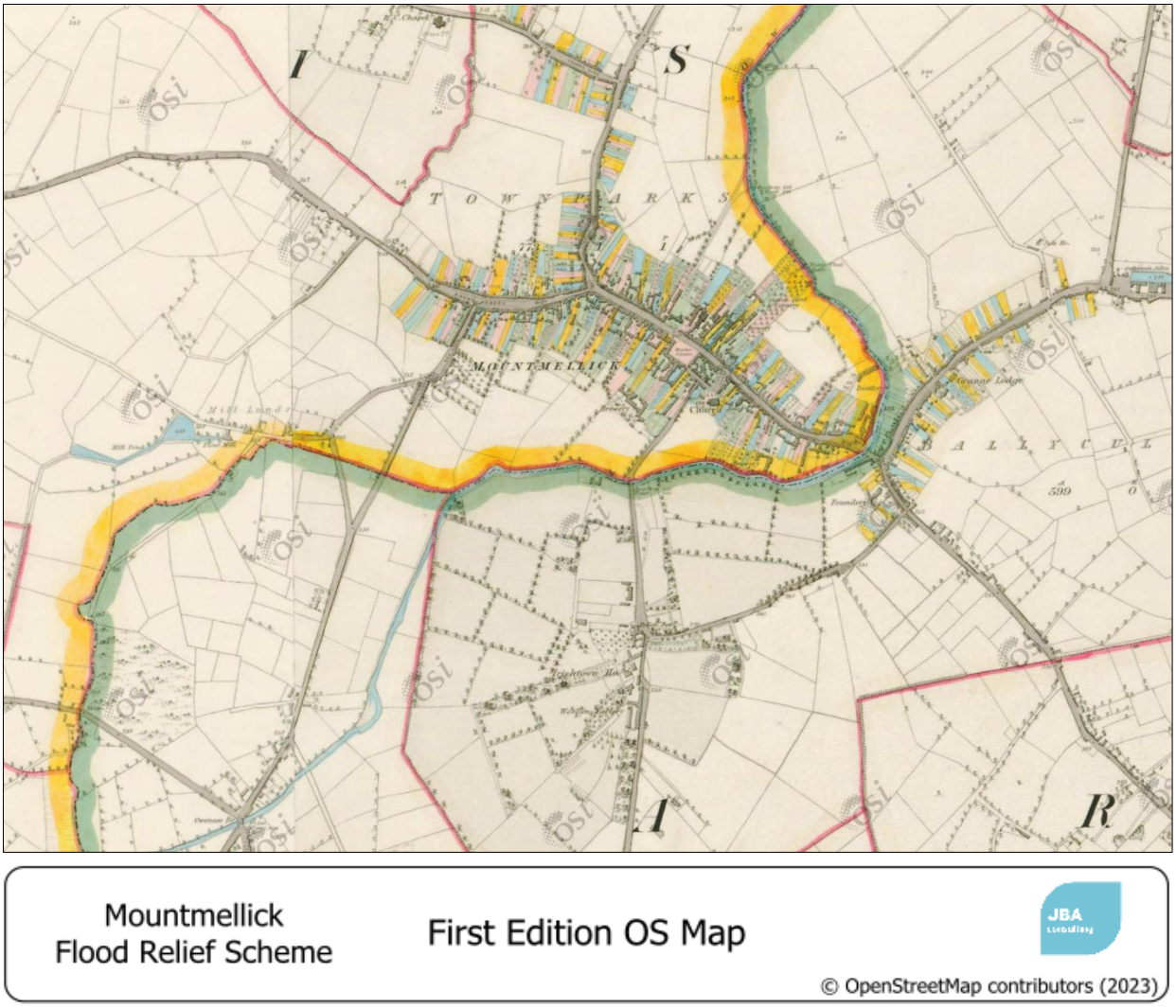


Figure 10-8: First edition OS Map 1838-41

By the revised edition OS Map the woollen factory in Irishtown was converted into a maltings. A Union Workhouse and Fever Hospital have been built to the north-east of the maltings, in the aftermath of the famine. The brewing industry seems to have consolidated into one large premises south of O'Connell Square and a barely store is located northeast (RPS 703) Mountmellick Mill Bridge. The mill to the west of the town is now named Manor (Corn) Mills and a mill race using the Pound River has been developed.

A new Catholic Church and convent has been constructed at the east end of the town off Bridge Street, north of the river and Convent Bridge. It replaces a former distillery site. The railway has also been constructed, with a terminus for the Mountmellick branch line situated to the west of the town. There are fewer properties in proximity Owenass bridge on this map edition. At Mountmellick Mill Bridge there is a newly developed path (CH5), indicated as 'foot path' (F.P), which runs westerly to the railway.

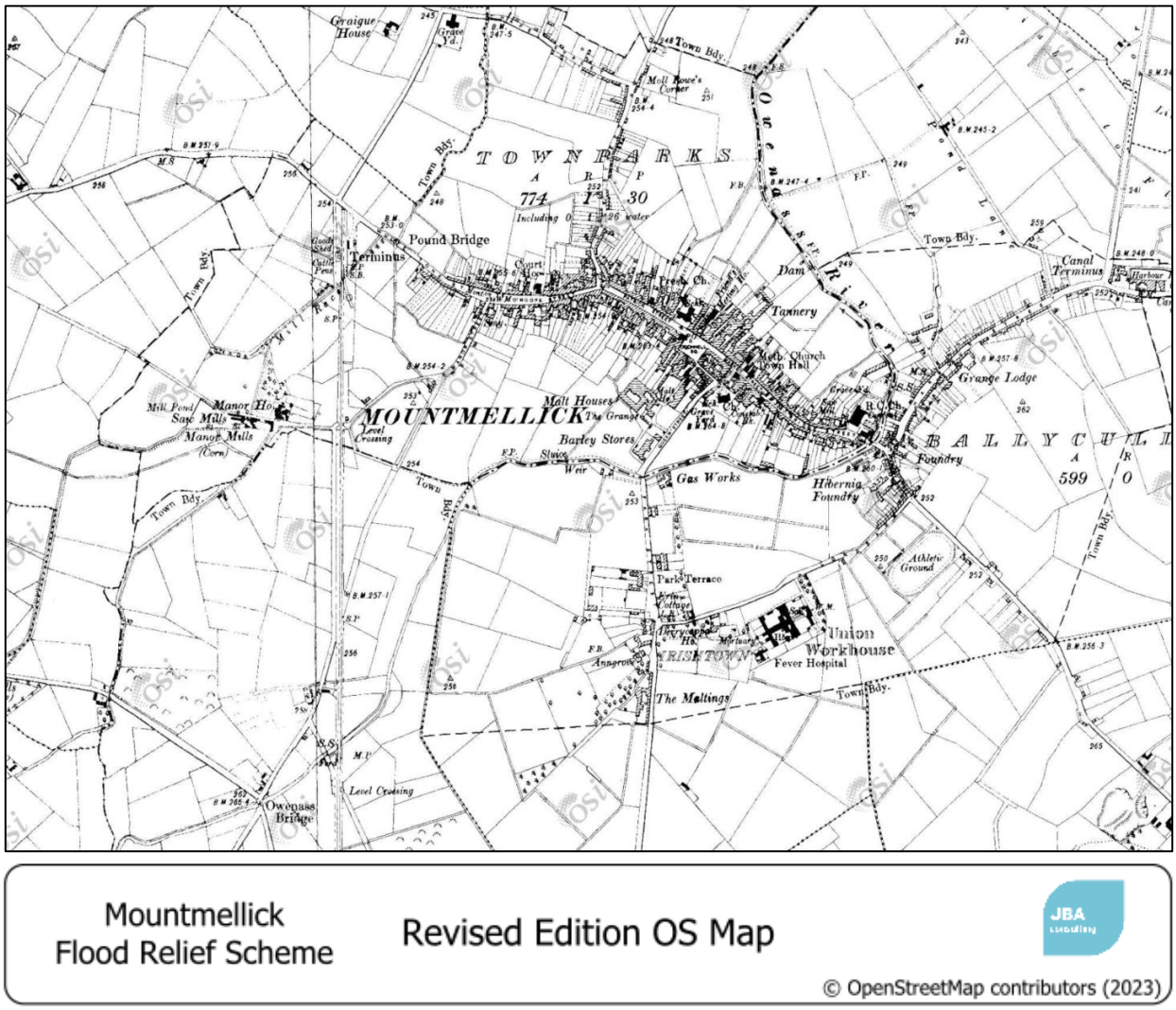


Figure 10-9: Revised from 1906-8 OS edition

The Ordnance Survey maps illustrate 19th century expansion of the town. They show the development of transport links, including the Great Southern and Western Railway (GSWR) and new roads into the town. The maps also capture the towns industries which were adapted to meet new demands and changing technology over time.

10.3.3 Townland Names and townland boundaries

The study area includes a total of six townlands in the parishes of Rosenallis and Ardea and the baronies of Tinnahinch and Portahinch in County Laois (Table 10.1). Townlands are land divisions that form a unique feature in the Irish landscape; their origins can be of great antiquity, and many are of pre-Norman date. They existed well before the establishment of parishes or counties. Townland boundaries can take the form of natural boundaries or routeways as well as artificially constructed earthen banks and ditch divisions. They are predominantly formed of substantial boundaries which are usually distinguishable from standard field division boundaries.

The name of Mountmellick is derived from the Irish *Mhóinteach Milic* (Bog of the land bordering a river). Although the town of Mountmellick itself is a 17th century foundation, most of the placenames outside of the town are of Irish origin which indicate the nature of the landscape, landuse and associated families before the English town was established. It is clear that there the area south of the town centre was occupied by the Gaelic Irish, as shown by the 'Irishtown' placename.

The townland names appear in sources from at least the mid- 17th century 'Townparks' is the only exception among the townland names, indicating the development of the town by English speakers.

This area was separated from the main settlement by the River Owenass.

Table 10-1: Townlands and their meanings within the study area

Townland	Parish	Barony	Placename origin/meaning (Logainm.ie)
-	-	Tinnahinch	*Tigh na hInse* (The house of the river-island). Originally known as *Uí Riagáin* after the ruling Gaelic family.
-	Rosenallis	Tinnahinch	*Ros Fhionnghlaise* (The light green wood), also noted in 1645 as *Ros an Allais* (The wooded height of the white stream).
Townparks	Rosenallis	Tinnahinch	English name representing the town layout.
Cloonagh	Rosenallis	Tinnahinch	Possibly meaning grassy meadow or could be derived from *Cluain Each* 'pasture of horses'
Drinagh	Rosenallis	Tinnahinch	Derived from the Irish *Droighneach*, meaning land abounding in black thorns' or perhaps *Doire Eidhneach* '(oak) wood of ivy'
-	-	Portnahinch	*Port na hInse* (The bank of the river meadow). Name indicating land use.
-	Ardea	Portnahinch	*Oireadh* (Tilled land). An indication of arable agricultural activity.
Acragar	Ardea	Portnahinch	*An tAcra Gearr* (The short acre).
Ballycullenbeg	Ardea	Portnahinch	*Baile Uí Chuilín Beag* (The town of Ó Cuilín). The *beag* (small) distinction was added in the 17th century to distinguish it from nearby Ballykillane.
Derrycloney	Ardea	Portnahinch	*Doire Cluana* (Oak wood of the pasture). Name indicating landuse and afforestation.

Townlands are land divisions that form a unique feature in the Irish landscape, their origins can be of great antiquity, and many are of pre-Norman date. They existed well before the establishment of parishes or counties. Townland boundaries can take the form of natural boundaries or routeways as well as artificially constructed earthen banks and ditch divisions. They are predominantly formed of substantial boundaries which are usually distinguishable from standard field division boundaries.

The proposed flood measures cross two townland boundaries. The embankment associated with the Upstream of Owenass measure crosses the Drinagh/Derrycloney townland boundary (CH8), this which is formed by a modest drainage ditch and hedgerow. This boundary also functions as the Ardea / Rosenallis parish boundary and the Portnahinch / Tinnahinch barony boundary. The Ballycullenbeg/Acragar townland boundary, is formed by a realigned drainage ditch is crossed by the works associated with the Clontygar Stream measure.

10.3.4 Previous Archaeological Investigations

Four archaeological investigations have been undertaken within the study area (Licence nos. 02E0231, 05E0944, 19E0028, 20E0158; RMP files, McLoughlin 2005[148], Hull 2019[149], Reilly & Shanahan 2020[150]), with post-medieval material having been identified in only one of these investigations. Archaeological monitoring (Licence no.: 19E0028) identified a deposit of post-medieval refuse containing glass bottles, animal bone and pottery sherds dating from the 18th to 19th centuries. The deposit would have been within the rear of a property on the west side of Park Street, before it was realigned in the late 19th century, and it was interpreted as most likely representing the refuse from an inn. While very few archaeological

[148] McLoughlin, C. (2005) '*Ballycullenbeg, Laois*'. Licence no.: 05E0944. Available at https://excavations.ie/report/2005/Laois/0013860/ [Accessed 22/11/23]
[149] Hull, G. (2019) '*Pearse Square and Park Street, Mountmellick, Laois*'. Licence no.: 19E0028. Available at https://excavations.ie/report/2019/Laois/0027557/ [Accessed 22/11/23]
[150] Reilly, F. & Shanahan, S. (2020) '*Pattison Housing Estate, Emmett Street, Townparks, Mountmellick, Laois*'. Licence no. 20E0158. Available at https://excavations.ie/report/2020/Laois/0030949/ [Accessed 22/11/23]

investigations have taken place in Mountmellick, the discovery of post medieval remains in the town centre indicates the potential for similar remains throughout this plantation town.

10.3.5 Archaeological Heritage Sites

There are no national monuments (state owned or vested in the care of local authorities), sites with Preservation Orders or Register of Historic Monuments sites within the study area.

There are three recorded archaeological sites (RMP sites) located within the study area, including the historic town itself (RMP no.: LA008-032) and the associated site of a seventeenth century church and graveyard (RMP no.: LA008-032001/002) (Figure 10-10, Table 10.2). The small number of sites is due to the post medieval date for the development of the town of Mountmellick, having been founded in the 17th century as an English colony.

Table 10-2: RMP sites in the study area

RMP / SMR no.	Class	Townland	ITM E	ITM N	FRS Measure
LA008-032	Historic town	Townparks	645043	707613	The Zone of Notification the historic town and the church and graveyard lies is in the Mountmellick Bridge to Convent Bridge Measure and immediately to the west of the within the Downstream of Convent Bridge Measure
LA008-032001	Church	Townparks	645112	707503	
LA008-032002	Graveyard	Townparks	645103	707484	

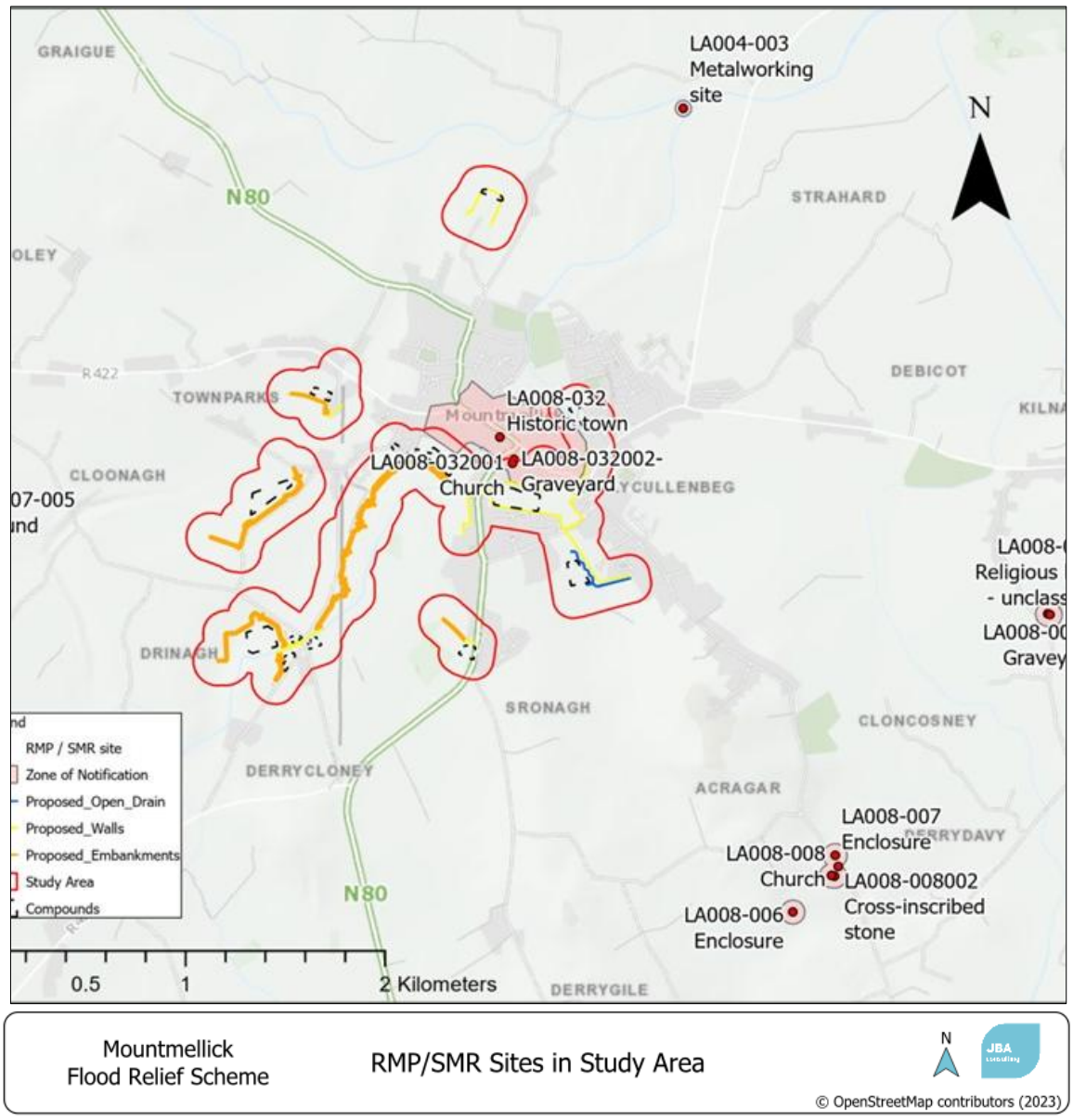


Figure 10-10: RMP / SMR sites in study area and the location of the FRS Measures

10.3.6 Architectural Heritage Sites

10.3.6.1 Architectural Conservation Area

It is an aim of the Laois County Development Plan (2021-2027[151]) to examine in the lifetime of the Plan the potential for designating an ACA in Mountmellick. The Mountmellick Local Area Plan (2018-2024[152]) reiterates this aim.

An ACA could include any group of buildings, which together give a special character to an area. Protection generally relates to the external appearance of structures, views and vistas and features of the streetscape. The aim of ACA designation is to guide sensitive, good quality development, which will enhance both the historical character of the area and the amenity of those who enjoy it, and not to prevent development. Any

[151] Laois County Council (2022) *'Laois County Development Plan 2021-2027'*. Laois: Laois County Council.
[152] Laois County Council (2018) *'Mountmellick Local Area Plan 2018-2024'*. Laois: Laois County Council.

development within an ACA must consider the material effect that the proposed development would be likely to have on the character of the ACA.

A Character Appraisal for the proposed ACA was undertaken in 2013 which sets out the characteristics of the proposed ACA (McLoughlin 2013[153]; Figure 10-11, Appendix 10.4.1).The characteristics of the proposed ACA are predominantly concerned with streetscapes, but the long garden plots reaching south from Parnell Street and Sarsfield Street towards the Owenass River are noted within the appraisal (McLoughlin 2013[154]). Many of these gardens have informal tree planting, and historic mapping indicates that urban gardens such as these were a strong characteristic of the town in the past. These gardens and the river setting can be seen from Convent Bridge and intermittently along the public walkway south of the river. The flood relief measures include a flood barrier wall along the river at the end of these gardens. The main street of the town (Patrick Street/ Market Square/ Parnell Street/ Sarsfield Street and Connolly Street) has its back to the river and aside from the views from the bridges at either end, there is little visual interaction between the river and streetscape within the town.

In accordance with the Department of Arts, Heritage, and the Gaeltacht and the Islands (DAHGI) 2011 'Architectural Heritage Protection, Guidelines for Planning Authorities'[155] any work to or in the vicinity of a Protected Structure, a National Inventory of Architectural Heritage (NIAH) site or an ACA requires prior consultation with a conservation specialist.

The Mountmellick Mill Bridge to Convent Bridge and the Downstream from Convent Bridge FRS measures includes the southernmost and the easternmost part of the of the ACA respectively.

[153] McLoughlin, R. (2013) '*Mountmellick Architectural Conservation Area. Mountmellick, Co. Laois'*. Unpublished draft report: Lotts Architecture and Urbanism Ltd.
[154] McLoughlin, R. (2013) Op. cit.
[155] Department of Arts, Heritage and the Gaeltacht (2011) *'Architectural Heritage Protection. Guidelines for Planning Authorities'*. Department of Arts, Heritage and the Gaeltacht.

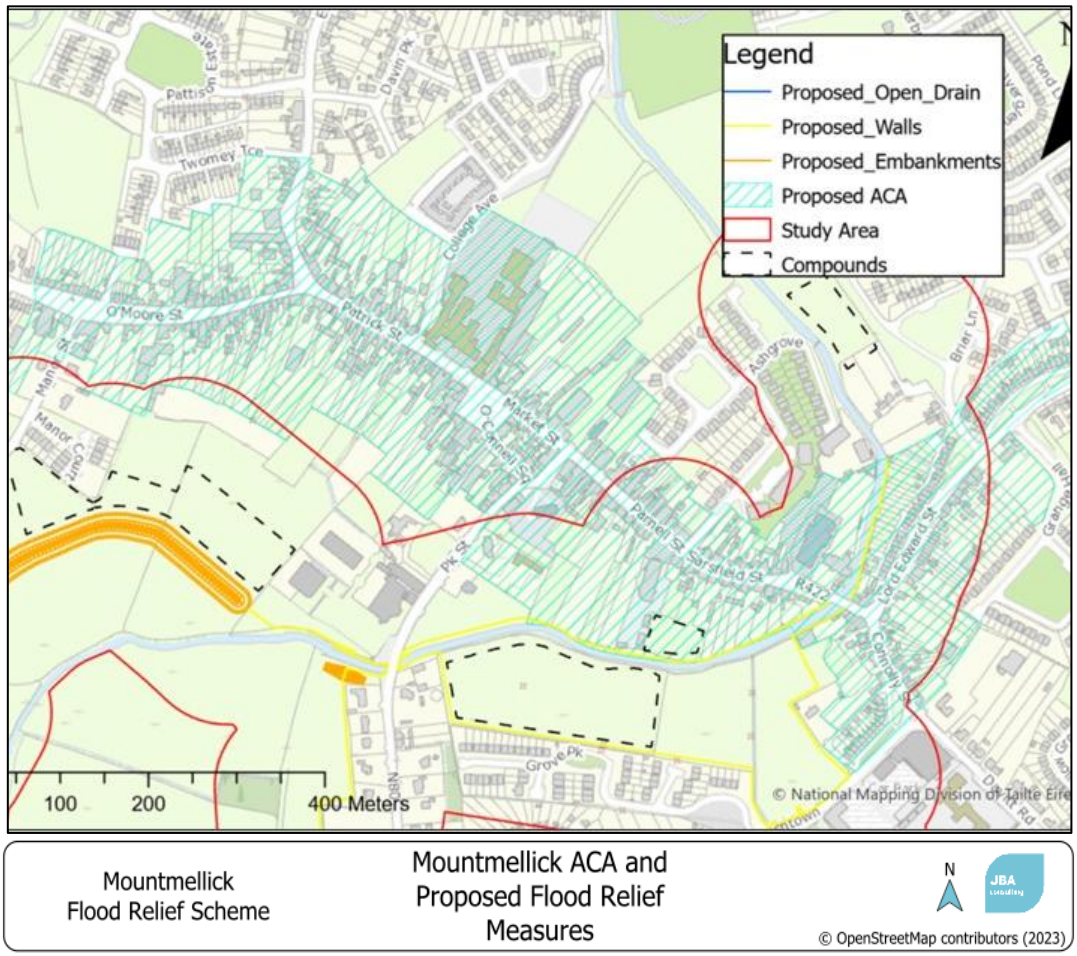


Figure 10-11: Proposed Mountmellick ACA (after McLoughlin 2013) and adjacent proposed flood relief measures

10.3.6.2 Record of Protected Structures and NIAH Surveys

There are 20 Protected Structures listed in the Record of Protected Structures (RPS) located within 100m of the proposed flood relief measures study area. All except two of the sites are also recorded in the National Inventory of Architectural Heritage (NIAH). There is also one NIAH site that is not designated a protected structure (Figure 10-12; Table 10.3). They predominantly comprise of houses and commercial buildings arranged along the principal streets of Mountmellick, with some structures related to the industrial heritage of the area on the fringes of town. Most of the Protected Structures date to the 19th century, with some of 18th century or early 20th century date. These sites are described in Appendix 10.4.2.

There are two RPS sites that will be subject to direct impact by the project, both within the Mountmellick Mill Bridge to Convent Bridge flood measure. A flood wall will slightly alter the west (upstream) face Convent Bridge (RPS 701), and a modern sculpture in the Children's Park (RPS 704) will require relocation in order to facilitate a new flood wall.

The flood wall proposed on the northern banks of the Owenass River includes the rear property boundaries of the properties fronting Parnell Street and Sarsfield Street, none of which are protected structures, though they all sit within the ACA as noted above.

There are no protected structures within 100m of the proposed Manor Road, Irishtown Garden Centre, Clontygar Stream to Davitt Road or the Midland Steel flood measure.

Table 10-3: RPS and NIAH structures within 100m of a flood measure (measured from RPS point data)

RPS ref.	NIAH ref.	Name	Site type	Address	FRS Measure
001	12900306	Presentation Convent	Convent/ nunnery	Sarsfield Street	c. 8 m from the Downstream of Convent Bridge measure, on the opposite side of the river.
002	12900307	Saint Joseph's Catholic Church	Church/ chapel	Sarsfield Street	c. 50m west of the Downstream of Convent Bridge measure, on the opposite side of the river.
N/A	12900305	House	House	Lord Edward Street	c. 77m West of the Downstream of Convent Bridge measure
003	12900355	Parochial House	Parochial house	Sarsfield Street	c.67m north of the Mountmellick Bridge to Convent Bridge measure
004	12900356	House	House	Sarsfield Street	c.77m north of the Mountmellick Bridge to Convent Bridge measure
005	12900357	Scott & Dunne House	House	Sarsfield Street	c.100m north of the Mountmellick Bridge to Convent Bridge measure
037A	12900365	Park Terrace	House	Park Terrace, Park Street	c.70 east of the Owenass Bridge to Mountmellick Bridge flood wall.
037B	12900365	Park Terrace	House	Park Terrace, Park Street	c.70 east of the Owenass Bridge to Mountmellick Bridge flood wall.
039A	12900362	House	House	Park Street	The flood relief measure (flood wall) for the Mountmellick Bridge to Convent Bridge runs to the rear boundary wall of this property. c.58 east of the Owenass Bridge to Mountmellick Bridge flood wall.
039B	12900362	House	House	Park Street	The flood relief measure (flood wall) for the Mountmellick Bridge to Convent Bridge runs to the rear boundary wall of this property. c.58 east of the Owenass Bridge to Mountmellick Bridge flood wall.
040A	12900363	House	House	Park Street	c.80 east of the Owenass Bridge to Mountmellick Bridge flood wall.
040B	12900364	House	House	Park Street	c.80 east of the Owenass Bridge to Mountmellick Bridge flood wall.
690	12900304	House	House	Lord Edward Street	100m from of the Downstream of Convent Bridge measure
693	12900332	Mountmellick Railway Station	Railway station	Wolfe Tone Street	c. 76m northwest of the compound and c.117m from the embankment at the Garroon Stream measure
701	12900359	Convent Bridge/ Ballycullenbeg Bridge	Bridge	Sarsfield Street	Part of the Mountmellick to Convent Bridge flood measure
703	12900360 (Record only)	National Training & Development / Mountmellick Steam Mill	Mill/ Civic building	Park Street	c. 70m north of the Owenass Bridge to Mountmellick Bridge measure (flood wall section).
704	12900361 (Record only)	Standing Stones sculpture within the public park and playground	Monument	Park Street	Part of the Mountmellick to Convent Bridge flood measure is located in the area of the park. c. 50m north of the Owenass Bridge to Mountmellick Bridge measure (flood wall section).
707	12900366	Hibernia Foundry	Building misc	Ballycullenbeg	The flood relief measure (flood wall) for the Mountmellick Bridge to Convent Bridge runs to the rear of this property.
829	N/A	Railway bridge	Railway bridge	Derrycloney	c.55m from the embankment for the Owenass Bridge to Mountmellick Bridge measure
857	N/A	Thatched house	Thatched house	Derrycloney	30m east (and across the road) of the Owenass Bridge to Mountmellick Bridge measure. C. 54m from the compound on the northern side of the Owenass river (on the opposite side of the road).

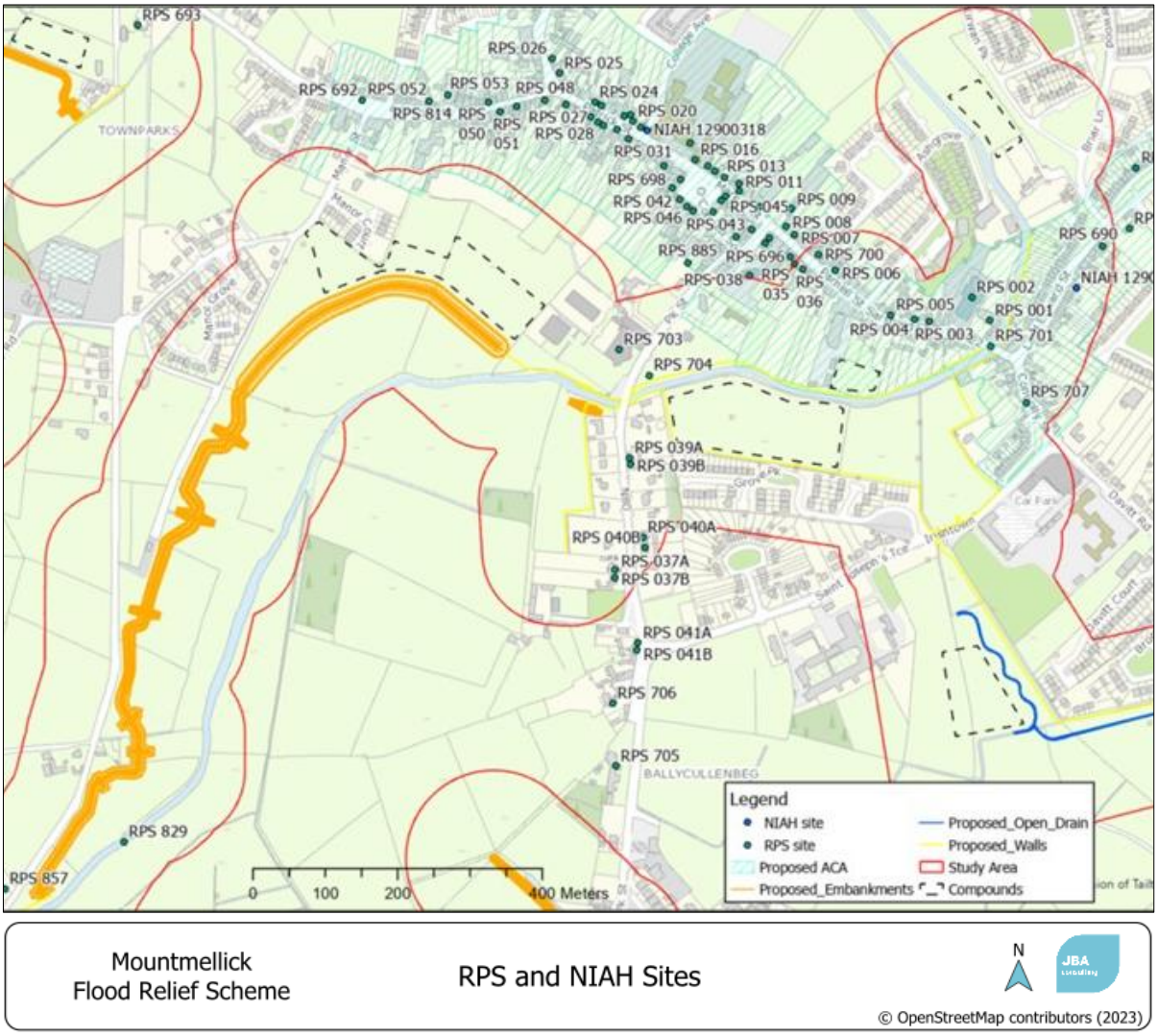


Figure 10-12: RPS and NIAH Sites within 100m of an FRS Measure and the ACA

There are no sites within the study area listed within the NIAH Garden Survey. This is a paper survey which was conducted through consultation of historic mapping and records the condition and survival of historic gardens.

10.3.6.3 Industrial Heritage Sites

It is a policy of Laois County Council to protect where appropriate industrial heritage structures or elements of significance identified in the Laois Industrial Archaeology Survey by adding them to the Record of Protected Structures during the lifetime of the County Development Plan.

There are 9 recorded industrial heritage sites within 100m of proposed flood relief measure (Table 10.4; Figure 10-13; Hamond 2004[156]; 2005[157]; 2009[158]). Four are record only and no longer standing, two are also designated as Protected Structures and three are upstanding structures which have no other designation: Manor Mill / Manor Saw Mill (LAIAR Ref: 007-002) which is north of the Manor Mills FRS measure and

[156] Hamond, F. (2004) '*Industrial Heritage Survey of County Laois*'. Laois County Council.
[157] Hamond, F. (2005) '*Mills of Co. Laois: An Industrial Heritage Survey*'. The Heritage Council.
[158] Hamond, F. (2009) *'Bridges of County Laois: An Industrial Heritage Review*'. Laois County Council.

Owenass Bridge (LAIAR Ref: 007-004). Owenass river will require replacement by the Owenass Bridge to Mountmellick Bridge measure and the upstream of Owenass Bridge measure.

There is no industrial heritage features recorded within 100m of the Garroon Stream, Clontygar Stream to Davitt Road or the Midland Steel flood measure.

Table 10-4: Industrial heritage sites within study area and within 100m of proposed flood defences

Industrial Heritage ID	Other Designations	Name	Address	ITM E	ITM N	FRS Measure
LAIAR-007-002	N/A	Manor Mill / Manor Saw Mill	Manor Road	644046	707451	c.20m east of the Manor Mills measure
LAIAR-007-004	N/A	Owenass Bridge	Derrycloney	644068	706592	Part of Owenass Bridge to Mountmellick Bridge measure
LAIAR-008-005	RPS 829	Railway Bridge	Derrycloney	644243	706725	c.55m from the embankment for the Owenass Bridge to Mountmellick Bridge measure
LAIAR-008-011	RPS 703	Mountmellick Maltings	Park Street	644934	707393	c. 70m north of the Owenass Bridge to Mountmellick Bridge measure (flood wall section).
LAIAR-008-012	N/a	Irishtown Bridge (site of)	Ballycullenbeg	645094	707365	Part of both the Owenass to Mill Bridge and Mill Bride to Convent Bridge flood relief measure
LAIAR-008-054	N/a	Brewery (site of)	Townparks	645208	707356	c. 8m from the Mill Bridge to Convent bridge flood relief measure
LAIAR-008-016	RPS 701	Convent Bridge / Big Bridge	Sarsfield Street	645447	707404	Part of the Mountmellick to Convent Bridge flood measure
LAIAR-008-070	N/A	Ennis' Mill / Conroy's Distillery (site of)	Sarsfield Street	645448	707494	Downstream of Convent Bridge flood relief measure
LAIAR-008-072	N/A	Site of Nuns' Bridge	Ballycullenbeg; Townparks (Tinnahinch By)	645378	707724	Downstream of Convent Bridge flood relief measure, 28m from Compound H

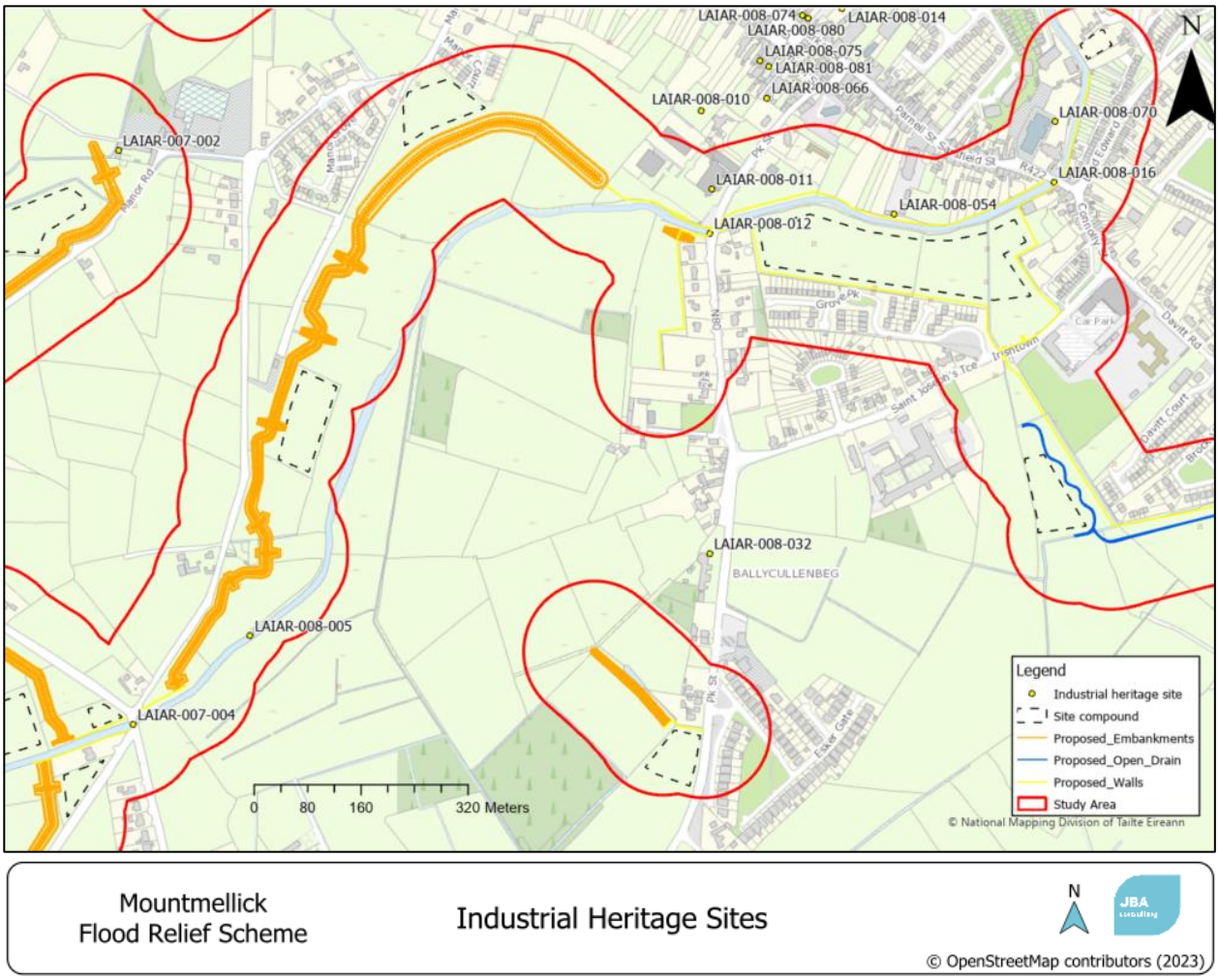


Figure 10-13: Industrial Heritage Sites and the FRS measures

10.3.7 Areas of Archaeological Potential and Undesignated Cultural Heritage Sites

Rivers have been the focal point for settlement, transport, resources, and trade since the earliest of times. Urban riverscapes in particular possess a significant potential to uncover a diverse range of archaeological heritage in a variety of contexts, including terrestrial, underwater, reclaimed ground, floodplains, industrial, vernacular, estuarine, and maritime environments (NMS 2023[159]). The dredged soil from a river, particularly in urban areas, can be rich in archaeological materials and objects, including organic materials. Any instream activity in a river should consider the potential to reveal archaeological sites or industrial heritage features in their vicinity, such as sites from early prehistoric fish traps to medieval mills or remnants of bridges, etc.

The Geological Survey of Ireland notes the underlying sediments in the study area comprise alluvium in the central area to the north and south of the town following the Owenass River, whilst cutover raised peat is located the west and southeast and areas of till and gravel in the far north. The exceptional capability of waterlogged areas, bogs and peatlands to preserve organic remains in the anaerobic conditions ensures that these areas are rich sources of archaeology. Fulachta Fiadh, Bronze Age cooking pits, are typically found in these areas. So, while there is no surface visibility of archaeological sites and features along the

[159] NMS (National Monuments Service) 2023. '*Archaeology and Flood Relief Schemes: Guidelines*'. Department of Housing, Local Government and Heritage.

margins of bogland, at the dryland interface there is the possibility that prehistoric settlement sites could be revealed.

Riverine environments and the adjacent undisturbed greenfields/reclaimed peatland and urban environment are therefore considered to be of archaeological potential. Each of the proposed flood relief measures is within a riverine environment, and for the aforementioned reasons, there exists an inherent archaeological potential to uncover previously unknown subsurface archaeological sites, soils, features, or artefacts during any earthmoving activities. All the flood relief measures are therefore considered to be in areas of archaeological potential (AP1–AP9). The geophysical survey and underwater assessment (Sections 10.2.9 and 10.2.10) have in some locations in the scheme have given definition of this risk in some areas.

Table 10-5: Areas of Archaeological Potential

Area of Potential	Type	Location	ITM_E,_N	FRS Measure
AP1	Riverine environment. Archaeological potential associated with riverine environment and greenfield areas upstream from Owenass Bridge	Derrycloney	644068, 706593 to 643626, 706491	Upstream from Owenass Bridge flood relief measure
AP2	Riverine environment, railway & demesne landscape. Archaeological potential associated with riverine environment and greenfield areas from Owenass Bridge to Mountmellick Mill Bridge	Derrycloney / Townparks	644068, 706593 to 644939, 707334	Owenass Bridge to Mill Bridge flood relief measure
AP3	Riverine environment & historic town. Archaeological potential associated with riverine environment and greenfield areas from Mountmellick Mill Bridge to Convent Bridge.	Townparks / Ballycullenbeg	644939, 707334 to 645447, 707408	Mill Bridge to Convent Bridge flood relief measure
AP4	Riverine environment. Archaeological potential associated with riverine environment downstream of Convent Bridge	Ballycullenbeg	645457, 707410 to 645499, 707568	Downstream of Convent Bridge flood relief measure
AP5	Riverine environment & milling activity Archaeological potential associated with riverine environment and greenfield areas at Manor Road and Manor Court.	Townparks / Derrycloney	644014, 707444 to 643589, 707105	Manor Road flood relief measure
AP6	Riverine environment & railway Archaeological potential associated with riverine environment and greenfield areas at Garroon Stream.	Townparks	643995, 707834 to 644248, 707772	Garroon Stream flood relief measure
AP7	Riverine environment Archaeological potential associated with riverine environment and greenfield areas at Clontygar Stream and Davitt Road	Ballycullenbeg / Acragar	645370, 707145 to 645725, 706879	Clontygar Stream and Davitt Road flood relief measure
AP8	Riverine environment. Archaeological potential associated with riverine environment and greenfield areas at Irishtown Garden Centre.	Irishtown, Ballycullenbeg	644755, 706703 to 644921, 706583	Irishtown Garden Centre flood relief measure
AP9	Riverine environment Archaeological potential associated with riverine environment and greenfield areas at Midland Steel.	Bay Road Business Park, Townparks	644898, 708743 to 644998,708850	Midland Steel flood relief measure

10.3.8 Undesignated Cultural Heritage Sites

A field inspection of the FRS scheme identified a number of undesignated cultural heritage sites (CH) which lie within the flood relief measures (Table 10.6, Figure 10-14). They comprise rubble stone walls and a former mill race, the full description of each feature is provided in an inventory in Appendix 10.4

Table 10-6: Undesignated Cultural Heritage Sites

CH ID	Type	Location	ITM_E,_N	FRS Measure
CH1	Partial remains of a ruined late 19th century building	Townparks	645290, 707343	Part of the Mill Bridge to Convent Bridge FRS Measure
CH2	Stone wall between Mill Bridge and Convent Bridge on south side of river path	Ballycullenbeg	644989, 707346 to 645396, 707368	Part of the Mill Bridge to Convent Bridge FRS Measure
CH3	Stone wall on north bank of Owenass River surrounding property west of Convent Bridge	Townparks	645404, 707390 to 645424, 707401	Part of the Mill Bridge to Convent Bridge FRS Measure
CH4	Former tail race associated with Manor Mills	Townparks	644221, 707746	Part of the Garroon Stream FRS Measure
CH5	Fragment of wall and style beside Mill Bridge to access a riverside walk	Townparks	644913, 707341	Owenass Bridge to Mill Bridge flood relief measure
CH6a-h	Sections of property boundary walls to the rear gardens on the northern banks of the Owenass river	Townparks	Various	Mill Bridge to Convent Bridge FRS Measure
CH7	Drinagh/Derrycloney Townland Boundary	Drinagh/Derrycloney	645540, 706888	Clontygar Stream to Davitt Road FRS measure
CH8	Ballycullenbeg/Acragar Townland Boundary	Ballycullenbeg/Acragar	643712, 706630	Upstream of Owenass FRS Measure

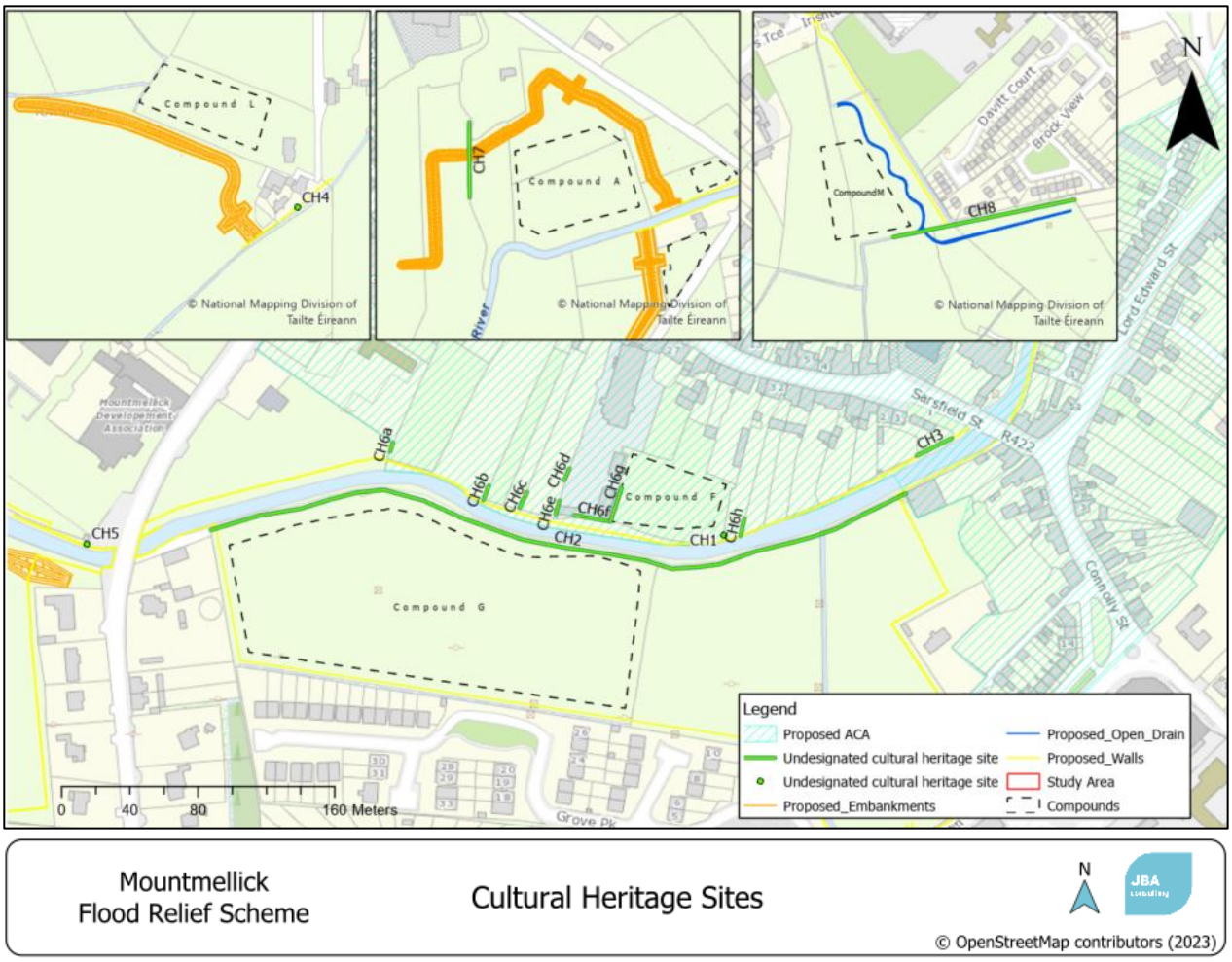


Figure 10-14: Cultural heritage sites impacted by the flood relief measures

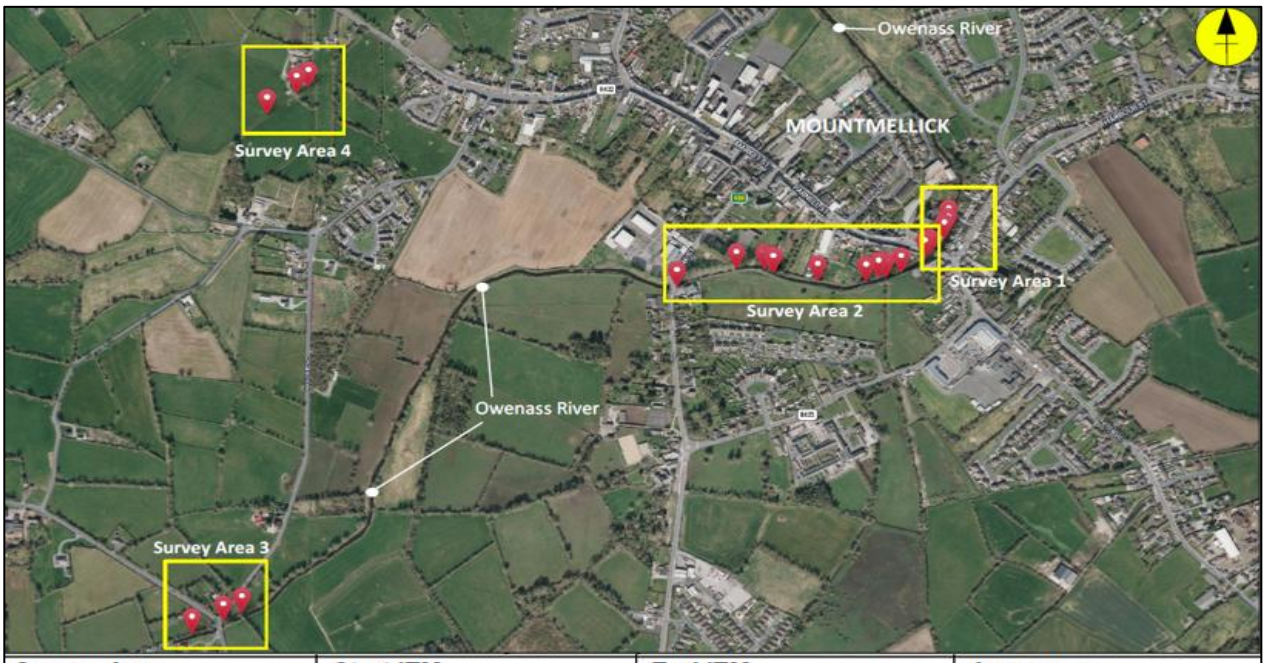
10.3.9 Underwater Archaeological Assessment

10.3.9.1 Introduction

An underwater archaeological impact assessment which included a wade (visual inspection) and metal detection survey of the Owenass River, and the Pound Stream was carried out by ACAS in April 2024, under licence to the National Monuments Service (NMS) DHLGH under Dive Licence Ref. No: 23D0148.

The purpose of the survey was to identify and record the character, extent and condition of any archaeological features that might be visible within the watercourses and to establish any likely effects of the proposed works on any features noted. Based on the baseline research and consultation with the underwater specialists, the survey aimed to resolve some research queries: firstly, while there is no current evidence that the town was walled, the long burgage plots extending to the river are reminiscent of other, albeit earlier, walled towns, this raises the question of whether there is any evidence of town or river wall defences on the northern side of the Owenass river. Secondly, the survey sought to determine if there is evidence of earlier bridge structures at the sites of existing bridges within the survey area (Owenass Bridge, Convent Bridge and Mountmellick Bridge). Lastly, historical cartographic sources (1657-7 Down Survey map, Figure 10-3) indicate that there were major iron works (mill pond and mill races) downstream of the town associated with Owenass river, prompting the question of whether any remains associated with this might exist.

The survey focused on four areas that will be impacted directly by the construction of flood relief in-water walls, and the replacement of Owenass bridge (Figure 10-15).



Survey Area	Start ITM	End ITM	Area name
Survey 1	645437, 707404	645471, 707465	Convent bridge north
Survey 2	645437, 707404	644947, 707329	Convent bridge-Mountmellick bridge
Survey 2 inaccessible area	645220, 707344	645134, 707360	
Survey 3	0644076 , 0706604	0644112 , 0706621 (north) 644015, 706576 (south)	Owenass bridge
Survey 4	644230, 0707751	644150, 707690	Garron stream

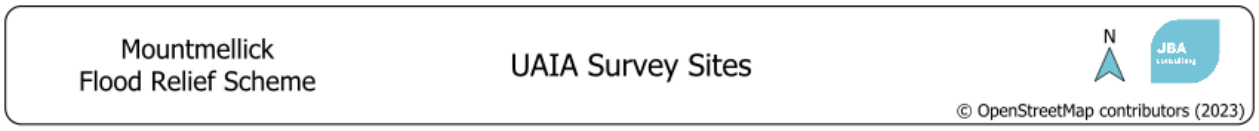


Figure 10-15: UAIA Survey Locations

10.3.9.2 Wade Survey Area 1 – Downstream of Convent Bridge FRS Measure

Starting on the south side of Convent Bridge, a 70m stretch of the river was surveyed, it was not possible to survey the most northerly section of survey Area 1 due to water depth and strength of the flow. A crossing or bridge at the site of Convent Bridge is indicated on the Down Survey map (Figure 10-4) suggesting that there may have been an earlier bridge here from at least the mid-17th century. No visual evidence of this bridge was noted during the survey. In addition, there was no evidence of the large mill pond and mill races that were also illustrated on the latter map source. A large brewery and later a distillery is marked on cartographic sources close to the river (Figure 10-5 and Figure 10-8) in the vicinity of the current convent grounds close to Convent Bridge, but again there was no visible evidence for these structures during the course of the survey.

Nothing of archaeological significance was revealed during the survey. The survey noted a modern culvert and four courses of a roughly cut 3m section of limestone wall along western bank immediately north of Convent Bridge which extended behind the bridge footing (possibly associated with F4 described below). The metal detection recovered a steel spoon.

10.3.9.3 Wade Survey Area 2 – Mill Bridge to Convent Bridge FRS Measure

A modern limestone retaining wall running along the southern bank from Convent Bridge to Mountmellick bridge was recorded during the survey. The northern bank was mostly made of clay with some sections having retaining walls with concrete footings. Special attention was paid to noting any remains of previous town wall defences along the northern bank of the river. None were noted during the wade survey.

On the southern side of the river a modern limestone river-retaining wall (F4) was visible extending almost the entire length of the river from Convent bridge to Mill Bridge, above it was the public walkway and field boundary wall that bounds it to the south (CH2, Plate 10-1). This was sitting on a clay foundation and measured over 2m in height, it consisted of nine courses of varying size stones ranging in size from 0.30 x 0.30m to 0.15 x 0.20m, it was just a single course deep measuring 0.30m and was set into the clay riverbank.



Plate 10-1: The retaining wall along the southern banks of the river

The 18th-19th century land use survey marks what appears to be a small footbridge in the vicinity of Mill Bridge (Figure 10-5). A larger bridge at this crossing is present on both the 1st and 2nd edition OS maps. There were no visible remains of this earlier bridge noted during the survey. On the upstream side of the bridge Grassy banks extended from the bridge along both banks.

Ten features/finds were identified including a modern debris metal detection hit, a modern retaining wall, a modern culvert, a concrete wall, a boundary wall (CH1), rock armour, concrete footing, a limestone weir and a concrete pipe. Nothing of archaeological significance was revealed during the survey.

10.3.9.4 Wade Survey Area 3 – Owenass Bridge FRS Measure

Survey area 3 was carried out both upstream and downstream of the Owenass Bridge. The survey established that the span of the Owenass Bridge across the riverbed (east-west) was 20m and that the river substrate at the bridge was stony with some large rough scattered limestone blocks below the bridge. The height from the substrate was 3m to the underside of the bridge and the depth of the bridge measured from the riverbed (north-south) was 11m. On the western side of the soffit the concrete footing extended 20m out and had a height of 5cm. It also sat on top of a concrete base measuring 1m, in width (east-west) and 3-3.5m (north south). On the eastern side of the soffit the concrete footing extends 20cm from the wall and had a depth of 25cm. It sat on top of a concrete base extending c. 30cm from the footing. There were six keystones protruding from the eastern abutment c. 00.50m-1.5m apart from each other. A concrete outflow pipe was visible at the northern edge of the bridge, on the eastern bank. There were several large limestone rocks scattered about the river and its eastern bank just north of the bridge. No earlier rubble or earlier bridge features were identified during the survey.

10.3.9.5 Wade Survey Area 4 – Garroon Stream FRS Measure

Survey Area 4 covered a section of the Garron Stream south of Wolftone Road to the west of Mountmellick town. The stream ran north from the former millpond of Manor Mills under the former railway line to the northeast, joining the Pound River at Wolftone Road to the north. The existing stream was located within agricultural fields, it measured was 1.5m wide with a maximum water depth of 40cm

The east bank measured 1m in height and consisted of a drystone limestone retaining wall (F12) sitting on a clay base, there were brambles and a green grassy field to the east. The limestone wall was visible for c. 30m beyond the northern limit of the survey area. The first edition OS map depicts a flour mill and mill pond south of the survey area with the name Mill Lands shown. A Manor House is depicted to the south, with sawmills, a corn mill and a mill pond. The revised OS map illustrates the Garroon Stream as a mill race running from the Manor Mills to join the Pound River at Wolftone Road. The limestone retaining wall (F12, CH4) is likely to be associated with this millrace, however it lies just outside the study area and will not be impacted.

The only features noted were a footbridge, outflow pipes and drainage pipes all of which were modern and an unidentified metal hit. No archaeological features were identified during this survey.

10.3.9.6 Conclusion

A total of 15 features were identified in the four wade survey areas, all the features were confirmed as modern apart from a drystone limestone wall just outside Study Area 4 that may be associated with a millrace marked in the early Ordinance Survey maps. Historic maps identified that the Garroon Stream served as a mill race in the 19th and 20th centuries and therefore has been identified as a cultural heritage asset (CH4).

No other features or finds of an archaeological significance were identified during the survey, including any earlier bridge structures, early town walls or for fording points. As there is always the possibility of archaeology being present in riverine environments, the report recommended that the excavations on the riverbanks or within the river be subject to archaeological monitoring.

The underwater assessment report is provided in Appendix 10.5.

10.3.10 Geophysical Survey

A high-resolution magnetic gradiometry geophysical survey (GS) conducted under Detection Device Consent Licence No. 24R0053, issued by the National Monuments Service (NMS) was carried out by 12th and 15th of February 2024 by Terradat. The survey was carried out in seven areas encompassing the flood relief measures and the proposed compounds all within agricultural lands. The survey covering all accessible parts of the survey area is proposed to identify features that may be of archaeological significance.

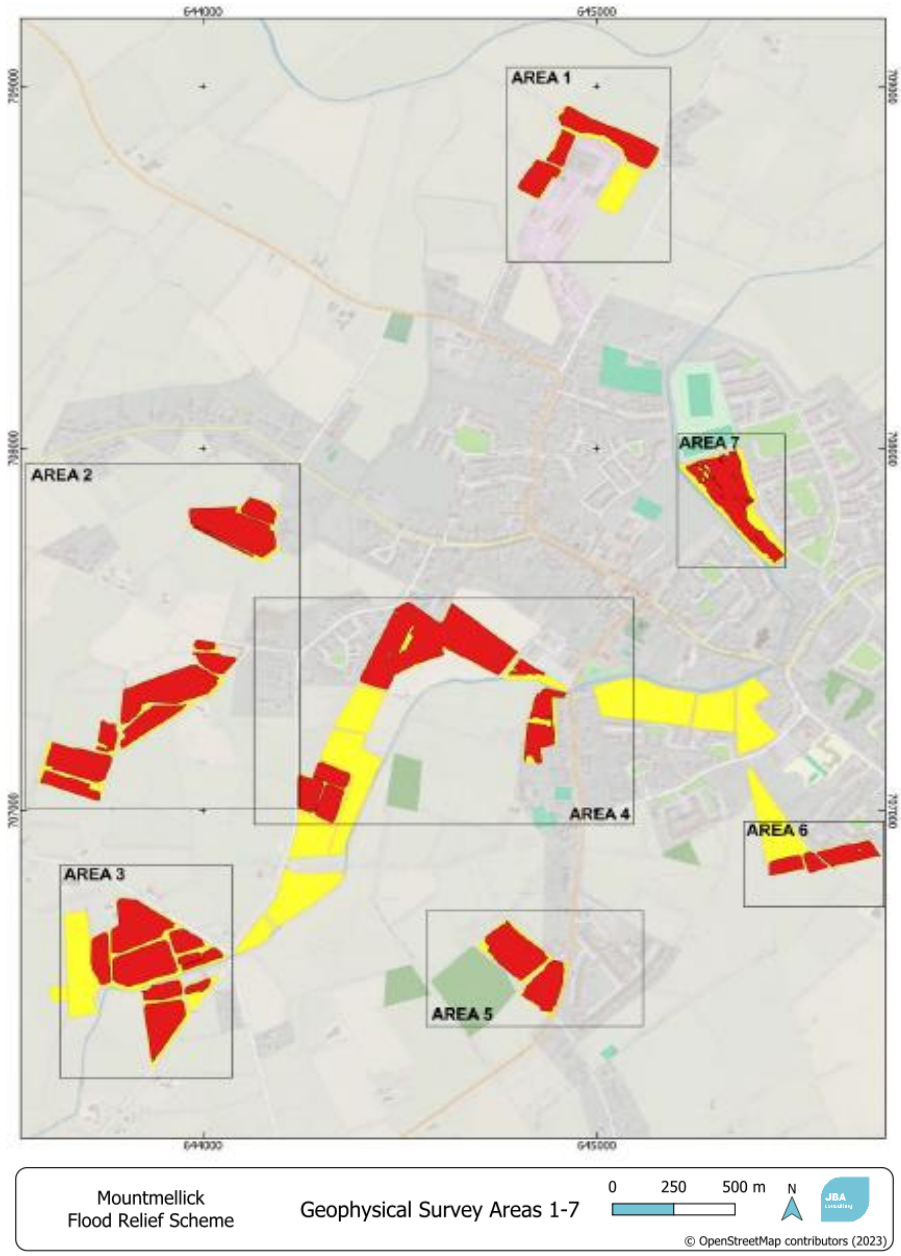


Figure 10-16: Geophysical Survey (GS) Areas 1 –7 (red shows the areas that were surveyed)

10.3.10.1 GS Area 1 – Midland Steel FRS Measure

The survey identified a short section of a paleochannel, buried services and pit like features, these were interpreted to be associated with the wooded area shown in this location of the first edition OS mapping. No anomalies identifiable as being of archaeological significance were recorded in this area.

10.3.10.2 GS Area 2 – Garroon Stream FRS Measure and Manor Road FRS Measure

Linear features were identified as agricultural turf cutting furrows. A short length of a linear anomaly was visible at the eastern end of the southernmost field. It was interpreted as a former ditch, approximately 2m in width, corresponding to the line of the Derrycloney/Mountmellick townland boundary on the 1st Edition OS 6-inch mapping.

A sub-circular ring (GS1, Figure 10-17) comprising at least 13 positive magnetic anomalies, each measuring up to 2m and forming a ring approximately 14m in diameter. The most likely interpretation is that this potentially represents a ring of pits or postholes but not necessarily a structure. Some 60m to the southwest if of Site 1 lies another area with pit-like positive magnetic anomalies. These show no clear spatial

organisation and may not be of archaeological interest. GS1 is located within the compound area for the Manor Road FRS Measure.

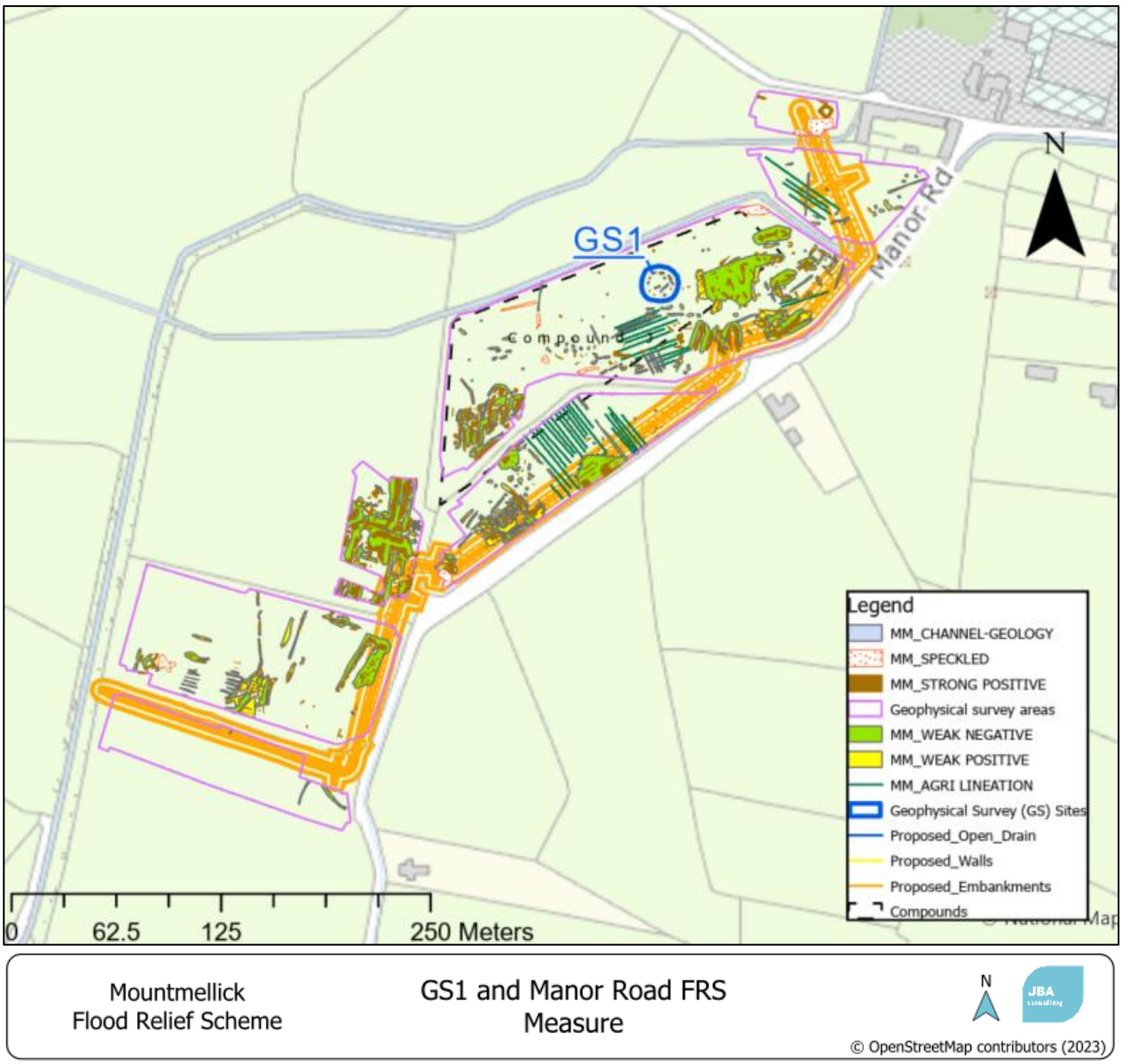


Figure 10-17: GS1- sub-circular ring and the Manor Road FRS Measure

10.3.10.3 GS Area 3 – Upstream of Owenass Measure FRS Measure

There were widespread minor anomalies associated with agricultural lineation and former field boundaries identified in the dataset. In the south of the area, one field has been completely covered with a material of high magnetic susceptibility, probably a form of industrial waste. To the east of the area, Site 3 (GS3, Figure 10-18) included a zone with abundant small dipolar magnetic anomalies comprising an area measuring 31m E-W and 21m N-S. Although this is likely to be a spread of industrial waste or other debris, it cannot entirely be excluded on the basis of geophysics that the spread might be of burnt stone or slag of archaeological significance. The feature is located partially beneath the proposed embankment measure. It was not possible to survey the field at the westernmost end of the flood measure in the townland of Drinagh.

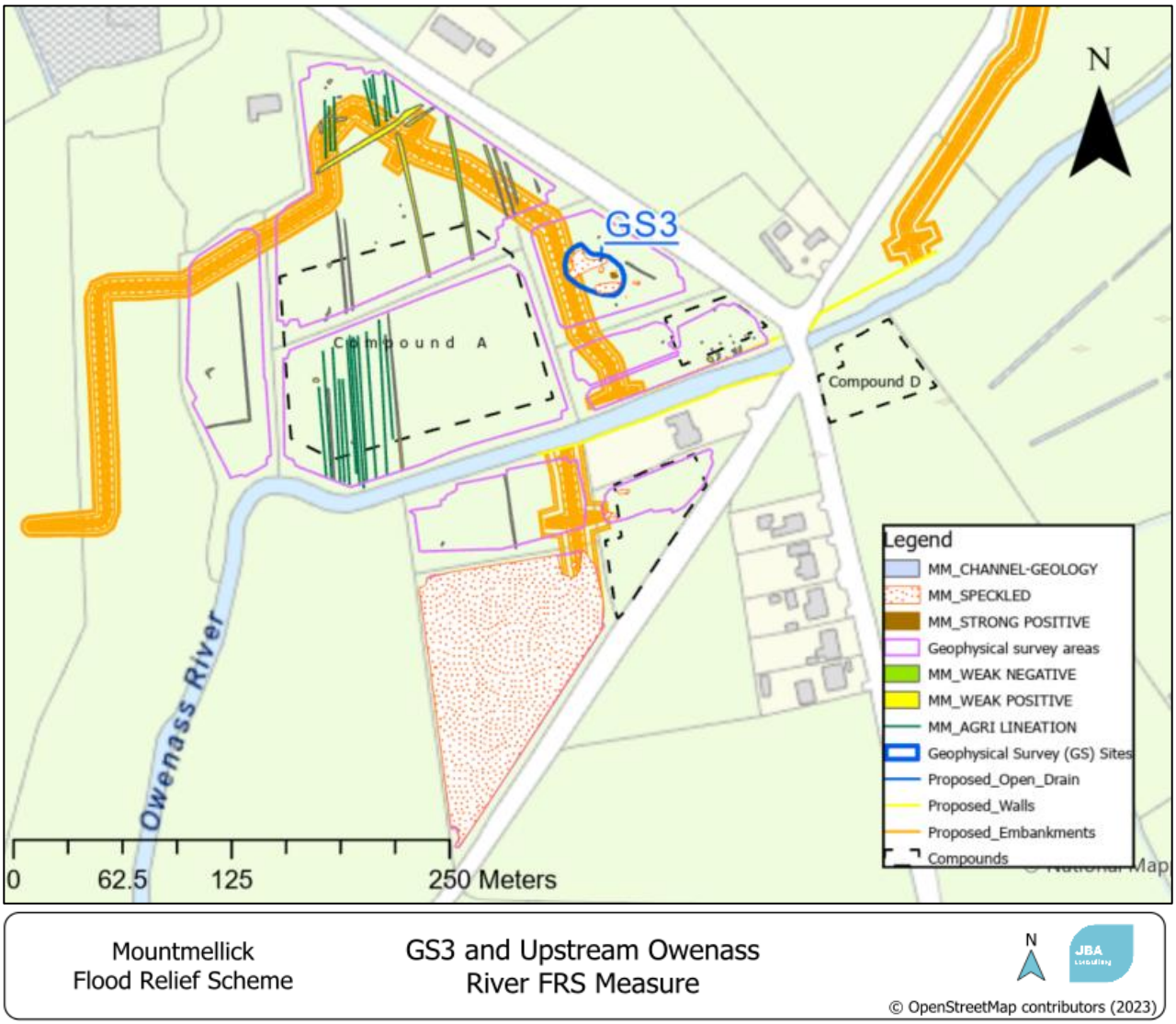


Figure 10-18: GS3 and the Upstream of Owenass Measure

10.3.10.4 GS Area 4 – Owenass Bridge to Mill Bridge FRS Measure

It was not possible to survey the entirety of the flood measure, two areas were surveyed, an area on the northern end of the proposed embankment in Townparks and the middle section of the embankment in Derrycloney (Figure 10-16).

No anomalies of archaeological significance were identified in the areas surveyed for the most part agricultural plough furrows and field boundaries were identified in the survey data.

10.3.10.5 GS Area 5 – Irishtown Garden Centre

No anomalies of archaeological significance were identified in this survey area.

10.3.10.6 GS Area 6 – Clontygar Stream FRS Measure

Strong magnetic responses, much of which is not easy to interpret was identified in Area 6. Regular agricultural lineation was identified in the easternmost fields (possibly plough furrows). In the western field a large area (c. 43m N-S by 38m E-W) comprising irregular point anomalies (each measuring 1.5m -2.5m in diameter) were identified have been grouped as Site 2 (GS2). These are more likely to indicate anthropogenic features and potentially of archaeological interest. Although interpretation of these in terms of natural features is possible, there is a possibility that they could be archaeologically significant (e.g. as

the basal pits of early bloomery iron smelting furnaces). The works associated with the proposed open drain/realigned stream may impact on these features.

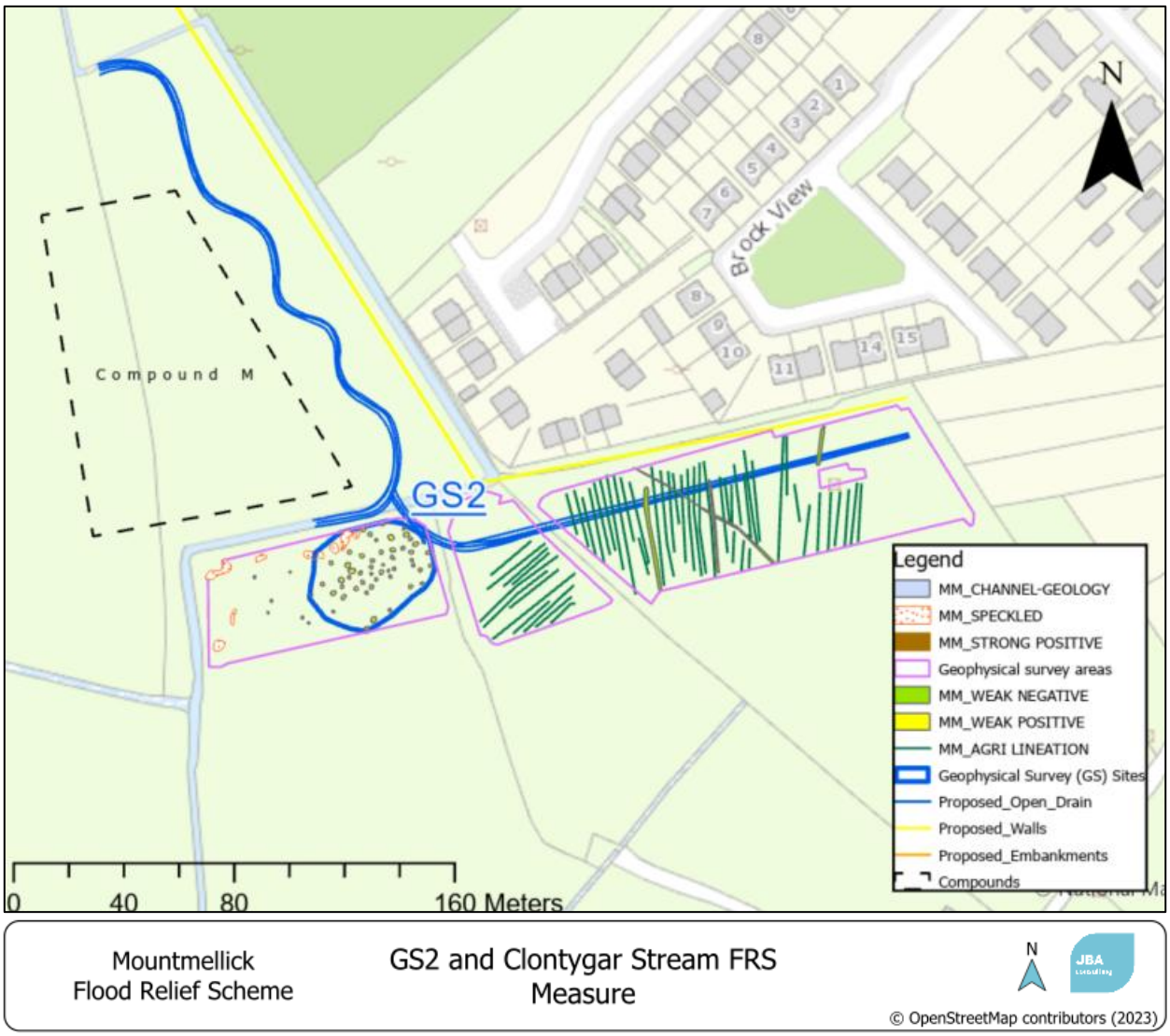


Figure 10-19: GS2 and the Clontygar Stream Measure

10.3.10.7 GS Area 7 –Downstream of Convent Bridge FRS Compound Area

A large greenfield area on the northern end of the town on the east side of the river at Kirwan Park was surveyed. Anomalies suggesting dumped ferrous and possibly building debris. None of the anomalies identified in the survey suggest an archaeologically significant feature and were likely to relate to modern activity.

The areas of archaeological potential identified during the survey are summarised in Table 10-7. The geophysical survey report is provided in Appendix 10.5.

Table 10-7: Possible Archaeological Sites identified in the Geophysical Survey

GS ID	Type	Location	ITM_E,_N	FRS Measure
GS1 (Area 2)	A ring of pits/post holes, c. 14m in diameter that might be archaeological	Townparks	643924, 707355	Within the compound area for the Manor Road FRS Measure

GS2 (Area 7)	Anomalous features of archaeological potential in an area measuring c. 43m N-S by 38m E-W.	Agracar	645498, 706856	Within the Clontygar FRS measure immediately to the south of where the open drain is proposed
GS3 (Area 3)	Anomalous features of archaeological that might represent burnt stone or slag of archaeological significance, in an area measuring c.31m E-W and 21m N-S.	Derryclooney	643952, 706638	Upstream of Owenass FRS measure. The possible feature runs beneath the earthen embankment.

10.4 Characteristics of the Proposed Development

The characteristics of the proposed flood relief scheme are set out in Chapter 4 of this EIAR and are discussed in detail in the assessment of potential impact below.

10.5 Potential Impact of the Proposed Development

The construction phase will have the potential to result in direct adverse effects and impacts to the setting of cultural heritage receptors, including sub-surface archaeological remains and above ground structures of architectural heritage significance. These potential construction phase impacts on archaeology may arise during ground reduction works undertaken during elements of the proposed development including but not limited to site investigations, enabling works, services diversion, excavation including services, drainage and hard and soft landscaping, and the provision of a temporary construction compound.

Impacts related to settings include alterations to the ACA or to the grounds of built heritage sites, including changes to the views into an ACA. Impacts on the setting of heritage assets describe how the presence of a development changes the surroundings of a heritage asset (archaeological, or cultural heritage sites) in such a way that it affects (positively or adversely) the heritage significance of that asset. Visual impacts are most commonly encountered but other environmental factors such as noise, light or air quality can be relevant in some cases. Such impacts may be encountered at all stages in the life cycle of a development from construction to operational stages.

Undesignated cultural heritage sites, which tend to be vernacular in nature and often commonplace, such as stone walls, they are of local interest and can provide a rural character to a place.

Following the construction phase, all site compounds and temporary access roads will be demobilised and reinstated in accordance with local authority requirements. All embankments will be seeded with grass and vegetation and a fence will be installed on either side.

The impact of distinct areas of works are set out below in the following order and include the adjacent compound locations:

- Upstream of Owenass Bridge
- Owenass Bridge
- Owenass Bridge to Mountmellick Mill Bridge
- Mountmellick Mill Bridge to Convent Bridge
- Downstream of Convent Bridge
- Manor Road
- Garroon Stream
- Clontygar Stream to Davitt Road,
- Irishtown Garden Centre
- Midland Steel

A glossary of impacts as defined by the EPA (2022) is provided in Appendix 10.3. The assessment has been carried out according to best practice and guidelines relating to archaeological and architectural heritage assessment (Appendix 10.1). A summary table of potential impacts is presented in Table 10-8.

10.5.1 Upstream of Owenass Bridge

10.5.1.1 Proposed Development

A new bridge is proposed to replace the Owenass Bridge (see detail below, Section 10.4.2). Retaining walls will be installed along the upstream banks to tie into the proposed new bridge, measuring 1.5m high and 116m in length on the northern bank and 150m in length and 1.9m high on the southern bank.

Embankments will extend into the fields from the ends of both of these retaining walls, with the north embankment measuring 618m long and up to 1.8m in height and the southern embankment 148m in length and up 1.3m in height. Culvert crossings will be installed at four locations across the embankments where existing land drains or streams are present. Works will be facilitated by the installation of three site compounds in the greenfields on both banks (Figure 10-20).

Ground disturbance will be required for the development of site compounds, utility diversions, tree removal along the riverbanks and adjacent land drains, temporary diversion of land drains and of the Owenass River and the construction of proposed flood walls. Topsoil removal will be required to construct the compound and to provide temporary access roads to the compound. There will be an excavation to the required foundation depth of the proposed flood walls, with the depth depending on ground conditions. Sheet piling will be installed along the riverbank to facilitate groundwater cut-off. A temporary flow channel will be installed during works and excavations will be required to accommodate the new culvert. There will be topsoil stripping along the extent of the new embankments, followed by excavation to foundation depth.

Instream works will be necessary for the construction of proposed flood defence wall on the southern embankment of the Owenass River. Instream works will be required during the replacement of the bridge, with a cofferdam installed while works take place (see Owenass Bridge measure in Section 10.4.2).

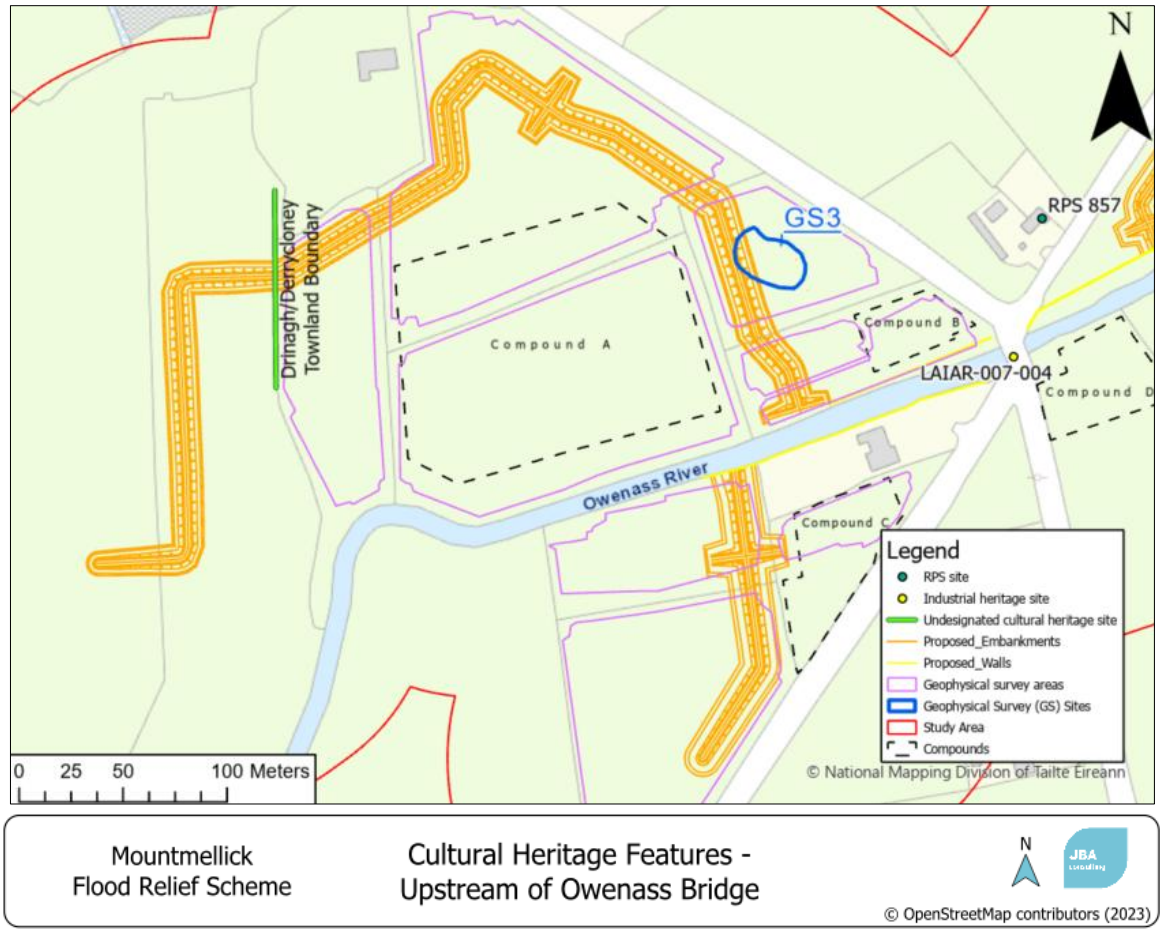


Figure 10-20: Cultural heritage features Upstream of Owenass Bridge

10.5.1.2 Archaeological Impacts

There are no recorded archaeological monuments within 100m of this flood relief measure.

An underwater archaeological assessment carried out on the upstream section of the Owenass River did not reveal any features or finds of an archaeological potential within the river. There was no evidence of an earlier bridge at or in proximity to the Owenass Bridge crossing or any other features of an archaeological significance (Section 10.2.8, Appendix 10.5 -Area 1).

Geophysical survey carried out across the greenfield areas identified a site of potential archaeological interest (GS3), comprising a spread of possible industrial material in an area measuring 31m E-W and 21m N-S. The feature is located partially beneath the proposed northern embankment measure and will be directly impacted by the earthmoving works associated with the embankment (Figure 10-20). Other than GS3, the geophysical survey identified possible agricultural furrows and did not detect any other features of an archaeological potential within the survey area. The westernmost end of the embankment in Drinagh townland was however not subject to geophysical survey. GS3 is of Unknown significance with a High magnitude of effect, resulting in an **Indeterminable, Adverse** effect.

The proposed measure is in an area represented as marsh on historic mapping and recorded as an area of cutover raised peat in the GSI. Due to the anaerobic environment and acidity in peatland deposits, objects, including organic matter (such as wood and leather), can be preserved, which is not typically the case in terrestrial archaeological conditions. There is a potential that the earthmoving works associated with the embankments, flood walls and compounds may identify previously unknown archaeological sites or features associated with the riverine and greenfield/peatland environment (AP1). Based on the geophysical survey results however any additional features that might be present in the surveyed areas are most likely to be small in scale and isolated. AP1 is of Unknown significance with a Low magnitude of effect, resulting in an **Indeterminable, Adverse** effect.

The proposed embankment north of the river will cross the Derrycloney / Drinagh townland boundary (CH7) which is formed by a drainage ditch and hedgerow. It also functions as the Ardea / Rosenallis parish boundary and the Portnahinch / Tinnahinch barony boundary. The section of the embankment that cuts through the boundary may reveal features associated with the construction of the boundary. The townland boundary is of Low significance with a Low magnitude of effect, resulting in a **Slight, Adverse** effect.

10.5.1.3 Built Heritage Impacts

No protected structures or NIAH sites will be subject to direct impacts as a result of the proposed flood measure. The closest RPS site is a thatched structure (RPS 857). This property is located on the northern side of the road junction (c. 36m to the north of the measure) orientated onto the Derrycloney Road. The intervening road, bound on both sides by mature hedgerows and a shelterbelt of trees to the south of the property boundary will screen any views from the property to the flood measure. There will be **No Impact** on this structure.

10.5.2 Owenass Bridge

10.5.2.1 Proposed Development

It is proposed to replace Owenass Bridge which carries the Derrycloney Road over the Owenass River with a new wider span arch structure 15m in length, 18.01m wide and up to 2.8m high (Figure 10-20). Instream works will be necessary for the demolition of the existing bridge, the excavations and construction of foundations and wing walls. 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 existing mill bridge parapet and wingwalls will be raised and will be cladded in stone.

10.5.2.2 Archaeological Impacts

The underwater archaeological assessment (Section 10.2.8, Appendix 10.5 -Area 3), sought to establish whether there was any evidence for an earlier river crossing or any other features of an archaeological potential within the measure to remove Owenass Bridge. No features or finds of an archaeological significance was identified in the survey and there was no evidence of an earlier structure.

Despite the findings of the wade survey and baseline research there is a potential that, as yet, undiscovered archaeology associated with the riverine environment (AP1) may be identified during the in-stream works or works along the riverbanks associated with this flood relief measure and the Upstream of Owenass Bridge Measure. Such archaeology may include fording points, evidence of milling or fishing weirs, etc., buried in the riverine deposits. AP1 (Upstream of Owenass Bridge Measure and Owenass Bridge) is of Unknown significance with a Low magnitude of effect, resulting in an **Indeterminable, Adverse** effect.

10.5.2.3 Built Heritage Impacts

Owenass Bridge (LAIAR-007-004) is a single arched masonry road bridge which is at the confluence of four roads in a rural environment. It is not a protected structure nor is it recorded by the NIAH. It was recorded in the Laois Industrial Heritage Bridges Review (Hamond 2009[160]) which concluded that the bridge was of local industrial heritage significance but was not sufficiently special to recommended it for inclusion in the RPS (Ibid). The east spandrel and parapet have been rebuilt with concrete blocks, and Hamond (ibid.) in his survey noted that its curved deck and high volume of traffic over it pose a threat to its long-term survival. Because the flood relief scheme will prevent flood water from flowing from the Owenass River to the Pound River and flooding the town, there will be an increase in the volume of water that would have to pass through the bridge.



Plate 10-2: Rebuilt west face (left) of Owenass Bridge

[160] Hammond. F for Laois County Council *Bridges of County Laois: An Industrial Heritage Review Part 2* (March 2009) Heritage Council



Plate 10-3: original east face (right) of Owenass Bridge

Further to consultation with and recommendations from the NBHS, the design team examined several design scenarios in a multidisciplinary effort to try to retain the bridge in-situ. The options for retention included bypass channels so the bridge would not have to convey all the retained flood water, however this option would require a significant increase in road levels making local access to the surrounding fields and properties impractical. A scour assessment concluded that the proposed flood relief scheme would significantly increase the scour risk and the hydraulic loading of the structure. An appropriate scour protection was considered; however, this would only be possible if a concrete slab was installed across the full width the river and extending 5-10 m upstream and downstream of the bridge which would have adverse effects on the designated SAC. The assessment concluded that the bridge would have to be replaced.

It was recommended by the projects conservation engineer that the form of the original structure be followed in so far as reasonably practicable to retain the countryside character of the road. The new structure and new wing walls will be resurfaced with stone using the original bridge material and in particular the original voussoirs. The engineering rational and methodology and specifications of the reconstruction of the bridge is provided in Appendix 10.7, Southgate Associates.

Owenass Bridge (LAIAR-007-004) is of Low significance with a High magnitude of effect, resulting in a **Moderate, Adverse** effect.

10.5.3 Owenass Bridge to Mill Bridge

10.5.3.1 Proposed Development

The proposed flood defence measures between Owenass Bridge and Mill Bridge generally consist of a 1,295m of flood embankment measuring up to 2.2 m high from Owenass Bridge to Mountmellick Bridge through agricultural land to the west and north of the Owenass River (Figure 10-21). It also includes three section sections of walls through agricultural land on the northern bank of the river. From the newly constructed Owenass Bridge an 87m long, 2.4m high flood wall will link it to the proposed embankment. A 315m length flood wall will be constructed on the north (left) bank of the Owenass River next to Mountmellick Bridge, measuring up to 2.9m high, this will be cladded in reused stone.

A raised footpath will also be installed upstream of Mill Bridge to retain existing pedestrian access. A 20th rubble stone stile (CH5) providing access to the will be removed to facilitate the demolition to ground level of a pumping station

To the south of the Owenass River from Mill bridge and to the rear of properties a flood wall of c.288m in length and up to 2.5m in height will be constructed. Site compounds will be located adjacent to the embankment, midway along it in Derrycloney and at the northern end of it in Townparks.

Ground disturbance will be required for the development of site compounds, the diversion of utilities, tree removal, the temporary diversion of the Owenass River and existing land drains. Topsoil removal will be required to construct the compound and to provide temporary access roads to the compound. The extent of the proposed embankment will be stripped of topsoil and excavated to foundation depth. The proposed flood walls will be excavated to the required foundation depth, the depth of which will depend on ground conditions. Sheet piles will be installed where groundwater cut-off is required. The installation of a new culvert will require excavation to formation level before it is installed in sections. The raised footpath will require excavation to install foundations. Instream works will be required during the construction of the embankment across existing land drains and streams. There will be a temporary diversion channel and excavation of the riverbed to formation level to accommodate the installation of a precast culvert. Temporary works such as a cofferdam may be required within the Owenass River at Mill Bridge in order to construct flood defences. Pre-condition surveys of the Mill Bridge and Owenass bridge will be undertaken.

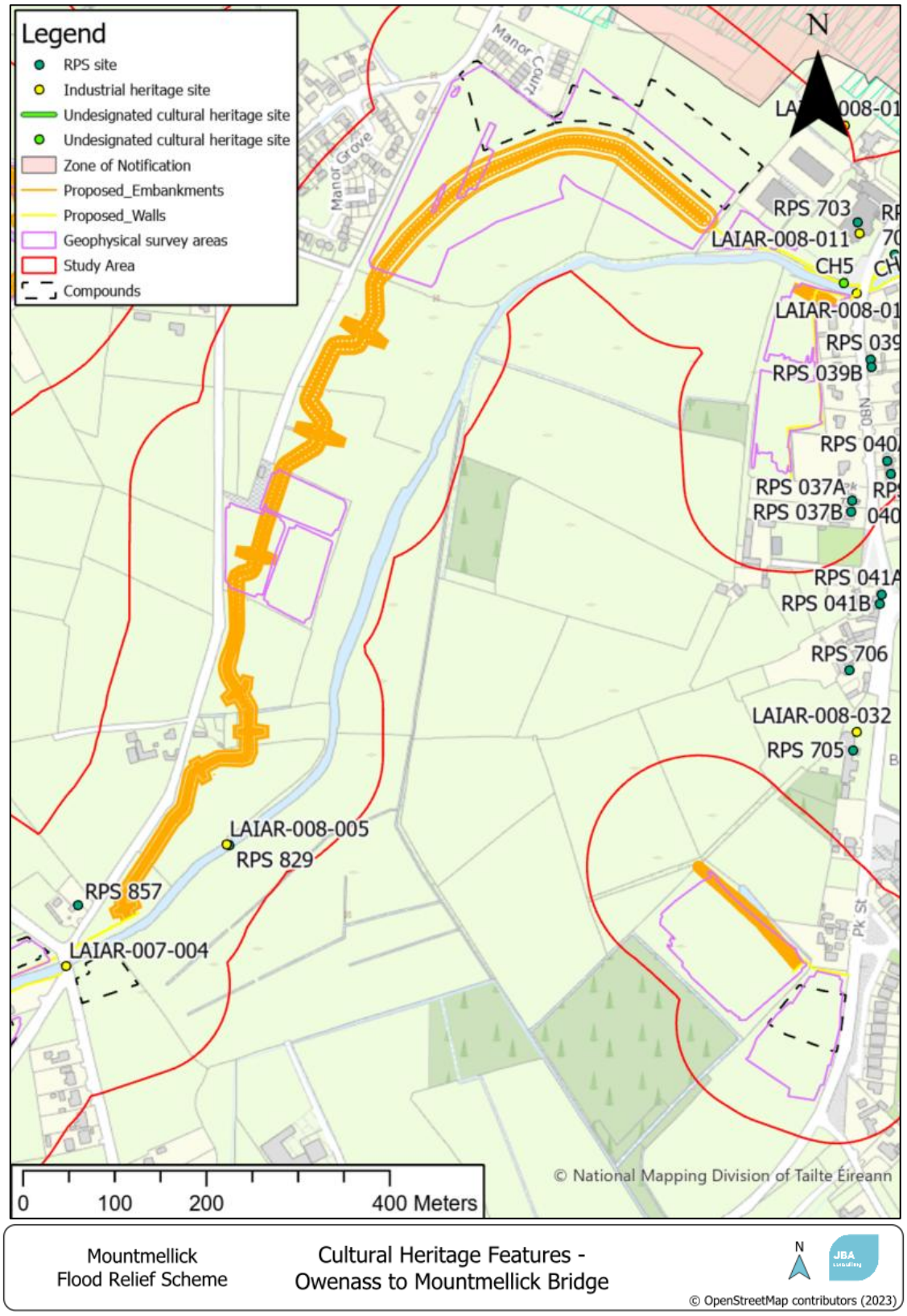


Figure 10-21: Cultural heritage features from Owenass Bridge to Mountmellick Bridge

10.5.3.2 Archaeological Impacts

There are no recorded archaeological monuments within 100m of this flood relief measure. The ZoN for the historic town of Mountmellick is over 110m north of the northern most end of the proposed embankment in Townparks.

A Geophysical survey was carried out in two areas of the flood embankment measure, comprising an area on the northern end of the proposed embankment in Townparks and the middle section of the embankment in Derrycloney (Figure 10-21). No features or anomalies of archaeological significance were identified in the areas surveyed, for the most part agricultural plough furrows and field boundaries were identified in the survey data.

The proposed flood wall to the rear of the properties on Pearse Street is in an area of land which was part of the demesne of the former Irishtown House. It was depicted as a demesne landscape in the Grand Jury Map of 1805 (Figure 10-6). While no features are depicted on historic maps at the site of proposed flood wall, it is possible that demesne features may survive within this area. It is also evident from historic mapping that a former road crossed the River Owenass via stepping stones, intersecting with the proposed embankment approximately 200m downstream from Owenass Bridge. It remained extant in the Revised Edition 6-inch map of 1911 but was removed in the 20th century. The Portlaoise-Mountmellick railway line depicted in the 25-inch map forms another feature of note in this area. The railway line is no longer extant and the only evidence of it at the time of field inspection was the former railway bridge (RPS 829), but evidence of it may survive beneath the surface which will be impacted by proposed embankments. A structure is depicted in the First Edition 6-inch OS map at the site of the northern construction compound adjacent to Manor Court but is no longer upstanding.

There is a potential (AP2) that previously unknown subsurface archaeological features, or remnants of the above-mentioned historic features, may be identified during the earthmoving works associated with this flood relief measure. In addition, as yet, undiscovered archaeological sites or finds associated with the riverine environment may be identified during the in-stream works or works along the river banks. Such archaeology may include fording points, evidence of milling or fishing weirs, etc., buried in the riverine deposits. Riverine deposits especially in rural environments can be rich in preserved organic material and stray artefacts/objects. AP2 is of Unknown significance with a Low magnitude of effect, resulting in an **Indeterminable, Adverse** effect.

The existing Mountmellick/Mill Bridge replaced a previous stone structure known as Irishtown Bridge (LAIAR-008-012). The existing bridge is aligned slightly to the east of the former structure. The underwater archaeological assessment described Mountmellick bridge as a modern concrete road bridge with wing walls constructed of concrete extending c. 5m eastwards on both sides, the survey did not identify any features associated with the former bridge structure (Section 10.2.8, Appendix .10.6 -Area 2). LAIAR-008-012 is of Low significance with a Negligible magnitude of effect, resulting in an **Imperceptible, Adverse** effect.

10.5.3.3 Built Heritage Impacts

There are eight protected structures within 100m of the proposed works in this area. Of these, six (RPS 037A, 037B, 039A, 039B, 829, 857) will not be impacted by the proposed flood relief measures, and existing vegetation and walls will provide screening from any potential visual impact. The standing stone sculpture (RPS 704) was assessed in the discussion of the Mountmellick Bridge to Convent Bridge area (Section 10.4.4). The flood measure is outside of the proposed ACA.

A former railway bridge over the River Owenass (RPS 829) is well screened by vegetation. In addition, the underside of the bridge deck is quite high and the water levels resulting from the design of the flood relief scheme are not predicted to reach the underside of the deck and there will be no change to the hydraulic loading on the structure. There will therefore be no impact to this structure.

While a thatched cottage (RPS 857) is quite close to the south end of the proposed embankment and flood wall at Owenass Bridge, the ground level of the farmyard is below the current road ground level and, between this and a dense hedgerow surrounding the property, it is not anticipated that there will be any visual impact on the structure. There will therefore be no impact to this structure.

The Mountmellick Development Centre (RPS 703), a late 19th century former steam flour mill, does not exhibit any historic character on the exterior. It is surrounded by a car park. Historic fabric can be seen on the interior, and part of the malt house complex survives to the north of the main building, beyond the view of the proposed flood relief measures. There will therefore be no visual impact from the proposed scheme to this protected structure.

A small section of a rubble stone wall and style (CH5), provides access to a footpath on the northern banks of the river on the west side of the bridge. It lies between a concrete wall and a pump house and is not readily noticeable. Historic mapping shows that the wall and the footpath is late 19th century, the footpath ran as far as the railway line/Manor Road. The style will be dismantled to facilitate the removal of an above ground pumping station and to provide construction access to the flood wall on the northern banks. The feature however will be reinstated as it was upon completion of the works and access to the northern banks of the river will be retained with a new footpath. The style is of Low significance with a Slight magnitude of effect, resulting in a **Slight, Adverse** effect.

The proposed walls and parapet of the upstream (west) side of the modern Mountmellick Mill Bridge, which is currently a metal rail will be cladded in reclaimed stone.

Owenass Bridge is recorded on the Industrial Heritage Survey (LAIAR-007-004) and is assessed in the discussion of the area upstream of Owenass Bridge (Section 10.4.2).

10.5.4 Mill Bridge to Convent Bridge

10.5.4.1 Proposed Development

The proposed development comprises the construction of a c.517m flood walls of 3.8m high along the north bank of Owenass River between Mill Bridge and Convent Bridge (Figure 10-22). It will also include the creation of a formalised flood plain to the south of the river, which include 227m of flood walls to a height of 1.9m on the south bank of the river and a flood wall measuring 965m in length and 3.1m high along the rear of Grove Park residential development. This will necessitate the removal of the retaining rubble stone walls along the southern bank (CH2), to allow the water to access and drain from the floodplain and the raising of an existing footpath. Flow control measures will be installed in an existing ditch between Grove Park and Clontygar Stream, and a proposed surface water pumping station will be installed north of Irishtown Road. A site compound will also be installed in the greenfield to the south of the river.

The new flood walls on the northern bank of the river will be stone clad with material salvaged from the stone wall which is due to be demolished (CH2), and with handrails as required.

Ground disturbance will be required for the construction of a site compound, diversion of utilities, the temporary diversion of land drains surrounding the proposed compound, tree removal, potentially the demolition of short sections existing boundary walls and retaining walls, and the construction of new flood walls. Topsoil removal will be required to construct the compound and to provide temporary access roads to the compound. Some of the flood walls along the riverbank will require instream works due to the lack of space in this area. It is not expected that the flood walls at Grove Park will require substantial instream works, except where the installation of new flow control devices and reinstatement of existing surface water connections will be. Instream works will be facilitated by a cofferdam sheet pile. Each segment of flood wall will be excavated to the required formation level / foundation depth, the depth of which will depend on ground conditions. The raising of the footpaths will first require excavation to formation level before installation of materials.

A demountable barrier will tie into the west (upstream) face Convent Bridge (RPS 701), a Protected Structure. The installation of the flood wall at the Children's Park will require the relocation of the standing stones sculpture (RPS 704).

Access and egress to the localised works on the northern bank will require access via the playground and existing property gardens. A potential access route and site compound may be available on the north bank within an existing greenspace, it will be accessed via the Mountmellick Arts centre carpark, to facilitate this some accommodation works will be required including the removal of short sections of existing boundary walls (Figure 10-22).

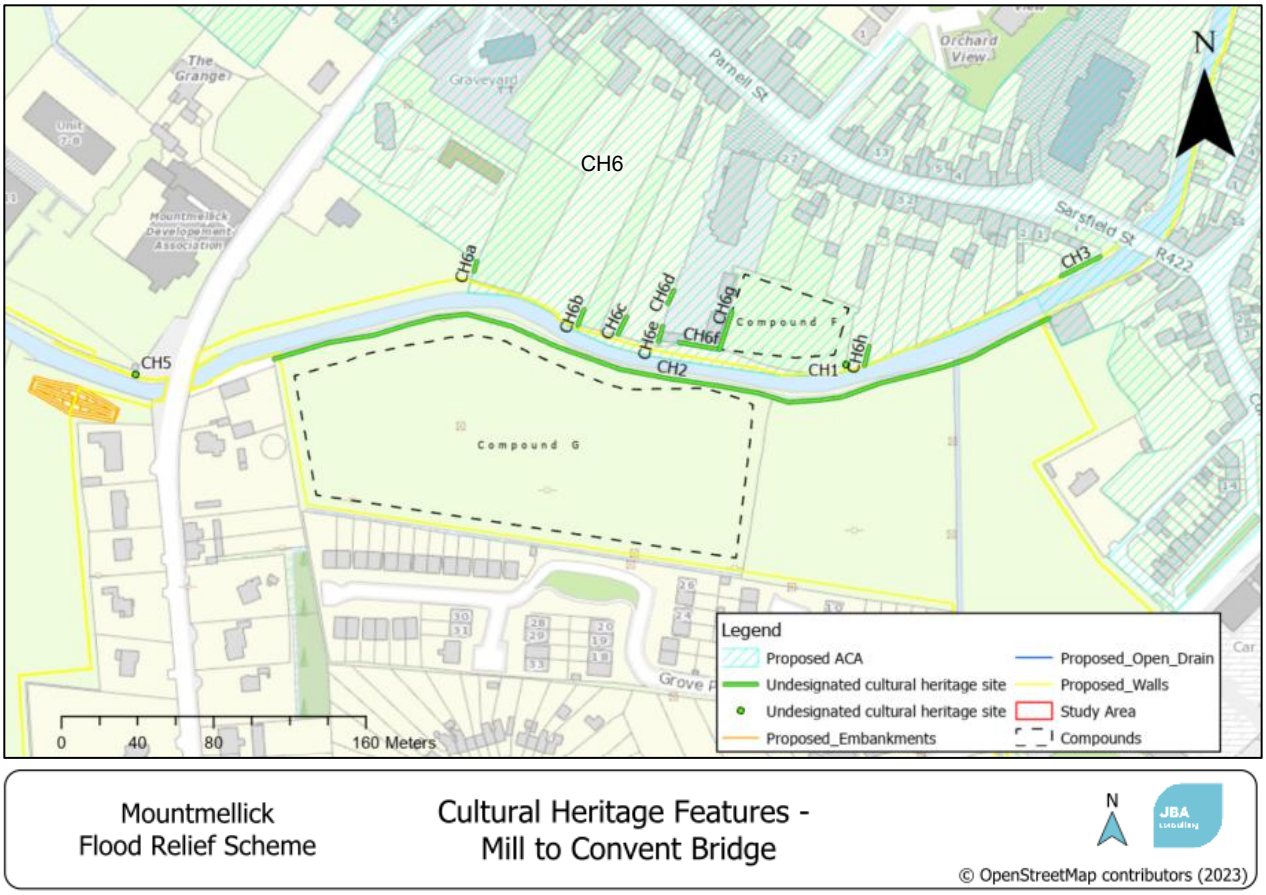


Figure 10-22: Cultural heritage features from Mill Bridge to Convent Bridge

10.5.4.2 Archaeological Impacts

The underwater archaeological assessment (Section 10.2.8, Appendix 10.5 -Area 2), sought to establish whether there was any evidence for town wall defences, earlier river crossings or any other features of an archaeological potential along the northern bank of the river. The survey established that the northern bank was mostly made of clay with some sections having retaining walls with concrete footings and were not of archaeological significance. The ruins of one structure (CH1) which was noted on the first edition OS map was recorded. On the southern side of the river a modern cut limestone river-retaining wall running from Mill Bridge to Convent bridge was identified, it was on a clay foundation and measured over 2m in height and just 0.30m deep. The survey did not identify any features of archaeological significance along this stretch of the Owenass River.

Despite the findings of the wade survey and baseline research there is a potential that, as yet, undiscovered archaeology associated with the riverine environment (AP3) may be identified during the in-stream works or works along the riverbanks associated with this flood relief measure. Such archaeology may include fording points, evidence of milling or fishing weirs, etc., buried in the riverine deposits. Riverine deposits especially in urban environments can be rich in preserved organic material and stray artefacts/objects. AP3 also

includes the Zone of Notification (ZoN) for the historic town of Mountmellick (RMP LA008-032) which extends to the north riverbank. Should a compound area be developed on the northern side of the river it would also be considered to be in an area of archaeological potential, as it is within the ZoN for the historic town. In addition, the compound area proposed in the undeveloped greenfield on the south side of the river is of unknown archaeological potential. There is a potential that subsurface archaeological features associated with riverine activity or with the development of the town may be identified during the earthmoving works required for the compounds.

All the works proposed in this measure is considered to have the potential (AP3) to uncover subsurface archaeological sites that are associated with the development of the town. AP3 and the ZoN of the historic town are of Medium significance with a Low magnitude of effect, resulting in a **Slight, Adverse** effect.

The proposed flood wall will be adjacent to the former brewery (LAIAR-008-054) on the north bank of the river. An overlay of historic mapping shows that the proposed flood wall will be located outside of the brewery site and there will therefore be no impact to the site.

10.5.4.3 Built Heritage Impacts

The flood walls on the northern bank and the eastern end of the flood measure are within the proposed ACA for Mountmellick. The streetscape will not be impacted by the proposed scheme, but the long garden plots reaching south from Parnell Street and Sarsfield Street are part of the character of this area, however there is no visibility from the main street into the rear gardens. These properties are generally either open to the river or separated by vegetation with occasional modern breeze block walls. One garden has an access platform to the riverbank, but access to the river will be maintained at this location. The grouping of historic structures comprising Convent Bridge (RPS 701), Presentation Convent (RPS 001) and St. Joseph's Church (RPS 002) is the most significant part of the ACA within the proposed FRS scheme. These structures are best viewed from west of Convent bridge. The view of these structures from the riverwalk on the southern bank of the Owenass river is mostly obscured by vegetation and is only intermittent through gaps (Plate 10-5), however from the east end of the riverwalk on the south bank of the river and on approach to Convent Bridge, the view opens out and captures the historic character and dominance of these structures in a way which is not possible from the streetscape (Plate 10-6). The proposed flood walls are not high enough to block this view, but they will slightly alter it, this however will not detract from the view or the ACA. The new flood walls will be clad in reused stone. The ACA is of Medium significance with a Negligible magnitude of effect, resulting in a **Not Significant, Adverse** effect.



Plate 10-4: View downstream towards the ACA midway along the public path alongside the river



Plate 10-5: View from river path of historic structures in ACA from the public path upstream from Convent Bridge

There are eleven protected structures within 100m of the proposed works in this area. Of these, eight protected structures (RPS 001, RPS 002, RPS 003, RPS 004, RPS 005, RPS 039A, RPS 039B, RPS 707) will not be impacted by the proposed flood relief measures, and existing vegetation and walls will provide screening from any potential visual impact. The Mountmellick Development Centre (RPS 703) will be assessed in the discussion of the Owenass Bridge to Mountmellick Bridge area (Section 10.4.3).

Short sections of property boundary walls (CH6) on the northern banks of the river may be required to be temporarily removed for construction access, the walls comprise a mix of modern and rubblestone but are overgrown with vegetation. The walls are not associated with protected structures but are located inside the ACA and may date from the 17th century. The walls are in the back lands to the rear of the buildings and will not impact the character of the ACA. The walls are of Medium significance with a Low magnitude of effect, resulting in a **Slight, Adverse** effect. When construction is complete the boundary walls will be rebuilt to match the original wall construction in accordance with the specification of a conservation engineer.

Convent Bridge (RPS 701; Plate 10-6) is not immediately obvious as an historic built heritage feature from within the streetscape. This is because there is a lack of locations to view the structure from, and the east (downstream) face and parapet have been replaced with modern material in c. 1980. As noted above, it is best viewed from the river path amenity from the upstream side. A proposed demountable barrier is proposed to tie into the western end of the bridge wall where there is an existing access ramp to the river (Figure 10-23). The tie-in is proposed in a discrete location, a location that is currently overgrown with vegetation. It will not detract from the structure nor impact on its heritage; it will not be visible from within the ACA and is only visible in relation to the whole structure when passing on the riverside path on the southern bank. Convent Bridge is of Medium significance with a Low magnitude of effect, resulting in a **Slight, Adverse** effect.

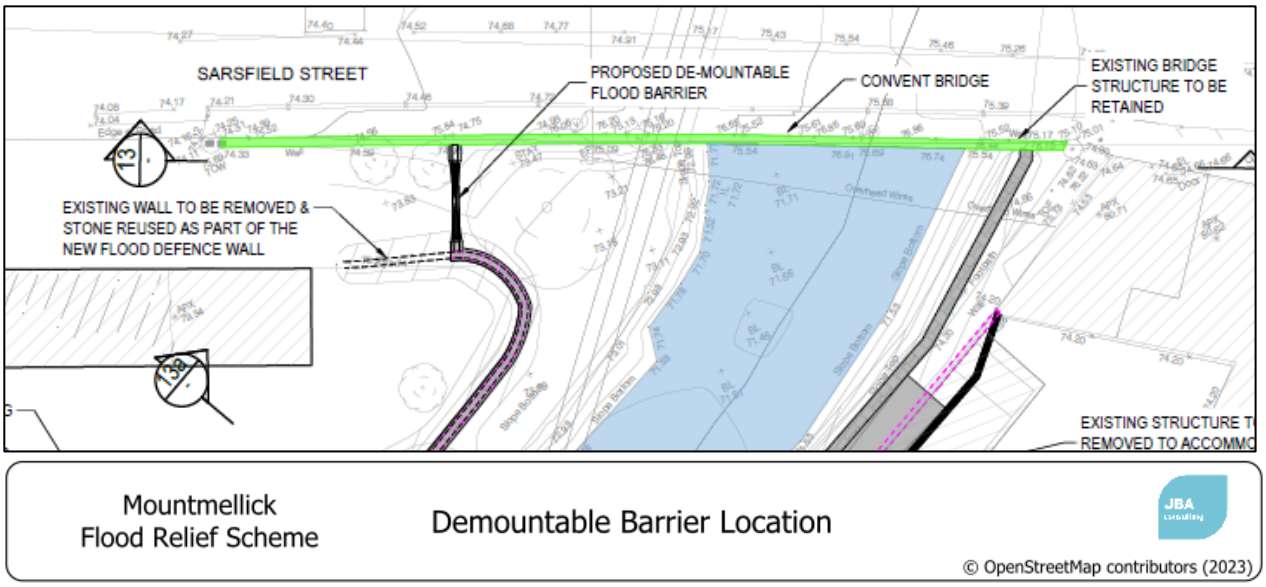


Figure 10-23: Location of the proposed demountable barrier at Convent Bridge

A sculpture in the Children's Park (RPS 704) which dates to the 1990s will require relocation in order to facilitate a new flood wall in this area. This modern sculpture is located in a corner of the park, in view of the road. The river does not appear to contribute to the setting of this feature, and it can therefore be moved with no significant impacts. The sculpture is of Medium significance with a Low magnitude of effect, resulting in a **Slight, Adverse** effect.

Some upstanding walls of a ruinous structure survive at the end of one of the Sarsfield Street gardens along the north riverbank (CH1). They are part of a structure depicted on the 25-inch OS map of 1909 along a former laneway named 'Pop Street'. A modern concrete revetment is located at the base of the wall. The ruinous structure is not publicly accessible and can only be partially viewed through vegetation from the opposite bank of the river. The flood wall will run inside this wall and as such it will be retained in-situ and not impacted by the flood works.

A river wall extends along much of the south (right) bank of the river, on the south side of the existing footpath (CH2). The wall and footpath are early-mid 19th century in date. It is associated with the provision of a new public access between Mill Bridge and Convent Bridge (see Appendix 10.4.4 – CH2) after the breakup of the Irishtown Demesne which held all the lands to the south of the river until the early 19th century. The path is part of the amenity of the town and is well used by the local population. The wall varies in height from c. 0.8-1.6m and is constructed from fairly regularly coursed limestone. As part of the FRS measure the wall will be reduced to ground level and its location will be retained in situ, it will be possible to see the path of the wall as the wall foundation will be flush with the ground and pinned with flat stone. A c.10m section of the wall at the Mill Bridge end will be retained for record purposes, this section will be repaired in accordance with the methodology and specification of the project's conservation engineer (Appendix 10.7). The stone from this wall will be reused elsewhere in the scheme to clad the new flood walls. The wall is of Low significance with a High magnitude of effect, resulting in a **Moderate, Adverse** effect.

A stone boundary wall (CH3) delimits a property on the north bank of the river immediately upstream from Convent Bridge. The wall generally appears to be modern in character, but some coursing at the base of this feature suggests that it incorporates part of an older structure. Indeed, historic mapping seems to indicate that a wall was in this location and that it has been altered to curve around the modern properties following the demolition of the structures depicted on historic mapping. This attractive wall is within the ACA, while of limited historic value it nonetheless contributes to the setting of the cluster of protected structures at Convent Bridge and on the approach to the bridge from the public path south of the river. It will be

removed, and the stone fabric reused in the cladding of the new flood wall as per the same specifications as the other flood walls along the scheme (Appendix 10.7).

10.5.5 Downstream of Convent Bridge

10.5.5.1 Proposed Development

The proposed development comprises the construction of a flood wall along the east (right) bank of the Owenass River to the rear of the properties on Lord Edward Street. The flood wall measures 165m in length and up to 2.4m high (Figure 10-24). It will be clad on both facades with material salvaged from another stone wall (CH2), with handrails as required. The site compound may be located in a greenspace adjoining Kirwan Park.

Ground disturbance will be required for the construction of a site compound, diversion of utilities, temporary diversions along the River Owenass and construction of the flood wall. Topsoil removal will be required to construct the compound and to provide temporary access roads to the compound. The required wall extent will be excavated as required and micro piles, sheet piles supporting ground beams and footings will be installed.

Due to limited space, instream works will be required to construct the wall along the bank, and to facilitate tree removal. A cofferdam will be installed for the duration of excavation works to create a temporary dry working area within the existing river.

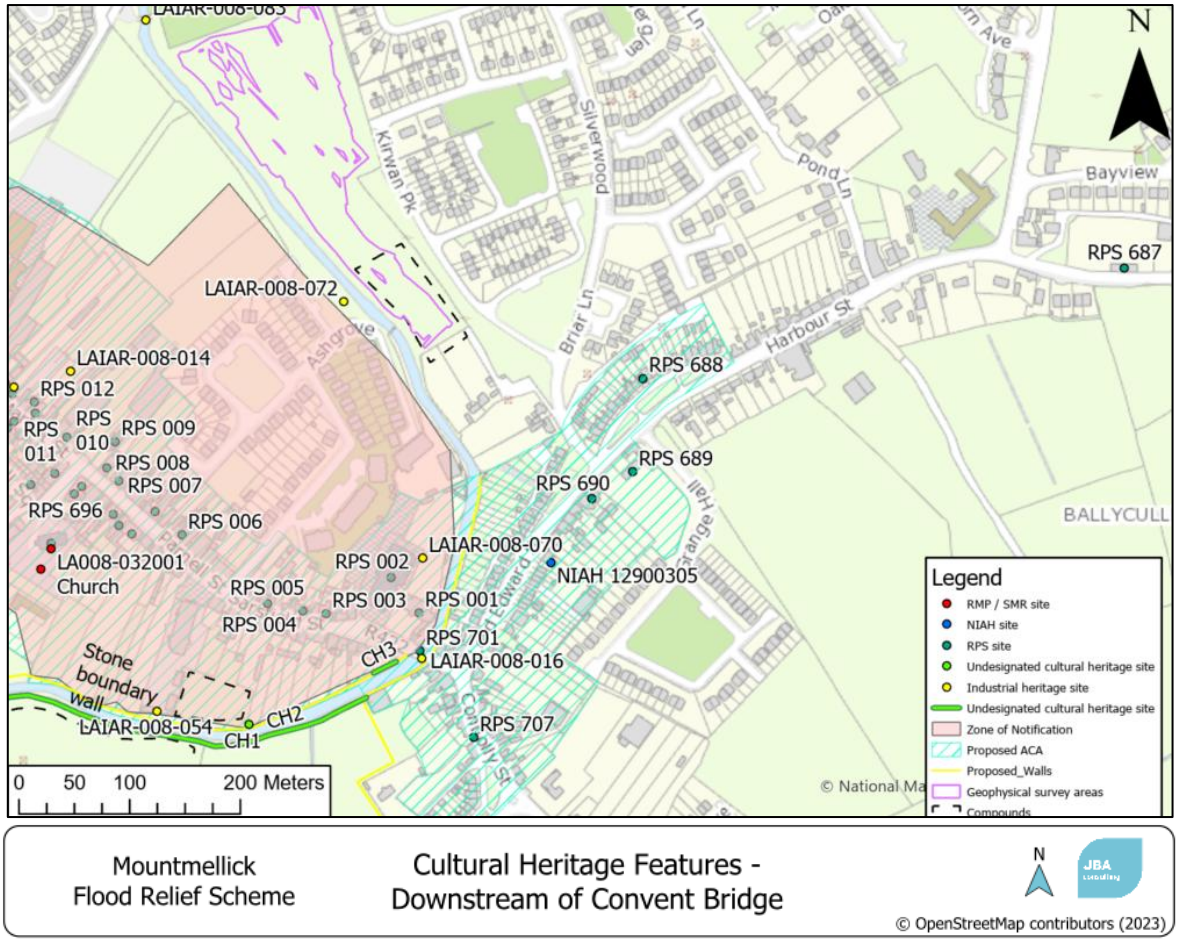


Figure 10-24: Cultural heritage features Downstream of Convent Bridge

10.5.5.2 Archaeological Impacts

While this flood relief measure area is outside of the ZoN for the historic town (RMP LA008-032), it is clear from the Down Survey map of 1656-8 (Figure 10-4) that not only was there a bridge at the site of Convent Bridge, but there was a small amount of settlement activity on the east side of the river at that time along with a large mill pond associated with an iron mills further downstream. By the 19th century, the site of the proposed flood wall comprised the back gardens of properties facing Lord Edward Street. Stepping stones are also indicated on the 25-inch map of 1909.

The underwater archaeological assessment did not identify any features of archaeological interest along this stretch of river, a modern culvert was recorded, and the metal detection noted a steel spoon (Section 10.2.8, Appendix 10.5 -Area 1). However, it should be noted that due to survey conditions it was not possible to survey the entire extent of the FRS measure.

Despite the findings of the wade survey and baseline research there is a potential that, as yet, undiscovered archaeology associated with the riverine environment (AP4) may be identified during the in-stream works or works along the riverbanks associated with this flood relief measure. Such archaeology may include fording points, evidence of milling or fishing weirs, etc., buried in the riverine deposits. Riverine deposits especially in urban environments can be rich in preserved organic material and stray artefacts/objects. AP4 is of Unknown significance with a Low magnitude of effect, resulting in an **Indeterminable, Adverse** effect.

10.5.5.3 Built Heritage Impacts

This area is partially within the proposed ACA for Mountmellick which was assessed in Section 10.4.4. There are five protected structures and one NIAH only site within 100m of the proposed works in this area (RPS 001, 002, 690, 701, 707; NIAH 12900305) and an additional industrial heritage site (LAIAR 008-070) (Figure 10-24). The measure is located along the rear property boundaries of the 19th century redbrick artisan houses fronting Lord Edward Street, which are part of the ACA. They have long back gardens bound to the rear with informal and inconsistent river boundary walls and fences of limited heritage value, the river and the boundary treatments can only be seen from the downstream side of Convent Bridge and cannot be seen from Lord Edward Street. These boundaries do not inform or enhance the character of the ACA.

The downstream view from the Convent bridge (RPS 701), albeit the modern extension of the bridge, captures the Presentation Convent (RPS 001), and St. Joseph's Church (RPS 002) on the west bank of the river which dominates the views at this end of the town. While the flood relief measure will result in changes to the views experienced within the ACA (view downstream of Convent Bridge), the change will not have an effect that would adversely impact on the architectural heritage character of the ACA at this end of the town.

The proposed floodwall on the east bank will be cladded on both sides with local stone salvaged (or similar locally sourced stone) from the stone wall being dismantled from the Mill Bridge to Convent Bridge measure (CH2). The new stone wall will enhance the view of the river downstream from Convent Bridge, which currently comprises modern irregular boundaries of random styles and fabric; the Convent and Church will remain the dominant feature in the view from the bridge. A method statement and specification for the building new relief wall cladding and capping has been developed by the projects conservation engineer and is provided in Appendix 10.7 with sketches.

10.5.6 Manor Road and Manor Court

10.5.6.1 Proposed Development

The proposed development will comprise the construction of a flood embankments totalling 714m in length and up to 2.1m high to the west of Manor Mills and along Manor Road (Figure 10-25). A culvert will be installed in the Pound Stream to facilitate an existing land drain which flows into it, and a flow control measure will be installed. It is proposed to install a site compound in a field to the west of the embankment.

Ground disturbance will be required for the construction of a site compound, tree removal, temporary diversion of land drains and the construction of flood walls and embankments. Topsoil removal will be

required to construct the compound and to provide temporary access roads to the compound. The proposed flood wall will be excavated up to the required foundation depth, with the depth depending on ground conditions. A temporary flow channel will be installed followed by excavation to formation level to accommodate the installation of a new culvert. The extent of the proposed embankment will be stripped of topsoil and then excavated to foundation depth. Instream works will be required across the Pound Stream and land drains to facilitate construction of culvert crossings, with temporary diversions of the stream also installed.

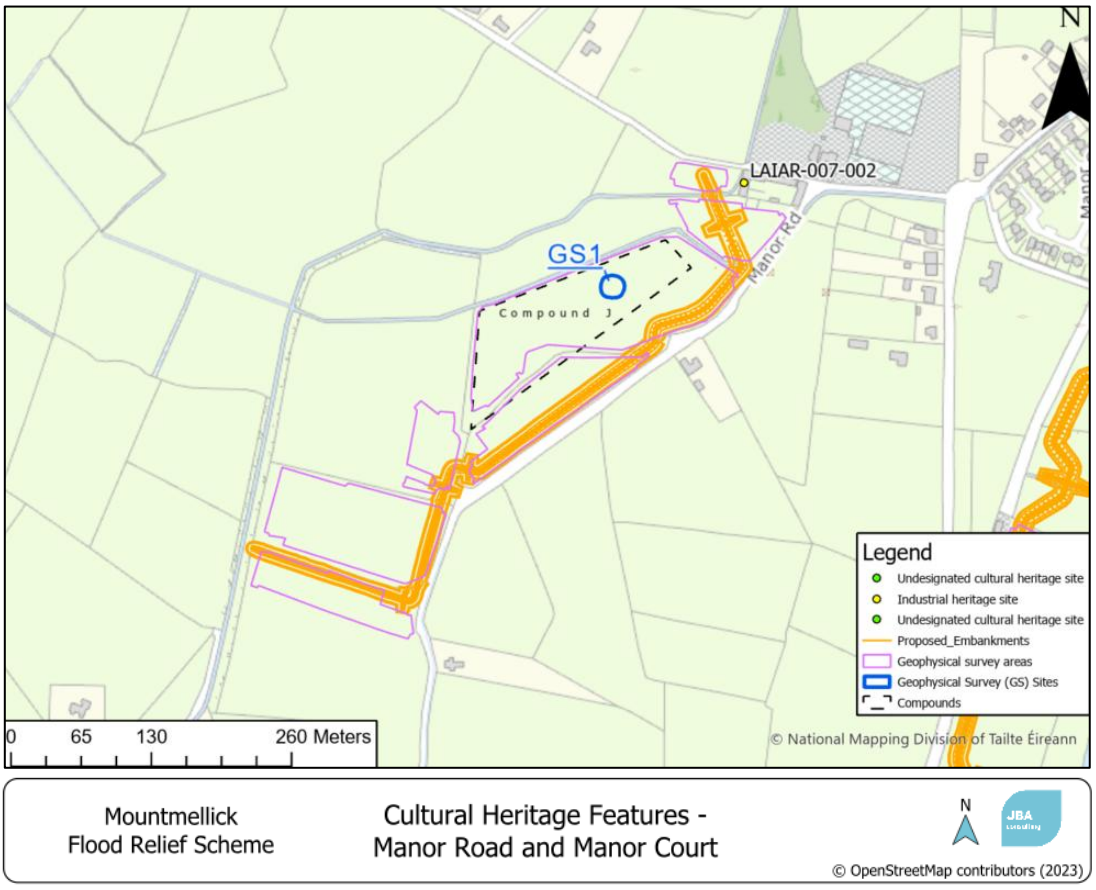


Figure 10-25: Cultural heritage features at Manor Road and Manor Court

10.5.6.2 Archaeological Impacts

There are no recorded archaeological monuments within 100m of the proposed flood relief measure. A geophysical survey of the flood measure identified a sub-circular ring approximately 14m in diameter of pits was identified in the area of the proposed compound (GS1, Figure 10-17). Whist the geophysical survey did not reveal any other features of archaeological potential, it did suggest the presence of turf cutting activity in the form of linear furrows. GS1 is of Unknown significance with a Low magnitude of effect, resulting in an **Indeterminable, Adverse** effect.

The GSI indicates that this area is cutover raised peat. Due to the anaerobic environment and acidity in peatland deposits, objects, including organic matter such as wood and leather, can be preserved, which is not typically the case in terrestrial archaeological conditions. There is a potential that the earthmoving works associated with the embankments, flood walls and compounds (AP5), may identify previously unknown archaeological sites or features, based on the geophysical survey results any features that might be present are most likely to be small in scale and isolated. The proposed embankment will cross Garroon Stream and the Pound Stream and the site of a former sawmill which is no longer which was associated with Manor Mills. The Garroon Stream functioned as the head race to Manor Mills. The instream works also have the potential to reveal riverine features and waterlogged material. AP5 is of Unknown significance with a Low magnitude of effect, resulting in an **Indeterminable, Adverse** effect.

10.5.6.3 Built Heritage Impacts

There are no protected structures or NIAH sites within 100m of this flood relief measure. There is one built heritage asset, Manor Mills (LAIAR-007-002), just north and east of the proposed embankment. While is not a Protected Structure or listed by the NIAH, it is recorded on the Industrial Heritage Survey and is an attractive complex of mill buildings, the industrial heritage survey gave the site a local significance rating as the structure was not considered special enough to warrant statutory protection (Hamond 2005[161]). Its historic character is maintained through its setting on a laneway which separates it from Manor House, which was once the residence of the mill master. Its buildings are arranged in an enclosed courtyard with an inward-looking setting that is now being used as a farmyard. The embankment is located in the agricultural fields to the rear and east of the structure with minimal visual impact, while there will be a change in the immediate setting of the structure the presence of the embankment will not detract from the industrial character of the structure. The mill is of Low significance with a Low magnitude of effect, resulting in a **Not Significant, Adverse** effect.

10.5.7 Garroon Stream

10.5.7.1 Proposed Development

The proposed development comprises an embankment of c. 246m length measuring up to 1.3m high located to the southwest of the existing properties and adjoining fields, and a reinforced concrete flood wall c. 92m in length and 1.9m high along the Garroon Stream (Figure 10-26). A construction compound is proposed for the agricultural lands west of the former railway station.

Ground disturbance will be required for the construction of a temporary access road and site compound, tree felling and the construction of flood defences. Topsoil removal will be required to construct the compound and to provide temporary access roads to the compound. The line of the flood walls will be excavated to foundation depth, with the depth depending on ground conditions. The flood walls will be supported by in situ piles and where groundwater cut-off is required sheet piles will be installed. The extent of the proposed embankments will be stripped of topsoil before excavations to foundation depth.

Instream works may be required for the construction of the flood wall adjacent to Garroon Stream.

[161] Hamond, F. (2005) '*Mills of Co. Laois: An Industrial Heritage Survey*'. The Heritage Council

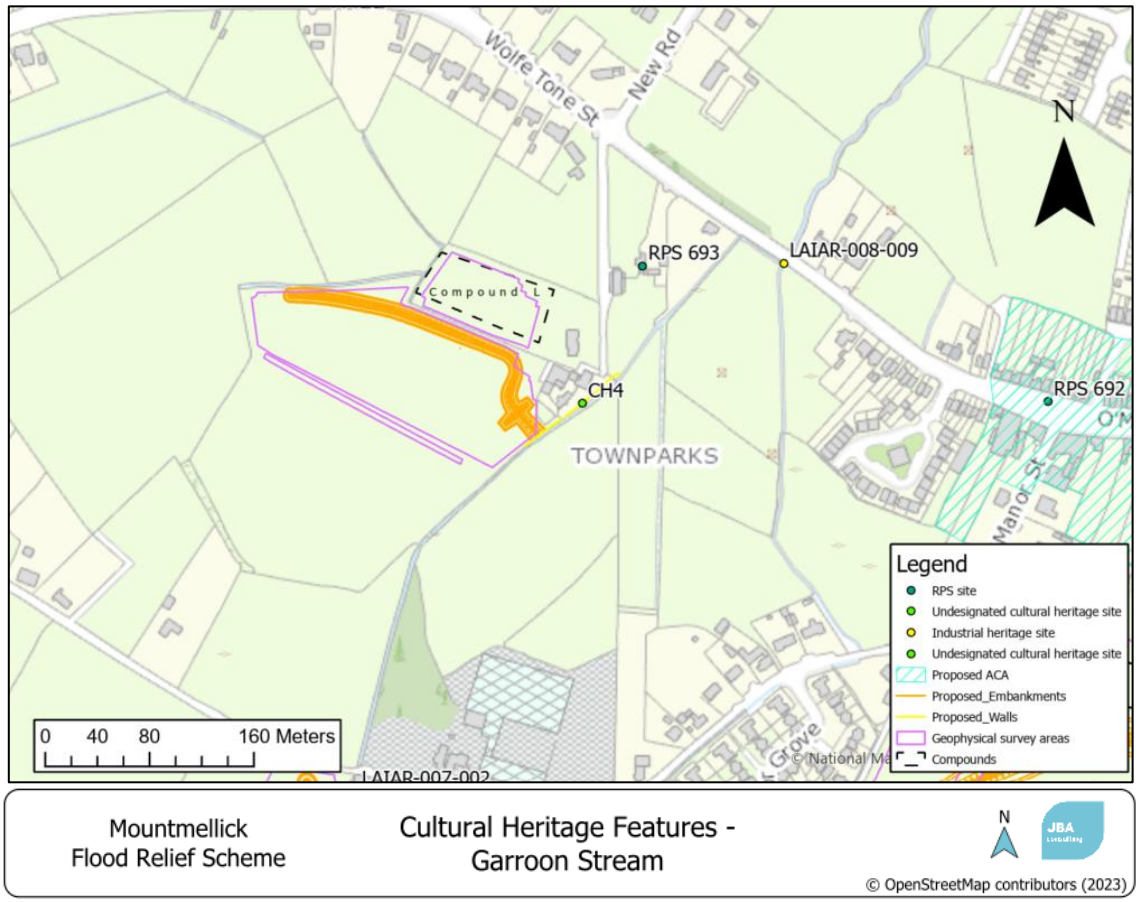


Figure 10-26: Cultural heritage features at Garroon Stream

10.5.7.2 Archaeological Impacts

A geophysical survey of the greenfields within the measure (Section 10.2.9, Appendix 10.6 –Area 2 (north)) did not reveal any features of archaeological potential. Agricultural furrows were found across much of the area. The flood measure however is an area of cut over raised peat which has been improved. Peatlands can be repositories of archaeological features and finds. There is a potential that the earthmoving works associated with the embankment, flood wall and compound may identify previously unknown archaeological sites or features, based on the geophysical survey results which did not identify any anomalies that were considered to be of archaeological potential any features that might be present these features are most likely to be small scale isolated and ephemeral. The flood measures are considered to be in an area of archaeological potential, AP6, is of Unknown significance with a Low magnitude of effect, resulting in an **Indeterminable, Adverse** effect.

Garroon Stream is labelled ‘Mill race’ on historic maps as it functioned as the tail race of Manor Mills which is located 280m to the south (see Manor Mills Flood Measure). This is confirmed by the underwater assessment which identified a drystone limestone retaining wall (CH4) on the east bank of the river (Section 10.2.8, Appendix 10.5 -Area 4 (F12)). The feature is of local industrial heritage significance. The former tail race wall (CH4) on the eastern bank of the Garroon Stream is of is of Low significance with a Low magnitude of effect, resulting in a **Slight, Adverse** effect.

The former Mountmellick Branch of the Great Southern & Western Railway crossed immediately downstream of the proposed defences. It is no longer extant, but some related features may remain, and evidence of the railway may survive beneath the surface. At the time of the site inspection one timber sleeper was visible where the ground surface had eroded, which suggests that others may still be present subsurface.

10.5.7.3 Built Heritage Impacts

There is one Protected Structure within 100m of this area of the proposed flood scheme. The former railway station (RPS 693) is located between the proposed works and Wolfe Tone Street. It comprises a group of buildings, with the closest being the former goods shed which is of industrial heritage character. The group of buildings are visually removed from the proposed works and screening from adjacent houses and vegetation will obscure much of the flood wall from view, with only the end of it visible. The railway station is of Medium significance with a Negligible magnitude of effect, resulting in an **Imperceptible, Adverse** effect.

On the west side of the flood wall and north of the embankment is a range of three farmhouses with farm buildings. The earliest was a derelict 18th-19th century vernacular single storey limestone cottage with a slate roof, built immediately to the north of this was a 1950s bungalow farmhouse and late 20th century single-story house and they are surrounded by agricultural sheds these are not considered to be of cultural heritage merit. These structures will be defended from future flood events.

10.5.8 Clontygar Stream to Davitt Road

10.5.8.1 Proposed Development

The proposed development comprises the construction of flood walls from Irishtown Road to the rear of Brockview, measuring up to 1.5m high and 475m long. The existing Clontygar Stream will be diverted to facilitate the construction of the proposed flood wall. The stream diversion will entail the construction of a new stream channel of 445m length and c. 6m width to replace the existing stream. The site compound is proposed for the fields to the west of the proposed works (Figure 10-27).

Ground disturbance will be required for the construction of a site compound, diversion of utilities, temporary diversion of land drains and the diversion of Clontygar Stream. Topsoil removal will be required to construct the compound and to provide temporary access roads to the compound. Topsoil will also be removed within the extent of the proposed stream diversion, followed by excavation to the proposed channel formation level. Adjoining embankments will be reinstated, and new culvert sections and a headwall will be installed in the channel diversion. Foundations will be excavated for the proposed new flood wall up to the required depth. Instream construction is expected following the diversion of the stream.

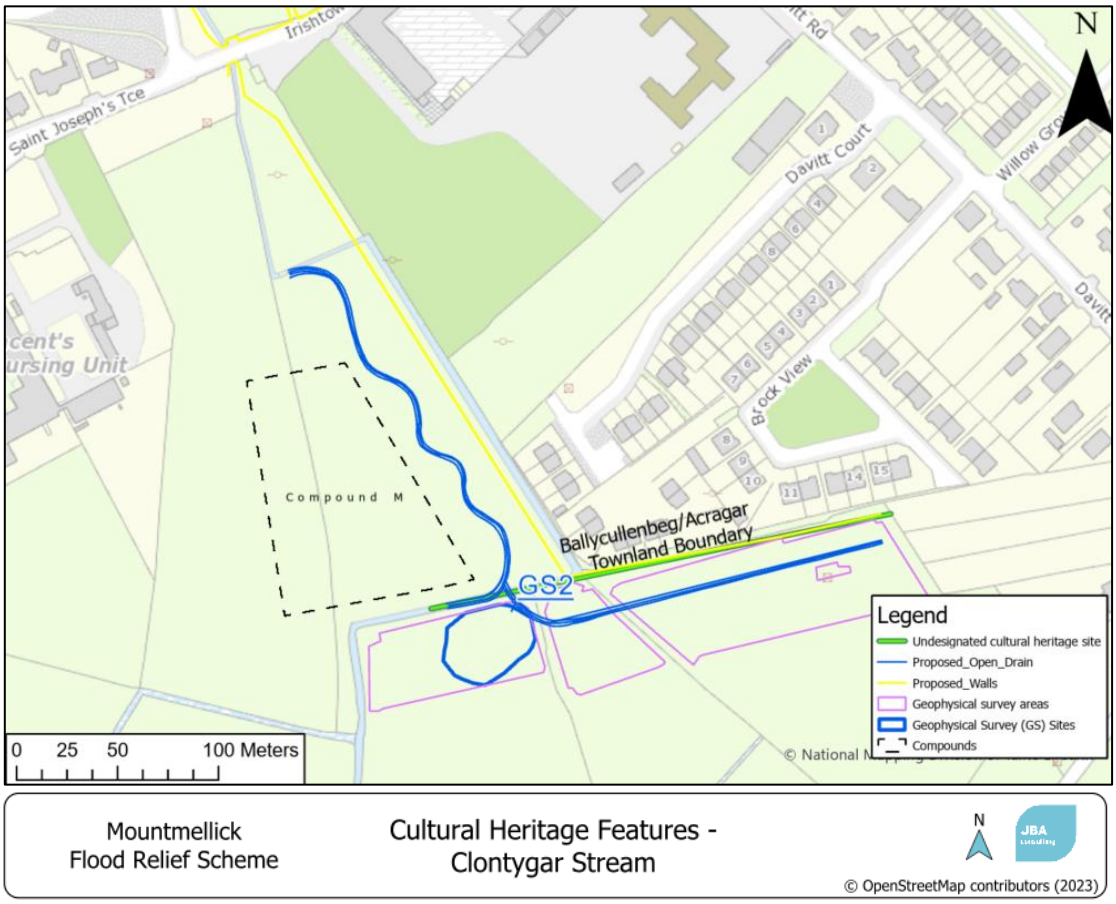


Figure 10-27: Cultural heritage features at Clontygar Stream

10.5.8.2 Archaeological Impacts

There are no recorded archaeological monuments within 100m of the proposed flood relief measure. A geophysical survey of the southern end of the flood measure identified a large area (c. 43m N-S by 38m E-W) of irregular pit-type anomalies were identified (GS2). These are located just south of the point where the proposed realigned stream runs north and west. The construction works associated with the proposed open drain will have a direct impact on these features. GS2 is of Unknown significance with a Low magnitude of effect, resulting in an **Indeterminable, Adverse** effect.

The existing stream forms the Ballycullenbeg/Acragar townland boundary (CH8), it is evident that the Clontygar Stream has been straightened in the past, and the original course and any potentially related features may be impacted by flood relief works. A former structure is also depicted on First Edition 6-inch OS mapping along Irishtown Road where the flood wall is proposed. Additional subsurface features may be located in the undeveloped greenfield areas where geophysical survey was not carried out and may be revealed during the earthmoving works for the flood measure. The anticipated instream works also have the potential to reveal riverine features and waterlogged material. This measure is considered to be in an area of archaeological potential (AP7). AP7 is of Unknown significance with a Low magnitude of effect, resulting in an **Indeterminable, Adverse** effect.

10.5.8.3 Built Heritage Impacts

No built heritage receptors are recorded in this area and no undesignated cultural heritage features were identified in the course of field survey.

10.5.9 The Garden Centre (Irishtown Garden Centre)

10.5.9.1 Proposed Development

The proposed development comprises the construction of an embankment c. 155m in length and up to 800mm high in the agricultural fields to the west of the Irishtown Garden Centre (Figure 10-28). A flood wall will run from the embankment to the N80 Irishtown Road for a distance of c. 70m and measuring up to 1.3m high.

Ground disturbance will be required for the development of the site compound and the construction of the embankments and flood walls. Topsoil removal will be required to construct the compound and to provide temporary access roads to the compound. The flood walls will be excavated to the required depth, with the depth depending on ground conditions. The extent of the proposed embankments will be stripped of topsoil before excavations to foundation depth. There are no instream works proposed in this flood measure.

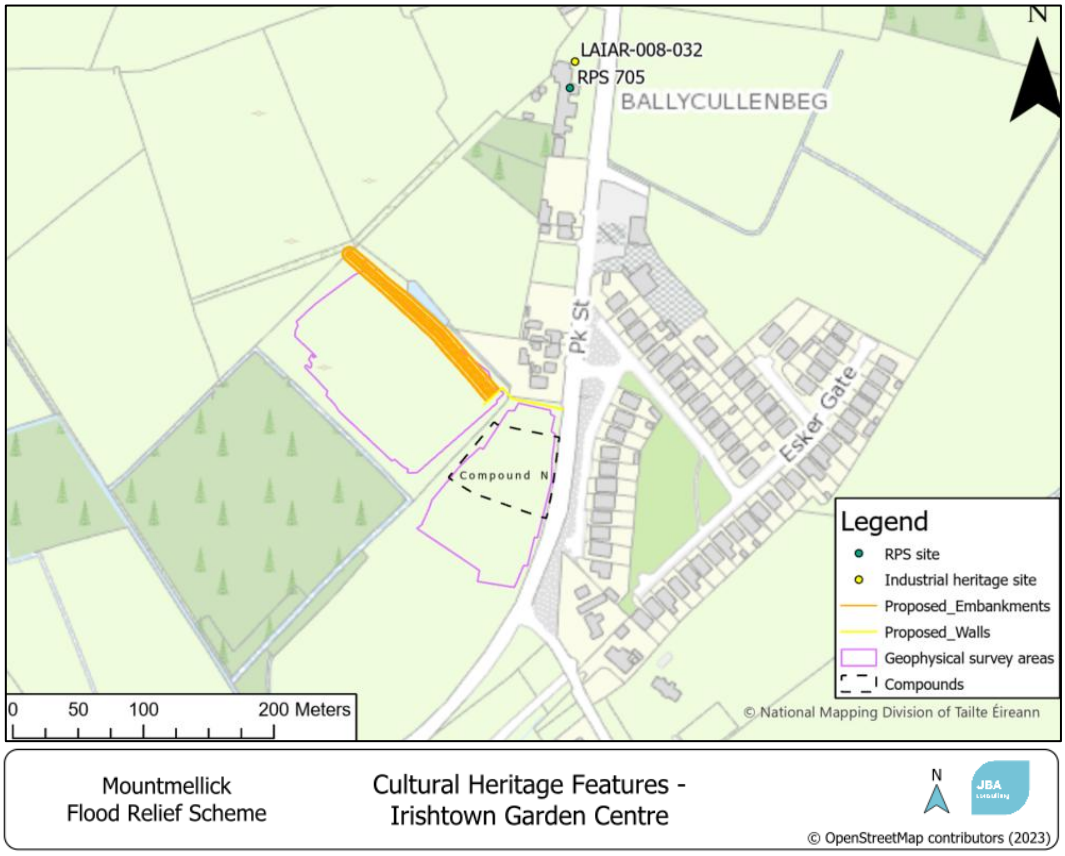


Figure 10-28: Cultural heritage features at Irishtown Garden Centre

10.5.9.2 Archaeological Impacts

There are no recorded archaeological monuments within 100m of the proposed flood relief measure. A geophysical survey of the location of the flood measure did not identify any features of archaeological potential in this survey area.

A pond is located to the north of the proposed embankment. This may have functioned as a millpond for the former woollen factory and Irishtown Maltings which was located to the north of this area. It was also within the former demesne lands associated with Irishtown House. Fieldwork revealed that a slight linear depression runs alongside the field boundary where the embankment is proposed. It is possible that this was a pathway associated with the pond. As with the other greenfield areas there is a potential that the earthmoving works associated with the embankments, flood walls and compounds, may identify previously unknown archaeological sites or features (AP8). Based on the geophysical survey results any features that

might be present at the flood relief measure are most likely to be small in scale and isolated. AP8 is of Unknown significance with a Low magnitude of effect, resulting in an **Indeterminable, Adverse** effect.

10.5.9.3 Built Heritage Impacts

No built heritage receptors are recorded in this area and no undesignated cultural heritage features were identified in the course of field survey.

10.5.10 Midland Steel

10.5.10.1 Proposed Development

The proposed development will comprise the construction of a flood wall along the existing western boundary of the property, measuring c. 428m long and 1.4m high. It is proposed to install a site compound in the field to the west of the site (Figure 10-29).

Ground disturbance will be required for the construction of a site compound and temporary access road, utility diversions, temporary diversion of existing land drain and the construction of the flood wall. Topsoil removal will be required to construct the compound and to provide temporary access roads to the compound. Access from the construction compound will require the temporary removal of land boundaries, including embankments. Flood walls will be excavated up to the required foundation depth. Instream works will be required for the diversion of a land drain.

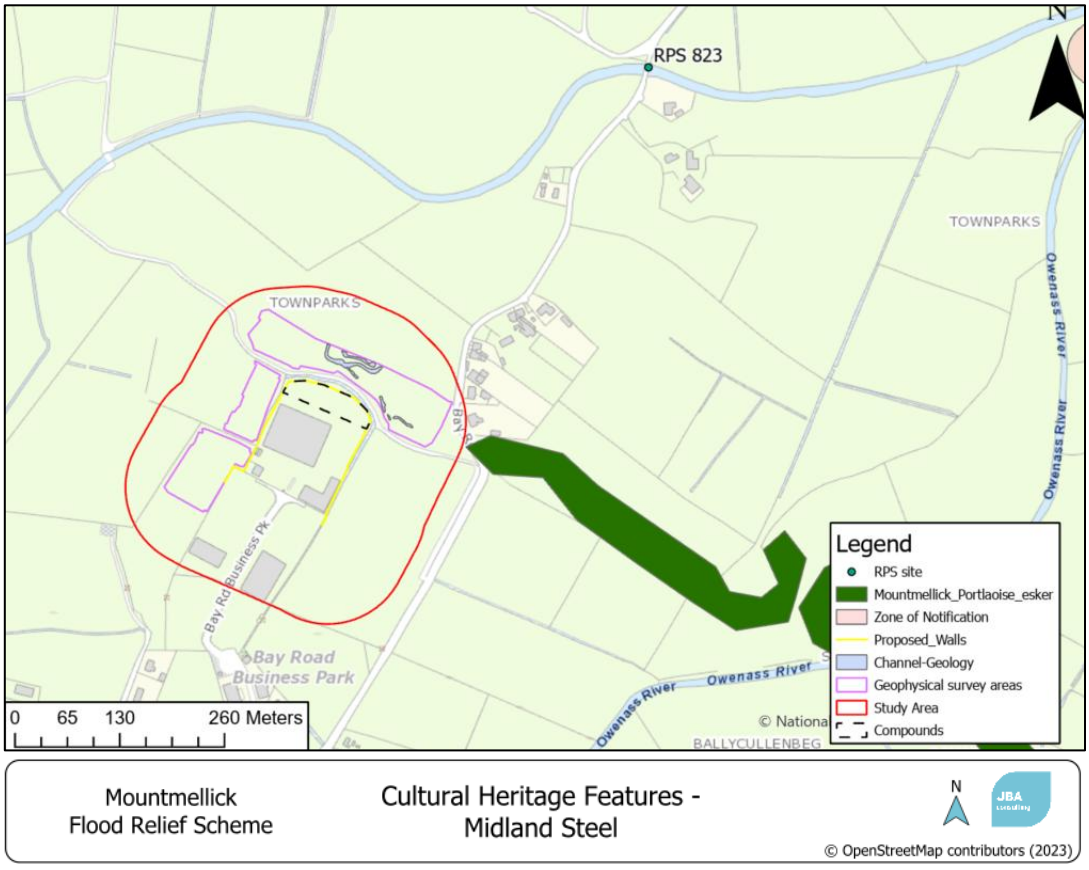


Figure 10-29: Cultural heritage features at Midland Steel

10.5.10.2 Archaeological Impacts

Geophysical survey did not identify any features or anomalies of archaeological potential within the greenfield areas of the flood measure. A paleochannel however was identified to the north, which may have attracted activity in the past and there is also a general greenfield archaeological potential associated with a riverine environment (AP9). The paleochannel is interesting as the Mountmellick-Portlaoise esker falls just

short of the site to the east (Figure 10-29). There is a potential, which based on the geophysical survey is low, that small scale and isolated archaeological features might be identified during the earthmoving works for this flood relief measure. AP9 is of Unknown significance with a Low magnitude of effect, resulting in an **Indeterminable, Adverse** effect.

10.5.10.3 Built Heritage Impacts

No built heritage receptors are recorded in this area and no undesignated cultural heritage features were identified in the course of field survey. There will be no built heritage effects.

10.5.11 Do-Nothing Scenario

In a Do-Nothing Scenario, flooding will continue to occur in Mountmellick resulting in the degradation of the built heritage environment including to the proposed ACA, Protected Structures and NIAH sites.

10.5.12 Summary of impacts

The table below lists the potential effects to the cultural heritage features identified during the study. A glossary of impacts as defined by the EPA (2022) is provided in Appendix 10.3. The assessment has been carried out according to best practice and guidelines relating to archaeological and architectural heritage assessment (Appendix 10.1).

Table 10-8: Potential effects to cultural heritage receptors – pre-mitigation

CH ref.	FRS Measure	Significance / Sensitivity Value	Magnitude of Effect	Quality of Effect	Significance of Effect	Duration
AP1 (Riverine environment)	Upstream of Owenass Bridge & Owenass Bridge	Unknown	Low	Adverse	Indeterminable	Permanent
AP2 (Riverine environment, railway & demesne landscape)	Owenass Bridge to Mountmellick Bridge	Unknown	Low	Adverse	Indeterminable	Permanent
AP3 (Riverine environment & ZoN RMP LA008-032 historic town)	Mill Bridge to Convent Bridge	Medium	Low	Adverse	Slight	Permanent
AP4 (Riverine environment)	Downstream of Convent Bridge	Unknown	Low	Adverse	Indeterminable	Permanent
AP5 (Riverine environment & milling activity)	Manor Road	Unknown	Low	Adverse	Indeterminable	Permanent
AP6 (Riverine environment & railway)	Garroon Stream	Unknown	Low	Adverse	Indeterminable	Permanent
AP7 (Riverine environment)	Clontygar Stream	Unknown	Low	Adverse	Indeterminable	Permanent

CH ref.	FRS Measure	Significance / Sensitivity Value	Magnitude of Effect	Quality of Effect	Significance of Effect	Duration
AP8 (Riverine environment)	Irishtown Garden Centre	Unknown	Low	Adverse	Indeterminable	Permanent
AP9 (Riverine environment)	Midlands Steel	Unknown	Low	Adverse	Indeterminable	Permanent
Proposed ACA	Mill Bridge to Convent Bridge	Medium	Negligible	Adverse	Not Significant	Permanent
RPS 693 (Railway station)	Garroon Stream	Medium	Negligible	Adverse	Imperceptible	Permanent
RPS 701 (Convent Bridge)	Mill Bridge to Convent Bridge	Medium	Low	Adverse	Slight	Permanent
RPS 704 (Sculpture)	Mill Bridge to Convent Bridge	Medium	Medium	Adverse	Moderate	Permanent
LAIAR-007-002 (Manor Mills)	Manor Road	Low	Low	Adverse	Not Significant	Permanent
LAIAR-007-004 (Owenass Bridge)	Owenass Bridge	Low	High	Adverse	Moderate	Permanent
LAIAR-008-012 (Irishtown Bridge [site of])	Mill Bridge to Convent Bridge & Owenass Bride to Mill Bridge	Low	Negligible	Adverse	Imperceptible	Permanent
CH2 (Stone wall)	Mill Bridge to Convent Bridge	Low	High	Adverse	Moderate	Permanent
CH4 (former tail race associated with Manor Mills)	Garroon Stream	Low	Low	Adverse	Slight	Permanent
CH5 (section of wall and style)	Owenass Bride to Mill Bridge	Low	Low	Adverse	Slight	Temporary
CH6 (Property boundary walls north of the Owenass River in the ACA)	Mill Bridge to Convent Bridge	Medium	Low	Adverse	Slight	Temporary
CH7 Derrycloney / Drinagh	Upstream of Owenass Bridge	Low	Low	Adverse	Slight	Permanent

CH ref.	FRS Measure	Significance / Sensitivity Value	Magnitude of Effect	Quality of Effect	Significance of Effect	Duration
townland boundary						
CH8 Ballycullenbeg/ Acragar townland boundary	Clontygar Stream to Davitt Road	Low	Low	Adverse	Slight	Permanent
GS1	Manor Road and Manor Court	Unknown	High	Adverse	Indeterminable	Permanent
GS2	Clontygar Stream to Davitt Road	Unknown	High	Adverse	Indeterminable	Permanent
GS3	Upstream of Owenass Bridge	Unknown	High	Adverse	Indeterminable	Permanent

10.6 Mitigation Measures

10.6.1 Mitigation by Design

Four options for the design of the FRS were presented at Design Option stage which were assessed according to a number of criteria including potential impacts to cultural heritage (O' Brien 2023). Other options would have impinged slightly more on the ZoN of the historic town. Option 1 would have included a more complex system of flood walls and been much more obtrusive to the complex of mill and mill master's house at Manor Mills, although Owenass Bridge would not have been impacted. The other options (2A, 2B, 2C) were quite similar to the final design, but with slightly different layouts for the proposed embankment between Owenass Bridge and Mountmellick Bridge. It was concluded from a cultural heritage perspective that Option 1 would have been the most intrusive, creating the most adverse effects while having the fewest positive effects as a result of reduced flood extents. Options 2A, 2B and 2C were quite similar in terms of impact, with Option 2C being marginally preferred as the embankment between Owenass Bridge and Mountmellick Bridge avoided the ZoN of the historic town (unlike Option 2B) and was not as close to the river as Option 2A. The current design is closest to Option 2C.

Following guidance from the NMS and NBHS, a multidisciplinary approach was undertaken by the project engineers, archaeologists, and conservation engineers to develop the detailed design for the FRS measures on features of cultural heritage importance. Alternatives for the removal of Owenass Bridge and of the stone wall along the Owenass River (CH2) were assessed by the Southgate Associates. Unfortunately, it was not possible retain both the bridge and to provide an effective flood relief without significant effects on the SAC. It was also recommended that the form of the proposed bridge at Owenass be followed as far as practical, that the new structure be refaced in reused stone and in particular the arch voussoirs, this will ensure that the new bridge will blend into the receiving agricultural environment.

A detailed specification for masonry, capping and cladding of the new flood walls and new bridge was developed by the conservation engineers (Appendix 10.7). It is proposed to reclaim and reuse existing stone, as well as the use of locally sourced stone. A best practice conservation approach was adopted, focussing on minimising visual impact of the flood walls on the heritage town, for example: cladding is proposed on sections of flood wall which are in areas where the built environment merits it, for example the urban environment between the proposed flood wall west of Mountmellick Bridge and the downstream of Convent Bridge, and at the replacement of Owenass Bridge. The material for the cladding will be salvaged

from the existing boundary wall (CH2) between Mountmellick Bridge and Convent Bridge, which is due to be demolished to ground level. This measure will ensure that the impact on the setting and character of the proposed ACA, protected structures and built heritage and character of the riverine area of Mountmellick is eliminated or much reduced. Sufficient reclaimed stone is expected to be available from the works. In the unlikely event of a shortfall a similar size and colour of stone will be obtained from a salvage source.

A public realm plan will be devised in advance of the construction phase which will ensure effective integration of the flood relief works into the historic townscape and river setting in a manner that seeks to contribute positively to the riverfront taking into consideration the historic and riverine heritage of the scheme area. This must include provisions for the relocation of the standing stone sculpture (RPS 704) in the Children's Park. The channels which link each stone are a part of the sculpture and they must also be reinstated at the new location for the sculpture. It is recommended that the artist, Eileen MacDonagh, be consulted to devise a suitable relocation strategy.

It will be necessary to remove some vegetation in order to facilitate the construction of the flood relief measures. This will contribute to an adverse visual effect in some areas as it may remove screening at some cultural heritage receptors. It is also noted that trees in the long gardens facing the River Owenass are a feature of the proposed ACA and their removal may create an adverse effect. A programme of tree planting will mitigate against this.

10.6.2 Built Heritage

Project Conservation Engineer

As recommended by the NBHS a project conservation engineer/ conservation architect will be retained during the detail design, construction and reinstatement stages of the FRS scheme. The conservation engineer will ensure that the methodologies outlined in Appendix 10.7 are carried out in full and will liaise with NBHS throughout the design and construction stage.

10.6.2.1 Recording

The upstanding built heritage features to be removed as part of the proposed flood relief scheme will be recorded in advance of construction i.e. Owenass Bridge (LAIAR-007-004) and stone boundary walls along the southern bank of the Owenass River (CH2).The recording will include a written and photographic record and scaled drawings.

10.6.2.2 Methodology and Specifications

Prior to the dismantling of the short sections of property boundary walls (CH6) on the northern banks of the river for construction access, the masonry will be cleaned back of vegetation and recorded. The record will note the capping stones, the coursing of the original masonry, where it exists or is preserved. Random rubble masonry will require the retention of all pinning stones so that the rhythm and texture of the original may be replicated and where it is built to courses the same attention to coursing is essential. The dismantling will be carried out by hand. When construction is complete the boundary walls will be rebuilt to match the original wall construction. The project engineer will provide a detailed methodology for this work and will review and advise on the works as they are being carried out. The style (CH5) to be dismantled and then reinstated at Mill Bridge will be subject to the same process. It will also be necessary to record the same amount of detail at Owenass Bridge as the form of the structure will be replicated in the new build.

A methodology and specification for the demountable barrier at Convent Bridge (RPS 701), will be developed by the project conservation engineer to ensure that the work is carried out in accordance with best conservation practice. The proposals for the barrier will be submitted to the NBHS for approval.

10.6.2.3 New Flood Walls and Owenass Bridge

Appendix 10.7 provides a methodology and specification for the cladding of the new flood walls. The project engineer will oversee these works to ensure that they are carried out as specified.

10.6.3 Project Archaeologist

As recommended in the NMS 'Archaeology and Flood Relief Scheme Guidelines' Laois County Council and OPW have engaged a Project Archaeologist (PA) to advise on the archaeological aspects of the FRS. This role will continue into the construction stage of the FRS where they will advise on archaeological mitigations, including surveys, archaeological monitoring, the assessment of potential on archaeological discoveries, archaeological excavations, and reporting requirements. This may include inspections of archaeological heritage (both terrestrial and underwater). They will also advise the contracting authority on post-excavation progress, requirements, and archiving and finally the publication and dissemination of results of archaeological works.

The PA will provide a consistent, independent approach to the portfolio of individual work packages and to manage a centralised framework for the development of all archaeological, architectural and cultural heritage considerations. The PA will advise on compliance with relevant legislation (including the Planning and Development Act, 2000, as amended), the implications of local authority listing of Protected Structures and ACAs, and compliance with the National Monuments Acts.

10.6.4 Archaeological Testing

10.6.4.1 Archaeological Testing

Archaeological test excavation is recommended to take place across three potential sites identified in the geophysical survey (GS1-GS3) to establish their exact nature and extent and significance. In addition, a programme of archaeological testing is also recommended across the footprint of the embankments and compound areas in greenfields where geophysical survey was not possible.

Mitigation of the impact of development on the archaeological resource can take the form of 'preservation by record' (full hand excavation, i.e. sterilisation of archaeological area); and 'preservation in situ' (excluded from development, i.e. avoidance through design in a location where the future protection and interpretation of the site can be assured) or a combination of both.

Where archaeological features revealed by the test-trenching, are directly impacted by the proposed works and cannot be avoided (preserved in-situ), they will be preserved by record by means of archaeological excavation, recording and publication of results. Archaeological excavation ensures that the removal of any archaeological soils, features, finds and deposits is systematically and accurately recorded, drawn and photographed, providing a paper and digital archive and adding to the archaeological knowledge of a specified area (i.e. preservation by record). As archaeological excavation involves the removal of the archaeological soils, features, finds and deposits, following this mitigation measure there is no further impact on the archaeological heritage.

The highest archaeological risk to large flood relief projects are delays to the construction programme, it is recommended that the archaeological testing is carried out as soon as it is feasible, well in advance of construction and site enabling works and as part of the detailed design process. The results of the testing will inform the construction stage programme of the project and will allow for the appropriate timing of the archaeological resolution (excavation) to take place in advance of construction.

An archaeological testing strategy will be developed in consultation with the Project Archaeologist and will be submitted to the National Monuments Service for approval. A method statement and licence or consent applications will be submitted to the NMS for review and approval.

10.6.5 Archaeological Monitoring

10.6.5.1 Earthworks

The construction phase will involve earthmoving activities including excavations for the construction of flood walls and embankments, flow diversions, diversions of utilities, and provision of construction compounds and temporary roads. All earthmoving activities will be subject to archaeological monitoring under licence from the NMS of the DHLGH. Archaeological monitoring will ensure the full recognition of, and the proper

excavation and recording of, all archaeological soils, features, finds and deposits which may be disturbed below the ground surface. This will include monitoring of townland boundaries at CH7 and CH8.

The licensed archaeologist will have provision to inspect all excavation to the formation level for the proposed works and to temporarily halt the excavation work, if and as necessary. They will be given provision to ensure the temporary protection of any features of archaeological importance identified. The archaeologist will be afforded sufficient time and resources to record and remove any such features identified.

In the event of the discovery of archaeological finds or remains, the NMS and the National Museum of Ireland (NMI) will be notified immediately. If features are revealed, the immediate area will be investigated, allowing no further development to take place until the site is fully identified, recorded and excavated the satisfaction of the statutory authorities. The provision (time and funding) will be made for the full recording and, if necessary, excavation of the archaeological material in compliance with any measures that the DHLGH and the relevant local authority deem appropriate. This possibility will be accounted for in the Project programme and budget and will be undertaken at the earliest phases of the development to allow the archaeologists sufficient time to record/excavate as required.

Laois County Council will make provision to allow for, and to fund, the necessary archaeological monitoring, inspection and excavation works that will be needed on-site during and prior to construction, either directly or indirectly via the appointed contractor.

All archaeological issues will be resolved to the satisfaction of the OPW Project Archaeologist, DHLGH and the NMI.

10.6.5.2 Material excavated from the river

An archaeological assessment of dredged/excavated spoil that is removed from riverbeds, streambeds, alluvial environments, and other waterways will be carried out. This material, particularly in urban areas, can be very rich in archaeological materials and objects, including organic materials.

In accordance with the flood relief Guidelines, all dredged spoil from areas within the Zone of Archaeological Potential (i.e. ZoN) for an historic town (i.e. the material from Mill Bridge to Convent Bridge and downstream of Convent Bridge), is assessed by means of spreading, searching for objects, and licenced metal detection (for metal objects). In order for artefacts to be accurately provenanced, where practicable, searching and metal detection will take place before bulk excavations occur, for instance where riverbeds have been temporarily dewatered and exposed. In the other areas of the scheme a 25% volume assessment of spoil is required. The NMS will consider the scaling up or down of this based on the on the artefactual retrieval results over an agreed time. A methodology for the spreading of the material in a location in proximity to the works area will be developed in consultation with the contractor.

Sufficient archaeological personnel need to be on site to monitor all aspects of works for an FRS, including work in water. Suitably qualified underwater archaeological personnel must be available to carry out rapid inspections following underwater discoveries to ensure assessment and stabilisation.

The developer is aware of their responsibility to fund all necessary archaeological work. All recommendations are subject to approval by the National Monument Service of the Department of Housing Local Government and Heritage and the local authority.

10.6.6 Construction / Traffic Management Plan

The construction phase will have a detailed Construction Plan and Traffic Management Plan which will include measures to protect cultural heritage receptors. This will include the provision of signage alerting construction workers to cultural heritage features, and depending on the nature of the ground may require light machinery or bog mats in certain areas.

10.6.7 Flood Protection of Cultural Heritage Receptors

In addition to mitigation measures, the overall effect of the proposed FRS will be a reduction in flood extents, which will have a positive effect on cultural heritage receptors. At present, parts of the proposed ACA and sites such as Presentation Convent (RPS 001), Mountmellick Development Centre (RPS 703), standing stone sculpture (RPS 704), the thatched cottage (RPS 857), Manor Mills (LAIAR-007-002) and Pound Bridge (LAIAR-008-009) are vulnerable to flood events. The flooding of these sites can cause a degradation to these cultural heritage receptors and their setting. The protection of these cultural heritage receptors from flood events serves as a mitigating factor to potential construction phase effects and effects to setting.

10.7 Residual Impacts

A residual effect is determined to be the degree of change to the cultural heritage environment that will occur after the proposed mitigation measures have taken effect. Following mitigation, there will be no residual effect to the archaeological heritage of Mountmellick. The overall effect on the built heritage environment will be positive, as potential adverse construction phase impacts are mitigated by design and by the positive effect of preventing / reducing flooding which would cause degradation of the built heritage.

Potential impacts to archaeological heritage sites (AP1-AP9, sites and GS1–GS3 and townland boundaries CH7 and CH8) will be mitigated by further testing and archaeological monitoring. Mitigation will include, if necessary, preservation in-situ or full archaeological excavation (preservation by record), depending on the nature and extent of the site. All archaeological issues at this location will be resolved in advance of development to the satisfaction of the NMS. The overall residual impact to archaeological heritage sites will be **Not Significant**.

While potential impact to setting of the proposed ACA of Mountmellick is Not Significant, this is mitigated by stone cladding in this area. The public realm plan will further mitigate against this and has the potential to provide a positive effect to these areas. Furthermore, the result of the proposed FRS will be in providing protection for the 1% AEP flood event, protecting the ACA and its character from flood related impacts to built heritage and setting. The overall residual impact to the ACAs is therefore predicted to be a **Slight, Positive** significance of effect.

While the potential visual impact to the railway station (RPS 693) is predicted to be **Imperceptible**, this can be mitigated with tree planting, resulting in a **Neutral** effect.

The potential impact to Convent Bridge (RPS 701) is related the tie-in of the demountable barrier. A detailed conservation specification and method statement will be developed by the conservation engineer for this, and it will be subject to approval from the NBHS. The tie in is proposed in a discrete location and will not detract from the structure, it will not be visible from within the ACA or from the riverside path on the southern bank. The overall residual effect will be **Neutral**.

While the standing stone sculpture (RPS 704) will require relocation, the use of a public realm plan and the overall protection from flood events mitigates against any potential adverse effect. The overall residual effect will be **Neutral**.

The Not Significant Adverse effect to Manor Mills (LAIAR-007-002) is mitigated by the protection of this site from flooding. The residual impact will therefore be **Slight, Positive**.

A number of built heritage sites are sufficiently removed from the flood relief measures that there will be no construction phase effects but they will benefit from the relief of flood events (J&M Moloney & Sons (RPS 028), a pair of semi-detached houses on Park Street (RPS 039A, 039B), Mountmellick Development Centre (RPS 703), the former railway bridge (RPS 829), the thatched cottage (RPS 857), and Pound Bridge (LAIAR-008-009)). They will be positively affected by the proposed scheme with a **Slight, Positive** significance of effect. Flooding is not fully prevented at Presentation Convent (RPS 001).

An adverse impact which cannot be fully mitigated is the impact caused by the demolition of stone wall along the River Owenass (CH2). This adverse effect has however been reduced as the stone from the demolished walls will be reused as stone cladding on the proposed river walls. Approximately c.10m of the wall will be preserved in situ, the remainder of the wall will be taken down to ground level and it will be possible to trace its original path.

The most significant adverse impact which cannot be mitigated is the replacement of Owenass Bridge (LAIAR-007-004). This is somewhat mitigated by the positive effects to other cultural heritage receptors within this scheme, including Protected Structures which are of a greater significance rating than this undesignated feature. The new bridge structure will follow the form of the original as far as practical, it will be refaced in reused stone, this will ensure that the new bridge will blend into the receiving agricultural environment. The residual effect will remain at **Moderate, Adverse**.

Table 10-9: Predicted impacts to cultural heritage receptors – post-mitigation

CH ref.	Significance / Sensitivity Value	Magnitude of Effect	Quality of Effect	Significance of Effect	Duration
Proposed ACA	Medium	Low	Positive	Slight	Permanent
RPS 028 (J&M Moloney & Sons)	Medium	Low	Positive	Slight	Permanent
RPS 039A (Semi-detached house)	Medium	Low	Positive	Slight	Permanent
RPS 039B (Semi-detached house)	Medium	Low	Positive	Slight	Permanent
RPS 693 (Railway station)	Medium	N/A	N/A	Neutral	Permanent
RPS 701 (Convent Bridge)	Medium	N/A	N/A	Neutral	Permanent
RPS 703 (Mountmellick Development Centre)	Medium	Low	Positive	Slight	Permanent
RPS 704 (Sculpture)	Medium	N/A	N/A	Neutral	Permanent
RPS 829 (Railway bridge)	Medium	Low	Positive	Slight	Permanent
RPS 857 (Thatched cottage)	Medium	Low	Positive	Slight	Permanent
LAIAR-007-002 (Manor Mills)	Medium	Low	Positive	Slight	Permanent

CH ref.	Significance / Sensitivity Value	Magnitude of Effect	Quality of Effect	Significance of Effect	Duration
LAIAR-007-004 (Owenass Bridge)	Low	High	Adverse	Moderate	Permanent
LAIAR-008-009 (Pound Bridge)	Low	Low	Positive	Slight	Permanent
CH2 (Stone wall)	Low	High	Adverse	Low	Permanent

10.8 Interactions

10.8.1 Cultural Heritage and Landscape and Visual

Interactions with Landscape and Visual comprise the potential for impacts to setting and visual amenity of cultural heritage receptors. Consultation between both disciplines has taken place with regard to potential impacts the built heritage of the Mountmellick. A strategy was agreed comprising the use of stone cladding in areas of heritage value and visual amenity.

10.9 Potential Cumulative Impacts

The projects whose duration of permission overlaps with the likely construction period of the proposed development (i.e., 2025 onwards) are included developments listed in Chapter 15 of this EIAR have been reviewed for potential cumulative impacts. No cumulative impacts to cultural heritage have been identified in the proposed scheme.

11 Landscape and Visual Impact Assessment

11.1 Introduction

This chapter of the EIAR was prepared to assess the potential significant effects of the proposed development on landscape and visual amenity. It will examine the potential effects of the proposed development on views from residential properties and nearby open spaces, in terms of visual intrusion and visual obstruction and the impact on landscape character areas from the permanent physical changes to the site brought about by the development.

Other effects of lower significance have been included in this assessment to better inform the decision-making process.

This chapter should be read in conjunction with the proposed development drawings, verified photomontages, and the Biodiversity and Cultural Heritage chapters of this report for references and descriptions of relevant designations.

11.2 Methodology

The methodology is based on national and local policy guidelines and best practice methodology. These are:

- Guidelines on Landscape and Visual Assessment (2002) Irish Landscape Institute (ILI);
- Guidelines for Landscape and Visual Impact Assessment (GLVIA), third edition (2013), Landscape Institute (UK) as updated in August 2024;
- Guidelines on Information to be Contained in Environmental Impact Assessment Reports (2022); Environmental Protection Agency (EPA);
- Environmental Impact Assessment of Projects: Guidelines on the Preparation of the Environmental Impact Assessment Report (EIAR) (2017); European Commission (EC);
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (2013); EC;
- Guidelines on Landscape and Landscape Assessment (2000); Department of the Environment, Community and Local Government (DOE);
- National Landscape Strategy 2015-2025; DOE;
- County Laois Development Plan 2021-2027;
- County Laois Landscape Character Assessment 2017-2023;
- Mountmellick Local Area Plan 2018-2024; and
- Visual Representation of Development Proposals, Landscape Institute (UK, 2019); Technical guidance notes for photomontages.

The landscape assessment undertaken is made with regard to the sensitivity of the landscape and its ability to undergo a change. as outlined in the references above. It will also involve consideration of aerial photography, emerging design drawings, together with visits to the site and environs of the proposed development.

The verified photomontages accurately depict the changes in specific views, have been produced in accordance with the GLVIA guidance[162] and are included in Appendix 11.1 to facilitate the assessment of

[162] Landscape Institute, 2019, *Visual Representation of Development Proposals, Technical Guidance Note 06/19*

visual impacts. The locations for the photomontages have been agreed following liaison of the assessor and the client with the local planning authority.

11.2.1 Landscape Impact Assessment Criteria

When assessing the potential impacts on the landscape resulting from a proposed project, the following criteria are considered:

- Landscape character sensitivity;
- Magnitude of likely impacts; and
- Significance of landscape effects.

11.2.2 Sensitivity of the Landscape

The sensitivity of the landscape to change is the degree to which a particular Landscape Character Area (LCA) can accommodate changes or new elements without unacceptable detrimental effects to its essential characteristics.

Landscape Sensitivity, often referred to as 'value', is classified using the following criteria which have been derived from a combination of industry guidelines from the Landscape Institute for Landscape and Visual Impact Assessment and professional judgement.

- Very high - Areas where the landscape character exhibits a very low capacity for change in the form of development. Examples of which are very high value landscapes, protected at an international level e.g., World Heritage Site, where the principal management objectives are likely to be protection of the existing character;
- High - Areas where the landscape character exhibits a low capacity for change in the form of development. Examples of which are high value landscapes, protected at a national level e.g., National Park, where the principal management objectives are likely to be protection of the existing character;
- Medium - Areas where the landscape character exhibits a medium capacity for change in the form of development. Examples of which are medium value landscapes, protected at a Local or Regional level e.g., Open space areas mentioned within a County Development Plan, where the principal management objectives are likely to be protection of the existing character;
- Low - Areas where the landscape character exhibits a high capacity for change and has very few or no designated landscapes or open space areas; and
- Negligible - Areas of landscape character that include derelict, mining, industrial land or are part of the urban fringe where there would be a reasonable capacity to embrace change or the capacity to include the development proposals. Management objectives in such areas could be focused on change, creation of landscape improvements and/or restoration to realise a higher landscape value.

11.2.3 Magnitude of Likely Landscape Impacts

The magnitude of a predicted landscape impact is a product of the scale, extent or degree of change that is likely to be experienced as a result of the proposed project. The magnitude takes into account whether there is a direct physical impact resulting from the loss of landscape components and/or a change that extends beyond the boundary of the proposed project that may have an effect on the landscape character of the area.

- Very high - Change that would be large in extent and scale with the loss of critically important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the landscape in terms of character, value and quality;
- High - Change that would be more limited in extent and scale with the loss of important landscape elements and features, that may also involve the introduction of new uncharacteristic elements or features that contribute to an overall change of the landscape in terms of character, value and quality;
- Medium - Changes that are modest in extent and scale involving the loss of landscape characteristics or elements that may also involve the introduction of new uncharacteristic elements or features that would lead to changes in landscape character, and quality;

- Low - Changes affecting small areas of landscape character and quality, together with the loss of some less characteristic landscape elements or the addition of new features or elements;
- Negligible - Changes affecting small or very restricted areas of landscape character. This may include the limited loss of some elements or the addition of some new features or elements that are characteristic of the existing landscape or are hardly perceivable;
- Neutral - Changes that do not involve the loss of any landscape characteristics or elements and will not result in noticeable changes to the prevailing landscape character; and
- Positive - Changes that restore a degraded landscape or reinforce characteristic landscape elements.

11.2.4 Significance of Landscape Effects

The significance of the landscape impact will be the combination of the sensitivity of the landscape against the magnitude of the change. It is summarised in Table 11-1 below.

Table 11-1: Significance of Landscape and Visual effects based on Magnitude and Sensitivity [163]

Magnitude	Sensitivity				
	Very high	**High**	**Medium**	**Low**	**Negligible**
Very high	Profound	Very significant	Significant	Moderate	Slight
High	Very significant	Significant	Moderate	Slight	Slight
Medium	Significant	Moderate	Slight	Slight	Imperceptible
Low	Moderate	Slight	Slight	Imperceptible	Imperceptible
Negligible	Slight	Slight	Imperceptible	Imperceptible	Imperceptible
Neutral	Imperceptible	Imperceptible	Imperceptible	Imperceptible	Imperceptible
Positive	Positive	Positive	Positive	Positive	Imperceptible

11.2.5 Sensitivity of Visual Receptors

Unlike landscape sensitivity, the sensitivity of visual receptors has an anthropocentric basis. It considers factors such as the perceived quality and values associated with the view, the landscape context of the viewer, the likely activity they are engaged in and whether this heightens their awareness of the surrounding landscape.

Visual receptors most susceptible to changes in views and visual amenity are:

- Very high - Residents in properties within protected landscapes and travellers on a Scenic route where awareness of views is likely to be heightened;
- High – Residents in properties with predominantly open views from windows, garden or curtilage. People, whether residents or visitors, who are engaged in outdoor recreation including use of public rights of way, whose attention or interest is likely to be focused on the landscape and on particular views, and those on a scenic route where the view is not specifically in the direction of the proposed development;

[163] Landscape Institute and Institute of Environmental management and Assessment, 2013, *Guidelines for Landscape and Visual Impact Assessment* (GLVIA), 3rd edition. Routledge

- Medium - Visitors to heritage assets, or to other attractions, where views of the surroundings are an important contributor to the experience, and communities where views contribute to the landscape setting enjoyed by residents in the area.
- Low - People engaged in outdoor sport or active recreation on a local scale, which does not involve or depend upon appreciation of views of the landscape; and people at their place of work whose attention may be focused on their work or activity, not their surroundings and where the setting is not important to the quality of working life, and people travelling in vehicles where their view is limited to a few minutes at any viewpoint; and
- Negligible - Changes affecting restricted viewpoints.

11.2.6 Magnitude of Visual Impact

The magnitude of a visual effect is determined based on several factors: the relative numbers of viewers, the distance from the viewpoint, the visual dominance of the proposed development within a view and its effect on visual amenity, as follows:

- Very high - The proposal intrudes into a large proportion or critical part of the available vista and is without question the most noticeable element. A high degree of visual clutter or disharmony is also generated, strongly reducing the visual amenity of the scene;
- High - The proposal intrudes into a significant proportion or important part of the available vista and is one of the most noticeable elements. A considerable degree of visual clutter or disharmony is also likely to be generated, appreciably reducing the visual amenity of the scene;
- Medium - The proposal represents a moderate intrusion into the available vista, is a readily noticeable element and/or it may generate a degree of visual clutter or disharmony, thereby reducing the visual amenity of the scene. Alternatively, it may represent a balance of higher and lower order estimates in relation to visual presence and visual amenity;
- Low - The proposal intrudes to a minor extent into the available vista and may not be noticed by a casual observer and/or the proposal would not have a marked effect on the visual amenity of the scene; and
- Negligible - The proposal would be barely discernible within the available vista and/or it would not detract from, and may even enhance, the visual amenity of the scene.

Magnitude can also be described as:

- Neutral - Changes that are not discernible within the available vista and have no bearing the visual amenity of the scene; and
- Positive - Changes that enhance the available vista by reducing visual clutter or restoring degraded features.

11.2.7 Visual Impact Significance

As stated above, the significance of visual impacts is a function of visual receptor sensitivity and visual impact magnitude. This relationship is expressed in the same significance matrix as used earlier in respect of landscape effects, see Table 11-1.

11.2.8 Impact Classification Terminology

The Impact Classification Terminology as published in the EPA guidance document[164] is shown in Figures 1-2 and 1-3 in Chapter 1. Standard definitions are provided in this glossary, which permit the evaluation and classification of the quality, significance, duration, and type of impacts associated with a proposed

[164]Environmental Protection Agency (May 2022) *Guidelines on Information to be Contained in Environmental Impact Assessment Reports.* Environmental Protection Agency, Ireland

development on the receiving environment. The term temporary and reversible are considered interchangeable in this report. Impacts that are expected to last less than a year are considered short-term.

Each impact is described in terms of its quality, significance, extent, duration & frequency and type, where possible.

11.2.9 Cumulative Impact Assessment

The cumulative effect of a set of developments is the combined effect of all the developments taken together. Cumulative effects on visual amenity consist of combined visibility and sequential effects. Combined visibility occurs where the observer is able to see two or more developments from one viewpoint.

Combined visibility may either be in combination (where several developments are within the observer's arc of vision at the same time) or in succession (where the observer has to turn to see the developments). Sequential effects occur when the observer has to move to another viewpoint to see different developments. For example, this could be when travelling along roads or paths. The occurrence of sequential effects may range from frequently sequential (the features appear regularly and with short time lapses between, depending on speed of travel and distance between the viewpoints) to occasionally sequential (long time lapses between appearances, because the observer is moving very slowly and / or there are large distances between the viewpoints).

Cumulative landscape effects affect the physical fabric or character of the landscape, or any special values attached to the landscape.

Cumulative effects on the physical fabric of the landscape arise when two or more developments affect landscape components such as woodland, dykes or hedgerows. Although this may not significantly affect the landscape character, the cumulative effect on these components may be significant – for example, where the last remnants of former shelterbelts are completely removed by two or more developments. Cumulative effects on landscape character arise from two or more developments. Housing developments introduce new features into the landscape. In this way, they can so change the landscape character that they can create a different landscape character type. That change need not be negative; some derelict or industrialised landscapes may be enhanced as a result of such a change in landscape character. The cumulative effects on landscape character may include other changes, for example trends or pressures for change over long time periods, which should form part of any consideration of a particular project.

The area in which the proposals site is located contains other built elements such as walls and therefore there is potential for cumulative effects on landscape and visual amenity.

11.3 Receiving Environment

11.3.1 Site Context

Mountmellick is located close to the northern border between County Laois and County Offaly. The N80, a National Secondary route, passes through the town connecting it with Portlaoise, Carlow, Waterford, and Rosslare to the south and Tullamore, Mullingar, and Athlone to the north. Mountmellick is part of the broader Irish Midlands, known for its expansive peatlands and bogs, much of which has been converted to arable land. The Garryhinch Bog lies approximately 4.5 km north of Mountmellick. The surrounding rural hinterland is predominantly comprised of grazing pastures. The Owenass River flows through Mountmellick and offers scenic walking routes for local residents.

Mountmellick lies in a flat landscape with no significant topological variance, so landscape sensitivity is on a smaller scale. The River Barrow and River Nore (which are also SAC) provide a key element to the local and surrounding landscape character. The Owenass River which flows from the southwest to the northeast and horizontally bisects the town, is part of the SAC. Bordered by well-developed riparian vegetation it is a distinct feature in the largely agrarian landscape that contributes to the amenity offered by the surroundings.

Over the years, Mountmellick has evolved into a vibrant community, with its history still visible in the architecture, street layout, and cultural traditions. Recently, the town has seen high levels of population growth. To accommodate this, urban and residential developments have rapidly expanded particularly in the northern and eastern parts of the town due to their proximity to the Dublin metropolitan area. Isolated rural housing is evident in southern areas of Mountmellick and is considered a major issue throughout County Laois.

The town has a history of flooding. Most recently, severe flash flooding occurred in November 2017 following heavy rain causing the Owenass River and several streams in the vicinity to break their banks. Lands to the south, southwest, and west were impacted the most which is reflected in the location of the proposed flood measures. These areas are predominantly pastures interspersed with single rural dwellings.

11.3.2 Landscape Character

The proposed development site is within two Landscape Character Areas (LCA). The town and immediate site surrounds are part of the Urban Fringe LCA and the hinterlands and broader landscape are part of the Lowland Agricultural LCA[165].

Several characteristics of the Urban Fringe LCA are radiating roads along which development has taken place in a ribbon-like manner, former agricultural lands zoned for future development are frequently underutilized, and architecture that varies from modern developments to historical structures, reflecting the evolving nature of the urban fringe. Individual sites are generally conceptualized in a suburban manner, and their more formal and sculpted characteristics typically do not incorporate with the surrounding landscape. The town's Quaker heritage, industrial history, and scenic surroundings also collectively contribute to its distinctive and appealing landscape character.

The Urban Fringe LCA is highly sensitive to changes in land use and development. Any alterations should be carefully planned to balance the need for urban expansion with the preservation of green spaces and the overall quality of life for residents. Surrounding the town, the landscape transforms into a patchwork of agricultural fields and green spaces, strengthening the overall rural character transitioning to the Lowland Agricultural LCA.

The Lowland Agricultural LCA encompasses the hinterlands of Mountmellick. It is typically a flat, open landscape, with distant views of the upland regions, such as the Slieve Bloom Mountains to the west. It is most suited to agricultural land uses such as pastoral and tillage farming. Large field patterns are typically bordered by mature deciduous trees and majority of the lowlands are enclosed by well-treed road corridors, parklands, and wooded areas. Hedgerows vary in terms of style, form and species content but are generally well managed along road corridors and wilder in between fields. In many areas hedgerows have been lost and replaced with post and wire fences, giving the countryside a much more open character and contributing to a decline in landscape condition.

In general, the county is reasonably well furnished with deciduous tree species. Beech, elm, ash, poplar, sycamore and alder are all still in abundance with oak present to a lesser degree. The rural landscape contains numerous trees growing often as mature stands or shelterbelts and within hedgerows. Broadleaf woodland and copses are prevalent in lowland areas and mature trees encircle many historic features such as raths and historic graveyards, forming prominent and attractive landscape elements.

11.3.3 Visual Amenity

There are no protected views designated in the CDP which could be impacted by the proposed development. Visual amenity is primarily on a local or household scale, with residences in the area enjoying

[165] Laois County Council 2021. *Laois County Development Plan 2021-2027*

views over the rural landscape and occasionally riparian vegetation along the Owenass River. These views are expected to be impacted during construction and/or operation by the proposed flood walls, embankments, and removal of existing vegetation.

11.3.4 Zone of Theoretical Visibility

A Zone of Theoretical Visibility (ZTV) was produced for the assessment. The ZTV shows the areas that the proposed development could be visible in the surrounding landscape within a radius from the proposed development. This is taken into consideration to form the study area for the assessment of visual impacts. The radius that is considered needs to be proportional to the height and extents of the proposed development. For this proposed development, the ZTV maps show the area with potential visibility within a 1.5 km radius from the proposed works. The ZTV was based on a viewer eye height of 1.6 m and a range of heights from 0.5 to 3m with an average of 1.46m were used to represent the proposed defences across the scheme. Points were placed roughly 50 – 100m apart. The ZTV is based on a digital terrain model (DTM) and represents a bare ground scenario i.e., with no trees, hedgerow or built features present that would provide screening.

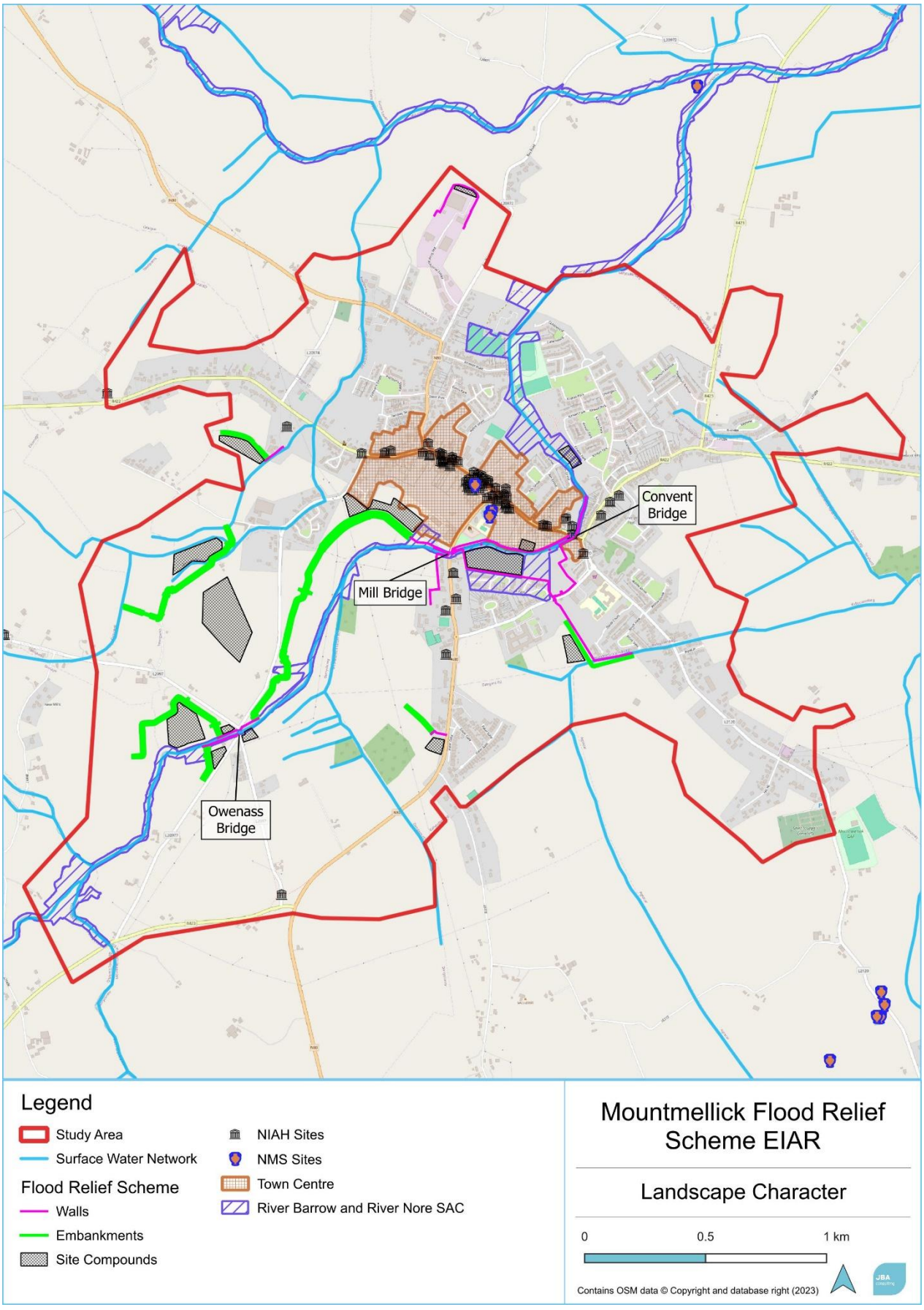


Figure 11-1: Landscape Character in Mountmellick

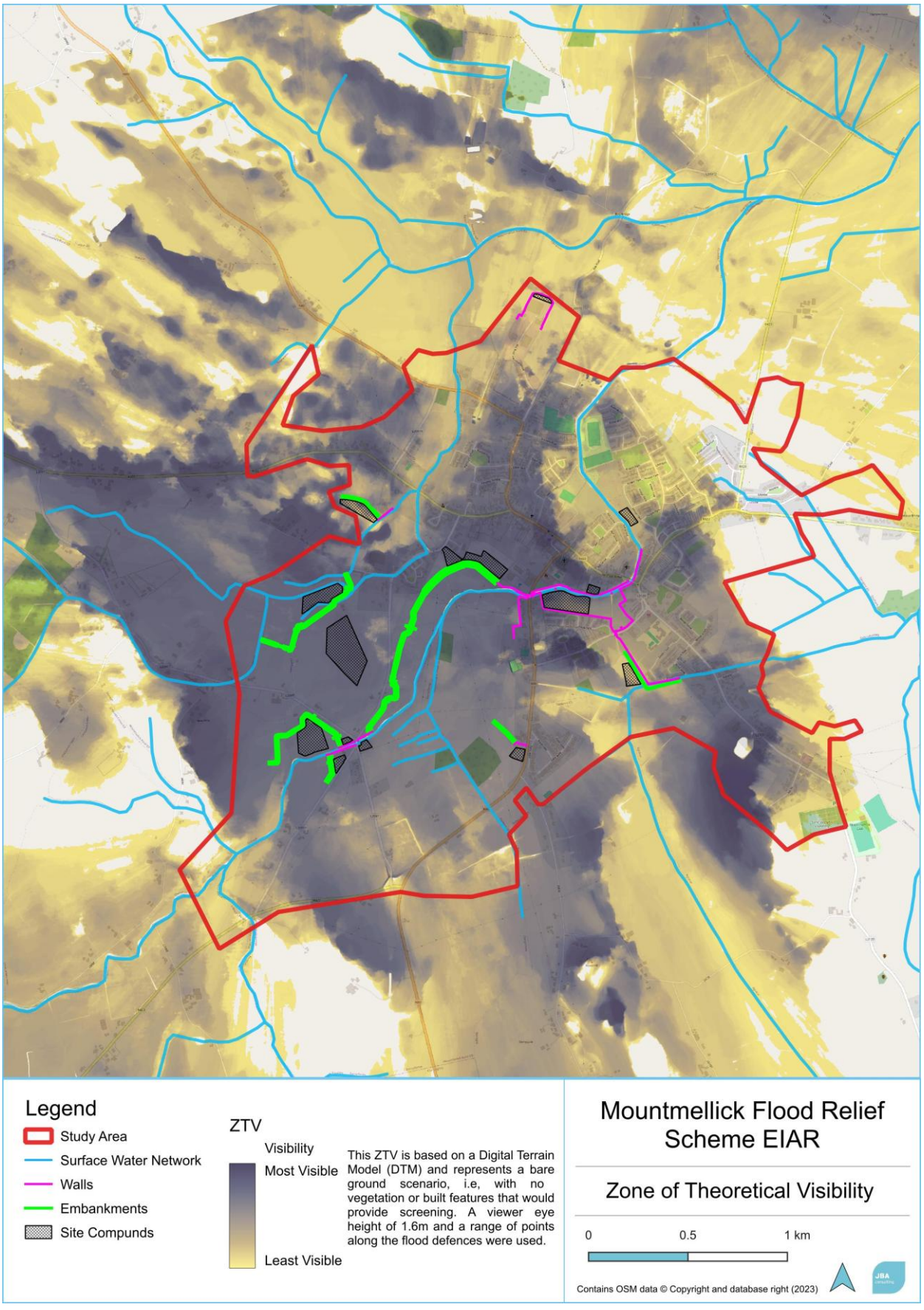


Figure 11-2: Zone of Theoretical Visibility of the proposed development

11.4 Characteristics of the Proposed Development

The full description of the Proposed Development is provided in Chapter 4 of the EIAR.

An estimated 3,500 linear metres of flood walls will be constructed as part of the scheme. Flood wall heights vary considerably throughout the scheme depending on topography and required level of protection. Height range will be between 0.6 and 4.0m above existing ground level. All walls will be set back from the channels and riparian zone. 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 the public realm, within the Architectural Conservation Areas and adjoining stone clad bridges. Elsewhere, in the finish will be smooth concrete. The Owenass Bridge replacement will be constructed using reinforced concrete material and a combination of precast and in-situ elements. The bridge will have a masonry finish reusing existing stone where possible, to match existing masonry finish and to provide a similar capping.

Flood embankment height will vary between 1.2m – 3.0m above the surrounding ground level. Embankments will be grass seeded or sewn with an indigenous wildflower mix to suit the location. New trees and deep rooting plants will not be proposed within a minimum distance of 2m from the base of the embankment as this would compromise their structural integrity.

Site compounds and welfare sites will be erected at appropriate locations as shown in Figure 4-7 of Chapter 4, to facilitate the construction works including the transport and storage of materials. Enabling and preparatory works for all flood defence features will involve some vegetation clearance and some tree removal at areas around the Garroon Stream, upstream of Owenass Bridge and downstream of Convent Bridge, as well as most works located within the riparian zones of watercourses.

11.5 Potential Impact of the Proposed Development

11.5.1 Predicted Impact Assessment

As described in the methodology, the impacts to the landscape and visual amenity have been assessed based on the sensitivity of the receptor and magnitude of change. This assessment as part of an EIAR is focused on potential significant impacts, and secondarily on impacts of lower significance.

Receptor groups were identified during the initial desktop investigation using aerial imagery and confirmed on site during the site visit. Receptors were grouped in terms of function, i.e., residential buildings, community buildings, town centre, tourism, etc., location and expected significance of impact. The identified receptor groups are shown in Figure 11-3 and are discussed in section 11.5.3 with an assessment of the effects on their visual amenity.

Verified photomontages have been produced showing the expected visual impact of the proposed development from selected points in public locations around the scheme. This provides a sense of the degree of screening and magnitude of change to these views as a result of the proposed development. The compendium of photomontages is presented in Appendix 11.1 and a series of images under the title *Verified Photomontages and CGI's.*

Impact Duration was considered permanent if a receptor had a distinct alteration to the horizon line or if views of a structure would continue to remain visible for more than 15 years. During the assessment, the landscape was also considered in the context of permanency. For example, retained mature trees were considered permanent, with management and evolution. Naturally colonising vegetation will in the short- to medium-term become a permanent screening feature due to size and density and presence in the vicinity of the proposed development.

Type of Impact was considered positive only if the proposals contribute to the character of the locality and would not be detrimental to the landscape or visual amenity. An adverse *Type of Impact* might occur if for example, the proposal altered the form and materials of the Owenass Bridge and therefore had a detrimental

impact on the quality of the view. Unless otherwise stated, impact is assumed to be adverse in the following sections.

11.5.2 Do-Nothing Impact

Under the do-nothing scenario the landscape character and visual amenity of the area would be unchanged, and Mountmellick would continue to be susceptible to flooding. During flood events, public open spaces and residential areas would continue to flood and these events are expected to increase in frequency and severity due to climate change. This will result in **Temporary, Adverse** impacts on landscape and visual amenity.

Were the proposed development not to be completed no vegetation or trees would be cleared and the visual amenity and views up and downstream of the Owenass River would remain the same. Vegetation would continue to mature and required periodic maintenance.

11.5.3 Receptor Descriptions

Landscape Impact Assessment

All proposed works will require some vegetation clearance to facilitate the installation of flood walls, culverts, or bridge upgrades. Depending on the degree of clearance this will have an impact on the quality of the riparian corridor and on the views to and from each of the bridges, with varied significance. Locations expected to be affected by vegetation clearance are areas around Clontygar Stream, Midland Steel, Irishtown Garden Centre, areas around the Garroon Stream, Upstream of Owenass Bridge, and between Mill Bridge and Convent Bridge.

Invasive species are present in areas of proposed vegetation clearance including three-cornered garlic, Butterfly bush, and invasive sycamore and snowberry. Vegetation clearance has the potential to increase the seed distribution of these species which could further degrade the quality of flora across the landscape. Appropriate biosecurity mitigation measures are included in Section 7.9.15. Following implementation of these measures, any adverse impact on the Landscape is not anticipated to be significant.

The proposed 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 the public realm, within the Architectural Conservation Areas and adjoining stone clad bridges. The stone form existing features will be reused. Elsewhere the finish will be smooth concrete. The Owenass Bridge replacement will be constructed using reinforced concrete material and a combination of precast and in-situ elements. The original bridge masonry will be reused to become the finish of the new bridge to closely resemble the former appearance.

Footpaths along the Owenass River between Mill Bridge and Convent Bridge encourage walking along its banks. This section of the river is particularly sensitive as it is embedded within the urban landscape of Mountmellick and provides a valuable natural landscape feature in an otherwise urban centre. The track extends south becoming a grassy path through fields towards Owenass Bridge. During construction, these walkways will be closed to facilitate the safe construction of the works. The park adjacent to Mill Bridge will also be temporarily closed to allow for works to take place along the northern bank of the Owenass River. These temporary closures will make unavailable recreational amenities for local residents. In addition to new walls along this section of the river, removal of the existing boundary wall along the southern riverbank will facilitate the movement of flood flows into the field located to the south. This will act as a formalised flood plain during flood events. The temporary loss of these amenities and presence of several construction compounds in the areas around Mill Bridge and Convent Bridge will have an effect of **Temporary, Moderate, Adverse** significance in accordance with the methodology. Once operational, the riparian landscape will be permanently altered by the presence of flood walls. The significance of this effect will be **Permanent, Slight, Adverse**.

Convent Bridge, also referred to as Sarsfield Bridge or Big Bridge, is a three-arch road bridge listed on the NIAH with Reg No. 12900359. The setting around the bridge as well as upstream and downstream views will be altered by the construction of new flood defence walls and footpath raising.

Instream works and construction along the riverbank of the Owenass River will have an impact on the SAC and water quality in the immediate site surrounds as well as downstream. Potential impacts for the SAC are provided in Chapter 7 Biodiversity and Chapter 9 Water respectively, of this EIAR. This will have an indirect**, Imperceptible, Reversible, Adverse** effect on the downstream landscape.

Owenass Bridge will be replaced as part of the flood relief measures. The new bridge will be a clear span structure to improve conveyance and alleviate the increase in risk of scour. Owenass Bridge is not a designated NIAH or NMS site; however, it forms part of the culture and heritage of Mountmellick. The bridge will have a masonry finish reusing existing stone where possible, to match existing masonry finish and to provide a similar capping that will match the appearance of the existing structure. During construction, the significance of the effect will be **Temporary, Slight, Adverse** due to the need of vegetation clearance to facilitate the works. Following construction, the new bridge will be finished to closely resemble the former, although there will be minor differences. The significance of this effect will be **Permanent, Slight, Adverse**.

Access to site compounds across the scheme area will require the use of both public rights of way in Mountmellick. Increased construction traffic and presence of the compounds along the routes will affect local access and landscape amenity. This impact will be confined to the construction phase of the proposed development. The significance of this effect will be **Temporary, Slight, Adverse**.

In addition to the extensive flood wall network proposed, earth embankments approximately 3,160 linear metres will also be constructed. Embankments are proposed at the Garroon Stream, Clontygar Stream, between Owenass Bridge and Mill Bridge, Upstream of Owenass Bridge, Irishtown Garden Centre and at Manor Road. The rural environs of Mountmellick have the open space that can accommodate these embankments which have been designed to incorporate slope variance to lessen the engineered look affording them a more natural appearance. Once operational, they will be grass seeded or sewn with an indigenous wildflower mix to suit the location and will be of similar character to the roadside and field hedgerows. The largest embankment is proposed between Owenass Bridge to Mill Bridge which will be approximately 1245m in length. During construction, mounds of excavated material and onsite construction machinery will contrast with the surrounding rural fields and will have an effect of **Temporary, Moderate, Adverse** significance in accordance with Table 1-2 of Chapter 1 and Table 11-1. Once operational the embankments will be low in visual impact owing to their semi-natural appearance and similar character to low-lying manicured hedgerows present in the locality. The significance of the effect will be **Permanent, Imperceptible** to **Slight, Adverse**.

In accordance with the methodology and the overall impact of the proposed development to visual amenity and landscape is expected to be **Temporary, Slight** to **Moderate, Adverse** during construction and **Permanent, Slight, Adverse** during operation. Impacts in areas between Mill Bridge and Convent Bridge are expected to have a greater significance due to the higher sensitivity of these locations within the urban fringe and designation as a Special Area of Conservation.

Table 11-2: Landscape Impact Assessment

Proposed development area	Measures details	Sensitivity	Magnitude of change	Predicted impact and duration	
				Construction	Operation
Midland Steel	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	Negligible	Negligible	Temporary, imperceptible	Permanent, imperceptible
Garroon Stream	7A- Embankment on western side of Garron Stream, Height 1.3m, Length 230m	Low	Low	Temporary, imperceptible	Permanent, imperceptible
Grove Park Pumping Station	Flood wall 965m length and up to 3.1m in height is proposed along the rear of Grove Park	Low	Low	Temporary, imperceptible	Permanent, imperceptible
Downstream of Convent Bridge	5A - Wall downstream of Convent Bridge, right side of Owenass River, Height 1.0m, Length 164m	Low	Medium	Temporary, slight	Permanent, slight
Mill Bridge to Convent Bridge	4A - Wall between Mountmellick Mill Bridge and Convent Bridge, left side of Owenass River, adjacent to playground, Height between 0.6m and 4.0m high, Length 525m 4B - Wall downstream of Mountmellick Mill Bridge, right side of Owenass River, Raised footpath and wall. Height up to 1.9m, Length 115m 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 4D - Wall upstream of Convent Bridge, right side of Owenass River, Raised footpath and wall. Height up to 1.9m, Length 112m	High	Medium	Temporary, moderate	Permanent, moderate
Clontygar Stream	8A - Wall left side of Clontygar River, Height 1.9m, Length 475m	Low	Low	Temporary, imperceptible	Permanent, imperceptible
Owenass Bridge to Mill Bridge	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	Medium	Low	Temporary, slight	Permanent, slight

	3C- Wall upstream of Mountmellick Mill Bridge, on left side of Owenass River, Height up to 2m, Length 315m 3D - Wall upstream of Mountmellick Mill Bridge, on right side of Owenass River, to rear of Pearse St/ M80 Wall 284m in length and up to 1.9m in height (above stream bed level)				
Owenass Bridge	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 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	Medium	Medium	Temporary, slight	Permanent, slight
Upstream of Owenass Bridge	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- instream sheet piling**	High	Low	Temporary, slight	Permanent, slight
Irishtown Garden Centre	9A - Embankment of 155m in length and up to 0.8m in height, located in the agricultural lands to south and west of the garden centre. 9B – New flood defence wall f 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 will be accessed off N80 and will involve removal of hedgerow.	Low	Low	Temporary, imperceptible to slight	Permanent, imperceptible to slight
Manor Road	6A - Embankment on right side of Pound River, Height up to 1.4m, Length 705m	Low	Low	Temporary, imperceptible to slight	Permanent, imperceptible to slight

Visual Impact Assessment

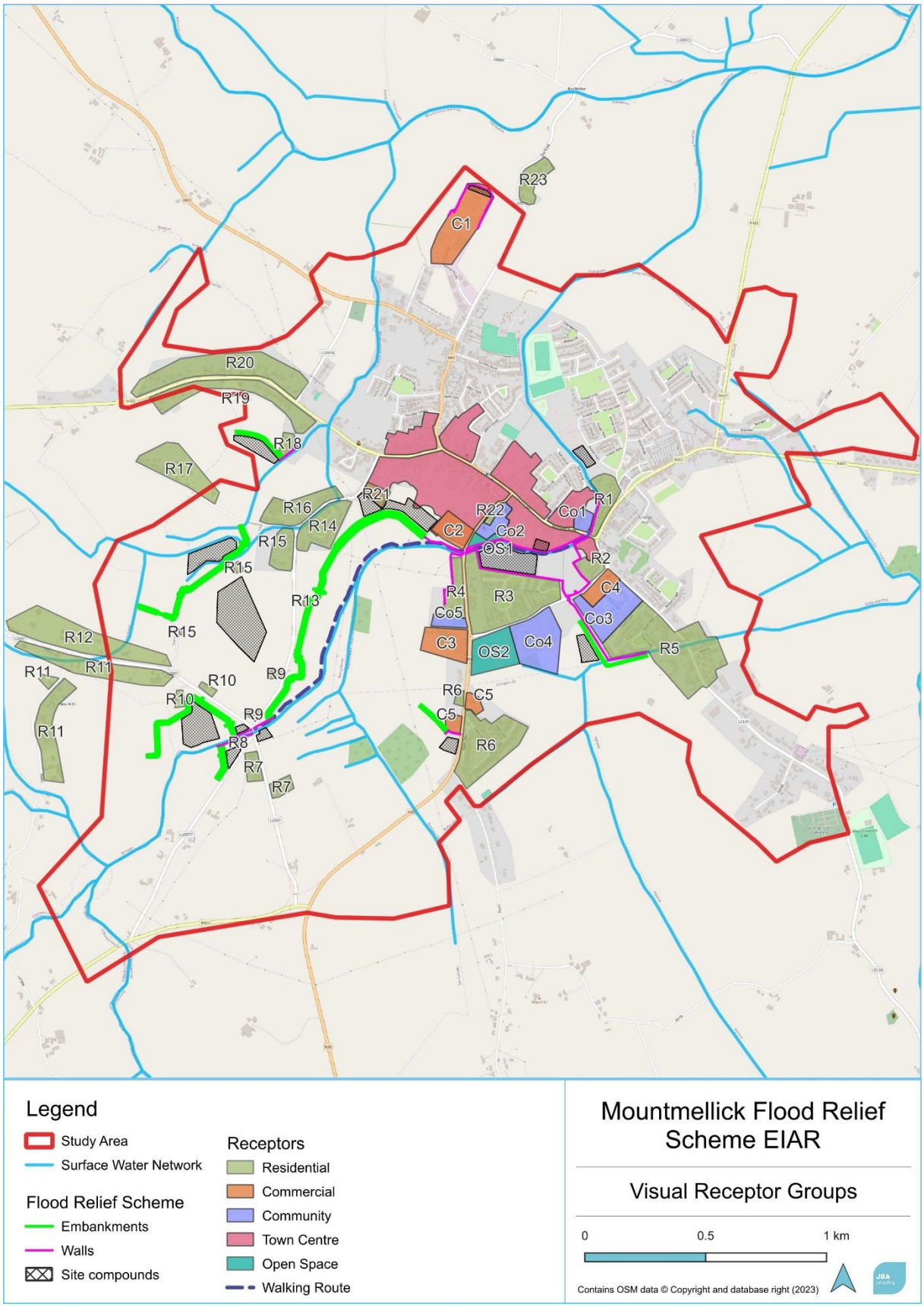


Figure 11-3: Visual Receptor Plan

Table 11-3: Visual Impact Assessment

Receptor No.	Distance from proposed development	Sensitivity	Magnitude of change	Predicted impact and duration	
				Construction	Operation
R1	0 – 80m	High	Low	Temporary, slight	Permanent, slight
R2	20 – 100m	High	Medium to Low	Temporary, moderate	Permanent, slight
R3	10 – 230m	High	Medium to Negligible	Temporary, moderate	Permanent, slight
R4	10 – 75m	High	Low	Temporary, slight	Permanent, slight
R5	10 – 240m	High	Medium to Low	Temporary, moderate	Permanent, slight
R6	50 – 250m	High	Low to Neutral	Temporary, slight to Imperceptible	Permanent, slight to Imperceptible
R7	85 – 250m	High	Low to Negligible	Temporary, slight	Permanent, slight
R8	0m	High	Medium	Temporary, moderate	Permanent, moderate
R9	30 – 40m	High	Low to Negligible	Temporary, slight	Permanent, slight
R10	20 – 45m	High	Low to Negligible	Temporary, slight	Permanent, slight to Imperceptible
R11	200 – 630m	High	Low to Negligible	Temporary, slight	Permanent, slight to Imperceptible
R12	170 – 700m	High	Low to Neutral	Temporary, slight to Imperceptible	Permanent, slight to Imperceptible
R13	10m	High	Low	Temporary, slight	Permanent, slight
R14	40 – 170m	High	Low to Negligible	Temporary, slight	Permanent, slight
R15	25 – 75m	High	Low to Neutral	Temporary, slight	Permanent, slight to Imperceptible
R16	85 – 140m	High	Neutral	Imperceptible	Imperceptible
R17	165 – 500m	High	Negligible to Neutral	Temporary, slight to Imperceptible	Permanent, slight to Imperceptible
R18	10m	High	Low to Negligible	Temporary, slight	Permanent, slight
R19	175 – 350m	High	Negligible to Neutral	Temporary, slight to Imperceptible	Permanent, slight to Imperceptible
R20	230 – 420m	High	Neutral	Imperceptible	Imperceptible
R21	70 – 140m	High	Low to Negligible	Temporary, slight	Permanent, slight
R22	90m	High	Neutral	Imperceptible	Imperceptible
R23	120 - 260m	High	Negligible to Neutral	Temporary, slight	Imperceptible
TC	0 – 600m	High	Low to Neutral	Temporary, slight to Imperceptible	Permanent, slight to Imperceptible
C1	0m	Low	Low	Temporary, slight to Imperceptible	Imperceptible
C2	35 – 110m	Low	Low to Negligible	Temporary, slight	Imperceptible
C3	130m	Low	Neutral	Imperceptible	Imperceptible
C4	5 – 100m	Low	Low	Temporary, slight to Imperceptible	Imperceptible
C5	0 – 150m	Low	Negligible	Imperceptible	Imperceptible
Co1	45m	Medium	Low	Temporary, slight, Adverse	Permanent, slight
Co2	50 – 130m	Medium to Low	Negligible to Neutral	Temporary, slight to Imperceptible	Permanent, slight to Imperceptible
Co3	140 – 200m	Low	Neutral	Imperceptible	Imperceptible
Co4	170 – 320m	High	Negligible to Neutral	Temporary, slight to Imperceptible	Imperceptible
Co5	80m	Low	Neutral	Imperceptible	Imperceptible
OS1	0m	High	Medium	Temporary, moderate	Permanent, moderate
OS2	190m	Medium	Neutral	Imperceptible	Imperceptible
WR	0 – 100m	High	Medium to Low	Temporary, moderate	Permanent, slight

R1 (A row of terraced houses along R422 and three residences along Briar Lane) – Distance from nearest flood defence measure = 0 – 80m.
This group is adjacent to the town centre to the east. The terraced properties have large rear gardens, which are bounded by the Owenass river to the west. Separated by low walls many also appear to have small outhouses or sheds.
This receptor can be seen in Photomontage View 1 in Figure 11-4 and Appendix 11.1 (View from Convent Bridge looking north and east).
Sensitivity Receptors would be residents at home. Sensitivity is High.

Magnitude During construction a site compound will be located in a small field to the north of the houses along Briar Lane which will be accessed via Kirwan Park. Flood walls will be located directly to the rear of the terrace gardens along the Owenass River. Thick riparian vegetation is present along this stretch of the river which would partially occupy rear facing views from the houses. A tall hedge with trees is present around the field in which the site compound will be located. This will screen the visibility although some vegetation may be cleared to accommodate the compound. Partially screened views of the construction compound and construction traffic entering via Kirwan Park will have an adverse visual effect for residents of this group. The highest magnitude of change will be Low.
Once operational, the cleared vegetation to the rear along the river is expected to have an Adverse visual effect, Low in magnitude which is expected to be further reduced as the remaining vegetation matures. Vegetation is also present on the western bank of the river which will not be subject to clearance.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** during construction and **Permanent, Slight, Adverse** during operation.

R2 (Houses at the western corner of the roundabout between Connolly Street and Irishtown Road) – Distance from nearest flood defence measure = 20 – 100m.
The row of terraced houses along Irishtown Road are two-storey properties oriented in a southeast-northwest direction. Rear views to the northwest overlook additional properties in this group. The single house along L2120 faces northeast southwest.
This receptor is to the south-east of Photomontage View 2 in Figure 11-5 and Appendix 11.1 (View from Convent Bridge looking south and west). where the proposed flood walls can be seen.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude A large construction compound will be located in the field to the west of this group. During construction, the presence of the compound along with machinery, equipment, and the movement of vehicles will have an adverse visual impact for the houses. Due to the orientation of the houses views of the compound will be angled and partially screened by a row of tall hedges along the western boundary. To accommodate the proposed flood walls, the hedges will be removed thus eliminating the screening. During construction, the magnitude of change is expected to be Medium due to the presence and proximity of the construction compound.
The proposed flood defence walls will be adjacent to the existing boundary wall enclosing the houses from the west and will be up to a height of 3.1m from stream bed level. The clearance of vegetation will open up views to the field and Irishtown Road, thus slightly reducing the level of privacy for the houses. The magnitude of change is expected to be Low.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary**, **Moderate**, **Adverse** during construction and **Permanent**, **Slight**, **Adverse** during operation.

R3 (Houses in Grove Park estate, St. Joseph's Terrace estate, and houses along N80 between Mill Bridge and the roundabout between Irishtown Road and N80) – Distance from nearest flood defence measure = 20 – 100m.
Properties in Grove Park are oriented in both east-west and north-south directions. They are semi-detached two-storey houses with open front gardens and closed rear gardens. Two large green spaces are located at the entrance to the estate from Irishtown Road and at the centre of the estate at the northern boundary. Houses in St. Joseph's Terrace are oriented along a road leading from Irishtown Road onto a central oval of green space facing in all directions. The properties are two-storey with small open front gardens and large, closed rear gardens. Along the eastern side of the N80 houses are a mix of detached private dwellings and terraces which are oriented in an east-west direction. A well-developed treeline located to the east separates these houses from north to south from those of St. Joeseph's Terrace and Grove Park. Walls also separate each housing group within this receptor group.
One house in this receptor group can be seen in Photomontage View 6 in Figure 11-9 and Appendix 11.1. (View from Mountmellick bridge) The receptor group R3 can also be seen in the background behind the proposed flood walls in Photomontage View 7 (Figure 11-10).
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude The construction compound proposed for the field north of Grove Park will be clearly visible from houses facing north-south. Houses oriented east-west will have angled views from side windows and rear gardens. Visibility of the compound from St. Joseph's Terrace will be filtered through Grove Park

properties and single trees and hedges that are present in the rear gardens of houses in St. Joseph's Terrace. During the winter months the screening may be reduced as trees lose their foliage. The treeline separating these two estates from houses along the N80 almost entirely screens rear views to the compound. The magnitude of the visual effect will range from Medium for north-south facing houses in Grove Park to Negligible for houses along the N80.
Once operational, wall height will be up to 3.1m from stream bed level and will have a lower visual impact than that of the compound due to the placement alongside existing boundary walls. The magnitude of change will be Low.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Moderate, Adverse** during construction and **Permanent, Slight, Adverse** during operation.

R4 (Houses along the western side of N80 (opposite those of R3)) – Distance from nearest flood defence measure = 10 – 75m.
Properties face in an east-west direction with majority being two-storey detached houses with front and rear gardens.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude Views from rear windows and gardens comprise fields and hedgerows south of the Owenass River which is to be made into a formalised flood plain as part of the flood relief measures. Proposed flood defences measures will involve the construction of a flood wall at Mill Bridge which will continue along the rear boundary for majority of houses with the exception of the most southern house of the group. The wall will have a maximum height of 1.9m above stream bed level. The closest construction compound will be entirely screened by R3. Visual effects during construction will be limited to the machinery and equipment required for the flood wall construction. The new walls may be partially visible from rear second storey windows; however, the existing boundary wall will provide screening, and the addition of a wall will not result in a significant change to the existing views for these houses. One of the houses has trees and tall hedges in the rear garden, while another has a kempt row of hedges. These elements will provide additional seasonal screening. The magnitude of change will be Low.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** during construction and **Permanent, Slight, Adverse** during operation.

R5 (Davitt Court estate, Brock View estate, and several single houses south along L2120) – Distance from nearest flood defence measure = 10 – 240m.
Each estate comprises semi-detached and detached two-storey houses with small front gardens and larger rear gardens separated by low walls. Houses along the southwestern boundary of Davitt Court and Brock View estates are oriented in the direction of proposed flood measures. The remaining houses in the estate are positioned in the opposite direction with views towards the proposed works only through side windows. Detached two-storey houses and bungalows along L2120 are angled in the general direction of the flood measures.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude A small construction compound will be located to the northwest of this receptor group and will be accessed via Irishtown Road. To establish the site compound and accommodate stream diversion and flood wall construction, vegetation clearance will be required. Flood walls will be constructed alongside the existing boundary wall with a maximum height of 1.9 m above stream bed level. During construction, the visual effect will be highest for houses in Davitt Court with rear views overlooking the compound and flood wall. The magnitude of this effect will decrease with distance and orientation in the opposite direction, where visibility will be angled through side windows and screened by houses closer to the works. The magnitude of change will range from Medium to Low.
Houses south along L2120 are oriented in a northeast southwest direction yet benefit from screening from trees and hedges present to the rear of the properties. During construction and operation, the magnitude of the visual effect will be Low.
Effect In accordance with the methodology, the significance of the visual effect is expected to be ***T*emporary, Moderate, Adverse** during construction and **Permanent, Slight, Adverse** during operation.

R6 (Esker Gate estate situated on the eastern side of the N80 at the southern boundary of the town and a single dwelling along the western side of N80) – Distance from nearest flood defence measure = 50 – 250m.

Houses in Esker Gate are low rise with front and rear gardens and are oriented in all directions along the internal estate roads. The single property faces east west. There is a garden centre to the south (C5) which screens southern views for the single house.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude. A construction compound will be situated opposite the estate to the south of C5. The proposed flood defence wall will have a maximum height of 0.8m and will replace the existing boundary fence between C5 and the be constructed perpendicular to N80 with an adjoining embankment of a maximum height of 0.8m following a southeast-northwest direction. A thick hedgerow with a height over 2.5m forms the estate perimeter so views are confined within the boundary. During construction and operation, the magnitude of change for houses in Esker Gate will be Negligible for those nearest the access road and Neutral for the remainder.
The garden centre will screen visibility of the wall and construction compound for the single dwelling further north along the N80. The house is also oriented at an angle such that views to the proposed embankment will be oblique. Trees and vegetation dividing two fields to the west will be cleared to accommodate the proposed embankment. This will have an adverse visual effect on the landscape. This will alter the nature of the horizon slightly; however, the appearance of the embankments will be of a similar character to the low-lying hedgerows in the area. During construction and operation, the overall magnitude of change will be Low.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** to **Imperceptible** during construction and **Permanent, Slight, Adverse** to **Imperceptible** during operation.

R7 (7 no. single houses east and west along L2097) – Distance from nearest flood defence measure = 85 – 250m.
5 no. dwellings along the west of L2097 are bungalows with open front gardens and walled off rear gardens. Each house has hedges and shrubs in the rear gardens. 2 no. houses along the east of L2097 boast similar features. Houses are oriented in a northeast-southwest direction. North of the group is the Owenass Bridge.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude The 5 no. houses along L2097 are closest to the two small construction compounds proposed in fields to the north and northwest. One in a triangular field along L20977 and the other in a field adjacent to the Owenass Bridge along L2097. A low hedgerow is present along both roads which will provide some screening. Due to the orientation of houses, views towards the compounds are angled and visibility decreases with distance. Bushes, hedges, and trees will be cleared along the riverbank to accommodate the proposed wall upstream of the bridge, and some vegetation clearance will also be required to accommodate the proposed embankment south of the river. Wall and embankment heights will not exceed 1m. Houses along the western side of L2097 will have the highest visibility of the construction compound and embankment through rear facing views. There will be partial screening from hedges and trees within the rear gardens of these properties. Subject to the season, there will be a variable degree of screening.
During construction and operation, the magnitude of change will be Low. For the 2 no. houses along the eastern side of L2097 the magnitude will be Negligible.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** during construction and **Permanent, Slight, Adverse** during operation.

R8 (A single house off L20977) – Distance from nearest flood defence measure = 0m.
This house has a dormer oriented in a northeast southwest direction, located upstream of the Owenass Bridge and set back from L20977 by a curved driveway.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude Several flood relief measures are proposed in the vicinity of this receptor. The house is adjacent to the triangular field along L20977 which is to be the location of a small construction compound. A flood defence wall up to 1.1m above stream level will be constructed along the southern bank of the Owenass River which will adjoin to the boundary wall of the receptor. An embankment will be constructed to the southwest of the property and northwest across the river. The embankment heights will be between 1.1 and 1.4m respectively. Vegetation surrounds the house blocking views of the proposed site compound, embankments, and wall.

To accommodate the new flood wall along the southern riverbank, there will be significant clearance of riparian vegetation. This will alter the views of the river from this property. Once operational, the appearance of the embankments will be of a similar character to local hedgerows and wall heights are not significantly elevated above stream level. The magnitude of change will be Medium.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Moderate, Adverse** during construction and **Permanent, Moderate, Adverse** during operation.

R9 (Two houses along a rural road downstream of Owenass Bridge) – Distance from nearest flood defence measure = 30 – 40m.
The house closest to the Owenass Bridge is a small bungalow with adjoining farm buildings. Further north is a two-storey detached house surrounded by mature trees and hedges. Both houses are situated on the northwestern side of the road. The Owenass River flows towards the northeast. This receptor is to the north-east of Photomontage View 11 (View from Owenass Bridge) in Figure 11-14 and Appendix 11.1.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude A small construction compound is proposed upstream of Owenass Bridge. Vegetation forms a boundary around both houses and consists of mature trees and hedges. A mid-height hedgerow is present along the road. between the properties and the proposed embankment.
A new flood wall and embankment are proposed immediately downstream of the Owenass Bridge and along the southeastern side of the road respectively. The wall will have a maximum height of 1.6m from stream bed level and the embankment will have a maximum height of 2.5m and a slope of 1:2. Some slope variance as part of the design may be incorporated to lessen the engineered look. Due to the presence and maturity of the vegetation present around the properties, visibility of the site compound, flood wall, and embankment will be partially or fully screened. When these elements are visible the view will be angled. The magnitude of change will be Low to Negligible.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary Slight, Adverse** during construction and **Permanent, Slight, Adverse** during operation.

R10 (Two standalone houses on either side of L2097, northeast of Owenass Bridge) – Distance from nearest flood defence measure = 20 – 45m.
Both houses are bungalows with spacious front and rear gardens featuring mature trees and shrubs. L2097 is bordered by a mid-level well-kempt hedgerow.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude Views from these houses comprise the adjacent agricultural fields partitioned by hedgerows and treelines. A large site compound is proposed in an area to the south of these properties. Clearance of a hedgerow to accommodate the compound is expected. During construction there will be angled partially screened views of the compound. The magnitude of change will be Low.
Flood measures in the vicinity of these houses consist of an embankment and will be located opposite and alongside the receptors of this group. The maximum height will be 1m with a side slope of 1:2. The low rise and gentle slope of the embankment will be of similar character to immediate landscape. Visibility may be greater when screening elements are not in foliage, however, the magnitude of change will not be significant. The magnitude of change will be Negligible to Neutral.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** during construction and **Permanent, Slight, Adverse** to **Imperceptible** during operation.

R11 (Houses along L6098 and L2097) – Distance from nearest flood defence measure = 200 – 630m.
There are 7 no. houses along L6098 and 5 no houses along the southern side of L2097. Together the receptors of this group form a T shape. The southeastern corner formed by the arrangement is occupied by a large, flat mosaic of pastures, with no internal hedgerows. Dwellings are a mix of bungalows and two-storey buildings with large front and rear gardens. Treelines and hedgerows are prominent along L2097 whilst L6098 has less vegetation.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude Houses along L6098 enjoy views across the large open space to the southeast which is oriented towards flood relief works proposed Upstream of Owenass Bridge. In the area east of the open space,

separated by a hedgerow and trees, an embankment is proposed and fields in the vicinity will also be the location of a large site compound for the duration of the works. The embankment will have a maximum height of 1m and a side slope of 1:2. Trees and hedgerows are present in and around the fields of the proposed site compound. Some vegetation clearance will be required to accommodate the compound which will open up views across the flat landscape. Due to the orientation of the houses towards the works there may be some visibility through gaps, particularly during winter months, however, from the most distant receptors of the group visibility will be low. The magnitude of change will be Low.
Houses located along L2097 have northeastern facing views towards other houses situated along the road and southwestern views of the expansive array of pastures to the south and houses along L6098. There also appears to be a higher volume of vegetation present to the rear of these receptors. Visibility of the site compounds during construction will be highly screened due to the presence of vegetation around both the receptors and the compounds and the orientation of each element. Screening may be reduced during the winter months to allow some visibility of the works through angled or partially filtered views. The magnitude of change will be Negligible to Neutral.
During operation, parts of the embankments may be visible through gaps in the vegetation, however, due to the low height and gentle slope it will not look out of character with the rural landscape. The magnitude of change will be Negligible.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** during construction and **Permanent, Slight, Adverse** to **Imperceptible** during operation.

R12 (5 no. houses along northeastern side of L6098, the most western house is recorded on the NIAH Reg No. 12800703) – Distance from nearest flood defence measure = 170 – 700m.
Hedgerows are well-developed along the road, and several houses are set back from the road and shrouded in trees and hedges. One house is not visible from the road due to the thick surrounding vegetation. Central to the receptor group is a small, forested area. The NIAH site (Reg No. 12800703) is the most western property of the group with mature trees and hedges present in the front and to the eastern side of the property. There also appears to be farm buildings to the rear of the property.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude At the eastern extreme of the group a house is situated beside a junction leading to flood works proposed for Manor Road. The property is at an angle to the proposed flood embankment, however, views across the large open field to the north are clear due to a lack of any hedgerows in the interim. The treeline alongside which the embankment will be situated is visible. The proposed embankment will be up to 1.4m in height with a slope of 1:2, including some variance to lessen the engineered appearance. During construction the presence of machinery will have an adverse visual effect in the quaint rural surroundings. During operation the presence of the embankment will not feel out of character with surrounding environment. The magnitude of change will be Low.
Moving west along the group, vegetation is present around properties and throughout the landscape which occupies the views towards the proposed flood works. These screening elements are dense and during full foliage will block visibility entirely. During the winter months, the level of screening will be reduced, however, it is unlikely to increase the visibility of the proposed embankment. The magnitude of change will be Neutral.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** to **Imperceptible** during construction and **Permanent, Slight, Adverse** to **Imperceptible** during operation.

R13 (Single house set back from rural road) – Distance from nearest flood defence measure = 10m.
The house is not visible from street view due to a small, forested area separating it from the road.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude A large construction compound to facilitate the construction of the embankment between Owenass Bridge and Mill Bridge will be situated approximately 40m to the southeast of the house. There are a few trees separating the house from the fields to the east. As such, views to the compound may be indirect with some screening. The house is surrounded by trees and fields with no other built visible built features in the vicinity, and the presence of the compound will be out of character with the landscape. The magnitude of change will be Low.

To accommodate the embankment, there will be some clearance of trees occupying views to the south of the house. The embankment proposed will have a maximum height of 2.5m with side slopes of a 1:2 gradient. Variation in the gradient along the length of the embankment has been proposed to lessen the engineered appearance. Once operational the magnitude of change will be Low.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** during construction and **Permanent, Slight, Adverse** during operation.

R14 (Manor Grove estate) – Distance from nearest flood defence measure = 40 – 170m.
Manor Grove estate comprises two-storey semi-detached houses with front and rear gardens. There is little vegetation along paths within the estate or between houses. Three small green spaces are present. A small slip road runs along the eastern boundary between a large open field and the estate. A thick, tall treeline forms sections of eastern boundary and all of the southern boundary. This receptor is to the south-west of Photomontage View 12 (View from Manor Road) in Figure 11-15 and Appendix 11.1.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude A construction compound will be located at the northeastern corner of Manor Grove estate. The treeline present along the eastern boundary ends at this point, and through a gap between the northeastern houses the view to the field is clear. During construction, the compound will be most visible from the upper floor rear windows of houses towards the northeast and along the eastern boundary. Views will become increasingly angled and screened by the treeline and other houses in the group. The magnitude of change will range from Low to Negligible.
Once operational, the embankment will be visible from rear upper storey windows through gaps in the trees and visibility will increase during the winter. For houses set back from the eastern boundary visibility becomes increasingly screened and angled. The embankment will have a maximum height of 2.5m and side slope gradient of 1:2, which will be varied along the length of the embankment to lessen the engineered appearance. The magnitude of change will be Negligible.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** during construction and **Permanent, Slight, Adverse** during operation.

R15 (6 no. houses along a rural road facing east and single house along another rural road facing northwest) – Distance from nearest flood defence measure = 25 – 75m.
The single house is a bungalow, set back from the road with front and rear hedges. The 6 no. houses along the rural road are single dwellings with large front and rear gardens separated by hedges. Most of the houses are set back from the road with front views facing east, and rear views facing west.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude A construction compound will be located in a field opposite the single house to facilitate works on the Pound Stream which will involve the construction of an embankment, culvert crossing, and removal of an existing flood wall. The proposed embankment will have a maximum height of 1.3m comparable to that of the boundary hedgerow of the containing field, which is well maintained. Part of the construction compound will be partially screened by an internal hedgerow as well as the vegetation within the front garden of the single house. Houses along the other road are separated from the compound by a road and field lined with a dense hedgerow. Vegetation is also present within the rear gardens of these houses. During winter visibility will be highest. The magnitude of change during construction will be Low.
The embankment will be of a similar character to the surrounding rural landscape. Due to the low height and proximity to the existing hedgerow, the magnitude of change for houses to the east will be Neutral and Negligible for the single house along the road.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** during construction and **Permanent, Slight, Adverse** to **Imperceptible** during operation.

R16 (8 no. houses along the north side of Manor Road) – Distance from nearest flood defence measure = 85 – 140m.
Manor Road curves north-eastward on approach to the town centre. 7 no. houses of the group follow this curve. A single bungalow situated at the fork in Manor Road is oriented east-west and views from front and rear windows overlook trees surrounding the property and R14 respectively. Further west a single two-storey

property on a large parcel of land faces south and upper storey windows face east and west away from proposed flood defences.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude Visibility of the proposed Garroon Stream embankment to the southwest of the group and the proposed embankment between Owenass Bridge and Mill Bridge to the southeast of the group are screened by several elements. A building situated along Manor Road is marked as a Flour Mill on the historical 6-inch map although it is not on the NIAH register. A high wall surrounds this property which blocks views towards the Garroon Stream embankment for the most westerly house of the group. Moving towards the town centre, hedgerows along the road, front garden vegetation and R14 combine to screen views for the remaining houses in the group. During construction and operation, the magnitude of change will be Neutral.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Imperceptible, Adverse** during construction and **Permanent, Imperceptible, Adverse** during operation.

R17 (Houses along Manor Road to the northwest) – Distance from nearest flood defence measure = 165 – 500m.
Manor Road continues northwest until it ends in a cul-de-sac. Hedgerow height varies along the road with occasional deciduous trees. Houses are either single storey or dormer with front and rear gardens and oriented in a northeast southwest direction.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude A construction compound and embankment are proposed to the southeast of this group across two hedgerow partitioned fields. Visibility is screened by roadside hedgerows, hedgerows within fields and vegetation present on the properties. In addition to screening elements, the angle of the houses creates oblique views towards the proposed embankment. Embankments will have a maximum height of 1.5m with a side slope of 1:2 that will reduce the severity of its appearance. The magnitude of change will be Negligible to Neutral.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** to **Imperceptible** during construction and **Permanent, Imperceptible, Adverse** during operation.

R18 (Single house down a laneway coming off R422) – Distance from nearest flood defence measure = 10m.
The house cannot be viewed from street view and no photos were taken along the access laneway. It is presumed that the house is single storey with what appears to be sheds, barns, and other farm style buildings on the property grounds. Trees are present to the north and southeast along the laneway. The orientation of the house could not be determined.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude A construction compound will be located in a field to the northwest of the property to facilitate works on the Garroon Stream which flows in a northeast direction to the rear of the property. The compound will be accessed from the north via R422. There does not appear to be significant vegetation separating the property and the compound, so visibility is assumed to be clear. Proposed flood defence measures will be an embankment with a maximum height of 1.3m to the northwest/west and a wall of up to 1.3m above stream bed level along the western bank of the stream to the southeast. The wall will integrate with the embankment at a point south of the house.
The magnitude of change has been estimated due to the lack of available information about the property. During construction, the presence of the compound and associated machinery will have an adverse visual effect with minimal screening from other elements in the landscape. The magnitude of change will be Medium. Once operational, the new flood wall will be set back from the laneway and screened by the trees present. The embankment will be of similar character to hedgerows in the area and will be an understated addition to the immediate site surrounds due to the low height and slope variance. The magnitude of change will be Negligible.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Moderate, Adverse** during construction and **Permanent, Slight, Adverse** during operation.

R19 (Houses along the southside of R422 including the old Mountmellick Railway station (NIAH Reg No. 12900332)) – Distance from nearest flood defence measure = 20 – 100m.
The houses, which are all bungalows, follow the arc of R422 that curves from the east to the west, with no houses present at the northern most section of the road. R20 is located on the other side of the road, and fields dominate the southern landscape views.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude Works proposed for the Garroon Stream are located to the south and southeast of the houses in this receptor group. Orientation is generally angled towards the works and compound whereby views from rear windows may have angled visibility of the works from a distance. The construction compound may be visible through gaps in the hedgerows, particularly in winter. Construction traffic will be entering the compound from R422 between eastern houses of the group.
Houses at the western end of the arc are oriented towards the embankment at an angle and fields to their rear have well developed hedgerows. Towards the east some houses may have limited visibility of the embankment, and there will be no visibility of the wall from this receptor group. During construction, the movement of vehicles to and from the compound will increase the magnitude of the visual effect. The magnitude of change will be Low. During operation, the magnitude of change will be Negligible to Neutral.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** to **Imperceptible** during construction and **Permanent, Slight, Adverse** to **Imperceptible** during operation.

R20 (Houses but along the northern side of R422) – Distance from nearest flood defence measure = 20 – 100m.
Houses are predominantly bungalows with small hedged front gardens and large narrows rear gardens. Houses are generally oriented towards the south.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude A construction compound, embankment, and flood wall are proposed south of this receptor group. The compound is situated beside a tall treeline which screens views from the northeast. The embankment will not exceed a height of 1.3m. Visibility of these flood measures is screened either by trees present throughout the immediate landscape or R19. The magnitude of change will be Neutral.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Imperceptible, Adverse** during construction and **Permanent, Imperceptible, Adverse** during operation.

R21 (Manor Court Estate off Manor Street) – Distance from nearest flood defence measure = 70 – 140m.
The small estate comprises semi-detached and terraced dormers with front and rear gardens forming a total of 12 no. houses. A low concrete wall surrounds the estate. Houses are oriented along the small T-shaped road internal to the estate.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude Current views from receptors in this group are occupies by residential elements of the estate, Wolfe Tone Court, R14, and R16 in addition to the large expanse of agricultural land to the south and some fields to the west. A construction compound will be located to the southwest of the estate. Views from the upper floor windows of the four houses closest to Manor Street which are angled towards the compound. A row of terraced houses is oriented perpendicular to the compound and views will be indirect and angled, visible only through side windows. Views from houses along the eastern boundary of the estate with be screened by other houses and several trees present around a large green space at the southeastern corner of the estate. Views of the construction compound will be clearest from the open space. The estate falls within the town centre boundary, and Manor Grove (R14) is visible for some houses through partially screened and indirect views. Due to the proximity of other houses and built features the magnitude of change during construction will be Low.
The embankment will have a maximum height of 2.5m and side slope gradient of 1:2, with variance in the slope proposed to lessen the engineered appearance. It will be set away from the boundary wall of the estate and therefore visibility will be increased within the broader landscape, however, the magnitude of change will be Low for houses with direct views and Negligible for houses with highly screened views.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** during construction and **Permanent, Slight, Adverse** during operation.

R22 (Single house along N80 within town centre) – Distance from nearest flood defence measure = 90m.
A single house within receptor group Co2.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude Walls proposed along the northern and southern banks of the Owenass River will not be visible from the house due to the presence of buildings in Co2, a thick tree line to the south, and Mountmellick Park (OS1) further south. The magnitude of change will be Neutral.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Imperceptible, Adverse** during construction and **Permanent, Imperceptible, Adverse** during operation.

R23 (Houses along L20972 northeast of Midlands Steel) – Distance from nearest flood defence measure = 120 – 260m.
The houses of this group are bungalows oriented in a northwest southeast direction where front facing views are to the northwest. Well-developed hedgerows are present along the road and also separate the properties.
Sensitivity Receptors would be residents at home. Sensitivity is High.
Magnitude Works will include the replacement and upgrade of the existing southwestern block boundary wall and the construction of a new flood defence wall up to 1.1m from existing ground level along the existing western boundary wall of the property. The site compound will be located within the Midland's Steel property boundary. Both the compound and the wall will be screened by Midlands Steel as views towards the compound and wall from these houses are from the east. A treeline also surrounds the property which provides seasonal screening although some vegetation clearance will occur to facilitate the works. The magnitude of change will be Negligible during construction and Neutral during operation.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** during construction and **Permanent, Imperceptible, Adverse** during operation.

Town Centre

TC (Mountmellick Town Centre) – Distance from nearest flood defence measure = 0 – 600m.
The centre of Mountmellick has been grouped as a receptor. This group includes a large number of houses, along with community facilities, such as churches, post office, health centres, Garda Station, schools etc., and a variety of commercial premises. R422 bisects the town in a general east-west direction as O'Moore Street and Sarsfield Street respectively. The N80 travels in a general north-south direction through the town as Market Street. A significant number of NIAH sites and several NMS sites are located within the town centre and are discussed fully in Chapter 10. The proposed flood walls can be seen to the south-east of this receptor in Photomontage View 2 and 3 (Figure 11-5 and Figure 11-6), and to the south in Photomontage View 4 in Figure 11-7 and Appendix 11.1.
Sensitivity Receptors would be a variety of residents at home, staff, students, and visitors. Sensitivity is Low to High.
Magnitude The southern area of the town centre is comprised of terraced buildings with few gaps and views towards the south. from the main streets. There is no visibility from the main street and views are confined to the streetscape. There will be no visual effect on the several NIAH sites in the town centre due to the confined views.
Convent bridge lies at the boundary of the town centre where proposed works upstream and downstream of the bridge will be visible. Once operational, the new flood walls and regraded walkway will have altered the appearance of the riparian landscape along the border of the town. The significance of the effect will be higher for pedestrian users of the space. The magnitude of change will be Low to Neutral.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** to **Imperceptible** during construction and **Permanent, Slight, Adverse** to **Imperceptible** during operation.

Commercial

C1 (Midlands Steel) – Distance from nearest flood defence measure = 0m.
Midlands Steel is located in an industrial site at the northern boundary of Mountmellick.

Sensitivity Receptors would be employees and customers. Sensitivity is Low.
Magnitude A flood defence wall of 1.1m in height above existing ground level will be constructed along the western boundary of the industrial area. A construction compound is also proposed in a field at the western boundary. Access for construction traffic to this potential compound will be via Bay Road and the adjoining temporary working area. The presence of the compound and wall will be similar in character to the industrial site. There will be vegetation clearance to facilitate some of the works and movement of machinery which will have an adverse visual impact. Overall, the magnitude of change will be Low.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** during construction and **Permanent, Imperceptible, Adverse** during operation.

C2 (Small commercial estate including HSE occupational therapy store, The Hare's Corner, Sonas Mountmellick Community Childcare, ProconPumps Europe LTD and Mountmellick Embroidery Museum) – Distance from nearest flood defence measure = 35 – 110m.
This receptor group is within the southern limit of Mountmellick town centre with access via the N80. At the southeastern corner of the receptor group is the Mill Bridge and to the south is the Owenass River. Buildings are two to three-storeys high.
This receptor group can be seen in Photomontage View 8 (View From Mountmellick bridge/ Mill bridge) in Figure 11-11 and Appendix 11.1.
Sensitivity Receptors would be employees and customers. Sensitivity is Low.
Magnitude Flood defence measures to the south of this group include the construction of flood defence walls along the northern and southern banks of the Owenass River. To the west, an embankment will adjoin with the walls. The embankment will have a maximum height of 2.5m and the wall will have a height of 2m above stream level. The construction compound adjacent to R21 may be visible across the large open fields that are to be formalised as a flood plain south of the river. Along the southern boundary of the commercial estate is a treeline that partially screens views towards the proposed walls. Once constructed, the embankment will be visible through angled views towards the west. The magnitude of change will be Low.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Imperceptible, Adverse** during construction and **Permanent, Imperceptible, Adverse** during operation.

C3 (Anngrove Stud farm) – Distance from nearest flood defence measure = 130m.
Anngrove Stud Farm is located towards the south of the town boundary along the N80. Dense sections of trees surround this property and flood defences are distant to the north and south.
Sensitivity Receptors would be employees and customers. Sensitivity is Low.
Magnitude Flood defence measures include the construction of a wall to the north behind R4, and an embankment adjacent to C5. The thick treelines surrounding the property fully screening any views towards flood measures in the vicinity. The magnitude of change will be Neutral.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Imperceptible, Adverse** during construction and **Permanent, Imperceptible, Adverse** during operation.

C4 (Small shopping centre including An Post, Supervalu, Pharmacy, Clinic, Warehouse store) – Distance from nearest flood defence measure = 5m.
This receptor is a small commercial mall located at the southeast of Mountmellick. R2 is to the northwest on the opposite side of Irishtown Road and Co3 is to the southeast. The shopping centre has a large, open central parking lot with clear views across Irishtown Road.
This receptor is to the south-east of Photomontage View 9 (View from shopping centre) in Figure 11-12 and Appendix 11.1.
Sensitivity Receptors would be employees and customers. Sensitivity is Low.
Magnitude A construction compound will be located in the field to the northwest to facilitate flood defence measures, which will include a flood wall with a height of 1.6m. Parts of the construction compound will be visible from the clinic and carpark. Visibility from the northeastern part of the receptor is partially screened by R2. The flood walls will be partially visible from the clinic and carpark once operational. The magnitude of change will be Low.

Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Imperceptible, Adverse** during construction and **Permanent, Imperceptible, Adverse** during operation.

C5 (Irishtown Garden centre, Applegreen, and Topaz) – Distance from nearest flood defence measure = 0 – 150m.
This group is located on either side of N80 towards the south, slightly staggered from one another. Receptors in R6 are located opposite each business.
Sensitivity Receptors would be employees and customers. Sensitivity is Low.
Magnitude A construction compound is to be located to the south of the garden centre and will facilitate works including the construction of a flood wall with a height of 0.7m and adjoining embankment with a height of 1.9m. The embankment will be constructed behind a treeline to the northeastern side which will fully or partially screen views subject to seasonality. The garden centre in addition to the treeline will fully screen views from Applegreen and Topaz. The magnitude of change will be Negligible.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Imperceptible, Adverse** during construction and **Permanent, Imperceptible, Adverse** during operation.

Community

Co1 (St. Joseph's Catholic Church Mountmellick) – Distance from nearest flood defence measure = 45m.
This group is located at the southeast of Mountmellick at the corner of Convent Bridge along R422. It includes the church, which is also a NIAH site (Reg No. 12900307), and a presentation convent (NIAH Reg No. 12900306).
Sensitivity Receptors would be churchgoers and residents of the convent. Sensitivity is High.
Magnitude Flood defence walls will be located along the eastern bank of the Owenass River to the east of the church and along both banks upstream of the bridge to the south. Walls will have maximum heights of 1 – 1.1m above stream level respectively. Views to the south from the church and convent are occupied by parts of the town centre. Towards the east the new walls will be visible through side windows of the convent. Vegetation clearance will be required to accommodate the new flood walls along the riverbank. The magnitude of change will be Low.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** during construction and **Permanent, Slight, Adverse** during operation.

Co2 (St. Pauls Church of Ireland, St. Pauls National School and Mountmellick Fire Station) – Distance from nearest flood defence measure = 50 – 130m.
This receptor group is located to the south of the town centre along the N80. The Owenass River flows to the south separated by OS1. St. Pauls Church is listed on both the NIAH register (Reg No. 12900345) and the NMS (Ref. LA008-032001-). The adjoining graveyard is also on the NMS (Ref. LA008-032002-).
Sensitivity Receptors would be churchgoers, employees, and students. Sensitivity is Medium to Low.
Magnitude Trees are present along the boundary of the park (OS1) which screen views towards the walls proposed along the northern and southern banks of the river. The church is angled in a northeast-southwest direction with virtually no visibility towards the walls. The magnitude of change will be Negligible to Neutral.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Imperceptible, Adverse** during construction and **Permanent, Imperceptible, Adverse** during operation.

Co3 (St. Joseph's Girls National School and Mountmellick Boys National School) – Distance from nearest flood defence measure = 140 – 200m.
The schools are located along Davitt Road to the southeast of Mountmellick in between C4 to the north and R5 to the south. St. Joseph's Girls National School is a three-tiered building with a large concrete open area to the rear. Some prefab buildings are also located on the site. This receptor is to the east of Photomontage View 10 (View from Irishtown) in Figure 11-13 and Appendix 11.1.
Sensitivity Receptors would be staff and students. Sensitivity is Low.
Magnitude Proposed works around the Clontygar Stream will include diversion of the existing stream, construction of a new channel and a flood wall up to 1.9m in height from stream bed level. The new flood

wall with connect with the existing property boundaries of the school. Positioned between the wall and the school premises is a mature hedgerow with trees. A construction compound will be located in the same field as the wall which will be visible through gaps in the hedgerow, particularly during the winter months. Views towards the wall will be from the outside playground area and rear windows of the school buildings. During construction the presence of machinery and construction works will be noticeable from the play area. Some vegetation clearance along the property boundary is envisaged to accommodate the new flood wall. Due to the low height of the wall the visual effect will not be significant. The magnitude of change will be Low.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Imperceptible, Adverse** during construction and **Permanent, Imperceptible, Adverse** during operation.

Co4 (St. Vincent's Community Nursing Unit) – Distance from nearest flood defence measure = 170 – 320m.
The nursing unit is located to the south of Mountmellick along Irishtown Road. R3 is located on the opposite side of the road, OS2 is adjacent to the west. There are carparks to the front and east and open green spaces throughout the grounds. The low-rise buildings are oriented in all directions.
Sensitivity Receptors would be staff and residents of the nursing unit. Sensitivity is High.
Magnitude The grounds are surrounded by trees to the south and east. The visibility of the construction compound adjacent to works around the Clontygar Stream will be screened by two treelines. During the winter the machinery and construction material R5 may be visible through gaps in the treelines. The magnitude of change will be Negligible to Neutral.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Slight, Adverse** to **Imperceptible** during construction and **Permanent, Imperceptible, Adverse** during operation.

Co5 (Mountmellick Tennis Club) – Distance from nearest flood defence measure = 45m.
The tennis club is located along the N80 towards the south of Mountmellick. R4 is to the north, C3 is to the south, and R3 is to the east.
Sensitivity Receptors would be employees and members of the club. Sensitivity is Low.
Magnitude Flood measures will be located to the back of R4 and entirely screened by vegetation present to the north. The magnitude of change will be Neutral.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Imperceptible, Adverse** during construction and **Permanent, Imperceptible, Adverse** during operation.

Open Space

OS1 (Mountmellick Amenity Area) – Distance from nearest flood defence measure = 0m.
The park is located off the N80 and the Owenass River flows directly south. A dense line of trees surrounds the park to the south and east. The amenity area has several playground features for young children, a picnic area, chess tables, an outdoor gym, and table tennis tables.
This receptor can be seen in Photomontage View 5 in Figure 11-8 and Appendix 11.1, along with the proposed flood walls. Additionally, this receptor can be seen in the foreground of Photomontage View 7 (Figure 11-10).
Sensitivity Receptors would be employees and customers. Sensitivity is Low.
Magnitude Flood walls will be located within the park that will require some vegetation clearance. During construction, onsite machinery and materials, excavated and cleared material, and diversions will create a construction environment in the park which is likely to disrupt the use of the amenity. The addition of walls in lieu of trees will have an adverse impact on the visual amenity of the park. The proposed planting is expected to reduce the Adverse impact of the tree removal, yet this is expected to be low until the new planting reaches maturity in the mid to long-term. The magnitude of change will be Medium.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Moderate, Adverse** during construction and **Permanent, Moderate** to **Low, Adverse** during operation.

OS2 (Mountmellick Tennis Club) – Distance from nearest flood defence measure = 45m.

A large open green space adjacent to St. Vincents Community Nursing Unit. There is a low wall around the boundary between the space, Irishtown Road, and the N80.
Sensitivity Receptors would be employees and customers. Sensitivity is Low.
Magnitude Flood measures pertaining to Mill Bridge to the northwest, Irishtown Garden Centre to the southwest, and the Clontygar Stream to the east will be fully screened by buildings and trees present throughout the immediate site surrounds. The magnitude of change will be Neutral.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Imperceptible, Adverse** during construction and **Permanent, Imperceptible, Adverse** during operation.

Walking Route

WR (Walking route between Convent Bridge and Owenass Bridge) – Distance from nearest flood defence measure = 0m.
The route is adjacent to the Owenass River with upstream and downstream views and wider rural landscape. The landscape within the vicinity of the route changes from urban to rural towards the south.
Sensitivity Receptors would be people using the route. Sensitivity is High.
Magnitude During construction, a significant southern portion of this route will be temporarily closed between Mill Bridge and Convent Bridge to allow for footpath raising, flood wall installation and removal of the existing southern boundary wall. Removal of the southern boundary wall is to encourage flood flows into the large field lying south of the river, formalising this area into a flood plain. The temporary closure will have an adverse visual effect. This southern field will also be the location of a large construction compound with access planned via Irishtown Road. Two other site compounds will be located within the vicinity of the walking route to facilitate the construction of an embankment. Rural landscape begins to dominate views towards the south and the presence of these compounds will have an adverse visual effect.
The embankment will adjoin with proposed walls along the northern riverbank and will continue southwards following the general route of the river until Owenass Bridge. The proposed flood wall heights will range from between 0.6 and 4.0m along the northern bank and 1.9m along the southern bank. The embankment height and slope will vary with a maximum height of up to 2.5m and average slope of 1:2. The presence of the embankment is not expected to have a significant visual effect as it will not be out of character with the rural landscape.
Clearance of riparian vegetation will be required to accommodate the wall foundations although majority of the walls will be set back from the bank. The walls will have a masonry finish in areas close to the public realm. The clearance of vegetation and addition of built features will degrade the visual amenity of the riverside. The magnitude of change will be Medium. Once remedial vegetation planting has matured, the significant of this effect will decrease.
Effect In accordance with the methodology, the significance of the visual effect is expected to be **Temporary, Moderate, Adverse** during construction and **Permanent, Slight, Adverse** during operation.



Figure 11-4: Photomontage View 1, proposed view from Convent Bridge looking north and east



Figure 11-5: Photomontage View 2, proposed view from Convent Bridge looking south and west



Figure 11-6: Photomontage View 3, proposed view from riverwalk looking southwest



Figure 11-7: Photomontage View 4, proposed view from riverwalk looking southwest towards playground

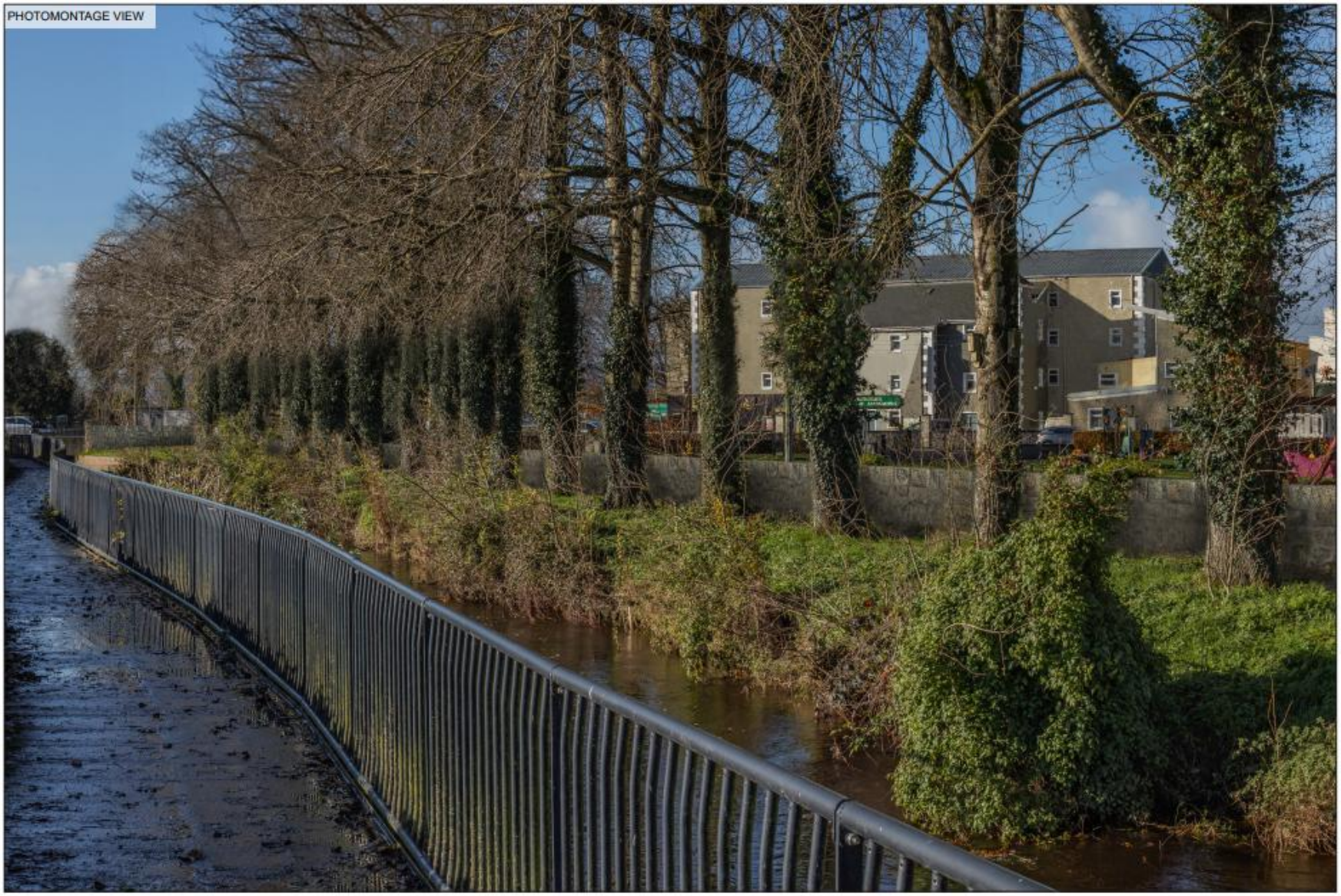


Figure 11-8: Photomontage View 5, proposed view from riverwalk looking west southwest towards playground



Figure 11-9: Photomontage View 6, proposed view from Mountmellick Bridge looking east southeast towards playground, ramp and field to the east



Figure 11-10: Photomontage View 7, proposed view from footpath looking south towards the playground



Figure 11-11: Photomontage View 8, proposed view from Mountmellick Bridge looking west towards picnic table area



Figure 11-12: Photomontage View 9, proposed view from entrance to shopping centre looking west northwest



Figure 11-13: Photomontage View 10, proposed view from Irishtown Street looking south southeast towards caravan park



Figure 11-14: Photomontage View 11, proposed view from Owenass Bridge looking north northwest



Figure 11-15: Photomontage View 12, proposed view from Manor Street looking south

11.6 Mitigation Measures

11.6.1 Construction Phase Mitigation

No significant landscape or visual impacts are expected during construction; therefore, no mitigation is required to reduce the magnitude of significant impacts to acceptable levels.

Construction hoarding will be installed to reduce visibility into the construction works. Hoarding will have viewing windows towards the River Owenass to maintain views. Replacement planting will be implemented in first planting season for quick regeneration.

11.6.2 Operational Phase Mitigation

No significant landscape nor visual impacts are expected during the operational phase; therefore, no mitigation is required to reduce the magnitude of significant impacts to acceptable levels.

The design of the proposed flood wall along the Owenass bridge and Covent bridge plus the finish to the replacement Owenass Bridge will be reusing parts of the existing wall and replicating its style including the capping over the wall. Where this is not possible, a similar looking finish will be used. The recommendations from the project Conservation Engineer will also ensure the proposed walls assimilate with the heritage setting. This will further mitigate visual impacts of the proposed walls on residential amenity.

11.7 Residual Impacts

No mitigation is required, and no residual impacts are expected.

11.8 Interactions

11.8.1 Landscape and Visual Amenity and Biodiversity

Elements of nature and biodiversity are often defining landscape features and contribute to landscape value and visual amenity. The Owenass River is an important natural amenity in Mountmellick where a significant proportion of the proposed works will take place.

Tree removal and vegetation clearance, particularly in riparian areas could have Adverse effects for both visual amenity and landscape and biodiversity which is fully discussed in Chapter 7. Mitigation measures outlined in Chapter 7 such as the use of root protection zones, transitional planting around culverts and remedial tree planting will help to mitigate impacts on visual amenity and landscape. The interaction between landscape and visual amenity and biodiversity will be **Temporary, Slight, Adverse**.

11.8.2 Landscape and Visual Amenity and Cultural Heritage

The landscape character along the riparian edge of rivers in Mountmellick will be altered by the proposed Flood Relief Scheme. This will lead to effects on cultural heritage, discussed in Chapter 10. The construction of flood walls between Mill Bridge and Convent Bridge and the replacement of Owenass Bridge will impact the setting of these locations and their views of the Owenass River and surrounding landscape. The proposed flood walls will incorporate stone from the existing walls or of a similar type where appropriate, reducing magnitude of change to existing views and therefore to the setting and visual amenity. The recommendations from the project Conservation Engineer will also ensure the proposed walls assimilate with the heritage setting. The interaction between landscape and visual amenity and cultural heritage will be **Permanent, Slight, Adverse**.

11.9 Potential Cumulative Impacts

Cumulative effects are the result of several minor effects combining to create one major effect. The assessment of cumulative effects considers existing stresses on the landscape and amenity as well as developments that are in planning or are underway.

The projects considered for potential cumulative effects with the proposed development are listed in Table 15-1 of Chapter 15. These projects were considered and assessed in terms of their potential impact on landscape and visual amenity and their potential to be experienced cumulatively with the proposed development.

It is possible that the construction period of the proposed development will overlap with that of several developments in Mountmellick. This would result in a **Temporary, Slight, Adverse** cumulative effect, for the duration of the overlapping construction period. A significant impact would not occur in this scenario.

Due to the nature of the proposed development and the nature of the projects listed in 15-1 of Chapter 15, cumulative effects during the operational phase are expected to be **Imperceptible, Adverse, Temporary.**

12 Material Assets

12.1 Introduction

Material assets, as described in the EPA Guidelines (2022)[166] covers three separate aspects: roads, traffic, and transport, built services or utilities, and waste management. These three aspects will be discussed in this chapter.

12.2 Methodology

The roads, traffic, and transport section describe the existing roads, traffic and transportation system in the vicinity of and leading to the proposed Mountmellick FRS. This section also examines the various aspects of the construction and operation of the development which have the potential to impact on roads, traffic and transportation, and the magnitude of these impacts are considered prior to mitigation. Mitigation measures are then discussed, and the residual impact (post-mitigation) is outlined. This section was undertaken using a desk-based study. The assessment of roads and traffic identifies roads, footpaths, cycleways and public transport routes that will be affected during the construction phase of the proposed scheme. This chapter is based on the anticipated method of construction and preliminary earth works calculations.

12.3 Existing Environment

12.3.1 Roads, Traffic, and Transport

12.3.1.1 Existing Environment

Roads in Ireland are classified as motorways, national (primary and secondary), regional and local roads. Transport Infrastructure Ireland (TII) has overall responsibility for the planning and supervision of the construction and maintenance of motorways, national primary and national secondary roads. Local authorities have responsibility for all non-national roads. The hierarchy of road types throughout Ireland is outlined in Table 12-1 below.

Table 12-1: Road classification in Ireland

Road Category	Description
Motorways	These are high quality multiple lane roads with limited grade separated junctions. They are high speed (120kph) roads predominantly provided to facilitate strategic traffic, with reduced journey times.
National Primary Roads	These are predominantly single carriageway, with some that are dual carriageway. Generally high speed (100kph) roads they also facilitate strategic traffic, with reduced journey times.
National Secondary Roads	These are medium distance through-routes connecting important towns, serving medium to large geographical areas and links to primary routes to form a homogeneous arterial network.
Regional Roads	Predominantly single carriageway roads of regional and local importance. These receive higher priority in maintenance criteria than Local Roads; hence tend to be structurally sound.
Local Roads (Primary, Secondary and Tertiary)	The local road system is operated in three tiers defining local importance, usage and maintenance priorities. They form a network of single carriageway roads of varying quality.

The existing road network in the general vicinity of the proposed development is outlined below and shown in Figure 12-1. The M7 motorway passes approximately 10.3km to the east of the proposed FRS, and connects Mountmellick to Limerick City and Dublin, via the N80 to Portlaoise, or the R422. The N80 passes through the town and connects Mountmellick to Tullamore in the north and Portlaoise in the south. The site is served by other local roads such as the R422 running in an east/west direction and intersecting with the

[166] EPA (2022) *Guidelines on the information to be contained in Environmental Impact Assessment Reports*. Available at: https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf [Accessed 09/01/2024]

N80, and the R423 running northeast for 11km toward Portarlington. The remaining roads and streets in the Mountmellick area are local roads.

Within Mountmellick, main roads and bridges include; Chapel Street, Emmett Street, Patrick Street, Market Street, Pearse Street and Mill Bridge all forming the N80 route in a north/south direction. Other town centre roads are O'Moore Street, Parnell Street and Sarsfield Street, Convent Bridge connecting to the R422 in a west/east direction. The Manor Road leads south towards Derrycloney and the Owenass Bridge.

Bridges in the proposed scheme area which will be directly impacted by the proposed development are the Owenass Bridge, Mountmellick Mill Bridge, and Convent Bridge. The Owenass Bridge is to be replaced as part of the FRS. The Mountmellick Mill Bridge will tie in with proposed flood defences, and its parapets will be raised by approx. 300mm on both the upstream and downstream sides. No works are proposed on the Convent Bridge other than tying into the proposed defences. The closest railway to Mountmellick is Portlaoise Railway Station 10.4 km to the south. This train line connects to Limerick City in the south, and to Dublin via Portarlington, Kildare, Sallins & Naas.

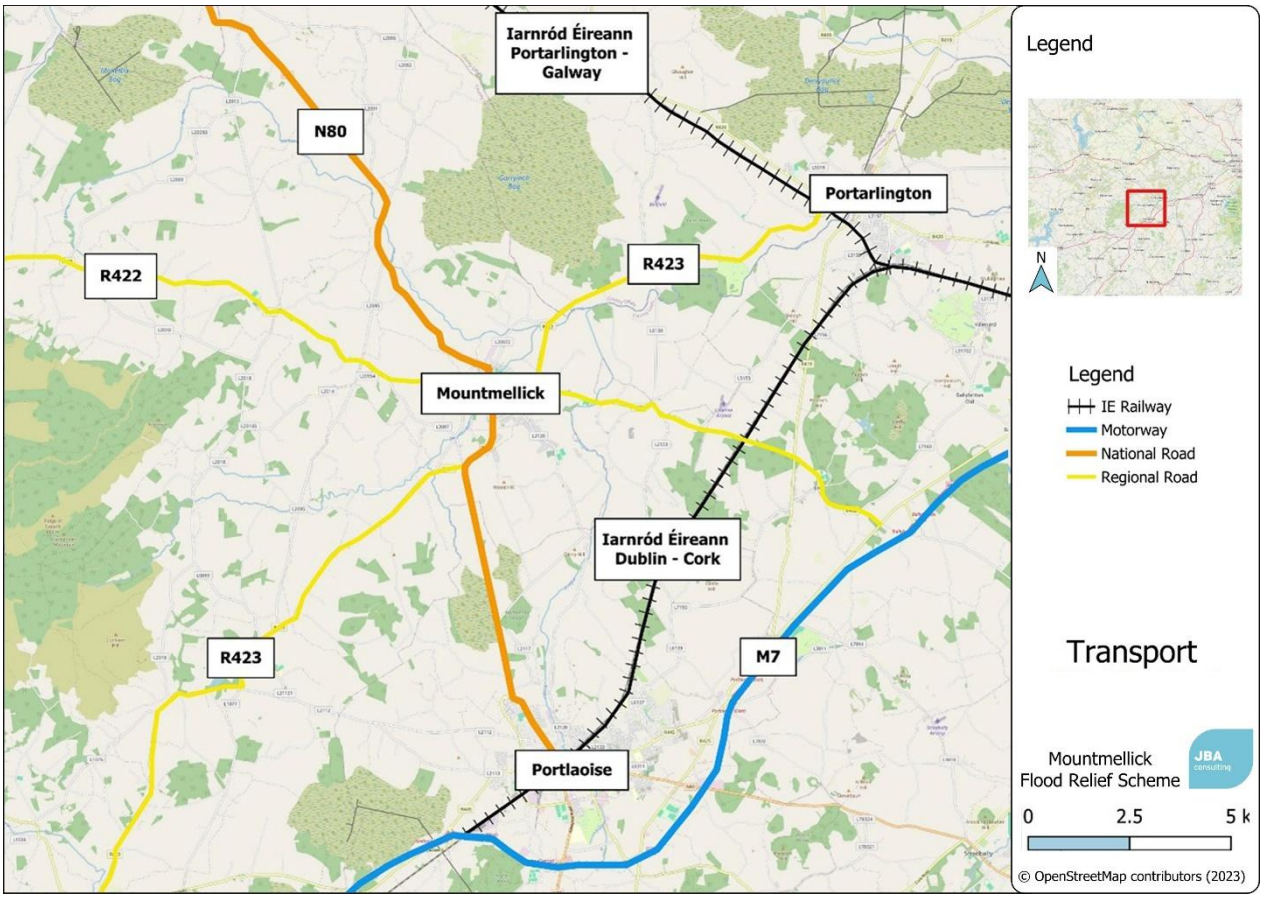


Figure 12-1: Transport network in the area

12.3.2 Utilities

12.3.2.1 Utilities in Mountmellick

Underground utilities are present in multiple locations around the site, and already serve Mountmellick. Interactions with utilities are possible during construction.

Proposed works associated with flood relief scheme that are in close proximity to existing utilities and utilities that require to be diverted are described below:

- At Midland Steel:

  - A medium-voltage ESB underground cable traverses the entrance, with connection to the four buildings adjacent to the works location undefined.
  - A surface water drainage pipe in the southwestern section servicing the four buildings adjacent to an existing land drain.
- At Davitt Road Pumping Station:
  - A low voltage overhead ESB power line extends parallel to the proposed flood defence wall and southern boundary of the pumping station adjoining Irishtown Road. The overhead line is located directly above the expected works area and will need to be diverted in advance of the proposed works.
  - A medium voltage ESB (overhead & underground) cable may be impacted by the proposed storm drainage alignment and access road to the pumping station. It is likely these cables will be diverted to accommodate the works.
  - A watermain and 225mm diameter foul sewer traverse the proposed drainage alignment in a West to East direction on Irishtown Road. It is not expected that these pipes will be diverted however some protection works will be required.
- Downstream of Convent Bridge:
  - Medium-voltage ESB overhead cable traverses and extends parallel to the proposed flood defence wall at multiple locations. The relocation of these overhead lines is included in the outline construction sequence; however, the final design of diversions is pending consultation with ESB networks at detailed design stage.
- Mill Bridge to Convent Bridge:
  - A medium-voltage ESB overhead line traverses the proposed flood plain downstream of Mill Bridge. The overhead line spans the river from the mature trees adjoining the park to the rear of Grove Park. This overhead line may need to be diverted; however, this will be confirmed following consultation with ESB networks at detailed design stage.
  - A low-voltage ESB overhead line across Mill Bridge. No impact is envisaged; however, the contractor will need to identify and protect the line while working adjacent to Mill bridge.
  - A telecommunications line upstream of Convent Bridge was identified. Permanent relocation of this line will be required as part of the works. The line is located within a duct attached to the existing bridge piers.
  - Water main services traverse Convent Bridge. It is not envisaged that this pipe will be impacted by the proposed works however the contractor will need to identify and protect the pipe during diversion of the telecoms.
- Clontygar Stream:
  - A medium-voltage ESB overhead line across field through Brock View in a north westly to south-easterly direction.
  - Water main services located at the southwestern corner of the site, feeding water to Brock View estate.
- Owenass Bridge to Mountmellick Mill Bridge:
  - Diversion of existing utilities: An existing low voltage ESB overhead cable upstream of Mill Bridge.
  - Protection of existing utilities: Existing medium and high voltage ESB cables traversing at various locations along the flood defence embankment.
  - Relocation of existing utilities: Existing telecommunications services located across the downstream section of Owenass Bridge.
  - Protection of Existing Uisce Eireann Pumping Station adjoining the MDA. The above ground structure may be removed as accommodation works to facilitate sheet piling from the riverbank if this were the selected contractor method.
- Owenass Bridge:
  - Diversion of existing utilities: An existing series of Eircom overhead lines traversing over Owenass Bridge will be temporarily diverted during the works, and

the existing post in proximity of the bridge may also be permanently diverted if deemed incompatible with the bridge reconstruction.

- Upstream of Owenass Bridge:
  - A medium-voltage ESB overhead line traverses the proposed northern flood plain upstream of Owenass Bridge. This line may need to be diverted; however, this will be confirmed following consultation with ESB networks at detailed design stage.
- Manor Road:
  - A medium-voltage ESB overhead line traverses the existing flood plain and proposed flood defence embankment to the south of manor house. This line may need to be diverted; however, this will be confirmed following consultation with ESB networks at detailed design stage.

No utilities have been noted at the locations below:

- Garroon Stream; and
- Irishtown Garden Centre

However, services may be present in these areas and temporary diversions of these utilities may be required during construction.

12.3.2.2 Water Services Infrastructure

Seven surface drainage pipe outfalls enter into the River Owenass in Mountmellick, as well as an outlet from the Mountmellick Urban Waste Water Treatment Plant (WWTP) [D0152-01] (Figure 12-2). The River Pound also has seven surface drainage pipe outlets flowing into it in the town. Foul and storm sewers in Mountmellick generally follow the road network, with some foul water pipes exceptions, running through greenfield sites. The layout of foul and storm water sewers has been provided by Laois County Council (LCC) and Irish Water.

The existing Mountmellick WWTP is located on the northern edge of Mountmellick, adjacent to the western bank of the Owenass River in the Bay Road Industrial Estate. The Mountmellick Urban WWTP was upgraded in 2018 to a capacity of 8,000 PE[167]. This is sufficient capacity for current population levels, but extra capacity is required to implement the policies and objectives of the Mountmellick LAP[168]. Mountmellick WWTW is shown in Figure 12-2.

There are three main pumping stations in Mountmellick serving the network, each of which has an emergency storm overflow discharging to the Owenass River – these are at Connolly Street and Irishtown which in turn flow into the third pumping station at Emmett Terrace[169].

12.3.3 Waste

There are no public waste recycling facilities in Mountmellick. The nearest recycling centre is located in Kyletalesha Landfill on the outskirts of Portlaoise town. The refuse collection service is privatised in Co. Laois. There are a number of private contractors in Co. Laois, who are required to operate under the

[167] Irish Water, (2020). Available online at: https://www.water.ie/projects-plans/mountmellick-water-main-r/

[168] Laois County Council, (2018, *p. 35). Mountmellick Local Area Plan 2018 – 2024*. Available at: Mountmellick-Local-Area-Plan.pdf (laois.ie) (Accessed: 12/12/2023)

[169] Mosley and Marsden. (2010) *Mountmellick Wastewater Treatment Works Upgrade.* Available at: Microsoft Word - FINAL Mountmellick HRA revised for SW Regs.doc (epa.ie) (Accessed: 12/12/2023)

conditions of their waste collection permits. Individuals and householders make their own arrangements, financially and otherwise, with the contractors for the collection of private waste.



Figure 12-2: Rivers surrounding Mountmellick and Waste Water Treatment Plant location

12.4 Predicted Impacts

12.4.1 Roads, Traffic, and Transport

12.4.1.1 Operational Phase

During the operational phase of a flood relief scheme, no additional traffic is generated other than for annual maintenance of the defences. As such this assessment focuses only on construction stage traffic.

12.4.1.2 Construction Phase

It is anticipated that the construction phase of the scheme will take approximately 48-72 months. Potential impacts will arise due to the truck movements (approximately 7,389) throughout the four construction phases. For the embankment works, bulk excavations and removal of material are estimated to require 7,042 truck movements for the import of impermeable clay and subsoil and export of fill. For flood walls, there will be 347 truck movements for concrete, cladding, capping stones, and railings. Impacts on local traffic and private access will occur resulting in temporary road closures or one-way stop-and-go systems. These impacts are discussed in detail in the sections below.

During the construction phase of the project, fill material will be imported into the site for the construction of the flood embankments. Approximately 3,160 linear metres of embankment will be formed.

Imported fill - The total material imports from the scheme will be approximately 105,000m^3 which may be reduced to 85,000m^3 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 77,000m^3, most of this material will need to be disposed of at a licenced soil recovery facility. Albeit if excavated material can be reused a backfill then the volume of material to be disposed of from site will be in the region of 56,000m^3. Seven licenced sites within Co Laois have been sourced that have capacity to received unsuitable material (https://facilityregister.nwcpo.ie/).

12.4.1.3 Construction Vehicle Movements

Table 12-2: Embankment Volumes and Truck Movements

	Defence 1	Defence 2	Defence 3	Defence 6	Defence 7	Defence 9	Total
Embankment Fill	5765	1035	16685	4031	730	490	**28736**
Foundation	7268	3195	31426	10903	1895	1352	**56038**
Backfill	1847	1375	11715	4727	726	472	**20863**
Total Fill							**105637**
Truck Movements	992	374	3988	1311	223	154	7042

See Figure 4-1 for location of Flood Defences referred to in Table 12-2 and text below:

- Defence 1 embankment is Upstream of Owenass Bridge on the LHB, construction vehicle movements in this section will be approx. 992 trips.
- Defence 2 embankment is Upstream of Owenass Bridge on the RHB, construction vehicle movements in this section will be approx. 374 trips.
- Defence 3 embankment is Owenass Bridge to Mill Bridge on the LHB, construction vehicle movements in this section will be approx. 3,988 trips.
- Defence 6 embankment is Manor Road on the RHB, construction vehicle movements in this section will be approx. 1,311 trips.
- Defence 7 embankment is Garroon Stream on the LHB, construction vehicle movements in this section will be approx. 223 trips.
- Defence 9 embankment is Irish Town Garden Centre, construction vehicle movements in this section will be approx. 154 trips.

This will result in 7,042 total trips, this figure will be reduced if excavation material is found to be suitable for reuse as backfill for embankments.

Impacts to Sensitive Receptors

The defence embankments 1 and 2, **Upstream of Owenass Bridge** on the LHB and RHB respectively, if the R423 is used will affect Barr Na Sruthan Primary School, located off the R423 on the L2110. This will cause an added time to the journey for access to the school avoiding the R423. The defence embankment 3, **Owenass Bridge to Mill Bridge** on the LHB, if the R422 is used will affect Naoinra Naomh Aine preschool if used within the schools operational hours. The effect of these works will be **Temporary, Slight, Adverse.**

Impacts to Private Access

Upstream of Owenass Bridge, the proposed bridge replacement works will impact access on traffic movements for approx. 20 properties that are in the immediate vicinity. A property on the southern side of the Owenass River will also be impacted during construction of the flood defence wall. It is anticipated that the fence line, furniture and concrete pillar along the north boundary line of the property will be temporarily relocated. A kerb line and gate located on the western end of the property will be removed and reinstated

upon completion of the works. The expected duration of the works in the area is approximately 14 months. The proposed works will result in temporary disruptions for these residences. The effect will be **Short-term, Moderate, Adverse.**

Downstream of Convent Bridge, the rear gardens of 28 properties including boundary walls and structures will be impacted by the works. The existing boundary walls will be replaced by the proposed flood defence wall. The expected duration of the works in the area is approximately 5 months. During this time, access to the rear gardens for these properties will be restricted. The effect of these works will be **Temporary, Slight, Adverse.**

The **Garroon Stream** works will have an impact on property access to the back of buildings situated east of the site compound location. Some of the existing boundary walls and structures around the property will be demolished and rebuilt to facilitate construction of the proposed works. The expected duration of the works in the area is approximately 4 months. The effect of these works will be **Temporary, Slight, Adverse.**

Temporary Road Closures

The **replacement of Owenass Bridge** will require the full closure of the road crossing the bridge, for the duration of the bridge replacement works. Widening of the road and an increase in height of the bridge soffit level cannot be undertaken with a single lane closure due to the constrictions on working space. The Owenass Bridge will be closed for approximately 6 months. Without mitigation measures in place, the effect of these works will be **Temporary, Significant, Adverse.**

The **Davitt Road Pumping Station** works will require a single lane closure due to constrictions on working space. A full road closure will also be required on a short-term basis to facilitate works to the drainage network underlying the road. Pedestrian access will remain in place during the works. The effect of these works will be **Temporary, Slight, Adverse** with one lane closed, rising to **Moderate** when both lanes are closed.

The **Mill Bridge to Convent Bridge** section of works will have intermittent impacts to traffic due to service diversions and the facilitation of safe removal of waste with plant or trucks arriving at and leaving from site. Footpaths in the playground on the north bank of the river will be closed to facilitate the proposed flood walls. The expected duration of the works in this area is approximately 11 months and the disruptions will be **Temporary, Slight, Adverse.**

The **Garroon Stream** section of works will include intermittent traffic disruption facilitating the construction of works, haulage of materials to and from site will utilise the public road network. These disruptions are expected to be temporary with the anticipated duration of works in the area to be approximately 4 months. The effect of the works will be **Temporary, Slight, Adverse.**

The **Midland Steel** section of works will bypass the Bay Road Business Park through a temporary access route to the site compound. No temporary road closures or diversions are needed for this area. However, this access route will have a temporary Adverse effect on the residents of five properties on Chapel Lane, due to construction traffic leading to the compound. The existing boundaries will be temporarily removed allowing for machinery and plant access to the construction compound. The expected duration of the works in the area is estimated at approximately 2 months and the effect of the works will be **Temporary, Slight, Adverse.**

Impacts on Traffic

During construction, temporary road closures such as those required at Irishtown Road will create slight delays to traffic as one lane will be closed for the works. Impacts such as this are typical of routine roadworks and construction works. With no mitigation measures in place, the effect will be **Temporary, Slight** to **Moderate, Adverse**. Mitigation measures are outlined in Section 12.4.1.

12.4.1.4 Operational Phase

The replacement of the Owenass Bridge will feature additional design measures; the height of the bridge soffit will increase allowing for floating debris to pass unimpeded through the structure. The new bridge will have a widened road width, assisting larger vehicles manoeuvring at the junction. The effect of these works will be **Permanent, Slight, Positive.**

12.4.2 Utilities

12.4.2.1 Construction Phase

Utilities

Utilities such as sewer, electricity and telecommunications networks will require identification on the ground by the appointed contractor prior to work proceeding on the scheme. There will be temporary disruption to utilities during the construction stage from diversions and upgrades listed below, which will result in **Temporary, Slight, Adverse** effects. All utilities will be reinstated resulting in no long-term impacts.

- A medium-voltage ESB overhead cable will be diverted, traversing the proposed flood plain downstream of Mill Bridge and spanning the river park to the rear of Grove Park;
- Permanent relocation of a telecommunications line upstream of Convent Bridge will be required as part of the works;
- Services at the Clontygar Stream will be diverted, including a medium-voltage ESB overhead cable across the field through Brock View and water main services located at the southwestern corner of the site, feeding water to Brock View estate;
- A low voltage ESB overhead cable upstream of Mill Bridge will be diverted and existing telecommunications services located across the downstream section of Owenass Bridge will be relocated; and
- Upstream of Owenass Bridge a medium-voltage ESB overhead cable and telecommunications services will be relocated/protected, additionally a medium-voltage ESB overhead cable along the flood wall Downstream of Convent Bridge will be relocated.

Any disruptions to services will be agreed with the relevant service providers and the property owners. The effect during construction will be **Temporary, Adverse, Slight** to **Negligible.**

Water Infrastructure

The Owenass Bridge to Mill Bridge area, next to Mountmellick Development Association on the north bank, will require the construction of a flood defence near the Uisce Éireann pumping station. As part of the accommodation works, the above ground structure may be temporarily removed to accommodate installation of the flood defence wall. The flood relief scheme itself benefits the pump station through reducing flood risk upon completion of the works.

A land drain receiving surface water from the Midland Steel site adjoins the western boundary field, discharging into a canal to the north, flows to the River Barrow. The drain has been culverted. The works will include temporary culverting of the remaining existing land drain to allow temporary working space.

Direct impacts are not expected to occur to other utilities, such as Mountmellick WWTW at Bay Road Industrial Estate. The works at Midland Steel are approx. 450m away. Indirect impacts could occur downstream due to an accidental spill or leak on site during construction, or due to increased sedimentation of surface water leaving the site. Due to the distance downstream and volume of water passing through Mountmellick, the effect with no mitigation measures in place would be **Temporary, Slight, Adverse.**

12.4.2.2 Operational Phase

Once the proposed development is operational, no impacts to utilities are expected to occur. The operational effect on utilities will therefore be **Neutral**.

12.4.3 Waste

12.4.3.1 Construction Phase

The proposed development will generate approximately 77,000m^3 of unsuitable material. It is estimated that this can be reduced to 56,000m^3 if detailed site investigated demonstrates that this material is suitable to be reused as backfill for embankments. The material will be removed from the site as waste to an appropriate licenced soil recovery facility to the seven licenced sites within Co Laois that have been sourced to have capacity to received unsuitable material (https://facilityregister.nwcpo.ie/). Alternatively, the contractor can reuse this material on another site as a by-product while adhering to Article 27 of the EC (Waste Directive) Regulations (2011). This would further reduce the volume of waste generated during excavation.

Small volumes of general construction waste will also be generated, typical of construction activities. This will be collected, segregated, and disposed of by licensed waste contractors.

During construction the effect on waste will be **Temporary, Slight, Adverse**.

12.4.3.2 Operational Phase

Once the proposed development is operational, no waste will be generated and the effect on waste will therefore be **Neutral**.

12.5 Mitigation Measures

12.5.1 Roads, Traffic, and Transport

12.5.1.1 Construction Phase

Construction works will be implemented in four phases and in the following sequence, generally from downstream to upstream on the Owenass River. The construction phase of the project is expected to span 48-72 months, 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 and to ensure that flood defences downstream are commissioned prior to works upstream commencing:

Construction sequence

Phase 1 on the eastern side of the town (construction traffic will access compounds from R423 northeast of town or R422 east of 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 (construction traffic will access compounds from N80 north and R422 west of 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 (construction traffic will access compounds from R422 west of town outside of hours used by the Naoinra Naomh Aine Preschool or N80 north of town)

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

Phase 4 on the southwestern side of the town (construction traffic will access compounds from R423 southwest of town or N80 south of town, see Figure 12-3 for traffic diversion routes during replacement of Owenass Bridge)

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

During construction, impacts to traffic and access due to heavy vehicle movements, including temporary road closures and one-way stop-and-go systems are expected. These are discussed in detail in the sections below.

Construction Vehicle Movements

During construction, there will be an estimated total of 7,389 truck movements throughout the four construction phases. The embankment works, bulk excavations and removal of material are estimated to require 7,042 truck movements for the import of impermeable clay and subsoil and export of fill. For flood walls, there will be 347 truck movements, for movement of concrete, cladding, capping stones, and railings.

Average construction vehicle movements for excavations and removal of material are estimated to be approximately 60, 2-way HGV trips per day, 5 days a week, over the construction period.

Therefore, typical construction vehicle movements per hour will be lower than quoted above for the majority of the time, and slightly higher for short periods as certain parts of the work progress. Construction truck movements at their peak will lead to a **Temporary, Slight, Adverse** effect. Over the full 48-72 month construction phase, this will equate to a **Short-Term, Slight, Adverse** effect.

The appointed Contractor(s) will prepare a Construction Traffic Management Plan (CTMP) which will address the following issues:

- Site Access & Egress;
- Traffic Management Signage;
- Routing of Construction Traffic / Road Closures;
- Timings of Material Deliveries to Site;
- Traffic Management Speed Limits;
- Road Cleaning;
- Road Condition;
- Road Closures;
- Implementation of Traffic Management Plan
- Details of Working Hours and Days;
- Details of Emergency Plan;
- Communication;
- Construction Methodologies; and
- Particular Construction Impacts.

Particular mitigation measures are identified in various sections of the EIAR and summarised below; these requirements shall be included in the CTMP:

- The scheduling of materials' deliveries to site outside of times where peak traffic flows will be using the network.
- A wheel wash will be installed at the entrance to and exit from the proposed pumping station on Davitt Road and construction compound locations;
- Roads used by construction traffic will be monitored visually and a road sweeper used to remove debris from construction activities when required;
- Loads of materials leaving site shall be assessed and covered where necessary to reduce dust impacts; and
- Development of a detailed construction programme that gives consideration to traffic flows and aims to avoid high volumes of traffic using the same roads.

The CTMP will also include the following:

- Adherence to relevant laws, regulations, and standards governing construction activities and traffic management. Key aspects will be adherence to traffic regulations, permitting and licensing, environmental regulations, health and safety standards, local authority requirements, emergency response plans, and public consultation.
- Deliveries will be limited to working hours (08:00 to 19:00 Monday to Friday, 08:30 to 14:00 Saturday, and none on Sundays or public holidays), or as determined by the County Council.
- Temporary access roads will be constructed from the site compounds and works areas. Construction vehicles will use designated haul routes.
- Periodic road cleaning around the site will also take place and be carried out by the contractor
- All necessary traffic safety precautions shall be undertaken by the Contractor to ensure the safety of all traffic and pedestrians using the existing roads adjacent to the site and connecting minor roads during the execution and completion of the Works, and all precautions shall be taken to minimise disruption to the local residents.

Temporary Road Closures and Private Access Impacts

A road diversion will be in place for the duration of the Owenass Bridge replacement works. Two alternative routes are available, either via the L21009 and Manor Road, or via the R423 and N80 (Figure 12-3). Both are approx. a 5 to 10 minute diversion by car. Signage will be erected in advance of works commencing and for the duration of the works, informing the public of the road closure and directions to the alternative route.

A Stop and Go system with one lane temporarily closed will be put in place on Irishtown Road to facilitate the Davitt Road Pumping Station works. For a short period, a full road closure will be required at this location. An alternative route is available via the N80, Sarsfield Street, and Connolly Street. Signage will be erected in advance of works commencing and for the duration of the works, informing the public of the one-lane closures.

During construction the contractor will prepare a Construction Traffic Management Plan in conjunction with the local authority, in consultation with local residents. This will ensure that traffic diversions on minor road L21009 temp, short-term…

In addition to these, the following will be put in place:

- The construction programme and sequence for the proposed Scheme shall be co-ordinated and planned. If there are any significant cumulative impacts to public arising from different sites, the proposed works at concerned sites shall not be progressed concurrently in order to mitigate the risk of cumulative impacts in the key junctions;
- Good construction management practices will be employed such as fencing the Site off from the public and neighbouring sites, adequate external/internal signage, secure internal site offices, dedicated construction access points all to ensure the safety construction staff and the public;
- Appropriate levels of staff parking and compounding will be provided to ensure no potential overflow or haphazard parking in the area. The Site will be able to accommodate employee and visitor parking throughout. Contractor's, subcontractor's or supplier's vehicles or staff vehicles, or any vehicles associated with the works are not permitted to park, idle or queue on the public road network;
- Construction traffic routes to/from the Site will be agreed with Laois County Council prior to the commencement of constructions activities on sites. The time of day permittable for such routes will also be agreed upon and outside of the AM and PM peak hours;
- Tracked excavators will be moved to/from the site on low-loaders and will not be permitted to drive on the street pavements.

The impact of the above construction works will be **Temporary, Moderate, Adverse**.

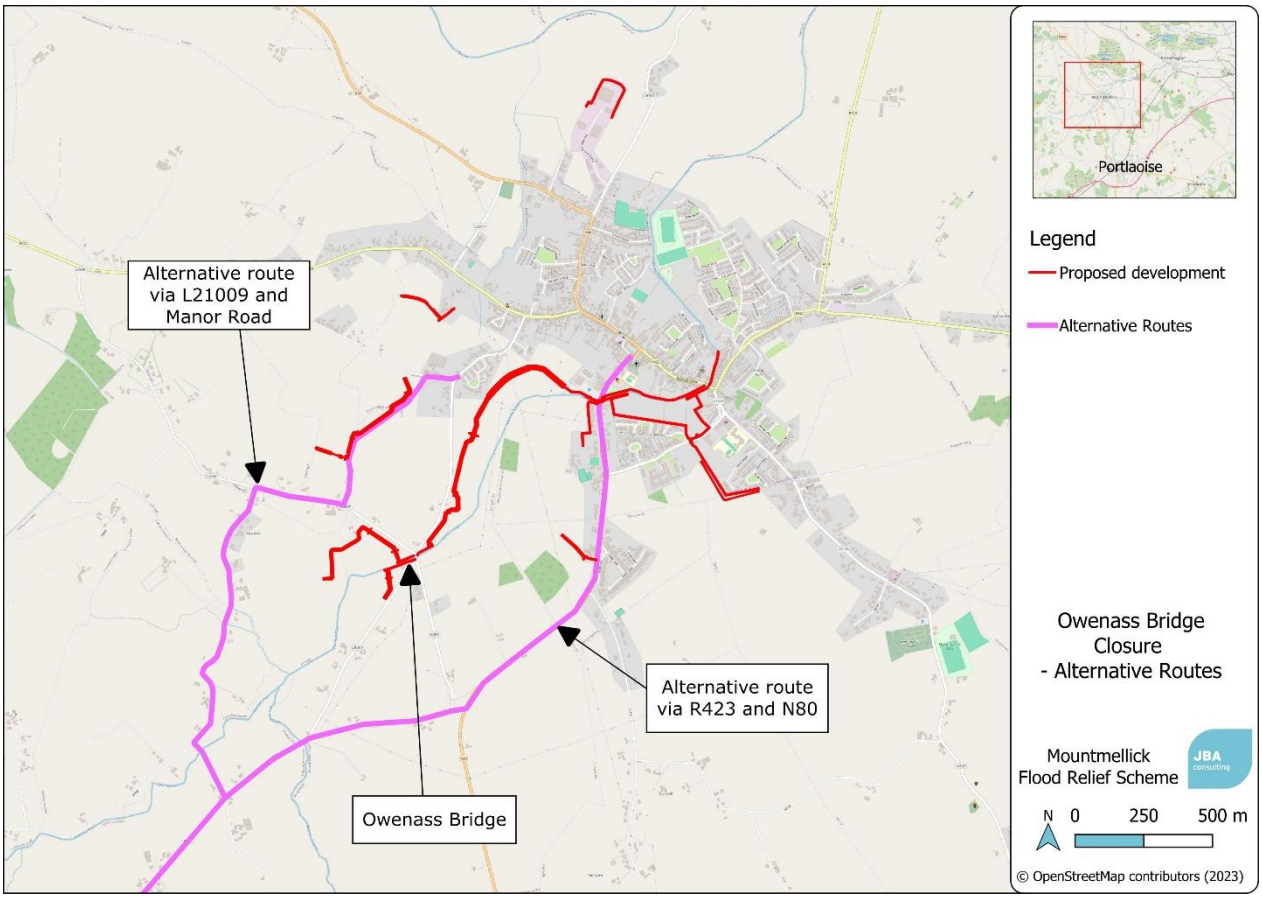


Figure 12-3: Diversion routes during the Owenass Bridge Replacement

12.5.1.2 Operational Phase

Once operational, **No Impacts** on traffic and transport are expected, and therefore no mitigation measures are required.

12.5.2 Utilities

12.5.2.1 Construction Phase

Utilities

Utility detection will be carried out to identify precise locations of underground utilities prior to excavation on-site. Any disruptions to services will be agreed with the relevant service providers and will be communicated in advance to the relevant property owners. Further mitigation measures for utilities are not required.

Mitigation measures outlined in Chapter 9 for the protection of surface and groundwater will further reduce potential for impacts on Mountmellick Wastewater Treatment Plant.

With these mitigation measures in place the effect on these utilities during construction will be **Negligible.**

Water Infrastructure

Temporary works at the Midland Steel area will require safe working space for the operatives. The existing land drain where it intersects with the proposed flood defence wall, will include temporary culverting and backfilling of the existing drainage channel. The channel surrounding the site will be reinstated to its original condition on completion.

Due to the limited available working space to construct the proposed flood defence walls within the Mill Bridge to Convent Bridge area, instream works will require the creation of a dry working space for operatives along some sections of the wall. 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.

Diversion of the flow to the realigned channel will facilitate the construction of the proposed flood defence wall along with installation of a new culvert and headwall on the upstream section of the channel diversion at the Clontygar Stream. Once installed, flow control measures such as a non-return valve will be included.

New flow control measures will be installed as part of the culvert works at Owenass Bridge to Mill Bridge area.

A Cofferdam or similar structure will be required to create a dry working space and temporary restriction of the channel width Upstream of Owenass Bridge, in-stream works are necessary to construct the flood defence wall on the southern embankment of the River Owenass.

At Manor Road, a flow-restriction structure will be constructed on the Pound Stream as part of the flood defence embankment to reduce the rate of flow in the stream during a design event and contain flow within the floodplain area. The restriction will be a culvert and headwall at the upstream and downstream ends of the channel traversing beneath the flood defence embankment. As the event dissipates the attenuated water volume will be released into the Pound Stream with lands returning to their pre-event condition.

Temporary works will be required to accommodate a safe working dry space Downstream of Convent Bridge for instream works. This will include the provision of a temporary haul road within the riverbed and de-watering arrangements required to maintain the safe working space during works for the construction of the flood wall along the eastern riverbank.

Consultation has taken place between the project team and Laois County Council. Prior to construction starting, the appointed contractor will need to liaise with the utility providers to confirm the locations of utilities and any additional requirements they have before going on-site. Advance testing will be arranged by the contractor to ensure that no undue delays occur.

12.5.2.2 Operational Phase

As no impacts on utilities and water infrastructure are expected once operational, no mitigation measures are proposed for the operational phase.

12.5.3 Waste

12.5.3.1 Construction Phase

All construction waste will be segregated and removed to an approved location. A Resource & Waste Management Plan (RWMP) will be produced by the appointed contractor to help manage, reduce, and dispose of waste arising during the construction phase. The RWMP will be prepared in line with the EPA's Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction and Demolition Projects. The contractor shall consider the relevant waste management acts, regulations, and litter pollution acts:

- Waste Management Act 1996 (as amended)
- Protection of the Environment Act 2003;
- Litter Pollution Act 1997; and
- The Waste Framework Directive (2008/98/EC) transposed into Irish Law as the European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011).

In developing the RWMP, the contractor shall also consider the reuse of materials where practicable, where permitted under the relevant waste legislation, and where the material meets the engineering requirements. The strategy shall follow the Waste Management Hierarchy:

- Prevention;
- Minimisation;
- Reuse;
- Recycling; and
- Disposal.

This hierarchy outlines that waste prevention and minimisation are the first priority in managing wastes, followed by waste reuse and recycling. Disposal of waste shall only be considered as a last resort. The management of all hazardous waste materials, if they occur, will be coordinated in liaison with the site Health and Safety Management Plan.

12.5.3.2 Construction Waste Management

The contractor shall establish a procedure to identify and classify all waste arising at the site in accordance with the List of Waste (LoW) Code. Waste materials generated during construction works on site will be segregated into hazardous and non-hazardous labelled storage containers at designated points within temporary site compounds. All waste generated will be handled by an approved waste contractor holding a current waste collection permit.

For each waste stream identified by the contractor, and for each additional waste stream that may arise during the course of the works, the contractor shall identify the following:

- The appropriate LoW Code;
- A suitable Waste Collection Contractor in possession of a valid Waste Collection Permit for the collection of the particular waste within Co. Laois;
- The waste recovery or disposal site, including the transfer station where the waste may be transferred to upon leaving the site in possession of a valid Waste Facility Permit or Waste License, as appropriate; and
- The recovery or disposal method for the waste.

Only contractors in possession of a valid Waste Collection Permit shall collect wastes from the site. The contractor responsible for the waste shall ensure that the Waste Collection Contractor:

- Is permitted to collect the particular waste;
- Is permitted to collect waste within Co. Laois;
- Uses a waste collection vehicle identified on the Waste Collection Permit; and
- Transfers the waste to a licenced waste facility identified on the Waste Collection Permit.

The contractor shall ensure the following information is provided and available upon request:

- Transfer notes for controlled waste and consignment notes for hazardous waste must include an accurate description of the type, quantity and containment of waste; Standard Industrial Classification; the LoW Code; and details of the waste carrier, who must be licensed;
- Sufficient information will be provided to ensure that the waste disposal operator is aware of the potential hazards of the substance;
- The contractor will also ensure that returns for consignment notes are collected and retained; and
- All documentation will be retained for a minimum of two years for transfer notes and three years for consignment notes and be available for inspection.

The contractor shall advise the consenting authority or its representatives in advance if it proposes to act as the Waste Collection Contractor, subject to agreement. In the event that the contractor acts as the Waste Collection Contractor, it shall ensure that it has the relevant Waste Collection Permit(s) in place prior to commencement of the Proposed Development.

With the above mitigation measures in place, the effect on waste during the construction phase will be **Temporary, Slight, Adverse.**

12.5.3.3 Operational Phase

Once operational, the proposed development will create small amounts of operational waste. This will include grass and vegetation cuttings, and occasional materials associated with repairs. The amounts of waste likely to be produced when operational will not be significant. Waste arising in the operational phase will follow the Waste Hierarchy and the principles outlined in the CEMP and the RWMP to be prepared by the contractor.

No mitigation measures are proposed for the operational phase.

12.6 Residual Impact

12.6.1 Roads, Traffic, and Transport

With the availability of alternative routes as outlined in Section 12.4.1 and signage on the approaching roads, the effect of the closure of the Owenass Bridge for the bridge replacement works will be **Temporary, Moderate, Adverse**.

The CTMP will take into account construction vehicles and mitigate against any issues with vehicles on public roads, minimizing the impacts to the public road network during construction stage. Appropriate phasing of construction works will enable access to affected properties in a safe and controlled manner. Once the proposed mitigation measures are put in place, the residual impact to roads, traffic and transport during construction will be **Temporary, Slight, Adverse**.

12.6.2 Utilities

Mitigation measures discussed in previous sections will reduce the environmental impact of the proposed development however, there are some impacts that cannot be avoided in the short term, such as short-term disruptions to watermains, foul sewer, or ESB stoppages for several hours during the connection of services. Residents will receive notices if stoppages are foreseen. There are no additional impacts expected once services are introduced. The overall residual impact during the construction phase from the relocation of services has been assessed as **Temporary, Imperceptible, Adverse.**

12.6.3 Waste

Mitigation measures such as the reuse of materials where feasible and the production of a RWMP will be put in place. The overall residual impact on waste has been assessed as a **Temporary, Slight, Adverse** effect**.**

12.7 Interactions with other Environmental Effects

Impacts to material assets have the potential to interact with the following environmental factors:

Soil and Geology, discussed in Chapter 8: The excavation of material will directly interact with the soil and geology environment at the site. Impacts such as soil compaction, removal of soil from site, and import of new material will affect soil quality and quantity. Mitigation measures such as safe sourcing of imported materials, and reuse of materials on site, will ensure that interactions between these effects are **Not Significant, Adverse, Temporary**. Mitigation measures include the extension of the programme of works to four phases over four to six years, with separate haul routes for each area to avoid traffic congestion, noise and air, and impacting on human beings.

Population and Human Health, discussed in Chapter 6: Impacts to accesses and roads will likely affect the population of Mountmellick and their daily activities during the construction phase.

Water, discussed in Chapter 9: Impacts to material assets are linked with impacts on water quality and quantity. Mitigation measures outlined in this chapter and in Chapter 9 will ensure that the interaction of these impacts is **Not Significant, Adverse**.

12.8 Potential Cumulative Impacts

The cumulative effects of the proposed development in combination with other relevant projects have been assessed to determine whether these would give rise to significant effects on the environment.

12.8.1 Roads, Traffic, and Transport

Of the project listed in Table 15-1 in Chapter 15 the following have potential to give rise to cumulative impacts in combination with the proposed flood relief scheme and have been considered further:

- **Application Ref. 22568** located off Davitt Road, for the demolition of existing buildings and construction of proposed residential properties (36 two-bedroom apartments). This application has been refused planning by LCC and refused on Appeal by ABP in 2024. The site is accessed off Davitt Road and is close to flood defence 8 and the proposed pumping station off Davitt Road. Should the application be amended, resubmitted and approved before the flood relief scheme then potential traffic conflicts may arise during construction of phase 1 (year 1) of the flood relief scheme. This cannot be assessed in detail at this stage. Therefore, cumulative impacts from development at this site are unlikely.
- **Application Ref. 2078** located at Dernacart approximately 6km north of Mountmellick, for the construction of a wind farm (8 turbines). This application was accompanied by an EIAR and Turbine Delivery Route Report. The Turbine Delivery Route Report described that the turbine components would arrive in Ireland via Dublin Port and be transported south to site via the M6, N52 and N80 through Killeigh to the site entrance at Dernacart approximately 6km north of Mountmellick. EIAR for the wind farm concluded that impacts on roads, traffic and transport will not be significant. The route for turbine delivery does not pass through Mountmellick or the scheme area, and delivery is to be carried out overnight in a single movement, i.e., not during the proposed FRS working hours. Therefore, no cumulative impacts are expected on roads, traffic and transport from the haulage of turbine components. The EIAR states that it is proposed to haul construction materials, from existing quarries and pits in the vicinity of the proposed development. These quarries and pits provide sources of aggregates, hardcore, fill materials; washed sand and gravel, pebble sand aggregates, ready mix concrete, and mortar. Cumulative impacts on roads, traffic and transport from importing of materials for access road and foundations at the wind farm site are possible if they occur at the same time as construction of the flood relief scheme and are sourced from quarries to the south of the wind farm site. This cannot be assessed in detail at this stage. Therefore overall, cumulative impacts from development at this site are unlikely

Cumulative impacts on Roads, Traffic and Transport are therefore not expected, and the effect is **Not Significant**.

12.8.2 Utilities

Of the projects listed in Table 15-1 in Chapter 15 only development at the site of Application Ref. 22568 on Davitt Road will come within 100m of the flood relief scheme. This application has been refused, therefore, cumulative impacts arising from future development at this site cannot be assessed.

Cumulative impacts on Utilities are therefore not expected, and the effect is **Not Significant**.

12.8.3 Waste

Of the projects listed in Table 15-1 in Chapter 15 only development of a wind farm comprising 8 turbines at Dernacart approximately 6km north of Mountmellick (Application Ref. 2078) has potential to general waste leading to cumulative impacts in combination with the proposed flood relief scheme. The EIAR for the wind farm specifies that Peat will be excavated, and trees will be felled in areas of forestry to facilitate development works relating to the wind farm. Surplus peat will be used to form berms along the access roads within the site and not transported off site as waste. :

Therefore, cumulative impacts on Waste from development at this site are not expected, and the effect is **Not Significant.**

13 Construction Impacts: Noise/Vibration, Air/Dust, Climate

13.1 Introduction

The project Scoping Report identified that the proposed development would affect the following areas of the EIAR only during construction and that it would result in no operational impacts. These are as shown below and are included together in this Construction Impacts chapter:

- Air Quality and Dust;
- Climate; and
- Noise and Vibration;

13.1.1 Assumptions on Programme

To complete all excavation works in one year, the construction works would have to be simultaneous, and this may not be possible due to the high volumes of cut and fill required across the site and the impacts on the town of construction traffic. As a result of these factors, the works will be carried out in four phases and in the following sequence, generally from downstream to upstream on the Owenass River. The construction phase of the project is expected to span 48-72 months, 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 and to ensure that flood defences downstream are commissioned prior to works upstream commencing:

Construction sequence

Phase 1 on the eastern side of the town (construction traffic will access compounds from R423 northeast of town or R422 east of 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 (construction traffic will access compounds from N80 north and R422 west of 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 (construction traffic will access compounds from R422 west of town outside of hours used by the Naoinra Naomh Aine Preschool or N80 north of town)

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

Phase 4 on the southwestern side of the town (construction traffic will access compounds from R423 southwest of town or N80 south of town, see Figure 12-3 for traffic diversion routes during replacement of Owneass Bridge)

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

13.2 Air Quality and Dust

This section of the EIAR assesses the air quality and dust impact of the proposed development during the construction and operational phases.

The potential significant effects of the proposed development on air quality have been assessed by considering the background concentration levels of pollutants in the atmosphere and the potential for construction, and operational effects associated with the proposed development.

13.2.1 Construction Dust Assessment Methodology

For the Construction Phase assessment, the focus is on air quality sensitive receptors adjacent to the proposed works that are susceptible to dust impacts. The greatest potential impact on air quality during the Construction Phase will be related to construction dust.

As prescribed within Environmental Protection UK and the Institute of Air Quality Management, Land-use Planning & Development Control: Planning For Air Quality (January 2017) the proposed Mountmellick Flood Relief Scheme has been assessed in accordance to the "*Guidance on the Assessment of Dust from Demolition and Construction (IAQM) January 2024 (Version 2.2)* (hereafter referred to as the 'IAQM guidance').

The construction effects have been assessed using the qualitative approach described in the IAQM guidance, which applies to the assessment of dust from construction and demolition activities (see section 13.2.4). The IAQM guidance has been referenced to assess the potential impact of the vehicle movements and the earthworks phase of the proposed works. Good practice construction mitigation measures are recommended to be implemented to minimise emission quantities during construction.

Dust Deposition Guidelines

Dust particles can be classified into those that are easily deposited and those that remain suspended in the air for long periods. This division is useful as deposited dust is usually the coarse fraction of particulates that causes dust annoyance, whereas suspended particulate matter is implicated more in exposure impacts. Airborne particles have a large range of diameters, from nanoparticles and ultrafine particles (diameters less than 0.1µm) to the very large particles with diameters up towards 100µm. There is no clear dividing line between the sizes of suspended particulates and deposited particulates, although particles with diameters >50µm tend to be deposited quickly and particles of diameter <10µm (PM_{10}) have an extremely low deposition rate in comparison. Therefore, the size of suspended and deposited dust particles affects their distribution and as such requires two very different approaches to sampling these fractions. PM_{10} is the fraction of airborne (suspended) particulates which contains particles of diameter less than 10µm. $PM_{2.5}$ is the fraction of airborne (suspended) particulates which contains particles of diameter less than 2.5µm. PM_{10} and $PM_{2.5}$ particles can penetrate deep into the respiratory system increasing the risk of respiratory and cardiovascular disorders. Total Suspended Particles (TSP) is the term used when referring to larger particles which do not have a specified size limit. It is common for TSP to be measured alongside PM_{10} and $PM_{2.5}$ particularly at industrial sites when dust monitoring is undertaken.

Particulate matter can emanate from natural and anthropogenic sources. Natural sources include sea salt, forest fires, pollen and moulds. Natural sources are unregulated and harder to control. Anthropogenic sources can be regulated and understanding the sources of particulate matter is very important. PM_{10} is most commonly associated with road dust and construction activities. Wear and tear of brakes and tyres on vehicles and crushing activities at construction sites can all contribute to a rise in PM_{10}. $PM_{2.5}$ is associated with fuel burning, industrial combustion processes and vehicle emissions. Larger particles (100µm diameter) are likely to settle within 5-10m of their source under a typical mean wind speed of 4-5 m/s, and particles between 30-100µm diameter are likely to settle within 100m of the source. Smaller particles, particularly those <10µm in diameter, i.e. PM_{10}, have a greater potential to have their settling rate impeded by atmospheric turbulence and to be transported further from their source. Dust emissions are exacerbated by

dry weather and high wind speeds. The impact of dust, therefore, also depends on the wind direction and the relative location of the dust source and receiver.

Currently no Irish statutory standards or limits exist for the assessment of dust deposition and its tendency for causing nuisance. Similarly, no official air quality criterion has been set at a European or World Health Organisation (WHO) level, although a range of national 'yardstick' criteria from other countries is found in literature.

The Quarries and Ancillary Activities, Guidelines for Planning Authorities states that following with regard to the control of dust;

"There are currently no Irish statutory standards or EPA guidelines relating specifically to dust deposition thresholds for inert mineral/aggregate dust. (See, however, the Air Quality Standards Regulations 2011 for measurement standards). There are a number of methods to measure dust deposition (such as the Frisbee method) but only the German TA Luft Air Quality Standard relates a specific method (i.e. Bergerhoff) of measuring dust deposition with dust nuisance. On this basis it is recommended that the following TA Luft dust deposition limit value be adopted at site boundaries near quarry developments:

Total dust deposition (soluble and insoluble): 350 milligram per square metre per day (when averaged over a 30-day period).

Best practice dust control measures should be proposed by the applicant".

In England and Wales, a *'custom and practice'* limit of 200 mg/m^2/day using Frisbee-type Deposition Gauges is referenced. This value was derived by multiplying a historical, typical UK median background by 3.5 (which was the ratio of the 95th percentile to the median). It should be noted that because background dust levels can vary significantly from place to place and with season, the authors Vallack & Shillito were clear that the preferred approach is to calculate a bespoke site-specific "complaints likely" dust guideline, where sufficient local baseline monitoring data is available (at least 12-months) based on 3.5 times the median background level. However, such bespoke local baseline data is often not available and in such cases the authors recommended using as a fall-back the 95th percentile of typical UK background data. It is important that the limitations of the 200 mg/m^2/day benchmark are appreciated: firstly, it is simply a custom and practice yardstick and it was never based on actual dose-response data; secondly, in deriving this default "complaints likely" guideline, the authors used a dataset that was quite old and not necessarily indicative of today's background levels.

The German TA Luft Regulations, "Technical Instructions on Air Quality Control" state that total dust deposition (soluble and insoluble, measured using Bergerhoff type dust deposit gauges as per German Standard Method for determination of dust deposition rate, VDI 2119) should not exceed a dust deposition rate of 350 mg/m^2/day (when averaged over a 30+/- 2-day period). The use of this limit value is appropriate to minimise the impact of airborne dust levels on the receiving environment beyond the site boundary. The German TA Luft criteria for '*possible nuisance'* and *'very likely nuisance'* are 350 mg/m^2/day and 650 mg/m^2/day, respectively.

Criteria from other countries that can be referred to include;

- In the USA, Washington has set a state standard of 187 mg/m^2/day for residential areas.
- Western Australia also sets a two-stage standard, with '*loss of amenity first perceived'* at 133 mg/m^2/day and '*unacceptable reduction in air quality*' at 333 mg/m^2/day.
- The Swedish limits promoted by the Stockholm Environment Institute, and used regularly in Scotland, range from 140 mg/m^2/day for rural areas to 260 mg/m^2/day for town centres.

These go some way to addressing the view that the annoyance impact (and hence potential for complaints) depends on the worsening of dust levels above existing background levels.

In 2005, the UK Highways Agency released an Interim Advice Note 61/05 *'Guidance for Undertaking Environmental Assessment of Air Quality for Sensitive Ecosystems in Internationally Designated Nature Conservation Sites and SSSIs'* as a supplement to the Design Manual for Roads and Bridges (DMRB)

Guidelines. This interim guidance states that dust or particles falling onto plants can physically smother the leaves affecting photosynthesis, respiration and transpiration. The literature suggests that the most sensitive species appear to be affected by dust deposition at levels above 1,000 mg/m2/day which is considerably greater than the level at which most dust deposition may start to cause a perceptible nuisance to humans. As such, once dust deposition rates are maintained within the guidelines for human nuisance the impact of dust deposition on sensitive ecosystems is considered negligible. Therefore, the following dust deposition limits are typically recommended;

- Dust Deposition Rate limit = 350 mg/m^2/day (averaged over a 30 +/- 2-day period using Bergerhoff Gauge Method).
- Dust Deposition Rate limit affecting sensitive ecological receivers = 1,000 mg/m^2/day.
- PM_{10} 24 Hour Mean concentration limit = 50 µg/m^3 not to be exceeded more than 35 times a calendar year.
- PM_{10} Annual Mean concentration limit = 40 µg/m^3.
- $PM_{2.5}$ Annual Mean concentration limit = 25 µg/m^3.

For the Construction Phase, an assessment of air quality impacts from the vehicle emissions has been screened out on the basis that these activities have a low potential for air pollutant and/or dust release and are likely to have a negligible impact on air quality sensitive receptors. The TII Air Quality Assessment Specified Infrastructure Projects PE-ENV-01106-01 (hereafter referred to as the 'TII guidelines') state that increases in annual average daily traffic (AADT) flows of 1,000 vehicles or 200 heavy duty vehicles (HDV) (greater than 3.5 tonnes) during the Construction Phase are unlikely to result in significant air quality effects. Likely significant effects on air quality are, therefore, assessed when the AADT flows are projected to increase above these thresholds. As traffic volumes are not projected to increase by 1,000 vehicles or 200 HDVs during the Construction Phase of the proposed development, traffic related air quality impacts have been screened out of the assessment.

13.2.2 Operational Air Quality Assessment Methodology

The operational phase of the proposed Mountmellick Flood Relief Scheme has been assessed in accordance with the Environmental Protection UK and the Institute of Air Quality Management, Land-use Planning & Development Control: Planning For Air Quality (January 2017). These guidelines provide a methodology for the assessment, management and mitigation of air quality that can be adapted accordingly, depending on the type, scale and nature of the proposed project. The IAQM guidance, Land-use Planning & Development Control: Planning For Air Quality (January 2017) *Table 6.2: Indicative criteria for requiring an air quality assessment*, outlines the following screening criteria;

The development will:	**Indicative Criteria to Proceed to an Air Quality Assessment**
1. Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors. (LDV = cars and small vans).	A change of LDV flows of: - more than 100 AADT within or adjacent to an AQMA - more than 500 AADT elsewhere.
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors. (HDV = goods vehicles + buses >3.5t gross vehicle weight).	A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.

Note: AQMA = Air Quality Management Area.

Based on the above criteria, the Operational Phase is unlikely to result in significant air quality effects, because the increase in annual average daily traffic (AADT) flows will be less than 500 vehicles or 100 heavy duty vehicles (HDV) (greater than 3.5 tonnes) during the Operational Phase.

The TII guidelines state that increases in annual average daily traffic (AADT) flows of 1,000 vehicles or 200 heavy duty vehicles (HDV) (greater than 3.5 tonnes) during the Operational Phase are unlikely to result in

significant air quality effects. Likely significant effects on air quality are, therefore, assessed when the AADT flows are projected to increase above these thresholds. As traffic volumes are not projected to increase by 1,000 vehicles or 200 HDVs during the Operational Phase of the proposed development, traffic related air quality impacts have been screened out of the assessment. In accordance with TII guidelines, operational phase traffic related air quality impacts have been screened out of the assessment.

For the Operational Phase, an assessment of air quality and dust impacts from the maintenance of the proposed development has been screened out on the basis that these activities have a low potential for air pollutant and/or dust release and are likely to have a negligible impact on air quality sensitive receptors.

13.2.3 Receiving Environment

Baseline Air Quality

No baseline air quality or dust deposition survey has been undertaken. Reference has been made to EPA data to quantify the existing air quality in proximity to the proposed development site.

The EPA has divided the country into zones for the assessment and management of air quality. The zones adopted in Ireland are Zone A, the Dublin conurbation; Zone B, the Cork conurbation; Zone C, comprising 21 large towns in Ireland with a population >15,000; and Zone D, the remaining area of Ireland. The background air quality in the area of the development is of good quality and the site is located in 'Zone D' as denoted by the EPA.

The EPA, working with local authorities and other public/semi state bodies, has established 116 ambient air quality monitoring stations nationwide. Monitoring data from these stations is available in real time on the website, www.EPA.ie and the data is used to inform national policy, meet Ireland's commitments to European reporting and is now used as one of the key inputs to the air quality forecast. Nitrogen Dioxide (NO_2), and Ozone (O_3) background concentrations from the EPA Air Quality monitoring station at Emo Co. Laois (Grid Ref: 253733, 206610), located approximately 8km of the Mountmellick FRS has been referenced. Also referenced is an EPA Air Quality monitoring station at Portlaoise (Grid Ref: 247752, 198590), located approximately 8.5 km south southeast of the Mountmellick FRS, where Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2), Carbon Monoxide (CO) and Particulate Matter (PM_{10} and $PM_{2.5}$) background concentrations are recorded.

The CAFE (Clean Air for Europe) Directive sets air quality standards for member states in Europe and has been transposed into Irish legislation by the Air Quality Standards Regulations 2011. Table 13-1 shows 2023 concentration levels to date (1st November 2022 – 3rd October 2023). Results show that there were no exceedances of these EU CAFE directive annual mean limits for NO_2, O_3, SO_2, CO, PM_{10}. or $PM_{2.5}$.

Table 13-1: Annual Average Nitrogen Dioxide (NO_2), Ozone (O_3), Sulphur Dioxide (SO_2), Carbon Monoxide (CO) and Particulate Matter (PM_{10} and $PM_{2.5}$) concentrations at Portlaoise and Emo, Co Laois (1st January 2023 – 31st December 2023)

Station	Period	Measured Concentration (µg/m³)					
		NO_2	O_3	SO_2	CO	PM_{10}	$PM_{2.5}$
Emo, Co. Laois	2023	2.6 µg/m³	52.27 µg/m³				
Portlaoise Co Laois	2023	8.36 µg/m³		3.30 µg/m³	0.42 µg/m³	11.04 µg/m³	7.44 µg/m³
Annual Mean Limit Value (Annual limit for protection of human health)						40 µg/m³	20 µg/m³
Annual Mean Limit Value (Annual limit for protection of vegetation)		30 µg/m³		20 µg/m³			

Maximum Daily 8 hr Mean Limit		120 µg/m^3		10,000 µg/m^3		

The Environmental Protection Agency's Air Quality Index for Health (AQIH) is a number from one to 10 that identifies the current air quality currently in a region and whether or not this might affect human health. This reading is updated twice a day, once in the morning (by 9.30am) and once in the evening (by 19.30pm). A reading of 10 means the air quality is very poor and a reading of one to three inclusive means that the air quality is good. The AQIH readings are based on five air pollutants which can harm human health: Ozone gas, nitrogen dioxide gas, sulphur dioxide gas, $PM_{2.5}$ particles and PM_{10} particles. The AQIH at the monitoring stations in Portlaoise and Emo, Co. Laois have a current rating of 1 and 2 successively, meaning 'Good' air quality [index as of 10.00 AM, Thursday, February 29th, 2024] (EPA, 2024)).

The World Health Organization (WHO) guidelines on outdoor (ambient) air pollution levels, which are widely used as reference tools by policymakers across the world to set standards and goals for air quality management, were updated in September 2021. Across nearly all pollutants, the new recommended limits for concentrations and exposures are lower than the previous guidelines. The 2021 update reflects far-reaching evidence that shows how air pollution affects many aspects of health, even at low levels.

13.2.4 Potential Impact of the Proposed Development

Do Nothing Scenario

The 'Do Nothing' scenario is defined as the option involving no future expenditure on flood defences or maintenance of existing defences/channels. There is no air quality and dust impact from the 'Do Nothing scenario'.

Construction Dust Impacts

The Dust Impact Assessment has been undertaken in accordance with Guidance on the Assessment of Dust from Demolition and Construction (IAQM) January 2024 (Version 2.2). to predict the risk of dust impacts and the level of mitigation that is required to control the residual effects to a level that is "not significant".

Activities on construction sites have been divided into four types to reflect their:

- Demolition;
- Earthworks;
- Construction; and
- Trackout.

The potential for dust emissions is assessed for each activity that is likely to take place. Obviously, if an activity is not taking place, e.g. demolition, then it does not need to be assessed. The risk assessment categories assume that the most basic project controls are applied to every project.

The assessment methodology considers three separate dust impacts:

- Annoyance due to dust soiling;
- The risk of health effects due to an increase in exposure to PM_{10}; and
- Harm to ecological receptors with account being taken of the sensitivity of the area that may experience these effects.

The assessment is used to define appropriate mitigation measures to ensure that there will be no significant effect. The assessment steps are:

- STEP 1 is to screen the requirement for a more detailed assessment. No further assessment is required if there are no receptors within a certain distance of the works.
- STEP 2 is to assess the risk of dust impacts. This is done separately for each of the four activities (demolition; earthworks; construction; and trackout)
- STEP 3 is to determine the site-specific mitigation (in addition to basic project controls) for each of the four potential activities in STEP 2. This will be based on the risk of dust impacts identified in STEP 2.
- STEP 4 is to examine the residual effects and to determine whether or not these are significant.
- STEP 5 is to prepare the dust assessment report.

STEP 1: Screening the Need for a Detailed Assessment

An assessment will normally be required where there is:

- a 'human receptor' within:
  - 250m of the boundary of the site; or
  - 50m of the route(s) used by construction vehicles on the public highway, up to 250m from the site entrance(s)
- an 'ecological receptor' within:
  - 50m of the boundary of the site; or
  - 50m of the route(s) used by construction vehicles on the public highway, up to 200m from the site entrance(s)

There are > 200 human receptors within 250m of the boundary of the site and an ecological receptor within 50m of the boundary of the site, therefore the assessment proceeds to STEP 2.

STEP 2: Assess the Risk of Dust Impacts

The risk of dust arising in sufficient quantities to cause annoyance and/or health and/or ecological impacts should be determined using four risk categories: negligible, low, medium and high risk. A site is allocated to a risk category based on two factors:

- the scale and nature of the works, which determines the potential dust emission magnitude as small, medium or large (STEP 2A); and
- the sensitivity of the area to dust impacts (STEP 2B), which is defined as low, medium or high sensitivity.

These two factors are combined in STEP 2C to determine the risk of dust impacts with no mitigation applied. The risk category assigned to the site can be different for each of the four potential activities (demolition, earthworks, construction and trackout). More than one of these activities may occur on a site at any one time. Where appropriate, the site can be divided into 'zones' for the dust risk assessment.

STEP 2A: Define the Potential Dust Emission Magnitude

Demolition, earthworks, construction and trackout will occur during the construction phase. Table 13-2 describes the potential dust emission class criteria for each outlined construction activity.

Table 13-2: Criteria Used in the Determination of Dust Emission Class

Activity	Criteria used to Determine Dust Emission Class		
	Small	**Medium**	**Large**
Demolition	▪ Total building volume <12,000 m^3 ▪ Construction ▪ material with low potential for dust release (e.g. metal cladding or timber ▪ Demolition activities <6m above ground level ▪ Demolition during wetter months	▪ Total building volume 12,000 m^3 - 75,000m^3 ▪ Potentially dusty construction material. ▪ Demolition activities 6-12m above ground level	▪ Total building volume >75,000m^3 ▪ Potentially dusty construction material (e.g. concrete) ▪ On-site crushing and screening, ▪ Demolition activities >12m above ground level
Earthworks	▪ Total site area <18,000m^2 ▪ soil type with large grain size (e.g. sand), ▪ <5 heavy moving earth vehicles active at any one time ▪ formation of bunds <3m in height	▪ Total site area 18,000 – 110,000m^2 ▪ Moderately dusty soil type (e.g. silt) ▪ 5-10 heavy moving earth moving vehicles active at any one time. ▪ formation of bunds 3m - 6m in height,	▪ Total site area >110,000m^2 ▪ potentially dusty soil type (e.g. clay) ▪ >10 heavy earth moving vehicles active at any one time. ▪ formation of bunds >6m in height
Construction	▪ Total building volume <12,000m^3 ▪ Construction material with low potential for dust release	▪ Total building volume 12,000 – 75,000m^3 ▪ Potentially dusty construction material (e.g. concrete) ▪ On-site concrete batching	▪ Total building volume >75,000m^3 ▪ On-site concrete batching ▪ Sandblasting
Trackout	▪ <20 outward HDV trips in any one day ▪ surface material with low potential for dust release, ▪ Unpaved road length <50m	▪ 20 - 50 outward HDV trips in any one day ▪ moderately dusty surface material (e.g. high clay content), ▪ Unpaved road length 50-100m	▪ >50 outward HDV trips in any one day ▪ potentially dusty surface material (e.g. high clay content ▪ Unpaved road length >100m

The potential dust emission magnitudes for the proposed development were estimated using information from the preliminary earthworks calculations and the anticipated construction methodology and determined using the criteria detailed in Table 13-2 as follows;

Demolition:

Demolition includes any activity involved with the removal of an existing structure (or structures). There is very little demolition required for this project. Several existing walls at Midland Steel, Garroon Stream, Mill Bridge to Convent Bridge and Irishtown Garden Centre will be demolished. The existing Owenass Bridge will also be demolished and replaced.

Therefore:

- Total building volume <12,000 m^3
- Potentially dusty construction material.
- Demolition activities <6m above ground level

Therefore, the dust emission magnitude for Demolition is defined as **Small.**

Earthworks:

Earthworks covers the processes of soil-stripping, ground-levelling, excavation, and landscaping. Excavated material will be generated from the stripping of surface and excavation of subsoil layers for the construction of the proposed foundations and channel works. The total material to be excavated will be approximately 77,000m^3, most of this material will need to be disposed of at a licenced soil recovery facility. Albeit if excavated material can be reused a backfill then the volume of material to be disposed of from site will be in the region of 56,000m^3.
Therefore:

- Total site area where earthworks will occur is 18,000 – 110,000m^2.
- The underlying bedrock of the site is mainly composed of Dark muddy limestone and shale (Ballysteen formation). In the centre of the site, the underlying subsoil is composed of limestone till (carboniferous), as well as alluvium, peat, and made ground.
- There will be 5-10 heavy moving earth moving vehicles active at any one time.

Therefore, the dust emission magnitude for Earthworks is defined as **Medium.**

Construction:

Construction covers any activity involved with the provision of a new structure (or structures), its modification or refurbishment.

Flood Embankments: Approximately 3,160 linear metres of embankment will be formed. The total material imports from the scheme will be approximately 105,000m^3 which may be reduced to 85,000m^3 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 embankment height will be between 1.2m and 3.0m above surrounding ground level. Excavation to a depth of up to 2m will be required subject to confirmation of ground conditions from site investigation. A temporary haul road up to 5m in width is proposed around both sides of the embankment.

Flood Walls: Approximately 3,500 linear metres of wall will be formed. The 4 types of walls proposed are described in Chapter 4, the final design of walls at each location will be subject to confirmation of ground conditions from site investigation at detailed design stage.

Therefore:

- Total construction volume is >75,000m^3
- Potentially dusty construction material (e.g. concrete).

Therefore, the dust emission magnitude for Construction is defined as **Large.**

Trackout:

Trackout covers the transport of dust and dirt from the construction site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction/demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site.

- Significant bulk excavation works and construction of new embankments will generate the most HGV movements during the anticipated dig and replace works and be the busiest construction period. During construction, there will be an estimated total of 7,389 truck movements throughout the four construction phases. Based on general construction rate assumptions for excavator work rates it is recommended to allow that 8 – 12 HGV movements per hour. Should the contractor's approach be to commence with the embankment works and the structural works for the walls etc in parallel, these HGV single trip movements can potentially increase to 12 -19 per hour. Therefore, there will be > 50 outward HDV trips in any one day.
- Potentially dusty surface material

- Unpaved road length, some elements are >100m.

Therefore, the dust emission magnitude for Trackout is defined as **Large**.

STEP 2B: Define the Sensitivity of the Area

The sensitivity of the area takes account of a number of factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM_{10}, the local background concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

The criteria for determining the sensitivity of receptors are detailed in Table 13-3 for dust soiling effects and health effects of PM_{10}.

Table 13-3: Criteria for Determining Sensitivity of Receivers

Sensitivity of Receiver	Criteria for Determining Sensitivity	
	Dust Soiling Effects	**Health Effects of PM_{10}**
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms	Residential properties, hospitals, schools and residential care homes
Medium	Parks, places of work	Office and shop workers not occupationally exposed to PM_{10}
Low	Playing fields, farmland, footpaths, short-term car parks and roads	Public footpaths, playing fields, parks and shopping streets

The criteria detailed in Table 13-4, Table 13-5 and Table 13-6 were used to determine the sensitivity of the area to dust soiling effects, human health impacts and ecological impacts.

Table 13-4: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receiver Sensitivity	Number of Receivers	Distance from Source (m)			
		<20m	**<50m**	**<100m**	**<250m**
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Table 13-5: Sensitivity of the Area to Human Health Impacts

Receiver Sensitivity	Annual Mean PM_{10} Conc	Number of Receivers	Distance from Source (m)			
			<20m	**<50m**	**<100m**	**<250m**

High	>32 µg/m^3	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32 µg/m^3	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28 µg/m^3	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	<24 µg/m^3	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Medium	>32 µg/m^3	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	28-32 µg/m^3	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	<24 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	-	≥1	Low	Low	Low	Low

Table 13-6: Sensitivity of the Area to Ecological Impacts

Receiver Sensitivity	**Distance from Source (m)**	
	<20	**<50**
High	High	Medium
Medium	Medium	Low
Low	Low	Low

A population of Mountmellick was reported as 4,905 in the Census of Ireland 2022. The flood relief measures will be constructed in close proximity to the built-up areas of Mountmellick, with flood walls and embankments to be placed close to residential areas and the historic town centre.

Table 13-7 outlines the range of numbers of properties within specific distance bands from the proposed construction activities to determine the receptor sensitivity of the area to Dust Soiling Effects on People and Property.

Table 13-7: Cumulative number of sensitive receivers within 20m, 50m, 100m and 250m of the site

Parameter	Number of Receivers within Distance from Site (m)			
	<20m	**<50m**	**<100m**	**<250m**
No. of receivers in proximity to Site	~45	~80	>200	>200
Receiver Sensitivity	High	High	Medium	Low

Sensitivity of People to Dust Soiling

- Demolition, Earthworks and Construction: Table 13-7 above shows there approx. 45 sensitive residential properties within 20m of the proposed construction activities on the site. (*The IAQM guidance states that a high sensitivity receptor is where: users can reasonably expect enjoyment of a high level of amenity; or the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land*). There are approx. an additional 35 dwellings within 50m of the proposed works

Therefore, based on the Table 13-3 and Table 13-4 the sensitivity of the Area to Dust Soiling Effects on People and Property is **High**; in terms of potential demolition, earthworks and construction dust impacts.

- Trackout: For trackout the distances should be measured from the side of the roads used by the construction traffic. The impact declines with distance from the site, and it is only necessary to consider trackout impacts up to 50m from the edge of the road, There are approximately 55-60 sensitive receptors within 50m from haul roads used by construction traffic.

Therefore, as shown in Table 13-4, the sensitivity of the Area to Dust Soiling Effects on People and Property is **Medium**; in terms of potential trackout dust impacts.

Sensitivity of the Area to Human Health Impacts

Section 13.2.3 outlines baseline air quality in the study area. The PM_{10} concentrations recorded at EPA monitoring station in Portlaoise located approximately 8.5km south southeast of the Mountmellick FRS, has been referenced for the calendar year 2023. This concentration value is 11.04 µg/m^3 which is well below the Air Quality Standard annual limit value of 40µg/m^3 and below the recent 2021 WHO air quality guideline value of 15 µg/m^3. There are ~45 sensitive receptors within 20m of the site. As shown in Table 13-5, the sensitivity of the Area to Human Health Impacts is **Low**; in terms of potential demolition, earthworks, construction and trackout dust impacts.

Sensitivity of the Area to Ecological Impacts

Dust deposition due to demolition, earthworks, construction and trackout has the potential to affect sensitive habitats and plant communities. Dust can have two types of effect on vegetation: physical and chemical. Direct physical effects include reduced photosynthesis, respiration and transpiration through smothering. Chemical changes to soils or watercourses may lead to a loss of plants or animals for example via changes in acidity. Indirect effects can include increased susceptibility to stresses such as pathogens and air

pollution. These changes are likely to occur only as a result of long-term demolition and construction works adjacent to a sensitive habitat.

The Owenass River is a major tributary to the upper section of the River Barrow. This river is a part of the River Barrow and River Nore Special Area of Conservation (SAC) (Site Code: 002162), which is a designated Natura 2000 site under the European Union Habitats Directive. Areas of the proposed works fall within the River Barrow and River Nore Special Area of Conservation (SAC). The River Barrow and River Nore SAC is protected under the EU Habitats Directive and are of international importance as it is the location of a number of habitats and species which are protected under the EU Habitats Directive.

In this respect, a Natura Impact Assessment (NIS) has been prepared and it concluded that the proposed development is appropriately balanced and will not impact the sensitive nature of the SAC.

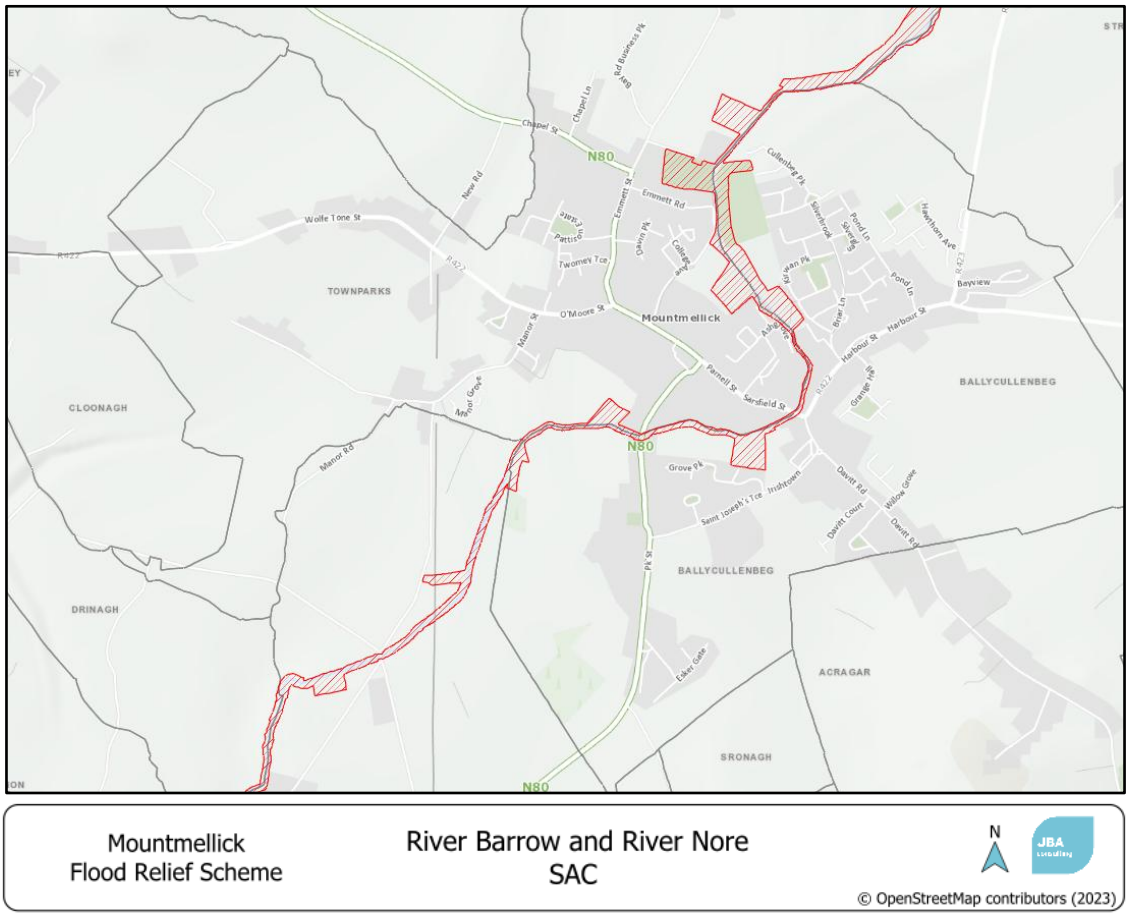


Figure 13-1: River Barrow and River Nore SAC

Table 13-6 outlines Sensitivity of the Area to Ecological Impacts. A high receiver sensitivity is those receivers with an international or national designation and the designated features may be affected by dust soiling; or locations where there is a community of a particular dust sensitive species. River Barrow and River Nore SAC is an international designation designated for the presence of several habitats and/or species listed on Annex I / II of the E.U. Habitats Directive. Much of the proposed works occur within 20m of the SAC. Therefore, the sensitivity of the Area to Ecological Impacts is **High**; in terms of potential demolition, earthworks, construction and track out dust impacts.

The sensitivity of the area to dust soiling, human health impacts and ecological impacts for each activity is summarised in Table 13-8.

Table 13-8: Outcome of Defining the Sensitivity of the Area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	High	High	High	Medium
Human Health	Low	Low	Low	Low
Ecological	High	High	High	High

STEP 2C: Define the Risk of Impacts

In accordance with the IAQM Guidance, the dust emission magnitude (Step 2A) and sensitivity of the area (Step 2B) have been combined and the risk of impacts from demolition, construction, earthworks and trackout determined (before mitigation is applied). The risk of dust soiling, impact on human health and ecological impact before mitigation, is summarised in Table 13-9.

Table 13-9: Summary Dust Risk to Define Site-specific Mitigation

Potential Impact	Dust Emission Magnitude			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Medium Risk	Medium Risk	High Risk	Medium Risk
Human Health	Negligible	Low Risk	Low Risk	Low Risk
Ecological	Medium Risk	Medium Risk	High Risk	High Risk

STEP 3: Site-Specific Mitigation

In accordance with the IAQM Guidance, for proposed mitigation measures, the highest risk category should be applied. Therefore, the mitigation measures applicable to a **High-Risk Site** should be applied as outlined in Section Mitigation Measures below.

Operational Dust Impacts

For the Operational Phase, an assessment of air quality and dust impacts from the maintenance of the proposed development has been screened out on the basis that these activities have low potential for dust release and are likely to have a negligible impact on air quality sensitive receptors. As outlined in Section 13.2.1, in accordance with the IAQM guidance and TII guidelines, operational phase traffic related air quality impacts have been screened out of the impact assessment.

13.2.5 Mitigation Measures

Construction Mitigation

The following mitigation measures are to be implemented during the construction phase:

STEP 3: Site-Specific Mitigation

In accordance with the IAQM Guidance, the highest risk category will be applied when determining proposed mitigation measures. Therefore, the mitigation measures applicable to a **High-Risk Site** will be applied. The proposed mitigation measures in the IAQM guidance are as follows:

General Measures

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.
- Implement a Dust Management Plan (DMP), to include the dust mitigation measures and monitoring as outlined in this report.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook.
- If applicable, hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas.
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.

- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste Management

- Waste Material to be disposed of at an appropriately licensed facility.

Measures specific to demolition

- Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.
- Avoid explosive blasting, using appropriate manual or mechanical alternatives.
- Bag and remove any biological debris or damp down such material before demolition.

Measures specific to earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.
- Only remove the cover in small areas during work and not all at once.

Measures specific to construction

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures specific to trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site logbook.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

Monitoring

The following monitoring measure will be implemented for the Construction Phase of the proposed development:

- The contractor will undertake daily on-site and off-site inspection, where receptors (including roads) are within 100 m of site boundary, to monitor dust, record inspection results, and make the log available to Laois County Council on request. If the daily on-site and off-site inspection indicate significant dust soiling of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, the contractor will provide cleaning as necessary. The frequency of the inspections will be increased during site activities which have a high potential to generate dust.

- Agree dust deposition and/or real-time PM_{10} continuous monitoring locations with Laois County Council. Where possible commence baseline monitoring at least three months before work commences on site. This programme of air quality monitoring implemented at the site boundaries for the duration of the construction phase activities is to ensure that the air quality standards relating to dust deposition and PM_{10} are not exceeded. The following limits are recommended;
  - Dust Deposition Rate limit = 350 $mg/m^2/day$ (averaged over a 30+/-2 day period using Bergerhoff Gauge Method).
  - Dust Deposition Rate limit affecting sensitive ecological receivers = 1,000 $mg/m^2/day$
  - PM_{10} 24 Hour Mean concentration limit = 50 $\mu g/m^3$ not to be exceeded more than 35 times a calendar year
  - PM_{10} Annual Mean concentration limit = 40 $\mu g/m^3$
  - $PM_{2.5}$ Annual Mean concentration limit = 25 $\mu g/m^3$

Where levels exceed specified air quality limit values, dust generating activities shall immediately cease and alternative working methods shall be implemented. A complaints log shall be maintained by the construction site manager and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.

Operational Mitigation

As there are no significant Adverse effects on air quality predicted during the Operational Phase of the Proposed Development, no mitigation measures are proposed.

13.2.6 Residual Impacts

STEP 4 - Construction site dust control measures and good construction site management and practice is capable of effectively mitigating the potential for significant impact of fugitive dust emissions. Therefore, the potential for fugitive dust emission effects at the nearest residential properties and ecological receptors will be controlled to ensure impacts are of negligible significance.

The IAQM Guidance recommends that significance is only assigned to the effect after considering the construction activity with mitigation. Therefore, the detailed mitigation measures have been defined in a form suitable for implementation by way of inclusion within the EIAR which makes up part of the planning consent.

Using the IAQM methodology for the assessment of impacts from construction activities, the following is indicated in Table 13-9 of that methodology;

- the risk of dust soiling impacts is medium risk for demolition, earthworks, and construction and high risk for trackout;
- the impacts on human health are low risk for demolition, and medium risk for earthworks, construction and trackout; and
- the ecological impacts are negligible risk for demolition and low risk for earthworks, construction and trackout.

In accordance with the IAQM Guidance, the highest risk category measures have been applied in the determination of appropriate mitigation measures. The significance of impacts arising from the risks identified together with the proposed mitigation measures are summarised in Table 13-10.

Together with the proposed mitigation measures and the existing low background particulate (PM_{10}) concentrations, the construction phase activities on the proposed site will not cause an exceedance of the air quality objectives at receptor locations.

Table 13-10: Summary of Significance of Impact including Site-specific Mitigation

Potential Impact	Significance			
	Demolition	**Construction**	**Earthworks**	**Trackout**
Dust Soiling	Negligible	Negligible	Negligible	Negligible
Human Health	Negligible	Negligible	Negligible	Negligible
Ecological	Negligible	Negligible	Negligible	Negligible

13.2.7 Interactions and Potential Cumulative Impacts

Interactions

The environmental effects on air quality are interlinked with the environmental effects of:

- Chapter 6 – Population and Human Health
- Chapter 7 - Biodiversity
- Chapter 8 – Land and Soil
- Chapter 9 – Water – Surface and Groundwater
- Chapter 11 – Landscape & Visual
- Chapter 12 – Material Assets

Combined effects are by their nature interactive, the effect of one impact is dependent or influenced by another effect. Earthworks during the construction phase has the potential to give rise to dust impacts, potentially giving rise to water pollution and impacts on flora and fauna and the visual landscape. Mitigation of combined effects is best achieved through management and control measures to prevent the individual impacts in the first instance or reduce the impacts themselves and therefore reduce the likelihood of such interactions occurring.

An assessment of the potential impact of dust deposition on ecological receptors in proximity to the proposed works has been undertaken. Much of the proposed works occur within 20m of the River Barrow and River Nore SAC. Earthworks during the construction phase has the potential to give rise to dust impacts, potentially giving rise to water pollution and impacts on flora and fauna. Therefore, the sensitivity of the Area to Ecological Impacts is High. Appropriate construction phase mitigation measures have been outlined in Section 13.2.5 to ensure that the potential impact on the SAC will be negligible. In addition, with the implementation of mitigation measures described in EIAR Chapter 7: Biodiversity, impacts on biodiversity associated with the construction and operation of the proposed development are considered unlikely to constitute a significant effect.

Potential interactive Adverse impacts have been identified in Chapter 14. All mitigation measures outlined in the respective chapters of this EIAR will be implemented in full to ensure the potential impact is minimised in relation to construction impacts.

Potential Cumulative Impacts

In relation to the in-combination construction and/or operational impact of the proposed Mountmellick Flood Relief Scheme, with other proposed schemes planned in the area, the list of schemes noted from Chapter 15, Figure 15-1, have been reviewed.

In section 13.2.5 Mitigation Measures above it states:

- If applicable, hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.

A list of projects presented in Chapter 15, Figure 15-1 and Table 15-1, within 500m from the proposed Mountmellick Flood Relief Scheme were considered:

- Planning Ref: 21204 - At Townparks, Mountmellick, Co. Laois. Permission granted to construct a dwelling house, detached domestic garage / shed, wastewater treatment system and all associated site works. Permission granted 24/06/2021, Expires 23/06/2026. From mapping it is evident this residential dwelling has been constructed, therefore there is no additional cumulative impact from construction. This development will not result in any significant additional operational air quality impact.
- Planning Ref: 19558 - At Cullenbeg Park, Ballycullenbeg, Mountmellick. Permission granted to construct 70 no. 2-storey houses and associated site development works. A Natura Impact Statement has been prepared in respect of this application. Permission granted 05/10/2020. Expires 04/10/2025. This development is located approximately 460m away from the proposed works at Defence 10, Midland Steel. It is uncertain at this time if the proposed development has been constructed. If the construction period of this development is to overlap with the proposed FRS, there is a potential to impact on air quality in the area. This development could be considered a medium/high risk site, therefore regular liaison meetings should be held to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. This development is required to make suitable provision for dust minimisation during construction works in accordance with its own planning conditions.
- Planning Ref: 19428 – At Patrick Street, Mountmellick, Co. Laois. Permission granted to 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. This development is approximately 300m away from the proposed works at Defence 3. It is uncertain at this time if the proposed development has been constructed. If the construction period of this development is to overlap with the proposed FRS, there is a potential to impact on air quality in the area. This development could be considered a high risk site, therefore regular liaison meetings should be held to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. This development is required to make suitable provision for dust minimisation during construction works to include measures such as road/access tracks cleaning, dust suppression, covering of lorries entering exiting the site, in accordance with its own planning conditions.
- Planning Ref: 22439 – At Townparks, Mountmellick, Co. Laois. Permission granted to construct 49 dwelling units, 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. This development is approximately 460m away from the proposed works at Defence 10, Midland Steel. It is uncertain at this time if the proposed development has been constructed. If the construction period of this development is to overlap with the proposed FRS, there is a potential to impact on air quality in the area. This development could be considered a medium/high risk site, therefore regular liaison meetings should be held to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. This development is required to make suitable provision for dust minimisation during construction works to include measures such as road/access tracks

cleaning, dust suppression, covering of lorries entering exiting the site, in accordance with its own planning conditions.

- Planning Ref: 216 – At Ballycullenbeg, off Harbour Street, Mountmellick. Permission granted to develop 54 dwelling units, remove part of existing boundary screen wall and create new entrance road, vehicular entrances and footpaths onto Grange Hall and installation of all necessary and associated site works. Approved 25/01/2022. Expires 15/12/2027. This development is approximately 250m away from the proposed works on Defence 5 at Convent Bridge. It is uncertain at this time if the proposed development has been constructed. If the construction period of this development is to overlap with the proposed FRS, there is a potential to impact on air quality in the area. This development could be considered a medium/high risk site, therefore regular liaison meetings should be held to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. This development is required to make suitable provision for dust minimisation during construction works in accordance with its own planning conditions.
- Planning Ref: 20208 – At St Vincent's Hospital, Ballycullenbeg, Mountmellick. Permission granted to 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. It is believed construction has started on this and possibly be completed before construction of the FRS starts. This development is required to make suitable provision for dust minimisation during construction works to include measures such as road/access tracks cleaning, dust suppression, covering of lorries entering exiting the site, in accordance with its own planning conditions.
- Planning Ref: 22568 – At Davitt Road, Mountmellick, Co. Laois. Permission granted to 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. This proposed development is adjacent to proposed works at Defence 8. Permission has been refused by An Board Pleanála, If however this development was sanctioned in the future, and if the construction period overlaps with the proposed FRS, there is a potential to impact on air quality in the area. This development could be considered a high risk site, therefore regular liaison meetings should be held to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. This development is required to make suitable provision for dust minimisation during construction works to include measures such as road/access tracks cleaning, dust suppression, covering of lorries entering exiting the site, in accordance with its own planning conditions.
- Planning Ref: 2460060 – At Horan Bus Hire, Irishtown Ballycullenbeg, Mountmellick. Permission granted to erect a 24m high lattice tower together with antennas, dishes and associated telecommunications equipment, all enclosed by security fencing. Application lodged 13/02/2024. Decision due 08/04/2024. This is not considered a high risk construction site and will not result in any significant additional construction/operational air quality impact.
- Planning Ref: 16505 – At Sronagh, Mountmellick, Co. Laois. Ten year permission granted to construct a Solar PV Energy Development. Approved 20/07/2017. Expires 19/07/2027. If the construction period of this development is to overlap with the proposed FRS, there is a potential to impact on air quality in the area. This development is ~350m from Defence 9 construction works and could be considered a high risk site, therefore regular liaison meetings should be held to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. This development is required to mitigate any environmental nuisance (noise/dust) which may arise during construction., in accordance with its own planning conditions.

13.3 Climate

This section of the EIAR assesses the climate impact of the Mountmellick Flood Relief Scheme, Mountmellick, Co. Laois during the Construction and Operational Phases.

This climate impact assessment has been prepared to assess the potential climate impact of the proposed flood relief scheme. The climate assessment for the proposed development in this chapter estimates the potential for greenhouse gas (GHG) emissions, i.e. carbon emissions.

It is envisaged that the future operation and maintenance of the proposed development will not have a significant climate impact. Provision is made in the design of the scheme in the present day to allow it to be adapted or enhanced in the future to address climate change. The operational phase of the proposed development may involve water pumps/generators in emergencies only and the maintenance of flood walls and flood embankments, and as such its impact is not considered significant. In actual fact, there are climatic benefits, in that lands that are at risk of flooding due to climate change will benefit from the proposed development and the associated environmental, health, social and economic impacts of flooding due to climate change will be mitigated. This constitutes a permanent significant positive impact during the operation phase of the proposed development. This benefit is assessed in detail in the Flood Risk Assessment.

The construction activities of the proposed development have been examined to identify those that have the potential to give rise to a short-term climate impact in terms of 'embodied carbon' and 'construction activities' carbon emissions.

The assessment and evaluation of the potential climate impact arising from the proposed development was based on reference to the relevant Transport Infrastructure Ireland (TII) Publications and TII Carbon Tool, for use in the assessment of climate effects for national road schemes and these are described in the SD and OTD for climate, as follows:

- Climate Assessment of Proposed National Roads, December 2022. This Standard Document (SD), PE-ENV-01105 sets out the required approach for Climate Practitioners to identify significant climate effects; in terms of both Greenhouse Gas (GHG) emissions and climate resilience, associated with all stages of proposed national road developments: the design, construction, and operation of national roads in accordance with TII's project planning and national planning requirements.
- The methodology outlined in this SD and the theory of climate assessment are presented in an "Overarching Technical Document" (OTD), PE-ENV-01104. The OTD should be read in conjunction with this SD. The OTD provides best practice methodology and processes for climate assessment for proposed national road developments, as well as light railway and rural cycleways (offline & greenways) projects.
- Transport Infrastructure Ireland Carbon Tool for Road and Light Rail Projects: User Guidance Document, GE-ENV-01106; and

In accordance with the TII Guidelines outlined above, the climate impact assessment has included a Greenhouse Gas (GHG) Assessment Process as follows;

- Using Table 3-21 Phase 2, Stage 2 GHG Assessment Instructions, it is a requirement to quantify available GHG data using the TII Carbon Assessment Tool. This process should include available major sources of GHGs provided to the climate practitioner by the project engineers including:
  - Cut and fill balance, etc.
  - Main materials for construction – these include pavement, earthworks, concrete, and steel, etc.

A Climate Change Risk (CCR) Assessment Process has been undertaken elsewhere in the EIAR in the form of detailed flood risk assessment, etc.

13.3.1 Methodology

13.3.1.1 Greenhouse Gas (GHG) Assessment

The GHG impact assessment for the proposed development has been assessed using the TII Carbon Assessment Tool. The Carbon Assessment Tool has been used for the calculation of emissions arising from the construction of the proposed development. The Carbon Assessment Tool aligns with TII's project phases

as well as the latest standard Carbon management in buildings and infrastructure[170] (PAS 2080:2023). The tool includes an emission factors library using factors developed by relevant industry bodies. The outputs from the Carbon Assessment Tool allow for comparison and evaluation of the lifecycle carbon impacts for any given national road project.

Using the Transport Infrastructure Ireland (TII) Carbon Tool for Road and Light Rail Projects: Guidance, the lifecycle carbon emissions for the flood relief scheme have been calculated. The calculation tool for lifecycle carbon emissions assesses various stages of the project as follows;

"**Pre-Construction"** stage considers activities that will take place at the pre-construction stage of a project, specifically clearance and demolition works.
"Embodied Carbon" stage considers the product stage, including materials that will be used during the construction process, their lifetime (to determine replacement cycles) and details of material transportation.
"Construction Activities" stage considers construction activities that will take place during infrastructure development, including excavation activities, energy use of construction activities, water use and landscaping and vegetation.
The **"Operational Use Carbon"** stage considers emissions associated with the operation of the infrastructure scheme such as energy, water and waste.
The **"Operational Carbon Emissions"** of a project, considers emissions associated with the use of the scheme.
The **"Maintenance Carbon"** stage of a project considers emissions associated with the fuel used for the maintenance of the infrastructure scheme during its use.
"**End of Life Carbon**" stage considers the decommissioning of the scheme, including deconstruction and demolition activities and waste disposal.

During the construction phase of the proposed development, GHG emissions will potentially be generated by site preparation works, excavation, infilling works, construction activities, energy usage, etc. During the operational phase for the proposed development, no climate impacts will result from carbon emissions. Therefore, only potential climate impacts in terms of carbon emissions (tCO_2e) during construction have been considered for the proposed development.

13.3.2 Receiving Environment

13.3.2.1 Baseline Climate Survey

'Ireland, National Inventory Report 2024' as published by the EPA in March 2024, indicates that in 2022, total emissions of greenhouse gases including indirect emissions from solvent use (without LULUCF) in Ireland were 60,604.9 kt CO_2 equivalent, and the total with LULUCF 64,588.2 kt CO_2 equivalent. This value is 9.7% higher than emissions in 1990 but the total for 2021 is 15.2% lower than the peak of 71,814.5 kt CO_2 equivalent in 2001 when emissions reached a maximum following a period of unprecedented economic growth.

The EPA reported total emissions of greenhouse gases in 2021, including indirect emissions from solvent use (without LULUCF), in Ireland were 62,109.9 kt CO_2 equivalent and the total with LULUCF 69,448.1 kt CO_2 equivalent. This value is 11.6% higher than emissions in 1990 but the total for 2021 is 13.5% lower than the peak of 71,814.5 kt CO_2 equivalent in 2001.

[170] PAS 2080:2023, BSI, ISBN:978 0 539 18034 3

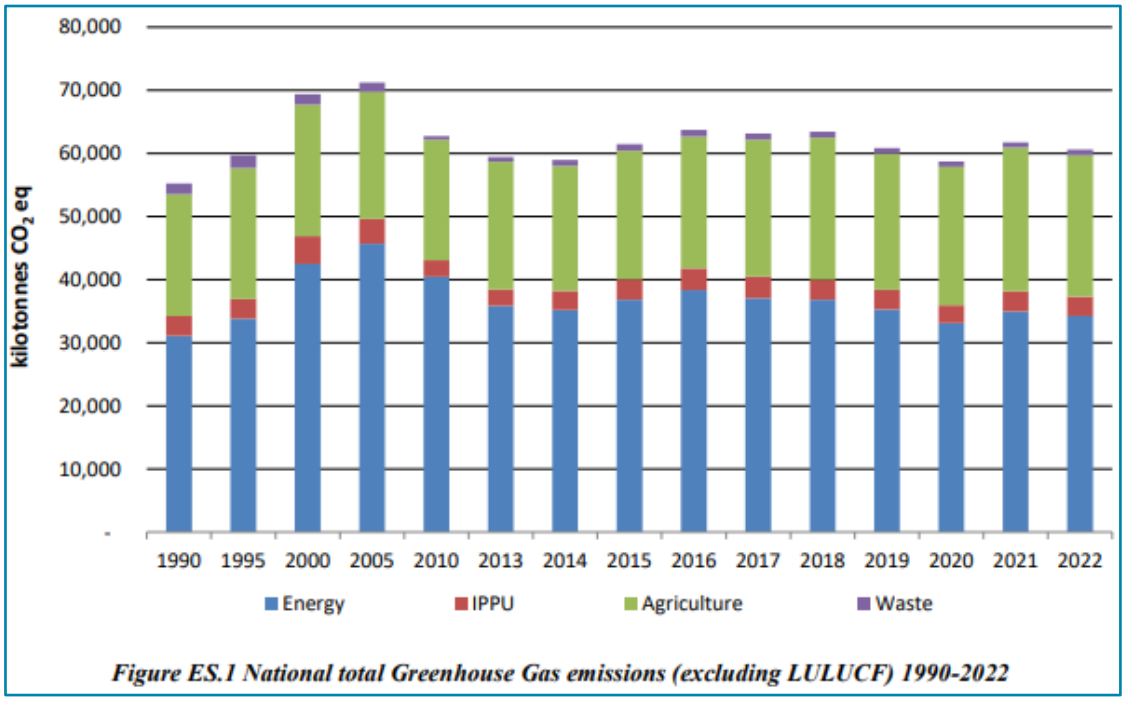


Figure 13-2: National Total Greenhouse Gas Emissions (Excluding LULUCF) 1990-2022

The Government's Climate Action Plan 2024 (CAP24) is the third annual update to Ireland's Climate Action Plan 2019. CAP23 was the first to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021, and following the introduction, in 2022, of economy-wide carbon budgets and sectoral emissions ceilings. The plan implements the carbon budgets and sectoral emissions ceilings and sets a roadmap for taking decisive action to halve our emissions by 2030 and reach net zero no later than 2050, as we committed to in the Programme for Government

Climate Action Plan 2024 builds upon CAP23 by refining and updating the measures and actions required to deliver the carbon budgets and sectoral emissions ceilings. The Plan provides a roadmap for taking decisive action to halve Ireland's emissions by 2030 and reach net zero by no later than 2050, as committed to in the Climate Action and Low Carbon Development (Amendment) Act 2021.

CAP 23 and CAP 24 outline that Flood Risk Management is the responsibility of the Office of Public Works. The detailed implementation maps for actions, including timelines and responsible organisations, are set out in the accompanying Annex. The relevant action numbers and actions from CAP 23 and CAP 24 are shown in Table 13-11 below.

Table 13-11: CAP23 and CAP24 Actions relating to flood risk

Action Number	Action
AD/24/2	Complete a review of the national Preliminary Flood Risk Assessment to assess the potential impacts of climate change on flooding and flood risk across Ireland
AD/24/3	Develop options for the delivery of a National Implementation Strategy for Nature-Based Solutions for the management of rainwater and surface water runoff in urban areas.
AD/23/2	Produce guidance on the assessment of adaptation measures and the development of Climate Change Adaptation Plans for past and new flood relief schemes.
AD/23/3	Update the existing Minor Works Programme to ensure applications consider the potential impacts of climate change and, where necessary, that any measures proposed provide for, or are adaptable to, possible future changes in flood risk

13.3.3 Potential Impact of the Proposed Development

13.3.3.1 Construction Climate Impacts

The quantification of carbon emissions and the associated climate impact as a result of the construction phase of the proposed flood relief scheme has been based on the construction quantity information provided by the project engineers. Therefore:

- The volume of excavated material will be approximately 77,000 m^3
- The volume of imported material will be approximately 105,000 m^3 (which may be reduced to 85,000m^3 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 volume of concrete material required is estimated to be ~3,850 m^3
- It can be expected that HGV vehicle movements may be in the region of 10-15 vehicles per hour during the busiest period of construction works. HGV vehicle movements will be required for bulk excavation works and clay importation for embankment construction. This will generate the most HGV movements during the anticipated dig and replace works and be the busiest construction period. In terms of carbon emissions, this has been assessed assuming 20 litres of fuel usage per hour, for 10 hours per day and for 90 days of continuous operations.

Table 13-12 outlines the Total Greenhouse Gas Emissions due to the construction phase earthworks for the proposed development described above, as predicted using the TII Carbon Tool.

Table 13-12: Total Greenhouse Gas Emissions (tonnes CO2 equivalent) due to the construction phase of the proposed development

Name	Pre-Construction	Embodied Carbon	Construction Activities	Construction Waste	Operational Use	Total (t CO_2 equivalent)
NA	0	1,881,078.08	66,034.59	0	0	1,947,112

Therefore, as a percentage of 2022 Annual Carbon Emissions of 64,588.20 kt CO2 equivalent, the proposed development will account for 0.0030% of annual CO_{2e} emissions. This represents a **Negligible** impact.

13.3.3.2 Operational Stage

There will be no significant operational climate impact from the operation of the proposed development. The proposed flood defence walls will require regular routine inspections to identify any damage or deterioration every 1 to 2 years or in the interim if accidental damage were to occur due to storms from debris, materials or other accidental damage (e.g. machinery/vehicles). The proposed flood defence embankments will be regularly maintained (grass cutting) at least once a year.

Emissions from emergency pumps/generator if required will be infrequent. During use, a diesel generator will emit carbon dioxide, nitrogen oxide and particulate matter, however, due to the low usage, the impact will be imperceptible. Maintenance vehicles will access the site at the most yearly, however, due to the low and infrequent traffic movements involved, the impact will be imperceptible. The operational phase of the proposed development will result in positive impacts on climate as the proposed development will provide tangible benefits in terms of reduced flood impacts, reduction of financial loss and disruption as well as alleviating future development restrictions.

13.3.4 Mitigation Measures

13.3.4.1 Construction Mitigation

As no significant adverse effects are predicted to occur during the construction phase, no specific construction phase mitigation measures are required.

13.3.4.2 Operational Mitigation

As the operation of the proposed development will have positive impacts on climate, mitigation measures are considered unnecessary.

13.3.5 Residual Impacts

As no significant adverse effects are predicted to occur during the construction or operation phase, no specific climate effects are predicted.

13.3.6 Interactions and Potential Cumulative Impacts

13.3.6.1 Interactions

No specific construction or operation phase mitigation measures have been outlined for the proposed flood relief scheme. A Climate Change Risk (CCR) Assessment Process has been undertaken elsewhere in the EIAR in the form of detailed flood risk assessment.

13.3.6.2 Potential Cumulative Impacts

The construction machinery and processes have the potential to give rise to Greenhouse Gas Emissions due to the construction phase of the proposed development as predicted using the TII Carbon Tool. In relation to the in-combination construction and/or operational impact of the proposed Mountmellick Flood Relief Scheme, with other proposed schemes planned in the area, the list of schemes noted in Chapter 15 have been reviewed. None of these schemes will result in any significant additional climate impact.

13.4 Noise & Vibration

This section of the EIAR assesses the noise and vibration impact of the Mountmellick Flood Relief Scheme, Mountmellick, Co. Laois during the Construction and Operational Phases.

This noise and vibration impact assessment has been prepared to assess the potential noise and vibration impact of the proposed flood relief scheme on the nearest residential properties. It can be expected that the future operation of the proposed flood relief scheme will not have a significant noise impact. Therefore, the construction activities of the proposed flood relief scheme have been examined to identify those that have the potential to give rise to a short-term noise and vibration impact and a suitable construction impact assessment has been undertaken. As appropriate, construction phase mitigation measures have been outlined.

The assessment and evaluation of the potential noise and vibration impact arising from the proposed flood relief scheme involved the following:

- Baseline Noise Survey – noise monitoring survey representative of the daytime period to determine the existing noise climate in proximity to the residential receivers in the vicinity of the proposed flood relief scheme.
- Identification and assessment of potential noise and vibration sources from the construction of the proposed flood relief scheme.
- Construction noise impact prediction using the methodology outlined in BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise.
- An assessment of the predicted noise levels and the noise impact on the nearest residential receivers against relevant guidelines and standards.
- A recommendation of appropriate construction and operational noise and vibration mitigation measures.

13.4.1 Methodology

13.4.1.1 ISO 1996-1:2016 Acoustics — Description, measurement and assessment of environmental noise — Part 1: Basic quantities and assessment procedures

The *ISO 1996-1:2016 Acoustics — Description, measurement and assessment of environmental noise — Part 1: Basic quantities and assessment procedures* defines the basic quantities to be used for the description of noise in community environments and describes assessment procedures. It also specifies methods to assess environmental noise and gives guidance on predicting the potential annoyance response of a community to long-term exposure from various types of environmental noises. Application of the method to predict annoyance response is limited to areas where people reside and to related long-term land uses. ISO 1996: 2016 describes adjustments for sounds that have different characteristics. The term rating level is used to describe physical sound predictions or measurements to which one or more adjustments have been added. Based on these rating levels, the long-term community response can be estimated. The potential noise is assessed either singly or in combination, allowing for consideration, when deemed necessary by responsible authorities, of the special characteristics of their impulsiveness, tonality and low-frequency content, and for the different characteristics of road traffic noise, other forms of transportation noise (such as aircraft noise) and industrial noise.

13.4.1.2 BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise

BS5228 gives recommendations for methods of noise control relating to construction sites, including sites where demolition, remediation, ground treatment or related civil engineering works are being carried out, and open sites, where work activities/operations generate significant noise levels, including industry-specific guidance. The legislative background to noise control is described and recommendations are given regarding procedures for the establishment of effective liaison between developers, site operators and local authorities. This part of BS5228 provides guidance concerning methods of predicting and measuring noise and assessing its impact on those exposed to it.

Annex E of BS5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise, provides guidance on assessing the potential significance of noise effects from construction activities. In relation to construction noise limits, BS 5228-1:2009+A1: 2014 Noise and Vibration Control on Construction and Open Sites Part 1: Noise details the 'ABC method', which recommends a construction noise limit based on the existing ambient noise level. General and short-term construction noise impacts that are deemed typical of any construction site noise sources, including activities such as ground preparation, site clearance, foundation earthworks, erection of new buildings, etc. are assessed in accordance with the 'ABC method' defined in BS 5228.

For the proposed flood relief scheme, the ambient noise levels have been determined through the baseline noise survey and then rounded to the nearest 5dB to determine the appropriate category (A, B or C) and subsequent threshold value. A potential significant effect is indicated if the construction noise level exceeds the appropriate category threshold value. If the existing ambient level exceeds the threshold category values, then a potential significant impact is indicated if the total noise level, including both the ambient noise and the various contributions of construction noise, is greater than the ambient noise level by more than 3dB. Table 13-13 reproduced from BS5228, demonstrates the criteria for selection of a noise limit for a specific receiver location.

Table 13-13: Construction noise threshold levels based on the BS 5228 'ABC' method

Assessment Category and Threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A [A]	Category B [B]	Category C [C]
Night time (23.00 to 07.00)	45	50	55

Weekdays evening (19.00–23.00) Saturdays (13.00–23.00) and Sundays (07.00–23.00)	55	60	65
Daytime (07.00 – 19.00) and Saturdays (07.00 - 13.00)	65	70	75

Notes:
Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.
Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.
Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

13.4.1.3 TII Construction Guidelines

There are no national construction noise limit guidelines. Instead, there are indicative levels of acceptability for construction noise, as contained in the National Roads Authority (now Transport Infrastructure Ireland or TII) *"Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes"* (March 2014) and outlined in Table 13-14.

Table 13-14: Maximum permissible noise levels at the façade of dwellings during construction

Days & Times	$L_{Aeq\ (1hr)}$ dB	L_{AMax} dB
Monday to Friday - 07.00 to 19.00	70	80*
Monday to Friday - 19.00 to 22.00	60*	65*
Saturday - 08.00 to 16.30	65	75

Notes:
** Construction activity at these times, other than that required in respect of emergency works, will normally require the explicit permission of the relevant local authority. (Ref. TII Guidelines)*

13.4.1.4 Construction Vibration Guidelines

The relevant guidelines for vibration limits are the following:

- British Standards Institution. British Standard 7385: Evaluation and measurement for vibration in buildings. Part 1: Guide for measurement of vibration and evaluation of their effects on buildings. 1990.
- British Standards Institution. British Standard 7385: Evaluation and measurement for vibration in buildings. Part 2: Guide for damage levels from ground borne vibration. 1993.
- British Standards Institution. British Standard 6472: Guide to evaluation of human exposure to vibration in buildings. Part 1: Vibration sources other than blasting. 2008.
- National Roads Authority (now TII), Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes, March 2014.

Relevant vibration limits and guidelines can be divided into two categories; those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. Higher levels of vibration are typically tolerated for single events or events of short duration such as during construction projects compared to permanent vibration from operational industrial sources. For example, blasting (an instantaneous activity) and piling (a repetitive/continuous activity), two of the primary sources of vibration during construction projects, are typically tolerated at vibration levels up to 12mm/s and 2.5mm/s, respectively.

The TII Guidelines (March 2014) identify limits for protection against cosmetic damage as a function of vibration frequency, and are:

- 8 mm/s (vibration frequency <10Hz)

- 12.5 mm/s (vibration frequency 10 to 50Hz)
- 20 mm/s (vibration frequency >50 Hz).

Guidance relevant to acceptable vibration at the foundation of buildings is contained within BS 7385 (1993): *Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground-borne vibration*. This guidance states that there should typically be no cosmetic damage to buildings if transient vibration does not exceed 15mm/s at low frequencies rising to 20mm/s at 15Hz and 50mm/s at 40Hz and above. These guidelines refer to relatively modern buildings.

13.4.2 Receiving Environment

13.4.2.1 Baseline Noise Survey

A daytime baseline noise monitoring survey was undertaken in proximity to the residential properties close to the proposed works areas at the Owenass Bridge, Manor Grove, Wolfe Tone Street and Grove Park in Mountmellick on 17th October 2023. The noise survey was undertaken in accordance with the methodologies outlined in ISO 1996 Description, measurement and assessment of environmental noise and BS 4142. A Norsonic Nor140 Sound Level Meter (Serial No. 1402988 – Calibration Date – 13/04/2023) was used during the noise monitoring survey. A wind shield was used on the microphone throughout the survey and the sound level meter was calibrated before and after the survey period. The sound level meter was placed at a height of approximately 1.25m at the selected monitoring locations. The noise monitoring survey durations in proximity to the nearest noise sensitive receiver locations were undertaken over consecutive 15-minute periods. The meteorological conditions during the noise survey periods were noted as ideal with no periods of rainfall or higher wind speeds. The weather conditions during the noise survey were noted to be relatively calm with a gentle breeze, a temperature of approximately 14°C and no rainfall.

The purpose of the noise survey was to determine a typical daytime background noise level in the area and the measurement parameters recorded and reported during the baseline noise survey are defined as follows:

- A-weighted Decibel (dBA): Decibels measured on a sound level meter incorporating a frequency weighting (A Weighting) which differentiates between sound of different frequency (pitch) in a similar way to the human ear. This takes account of the fact that the human ear has different sensitivities to sound at different frequencies.
- L_{Aeq} is the A-weighted equivalent continuous steady sound level during the sample period.
- L_{A10} is the A-weighted sound level that is exceeded for 10% of the sample period and is generally used to quantify traffic noise.
- L_{A90} is the A-weighted sound level that is exceeded for 90% of the sample period and is generally used to quantify background noise.
- L_{Amin} is the minimum A-weighted sound level measured during the sample period.
- L_{Amax} is the maximum A-weighted sound level measured during the sample period.

Baseline noise measurements were undertaken in proximity to the representative residential receivers in accordance with ISO 1996: 2016 as shown in Figure 13-3. All noise measurement data was downloaded at the company office, exported from the manufacturer's software and stored as Microsoft Excel spreadsheet files.

Table 13-15: Baseline Noise Levels

Location	Time	L_{Aeq}	L_{AMax}	L_{AMin}	L_{A10}	L_{A90}	Sources
NML 1 – At Owenass Bridge	12:20	57.5	76.1	44.7	59.9	51.6	Traffic on Local Road. Water in river. Birdsong.
	12:50	57.7	75.9	47.1	60.2	52.3	
	13:13	56.6	67.1	39.6	60.1	46.8	

NML 2 – At Manor Grove	13:28	56.6	72.2	39.4	60.1	46.9	Occasional passing traffic in Manor Grove. Traffic on Manor Road.
NML 3 – Off Wolfe Tone Street	13:53	58.8	77.6	43.3	60.1	51.5	Occasional passing traffic on R422.
	14:08	57.7	76.6	43.9	59.9	52.6	
NML 4 – At Grove Park	14:32	49.2	73.4	38.0	50.4	40.1	Very occasional passing traffic in Grove Park. Distant traffic on N80
	14:47	49.5	79.9	38.1	51.6	40.8	

The baseline noise measurement data indicates that Mountmellick is a relatively quiet town with passing traffic on the surrounding road network the dominant noise source.

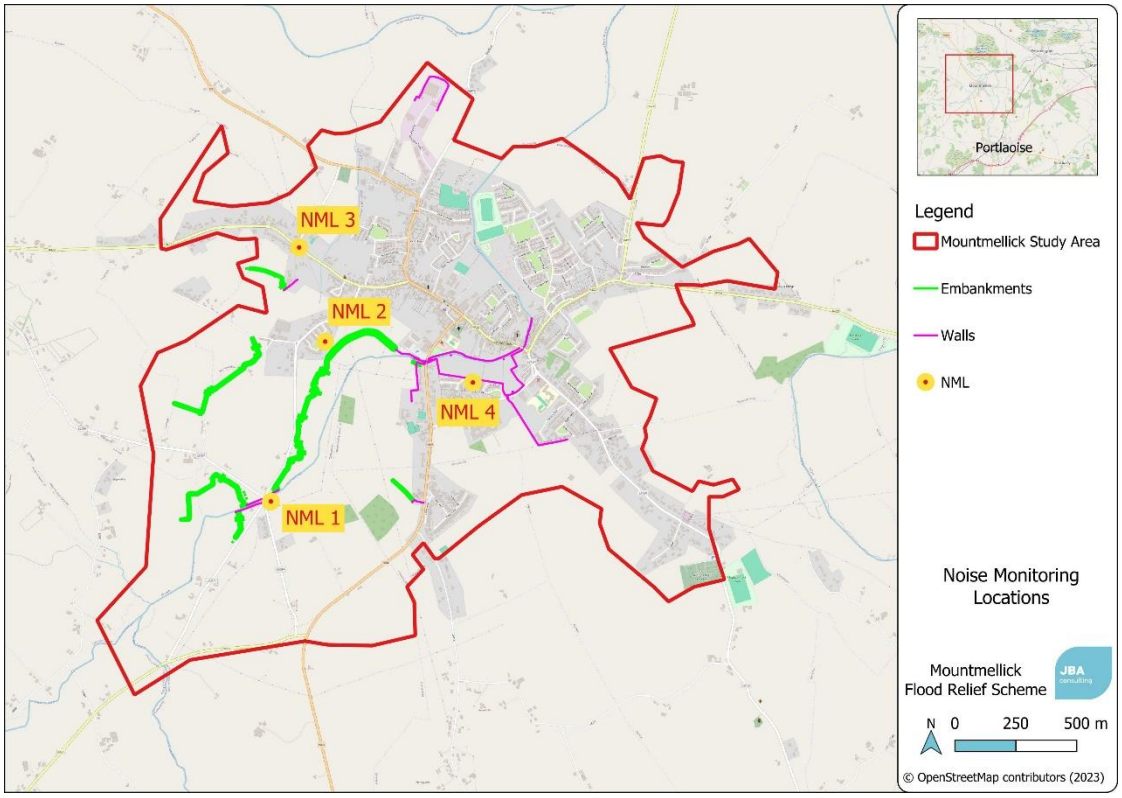


Figure 13-3: Noise Monitoring Locations (NML)

13.4.3 Potential Impact of the Proposed Development

13.4.3.1 Construction Noise Impacts

A full description of all the proposed works can be found in Chapter 4. This section further summarises and assesses the nature of only proposed construction works in each area and the approximate distance to the nearest noise sensitive receivers. No significant difficulties were encountered when preparing this Noise and Vibration impact assessment.

Noise impacts as a result of the construction phase of the proposed flood relief scheme will be perceptible at nearby properties but this will be intermittent and temporary. Construction activities will not take place during night-time hours. The following construction practices have the potential to produce intermittent and temporary noise impacts:

- Site Clearance, Excavation and Embankment Construction - Dozers, tracked excavators and dump trucks;

- Infilling / Levelling – Dozers, excavators, wheeled loaders and rollers;
- Wall removal and construction - Concrete mixer trucks and delivery vehicles;
- General Construction - Masonry wall construction, etc.

It can be expected that HGV vehicle movements may be in the region of 10-15 vehicles per hour during the busiest period of construction works. HGV vehicle movements will be required for bulk excavation works and clay importation for embankment construction. This will generate the most HGV movements during the anticipated dig and replace works and be the busiest construction period.

Construction noise can be assessed in terms of the equivalent continuous sound level and/or in terms of the maximum level. The level of sound in the neighbourhood that arises from a construction site depends on a number of factors and the estimation procedures need to take into account the following significant factors;

- the sound power outputs of processes and plant;
- the periods of operation of processes and plant;
- the distances from sources to receiver;
- the presence of screening by barriers;
- the reflection of sound;
- ground attenuation;
- meteorological conditions (particularly wind speed and direction), and
- atmospheric absorption.

It is most likely that the above outlined construction activities will occur separately throughout periods of construction at each works location. The proposed construction works will not be continuous over the construction period at any one location. By its nature, construction phases of such a proposed development are transient in terms of locations of precise activities on site from time to time. Therefore, the predicted worst-case $L_{Aeq,1\ hour}$ noise levels at specific locations have been outlined to present a worst-case range of noise levels that have the potential to occur at various stages throughout the construction period.

Typical noise levels from construction works likely to take place during construction phase of proposed flood relief scheme are outlined in Table 13-16.

Table 13-16: Typical Noise Levels from Construction Works likely to take place during the construction of proposed development

Ref No.	Equipment	A-weighted sound pressure level, L_{Aeq}, dB @ 10m
Table C.2 Sound level data on site preparation		
Clearing Site & Ground excavation/earthworks		
1	Dozer ж (142 kW, 20T)	75 ж
3	Tracked excavator (102 kW, 22T)	78
12	Dozer (142 kW, 20T)	80
14	Tracked excavator (226 kW, 40T)	79
Loading lorries		
27	Wheeled loader (493 kW)	80
Distribution of material		
30	Dump truck (tipping fill) (306 kW, 29T)	79
31	Dump truck (empty) (306 kW, 29T)	87
Rolling and compaction		

37	Roller (rolling fill) ж	79 ж
Table C.4 Sound level data on general site activities		
Distribution of materials		
1	Articulated dump truck ж	81 ж
Mixing & Pumping concrete		
20	Concrete mixer truck	80
Trenching		
63	Tracked excavator	77
Power for site cabins		
84	Diesel generator	74
Pumping water		
88	Water pump (diesel) (10 kW, 100Kg)	68
Sweeping and dust suppression		
90	Road sweeper (70 kW)	76
91	Dust suppression unit trailer	78
Table C.5 Sound level data on road construction works		
Breaking road surface & concrete		
1	Backhoe mounted hydraulic breaker	88
6	Hand-held pneumatic breaker	95

Notes:
ж Drive-by maximum sound pressure level in L_{Amax} (overall level) (Ref: BS 5228 Noise on Construction and Open sites)

The predicted worst-case construction noise levels at receiver locations within 50m and 100m in proximity to potential future proposed construction works are summarised in Table 13-17.

Table 13-17: Predicted worst-case 1-hour construction noise levels at receiver locations within 50m and 100m in proximity to short-term construction works

Reference	Description	Likely Equipment / Plant expected to be required	Proximity of works to receiver and Predicted Worst-case 1 Hour Noise Level $L_{Aeq/1\ hour}$
1	Midland Steel	1 No. Excavator, 1 No. Dump Truck, 1 No. Dozer, Concrete Mixer Truck & Wall construction	~50m - 63 dB(A) $L_{eq,\ 1\ Hr}$ ~100m - 56 dB(A) $L_{eq,\ 1\ Hr}$
2	Garroon Stream	1 No. Excavator, 1 No. Dump Truck, 1 No. Dozer, Concrete Mixer Truck & Wall construction	~50m - 66 dB(A) $L_{eq,\ 1\ Hr}$ ~100m – 59 dB(A) $L_{eq,\ 1\ Hr}$
3	between Mill Bridge (Pearse Street) and Convent Bridge (Sarsfield Street)	1 No. Excavator, 1 No. Dump Truck, 1 No. Dozer, Concrete Mixer Truck & Wall construction	~50m - 66 dB(A) $L_{eq,\ 1\ Hr}$ ~100m – 59 dB(A) $L_{eq,\ 1\ Hr}$
4	Clontygar Stream	1 No. Excavator, 1 No. Dump Truck, 1 No. Concrete Mixer Truck & Wall construction	~50m – 62 dB(A) $L_{eq,\ 1\ Hr}$ ~100m - 54 dB(A) $L_{eq,\ 1\ Hr}$
5	between Owenass Bridge and Mill Bridge	1 No. Excavator, 1 No. Dump Truck, 1 No. Concrete Mixer Truck & Wall construction	50m - 62 dB(A) $L_{eq,\ 1\ Hr}$ ~100m - 54 dB(A) $L_{eq,\ 1\ Hr}$

6	upstream of Owenass bridge	1 No. Excavator, 1 No. Dump Truck, 1 No. Dozer, Concrete Mixer Truck & Wall construction	~50m - 66 dB(A) $L_{eq, 1 Hr}$ ~100m - 59 dB(A) $L_{eq, 1 Hr}$
7	Irishtown Garden Centre	1 No. Excavator, 1 No. Dump Truck, 1 No. Dozer, Concrete Mixer Truck & Wall construction	~50m - 66 dB(A) $L_{eq, 1 Hr}$ ~100m - 59 dB(A) $L_{eq, 1 Hr}$
8	around Manor House and Manor Road	1 No. Excavator, 1 No. Dump Truck, 1 No. Dozer, Concrete Mixer Truck & Wall construction	~50m - 66 dB(A) $L_{eq, 1 Hr}$ ~100m - 59 dB(A) $L_{eq, 1 Hr}$
9	Downstream of Convent Bridge	1 No. Excavator, 1 No. Dump Truck, 1 No. Dozer, Concrete Mixer Truck & Wall construction	~50m - 63 dB(A) $L_{eq, 1 Hr}$ ~100m - 56 dB(A) $L_{eq, 1 Hr}$

13.4.3.2 Construction Noise Impact Significance

In accordance with the BS 5228-1:2009+A1: 2014 Noise and Vibration Control on Construction and Open Sites Part 1: Noise 'ABC method', the ambient noise levels (rounded to the nearest 5 dB) in the area of the proposed construction works range from 45 - 60 dB $L_{Aeq,T}$ during daytime. As a result, the noise sensitive receivers fall into Category A of the 'ABC' assessment methodology.

It is important to note that construction noise impacts will occur during daytime hours only and will be short-term at each area of construction along the proposed flood relief scheme. Not all construction noise sources will operate at once and construction noise levels are likely to vary throughout the typical working day.

A pragmatic approach needs to be taken when assessing the significance of noise effects of any construction project. The significance of the construction noise from the project has been determined by considering the change in the ambient noise level with the construction noise on-going. BS5228 states that noise levels generated by construction activities are deemed to be significant if the total noise (pre-construction ambient noise level plus construction noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB $L_{Aeq, Period}$, from construction noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant impact. BS5228 also states that for public open space, impact might be deemed to be significant if the total noise (pre-construction ambient plus construction noise) exceeds the pre-construction ambient noise ($L_{Aeq, Period}$) by 5 dB or more for a period of one month or more.

Based on the BS5228 'ABC' assessment methodology, the contractor should aim to limit daytime construction noise to 65 dB $L_{Aeq,12\ Hour}$ at all works areas with the application of appropriate mitigation measures.

Based on the expected short-term duration of works at each location there will be a short-term noise impact at the nearest sensitive receivers to the proposed works. In some of the works areas, the predicted worst-case 1-hour construction noise levels may briefly be in excess of the recommended maximum noise level of 70 dB L_{Aeq} / 80 dB L_{AMax} at the nearest residential properties as outlined by the TII Guidelines (March 2014).

Noise from construction works will fluctuate throughout the course of a typical working day as well as over the course of the construction works being undertaken in any one location. Therefore, the daytime construction noise limit of 65 dB $L_{Aeq,12\ Hour}$ should be achieved at the nearest residential properties. The construction noise impacts will be short-term and will not be significant, as the works are most likely to occur in one area for no more than 1 month.

Appropriate construction mitigation measures outlined below will be implemented as part of the Construction Environmental Management Plan (CEMP).

13.4.3.3 Construction Vibration at Sensitive Receivers

Construction noise and vibration impacts have the potential to occur if piling works are undertaken in very close proximity to sensitive receivers. Piling works are proposed to be required for the Mountmellick FRS project at Convent Bridge and temporary sheet pile cofferdams will be needed in order to create a dry working space at 6 other locations. Therefore, there is potential for a noise and vibration impact at nearby properties. The new flood defence wall will be constructed of reinforced concrete and supported by precast or cast in situ piles with an interconnecting ground beam/ pile cap. This foundation has been specifically designed to mitigate any impact the foundations may have on existing mature trees and ground water cut-off.

The project will include a short-term period of piling works with approximately a 10 day duration for works at Convent Bridge and 1 day estimated per location at the 6 locations where temporary sheet pile cofferdams are required. These temporary sheet pile cofferdams will be needed in order to create a dry working space. Low noise and vibration methods can be used such as using bottom driven mini piling. Vibration due to the bottom driven mini piling method is <1 mm/s when at a distance in excess of 12m-15m from the piling location. This is based on available information which advises that this a low noise and vibration method of piling widely used in urban settings. The nearby residents and occupants of adjacent buildings will be made aware of the period of piling works and therefore, will not experience startle or undue surprise from occasional increased noise and vibration levels.

13.4.3.4 Operational Stage

There are no significant mechanical elements such as removable flood defences proposed in the proposed flood relief scheme. Therefore, there will be no significant operational noise impact.

The operational and maintenance stage of the proposed development has no potential for significant noise and vibration impacts due to the limited nature and type of maintenance activities proposed:

- With the exception of occasional activation of pumps during emergencies and occasional annual maintenance activities such as embankment mowing, which are considered to not have a significant impact on nearby receptors, there will be no operational phase noise emissions from the proposed development.
- There will be no operational phase vibration emissions from the proposed development.

13.4.4 Mitigation Measures

13.4.4.1 Construction Mitigation

Appropriate mitigation measures have been identified to ensure the Construction Phase target noise limits are not exceeded. The contractor will be required to implement the control measures recommended in BS 5228 and apply the appropriate measures where applicable. Other measures will include:

- Working hours during site construction operations will be restricted to daytime hours from 07:30 hours to 16:30 hours (Monday to Friday) and, as may be required, from 08.00 hours to 13.00 hours (Saturdays). Evening and night-time work is not expected to take place although it is possible that limited 24-hour working may be required to take place on occasion. This will only take place with the prior agreement of Laois County Council.
- An on-site speed limit will be enforced for all traffic. Drivers of vehicles will be advised of the speed limits through the erection of signs *i.e*. a typically recommended on-site speed limit is 10 km/hr.
- Where practicable, the use of quiet working methods and the most suitable plant will be selected for each activity having due regard to the need for noise control.
- Best practicable means will be employed to minimise noise emissions and will comply with the general recommendations of BS 5228. To this end operators will use "*noise reduced*" plant and/or will modify their construction methods so that noisy plant is unnecessary.
- By positioning potentially noisy plant as far as possible from noise sensitive receivers the transmission of sound can be minimised. Earth mounds and/or stockpiles of material or perimeter hoarding on site can be used as a physical barrier between the source and the receiver.

- Mechanical plant used on site will be fitted with effective exhaust silencers. Vehicle reverse alarms will be silenced appropriately in order to minimise noise breakout from the site while still maintaining their effectiveness.
- All plant will be maintained in good working order. Where practicable, machines will be operated at low speeds and will be shut down when not in use.
- Compressors will be of the "noise reduced" variety and fitted with properly lined and sealed acoustic covers.
- In all cases engine and/or machinery covers will be closed whenever the machines or engines are in use.
- All pneumatic percussive tools will be fitted with mufflers or silencers as recommended by the equipment manufacturers. Where practicable, all mechanical static plant will be enclosed by acoustic sheds or screens.
- Employees working on the site will be informed about the requirement to minimise noise and will undergo training on the following aspects:
    - The proper use and maintenance of tools and equipment.
    - The positioning of machinery on-site to reduce the emission of noise to the noise sensitive receivers.
    - Avoidance of unnecessary noise when carrying out manual operations and when operating plant and equipment.
    - The use and maintenance of sound reduction equipment fitted to power pressure tools and machines.
- Cognisance will also be taken of the *Environmental good practice site guide* 2005 compiled by CIRIA and the UK Environment Agency. This guide provides useful and practical information regarding the control of noise at construction sites.
- Where excessive noise levels are recorded, further mitigation measures will be employed which may include temporary wooden hoarding / acoustic screening to be installed to a height of no less than 2m around areas of construction where loud noise levels occur.
- The contractor will ensure that the TII Guidelines which identify limits for protection against cosmetic damage as a function of vibration frequency are not exceeded through the use of the selected low vibration piling method.
- Responsible Person –The Contractor will appoint a responsible and trained person who will be present on site and who will be willing to answer and act upon complaints and queries from the local public.
- Night-time Working - If there are items of plant (*e.g.* dewatering pumps and similar) in use during night-time hours they will be chosen, sited and enclosed such that levels at the nearest properties do not exceed the measured background noise levels.

13.4.4.2 Monitoring

Where deemed necessary due to excessive impact or complaints received, noise monitoring will be undertaken during construction works to determine noise levels at noise sensitive receivers. On the basis of the findings of such noise monitoring, appropriate noise mitigation measures will be implemented to reduce noise impacts.

13.4.4.3 Operational Mitigation

The proposed flood relief scheme will not result in an operational noise impact. Therefore, no operational mitigation measures are deemed necessary.

13.4.5 Residual Impacts

The assessment of construction noise impacts from the proposed flood relief scheme has indicated that construction noise limit criteria may be exceeded at the nearest residential properties for short periods during daytime. This may occur on occasions when heavy construction activity occurs in close proximity to noise sensitive receivers. Noise from construction works will fluctuate throughout the course of a typical working day as well as over the course of the construction works being undertaken in any one location. Therefore, the daytime construction noise limit of 65 dB $L_{Aeq,12\ Hour}$ should be achieved at the nearest residential properties. The construction noise impacts will be short-term and will not be significant. Also, while the

overall construction activities for the proposed flood relief scheme will occur over several months, the nature of the proposed works and its duration at any one location will mean that noise sensitive receivers will not be exposed to continuous construction noise impact during the construction period.

Once the above mitigation measures have been implemented, the residual impacts from the development will not be significant

13.4.6 Interactions and Potential Cumulative Impacts

13.4.6.1 Interactions

Appropriate construction phase mitigation measures have been outlined to ensure that the potential impact on the human receivers and the Owenass River, which is a part of the River Barrow and River Nore Special Area of Conservation (SAC) (Site Code: 002162), will be negligible. Therefore, the noise and vibration impact in combination with other environmental effects e.g. direct loss of habitat, pollution, etc will result in an **Imperceptible** effect on the River Barrow and River Nore SAC and any other habitats of significance.

The proposed vehicular movements and construction machinery during the construction phase has the potential to give rise to noise impacts, potentially giving rise to impacts on humans and fauna. Potential interactive Adverse impacts have been identified in Chapter 14, and a full suite of appropriate mitigation measures have been included in the relevant sections of the EIAR.

13.4.6.2 Potential Cumulative Impacts

In relation to the in combination construction and/or operational impact of the proposed Mountmellick Flood Relief Scheme, with other proposed schemes planned in the area, the list of schemes noted in Chapter 15 have been reviewed. None of these schemes will result in any significant additional construction and/or operational noise and vibration impacts

14 Interactions

14.1 Introduction

The EIA Directive (2014/52/EU) requires a description of:

> '*the interaction between any of the foregoing aspects'.*

Interactions can occur when a predicted impact causes interaction or dependency with other environmental aspects. This section discusses the interactions between aspects and assesses them as positive, Adverse or neutral (as having no interaction or interdependency).

The interactions of environmental effects were considered throughout the design development for the proposed flood relief scheme and adjustment were made to the design of the layout to mitigate impacts arising from these interactions. Interactions between certain environmental aspects are illustrated in Table 14-1 and discussed in the sections below.

Table 14-1: Interactions between environmental aspects and significance of impacts

Interaction	Population and Human Health		Biodiversity		Land and Soil		Water		Cultural Heritage		LVIA		Material Assets		Air Quality and Dust		Climate		Noise and Vibration	
	Con	Op.	Con	Op.	Con	Op.	Con	Op.	Con	Op.	Con	Op.	Con	Op.	Con	Op.	Con	Op.	Con	Op.
Population and Human Health			✗	✗	✗	✗	✓ to ✓	✗	✗	✗	✗	✗	✓	✗	✓	✗	✗	✗	✓	✗
Biodiversity					✓	✗	✓ to ✓	✗	✗	✗	✓	✗	✗	✗	✓	✗	✗	✗	✓	✗
Land and Soil							✓	✗	✗	✗	✗	✗	✓	✗	✓	✗	✓ to ✓	✗	✗	✗
Water									✗	✗	✗	✗	✓	✗	✗	✗	✗	✗	✗	✗
Cultural Heritage											✓	✗	✗	✗	✗	✗	✗	✗	✗	✗
LVIA													✗	✗	✗	✗	✗	✗	✗	✗
Material Assets															✗	✗	✗	✗	✗	✗
Air Quality and Dust																	✗	✗	✗	✗
Climate																			✗	✗
Noise and Vibration																				

Con.	Construction Phase	✖	No Interaction	✓	Imperceptible
Op.	Operational Phase	✓	Not Significant	✓	Slight

Figure 14-1: Key to show interactions and significance of residual adverse impacts between environmental aspects

14.2 Population and Human Health – Water

Water is discussed in Chapter 9: Impacts to water quality could Adversely interact with population and human health, due to either impacts to drinking water, or the amenity value of the watercourses in the town, principally the Owenass. Adverse interactions with population and human health are not expected to occur, due to the mitigation measures to be put in place for the protection of water, and residual impacts to water being **Temporary, Slight, Adverse** to **Imperceptible**

14.3 Population and Human Health – Material assets

Material Assets are discussed in Chapter 12: Impacts to material assets, in particular to utilities or roads, traffic, and transport, could lead to interactions with population and human health if significant or allowed to go on for a long time. This is unlikely to occur given the nature of the proposed works and likely short length of disruptions to utilities. Impacts on population and human health due to material assets impacts are likely to be **Slight, Temporary, Adverse**.

14.4 Population and Human Health - Air quality Dust, Noise and Vibration

Air quality, Noise and Vibration are discussed in Chapter 13: Excessive noise or vibration during construction can cause disturbance to human health to residents in Mountmellick or the surrounding area. Mitigation measures outlined in the Construction Impacts chapter will ensure that the impact of noise and vibration on population and human health will **Not Significant, Temporary, Adverse**.

14.5 Land and Soil - Water

Soils and geology share direct links with groundwater and surface water. Soil quality and characteristics such as granularity, pore space, moisture content and texture have effects on the rate of groundwater recharge, infiltration, percolation, transmissivity, and run-off. Similarly, surface water run-off can affect soil quality and condition through deposition or withdrawal of chemicals, suspended solids, and nutrients. Proposed flood relief measures are located at downstream points along the Owenass River, the Garron and the Clontygar Streams. These waterbodies have a Moderate water quality status for the last WFD reporting period (2016-2021). All waterbodies in the area of proposed works are also ‘At Risk’ of failing to meet WFD objectives. It is therefore imperative that proposed flood measures do not cause a reduction in water quality status.

Effects arising from surface water run-off are further discussed in Chapter 9 of this EIAR. Without mitigation, the interaction between effects on Hydrology and Soils and Geology could result in a **Short-term, Significant, Adverse** effect. Through implementation of mitigation measures outlined in this chapter and Chapter 9 of the EIAR, the potential impact through interaction is reduced to **Short-term, Slight, Adverse**.

14.6 Land and Soil - Biodiversity

Interactions between soils, geology, and biodiversity can occur through surface, groundwater, and air pathways. The proximity of the River Barrow and River Nore SAC poses a significant risk for the entry of contaminants via surface water run-off, dewatered groundwater, and soil erosion. Introduction of contaminants and suspended solids could lead to habitat degradation.

Without the implementation of mitigation measures outlined in this chapter and Chapter 7, potential impacts through interaction would be **Short-term, Significant, Adverse**. With the implementation of appropriate mitigation measures, these combined effects would be reduced to **Short-term, Imperceptible, Adverse.**

14.7 Land and Soil - Material Assets

A large proportion of proposed flood relief measures and site compounds are proposed in urban areas adjacent to houses or along roads. The temporary use of public roads and private lands will be required during the construction phase. Access to private properties will require appropriate liaison with owners. Diversions, temporary disruptions and increased traffic volume are anticipated given the estimated 4,286 number of truck movements required for the movement of materials.

No new storm water sewers or drains will be installed as part of the works and appropriate protection and mitigation measures will be implemented for existing services in the vicinity of any of the proposed works. It is likely that there will be interaction with utility networks such as ESB substations and networks, underground and overhead electric cables and masts, sewer networks, and streetlights which fall within the footprint of works proposed across the proposed development area. Without mitigation, the resulting interaction effects could be **Short-term, Significant, Adverse**. Through the implementation of appropriate mitigation measures these effects will be **Short-term, Imperceptible, Neutral**.

14.8 Land and Soil - Climate

Works where excavation of soil is proposed occur in areas of seasonal waterlogging and peat. Anaerobic conditions in soils can lead to an increase in carbon dioxide. Excavation of between 56,000 m^3 and 77,000m^3 of material across the scheme area will release sequestered carbon increasing greenhouse gas levels in the air. These effects are further discussed in Chapter 13. The interaction of these effects will be **Long-term, Imperceptible, Not Significant.**

14.9 Water – Biodiversity

Water and Biodiversity, discussed in Chapter 7: The River Owenass through Mountmellick is part of the River Barrow And River Nore SAC, which is valuable habitat for a number of significant and protected species. Impacts on waterbodies are related to the ability of the physical habitat conditions and water quality to support aquatic species. Provided that mitigation measures are followed closely during the construction phase of the scheme in particular the recommendations from consultation with stakeholders, the impact on Biodiversity will be reduced to **Temporary, Slight, Adverse** to **Imperceptible.**

14.10 Landscape and Visual Amenity – Biodiversity

Elements of nature and biodiversity are often defining landscape features and contribute to landscape value and visual amenity. The Owenass River is an important natural amenity in Mountmellick where a significant proportion of the proposed works will take place.

Tree removal and vegetation clearance, particularly in riparian areas could have Adverse effects for both visual amenity and landscape and biodiversity which is fully discussed in Chapter 7. Mitigation measures outlined in Chapter 7 such as the use of root protection zones, transitional planting around culverts and

remedial tree planting will help to mitigate residual impacts on visual amenity and landscape and biodiversity to a **Permanent, Slight, Adverse** level.

14.11 Landscape and Visual Amenity - Cultural Heritage

Parts of Mountmellick will be altered by the proposed Flood Relief Scheme. This will lead to effects on cultural heritage, discussed in Chapter 10. The construction of flood walls between Mill Bridge and Convent Bridge and the replacement of Owenass Bridge will impact the setting of these locations and their views of the Owenass River and surrounding landscape. The proposed flood walls will incorporate stone from the existing walls or of a similar type where appropriate, reducing these Adverse impacts on setting and visual amenity. The recommendations from the project Conservation Engineer will also ensure the proposed walls assimilate with the heritage setting. The interaction between landscape and visual amenity and cultural heritage will be **Permanent, Slight, Adverse**.

14.12 Material Assets – Water

Water, discussed in Chapter 9: Impacts to material assets are linked with impacts on water quality and quantity. Mitigation measures outlined in this chapter and in Chapter 9 will ensure that the interaction of these impacts is **Not Significant, Temporary, Adverse**.

14.13 Air Quality and Dust – Biodiversity

Earthworks during the construction phase has the potential to give rise to dust impacts, potentially giving rise to water pollution and impacts on flora and fauna. As the proposed works will be undertaken near in the Near Barrow and River Nore SAC, the sensitivity of the Area to Ecological Impacts is High. Appropriate construction phase mitigation measures, provided in Chapter 7 have been outlined to ensure that the potential impact on the human receivers and the Owenass River, which is a part of the River Barrow and River Nore Special Area of Conservation (SAC) (Site Code: 002162), will be **Imperceptible, Temporary, Adverse**.

15 Cumulative Impacts

15.1 Introduction

This chapter provides a summary of the potential cumulative effects assessed throughout this EIAR. The cumulative effects of the proposed development in combination with other relevant existing, planned and permitted projects have been assessed to determine whether these would give rise to significant effects on the environment.

Any predicted cumulative effects arising from the proposed development in combination with other existing, planned and permitted projects are set out in the various chapters throughout this EIAR. Figure 15-1 and Table 15-1 below provide summary details of the projects/developments that have the potential to impact resources, traffic, or the local area, and so could have potential cumulative effects with the proposed flood relief scheme.

Only those projects whose duration of permission overlaps with the likely construction period of the proposed development (i.e., 2025 onwards) are included. Small developments such as house extensions and alterations, or the construction of a single dwelling or structure, have been excluded as the likely effects of such developments will not be significant, except where they are taking place adjacent to or in close proximity to the proposed defences.

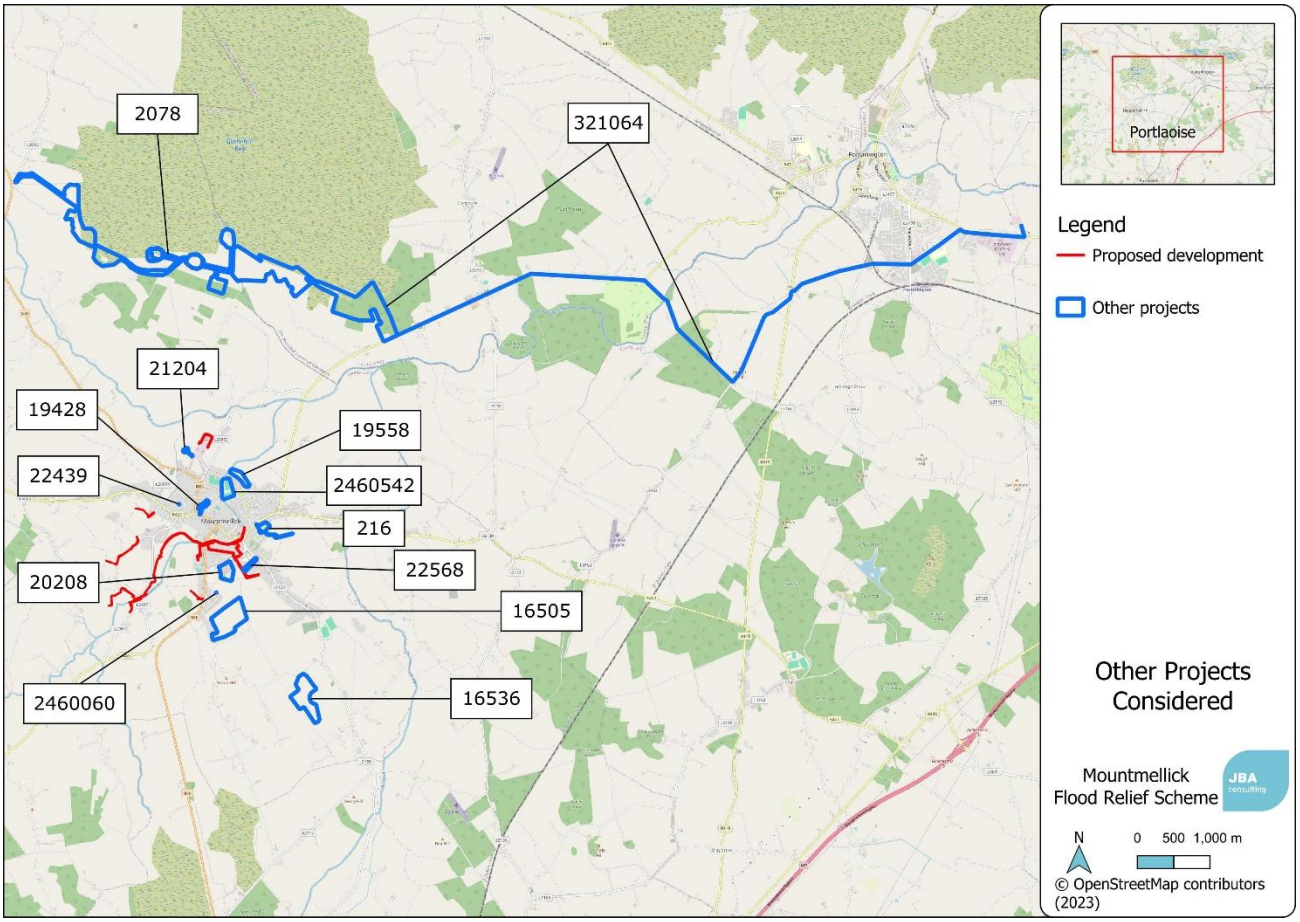


Figure 15-1: Other projects considered

Table 15-1: List of projects considered for Cumulative Effects

Project name or Reg. Ref.	Location	Description	Status
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.	Application under Appeal dated 17-10-2024 previously refused by ABP on 13-09-2023
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
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
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
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.
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
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
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 and footpaths onto Grange Hall. Continue the	Approved 25/01/2022. Expires 15/12/2027

		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.
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 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.	Permission refused 30/04/2021. Approved by ABP 03/01/2024. Expires 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.	Decision will be granted 11/11/2024.
321064	Townlands Barranaghs, Garryhinch, Annamore in County Offaly and Forest Lower,	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.

	Coolnavarnoga, Coolaghy, Kilbride, Ballymorris, Cooltederry and Bracklone Co. Laois.		

15.2 Air Quality and Dust

In relation to the in-combination construction and/or operational impact of the proposed Mountmellick Flood Relief Scheme, with other proposed schemes planned in the area, the list of schemes in Table 15-1 have been reviewed.

In section 13.2.5 Mitigation Measures above it states:

If applicable, hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.

A list of projects presented in Chapter 15, Figure 15-1 and Table 15-1, within 500m from the proposed Mountmellick Flood Relief Scheme were considered. It is possible that the construction phases of the following developments may overlap with the construction phase of the proposed FRS. If the construction periods of these developments overlap with the proposed FRS, there is a potential to impact on air quality in the area. These developments could be considered medium/high risk sites, therefore regular liaison meetings should be held to ensure plans are co-ordinated and dust and particulate matter emissions are minimised.

These developments are required to make suitable provision for dust minimisation during construction works in accordance with their own planning conditions.

- Planning Ref: 19558
- Planning Ref: 19428
- Planning Ref: 22439
- Planning Ref: 216
- Planning Ref: 22568
- Planning Ref: 16505

With the mitigation measures outlined in Chapter 13 in place, significant cumulative impacts on air quality are not expected to occur.

15.3 Climate

The construction machinery and processes have the potential to give rise to Greenhouse Gas Emissions due to the construction phase of the proposed development as predicted using the TII Carbon Tool. In relation to the in-combination construction and/or operational impact of the proposed Mountmellick Flood Relief Scheme, with other proposed schemes planned in the area, the list of schemes noted in Chapter 15 have been reviewed. None of these schemes will result in any significant additional climate impact.

15.4 Noise and Vibration

In relation to the in-combination construction and/or operational impact of the proposed Mountmellick Flood Relief Scheme, with other proposed schemes planned in the area, the list of schemes noted in Chapter 15 have been reviewed. None of these schemes will result in any significant additional construction and/or operational noise and vibration impacts.

15.5 Population and Human Health

If the construction phases of developments listed in Table 15-1 coincide with the construction phase of the proposed development then there is the potential for cumulative impacts arising from the presence of widespread construction works, disruptions, and diversions throughout the town and surrounding areas.

These effects will be temporary and not significant given the size and nature of other developments in Mountmellick.

Once operational, the proposed FRS, when considered cumulatively with the above developments, will have a positive impact on population and human health.

15.6 Biodiversity

The list of projects in Table 15-1 was consulted for potential cumulative effects. None of their associated Environmental reports indicate significant cumulative effects to biodiversity.

15.7 Land and Soil

The list of projects in Table 15-1 was consulted for potential cumulative effects. The proposed FRS is not expected to lead to significant cumulative impacts on land and soils with other proposed or in-progress developments.

15.8 Water

The list of projects in Table 15-1 was consulted for potential cumulative effects. The proposed FRS is not expected to lead to significant cumulative impacts on water with other proposed or in-progress developments.

15.9 Material Assets

15.9.1 Roads, Traffic, and Transport

The list of projects outlined in Table 12-1 has been consulted; no significant Adverse impacts on traffic are expected.

Application Ref. 2078 for the construction of a wind farm north of Mountmellick was accompanied by an EIAR and Turbine Delivery Route Report. The EIAR for the wind farm concluded that impacts on traffic will not be significant. The route for turbine delivery does not pass through Mountmellick or the scheme area, and delivery is to be carried out overnight in a single movement, i.e., not during the proposed FRS working hours. Therefore, no cumulative impacts are expected.

Application Ref. 321064 for the construction of a 110kV substation and 10.85km of 110kV underground electrical cabling may cause Adverse impacts if the construction works along the R423 overlap with Phase 1 construction of the Mountmellick Flood Relief Scheme. This Phase will be based on the eastern side of Mountmellick town and construction traffic will access site compounds using the R423. Phase 1 is expected to last 12 months.

Other developments in the area are either small enough or in an area which will not result in significant impacts on traffic. Cumulative impacts are therefore not expected.

15.9.2 Utilities

The connection of services to the above developments would cause additional disruption to the residents of Mountmellick in addition to disruption already discussed from the proposed flood relief scheme if it was to occur simultaneously. Based on the expected impacts, any cumulative effect is not likely to be significant.

15.9.3 Waste

Waste generated from the demolition of the existing building at Davitt Road will cause a slight impact, in addition to the excavation material generated from the flood relief scheme to be sent to a soil transfer facility. No other cumulative impacts with regard to waste are expected.

15.10 Cultural Heritage

No potential cumulative impacts were identified with regard to cultural heritage.

15.11 Landscape and Visual Impact

The projects considered for potential cumulative effects with the proposed development are listed in Table 15-1. These projects were considered and assessed in terms of their potential impact on landscape and visual amenity and their potential to be experienced cumulatively with the proposed development.

It is possible that the construction period of the proposed development will overlap with that of several developments in Mountmellick. This would result in a **Temporary, Slight, Adverse** cumulative effect, for the duration of the overlapping construction period. A significant impact would not occur in this scenario.

Due to the nature of the proposed development and the nature of the projects listed in Table 15-1, cumulative effects during the operational phase are expected to be **Imperceptible**.

15.12 Summary

Potential cumulate impacts may arise for Roads, Traffic and Transport for one project listed below:

- Planning Ref. 321064

Adverse impacts if the construction works along the R423 overlap with Phase 1 construction of the Mountmellick Flood Relief Scheme. This Phase will be based on the eastern side of Mountmellick town and construction traffic will access site compounds using the R423. Phase 1 is expected to last 12-18 months.

Potential cumulate impacts also may arise for Air Quality and Dust for project listed below which are close to the proposed flood defence sites:

- Planning Ref: 19558
- Planning Ref: 19428
- Planning Ref: 22439
- Planning Ref: 216
- Planning Ref: 22568
- Planning Ref: 16505

Mitigation measures propose regular liaison meetings with other high risk construction sites. The aim of these is to ensure that plans are coordinated, and dust and particulate matter are minimised.

16 Schedule of Mitigation

Table 16-1 provides a summary of the mitigation measures identified in each of the chapters of the EIAR. It is recommended that the proposed mitigation measures be incorporated into a site-specific Construction Environmental Management Plan by the proposed contractor and developed prior to construction.

Table 16-1: Summary of mitigation measures

Phase	Mitigation
Chapter 6. Population and Human Health	
Construction	1. Final proposal design will be subject to safety design reviews. A Project Supervisor for the Design Process (PSDS) will be appointed as part of this process; 2. Temporary contractor facilities and areas under construction will be enclosed and fenced off from the public with adequate warning signs of the risks. Entry will be restricted and kept secure when construction is not taking place;
Operational	3. Repairs will be made as necessary. 4. Guarding heights will be at 1.2m along flood defence walls and embankments will be sloped gently.
Chapter 7. Biodiversity	
Construction	**Standard Environmental Practice** 5. Activities required for the proposed development's construction phase will remain within boundary of the proposed site, bar select compound areas, which will be located in adjacent lands. 6. Environmental Clerk of Works (ECoW) will be appointed by Contractor. For roles and responsibilities of ECoW refer to Section 4.4 of Construction Environmental Management Plan (CEMP). 7. Project Ecologist will be appointed by Laois County Council. For roles and responsibilities of Project Ecologist refer to Section 4.5 of CEMP.
Construction	**Environmental Management of Site Compounds** 8. Site compounds will not be located within core foraging areas utilised by QI or other protected species. 9. Only plant and materials necessary for construction of the works will be permitted to be stored at compound location. 10. Site establishment will include the following: ▪ Site offices. ▪ Site facilities (canteen, toilets, drying rooms, etc.). ▪ 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. 11. All sub-contractors will be given induction toolbox talk. 12. Construction materials within the compound will be stored in a designated area in an organised manner.

	13. The Contractor will maintain all training records and carry out weekly environmental inspections. 14. Drainage collection system for washing area to prevent run-off into surface water system will be agreed with Project Ecologist and monitored by ECoW. 15. Stockpiling of spoil and spoil-like materials will be located within the compounds. 16. All refuelling of vehicles will be carried out at fuel stores within the main site compound and only ADR trained personnel will be permitted to operate fuel bowsers.
Construction	**Surface Water Management Plan** 17. Oil booms and oil soakage pads will be maintained on-site. These will be disposed of correctly and records will be maintained by environmental manager of the used booms and pads taken off site for disposal. 18. Management of silt-laden water on-site, including procedures for accidental leaks / spills to ground, as well as water quality monitoring will be carried out. 19. Treated water will not be discharged to local surface water network without water quality meeting statutory limits. 20. Fail-safe site drainage and bunding through drip trays on plant and machinery will be provided. 21. Oil booms will be on hand when construction activities are located beside aquatic habitats. 22. Washout of concrete plant will occur at a designated impermeable area with waste control facilities. 23. Pre-cast concrete bridge features will be utilised. 24. Construction methodologies relating to concrete delivery and concrete pours will be agreed between Project Ecologist and Contractor. Project Ecologist will be present to oversee pours within the SAC and adjacent to the watercourses that flow into the SAC. 25. Temporary stockpiles will be monitored for leachate generation. Stockpiles will be placed within designated areas and not located within vicinity of watercourses, wetlands, or artificial surface water drainage features. 26. Excavated contaminated soils will be segregated and securely stored in a designated area where possibility of runoff or infiltration to ground/surface water drainage has been eliminated through bunding and imperviable geotextile linings. Contaminated soils will then be classified as clean, inert, non-hazardous, or hazardous. No cross-contamination with clean soils will happen elsewhere throughout the development site. 27. Silt fencing will be installed prior to any construction works. Shallow interceptor trenches will be installed in front of these silt fences. The Project Ecologist will be present during the installation of these protective measures. 28. Silt fences will be repaired and/or replaced as necessary.
Construction	**Pollution Control Plan** 29. Hydrotreated Vegetable Oil (HVO) to be used where possible. 30. No refuelling of machinery within or near the river channel. Refuelling will take place at designated locations at distances of greater than 10 metres from the watercourse. 31. No vehicles will be left unattended when refuelling and a spill kit including an oil containment boom and absorbent pads will be on site at all times. 32. Regular inspections and maintenance of plant and machinery checking for leaks, damage or vandalism will be made on all plant and equipment.

	33. Emergency response awareness training will be carried out for all site-based staff. 34. Appropriate and sufficient spill control materials will be installed at strategic locations within the site. Spills kits for immediate use will be kept in the cab of mobile equipment. 35. Spill kits must include suitable spill control materials to deal with the type of spillage that may occur and where it may occur. Typical contents of an on-site spill kit will include the following as a minimum: ▪ Absorbent granules ▪ Absorbent mats/cushions ▪ Absorbent booms ▪ Track-mats, geotextile material and drain covers. 36. All used spill materials e.g., Absorbent pads, will be placed in a bunded container in the contractor's compound. Material will be disposed of by a licenced waste contractor at a licenced facility. Records will be maintained by environmental site manager. 37. All potentially polluting substances such as oils and chemicals used during construction will be stored in containers clearly labelled and stored with suitable precautionary measures such as bunding within site compound. 38. All tank and drum storage areas on the site will be bunded to a volume not less than the following: ▪ 110% of the capacity of the largest tank or drum within the bunded area, or ▪ 25% of the total volume of substances which could be stored within the bunded area. 39. All hydrocarbons to be utilised during construction are to be appropriately handled, stored, and disposed of. 40. The site compound fuel storage areas and cleaning areas will be rendered impervious and will be constructed to ensure no discharges will cause pollution to surface or ground waters. 41. Damaged or leaking containers will be removed from use and replaced immediately.
Construction	**Dust Management Plan** 42. Breaking of topsoil/earth stripping will be minimised during dry and windy weather where possible. 43. 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. 44. Pre-cast concrete features will minimise generation of concrete-based dusts. 45. 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.
Construction	**Concrete Management Procedures** 46. Pre-cast concrete features will minimise risk of concrete-based pollution event. 47. Washout of concrete plant will occur off site at a designated impermeable area with waste control facilities. 48. Raw, uncured, or waste concrete will be stored appropriately prior to disposal by licenced contractor. 49. Construction methodology will require use of precast elements; secondary protection shuttering for concrete pours; all pours to be carried out in dry weather conditions; and all trucks be cleaned prior to leaving depots. 50. Contractor will use experienced operators for work; provide continuous monitoring during any concrete pours by experienced management; and have method statements approved by client prior to commencing works.

Construction	**Construction of the Walls** *Bankside Construction* 51. When demolishing an existing wall, a light silt fence with shallow stakes will be placed between existing wall and adjacent habitats (woodlands or rivers). Fence will be lined with terram/geotextile material which will be held down with geotextile sandbags. Fence will be reinforced with geotextile sandbags to rear. Silt fence will sit on surface of adjacent habitats and can be manoeuvred around vegetation. 52. After wall is demolished/disassembled, excavations for the new wall foundations will be constructed. Once this work is complete, any sand and silt build up in silt fencing will be removed in direction away from adjacent habitats. Any silt will be disposed away from watercourses. 53. Protection of water from cement leachate: excavated space to facilitate wall foundations will be lined with an impermeable geotextile to create a buffer between any works involving concrete/cement. Once area is lined the foundation and wall will be constructed. 54. Once wall is constructed the silt fencing will be removed by hand, with silt fencing transported out of the area by wheelbarrow. Alternatively, silt fencing can be placed in a container and lifted over the wall using machinery placed on the opposite site of vulnerable habitats.
Construction	**In-Stream Works** 55. Water diverted to facilitate in-stream works will be achieved through stream diversion. These will be required during 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. *River Pumping During Dry Cell Works* 56. All stages of dry cell works or stream diversion will be overseen by Project Ecologist who will monitor all stages of in-stream works, with regular reporting to IFI and Laois Heritage Officer. 57. Habitat connectivity will be retained during the proposed works. 58. A three-side coffer dam will be used to facilitate works. 59. If in-stream works require dry celling of sections of the stream width to create a dry bed for construction works, river connectivity will be maintained and water pumping avoided. 60. Requirement for electrofishing will be assessed by IFI in association with Project Ecologist. Electrofishing will require licensing (obtained by the electrofishing specialist) and AA Screening (produced by the Project Ecologist). *Coffer Dam – Installation of Sheet Piling; Cement Pours* 61. Presence of Project Ecologist will be required during the installation of the sheet piling within the stream. 62. Dewatering of coffer dam and/or dry cell area will require installation of sheet pilings between the bank and the area of works. Electrofishing will be undertaken by an electrofishing specialist for the removal of fish / lamprey will be from these areas prior

	to the dewatering process. Water will be introduced back into river after suspended sediment has settled and/or filtered from water. This will be approved by IFI where instream works are occurring and monitored by the Project Ecologist. 63. One approved method is pumping water into a created settling pond more than 30m from river, slowly spilling the water through silt bag traps into a discharge point located on the edge of river. 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 dry cell area will settle within the settling pond and then filter through a silt bag, straw bales, and silt fences before diffusely discharging back into the river. 64. Another method is implementation of a combination of sedimentation tanks, silt bags and percolation areas. 65. Discharge points will be constructed prior to commencement of construction works and will be monitored on a daily basis when in use. Works will be scheduled for a dry weather period. Should any aquatic fauna enter dewatering system or become trapped in dry cell area, Project Ecologist will secure them and ensure their safe return to the River Owenass. 66. Project Ecologist will be present during any phase which involves pouring of concrete within 10m of all waterbodies. Project Ecologist will recommend works cease if they are not satisfied the appropriate mitigation measures have been put in place. 67. Monitoring of noise and vibration will be required by the contractors ECoW to mitigate impacts to nearby sensitive receptors. 68. All instream works will be conducted between July and September.
Construction	**Deconstruction and Reconstruction of Owenass Bridge** 69. Deconstruction/reconstruction of the Owenass Bridge will occur outside of main fish spawning season. 70. Given salmonid spawning areas are located downstream of bridge, dewatering of channel is to be done in halves, with one half of channel dewatered at a time, while other half is allowed to flow naturally: 71. Deconstruction of the bridge as follows; 1. Install instream temporary works to support the bridge arch during demolition. 2. Introduce scaffolding to support bridge. 3. Install cofferdam sheet pile on a stage basis to segregate works area from river to facilitate demolition of existing bridge abutments. 4. Electrofishing carried out during dewatering process for coffer dams, will require licensing and AA Screening. Only after dewatering has taken place can demolition of the existing bridge abutments take place. 5. Dismantle bridge arch, commencing by breaking down the top of the arch first and moving towards the side, retaining falling debris with temporary structure. 6. Demolition of the existing bridge abutments will take place within dry working space. 72. Dry cell will be removed and river will be allowed to flow again, before steps 1-6 are to be repeated for demolition of the second half of the bridge. 73. Construction of the bridge will require instatement of cofferdam and dry cells. Construction new bridge will commence by installation of new bridge abutments along the banks of river. Bridge will consist of two pre-cast concrete arches. Instream works may be required to guide the installation of concrete arches. 74. The operation of machinery for steps listed above will be kept to a minimum. All required machinery will be steam cleaned and checked for leaks prior to commencement of in-stream works.

Construction	**Fish** 75. Fish salvage and translocation works will be undertaken by the electrofishing specialist in advance of dewatering. 76. If fish become entrapped during the works, they will be removed by the Project Ecologist. 77. Lamprey in fine sediment along the banks will require translocation. 78. To successfully translocate fish (and lamprey ammocoetes), criteria below will be followed: ▪ Work will be conducted by an electrofishing team led by a qualified aquatic ecologist and/or ECoW under licence. ▪ Precise location of proposed piling must be communicated with electrofishing lead who will conduct translocation work in tandem with the piling efforts. Stop nets reaching to river bottom will be erected around affected areas. ▪ Electrofishing lead will assess substrate conditions to determine if appropriate habitat is present by 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 removed using a dip net 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, they will be returned to the river as soon as they are caught. Others caught during fishing efforts will be moved to an aeration system before being transported to section of River Owenass with appropriate habitat. Fish will not be kept within aeration system for more than two hours. ▪ Fishing efforts will continue until there is successive efforts with no catch return. ▪ Works will not take place if water temperature exceeds 20°C to avoid thermal stress in fish. If a significant level of stress/mortality is observed, fishing efforts will be suspended.
Construction	**Culvert and Headwall Design** 79. Culverts within the Scheme must meet the following criteria: ▪ A maximum gradient of 3-5%. ▪ Positioned so that both upstream and downstream invert will be 500mm below upstream and downstream riverbed invert levels respectively. ▪ Piped culverts will be avoided, with inverted U-shape/box culverts preferred option. If piped culvert is only option at detailed design, IFI must be consulted in advance of works, and piped culvert must be buried deeper than bed level. ▪ Pools will be formed at each end of culvert to provide transition from the shape of the opening to the river downstream. Pools will be built in natural rock and designed to provide take-off conditions for upstream migrants entering/leaving the culvert. ▪ Areas around inlet and outlet will be planted with transitional planting (Willow or Alder). ▪ Flow velocity must not exceed 1.2m/sec, with water depth through the culvert kept as deep as possible. Power densities must not exceed 150Wm3. ▪ Head drops will be avoided during detailed design, but if required a maximum head drop of 0.1m is permitted. ▪ Trash screens will be spaced to approx. 230mm. Mesh screens will be avoided.
Construction	**Realignment of the Clontygar Stream**

	80. Investigations must be conducted along the existing Clontygar Stream to establish prevailing bed and bank material and to inform need for proposed clay and geotextile linings. This includes: ▪ Visual survey of existing riverbed and bank material ▪ Ground investigation (e.g., augering) along bank of existing stream to below bed level. 81. Investigations must be conducted along the proposed stream realignment. 82. Sediment types along lengths of the affected and proposed channel will be compared to evaluate whether there is a substantial difference. Survey will be conducted by a geomorphologist and/or hydrogeologist in summer months and expert judgement must be considered during detailed design. Default position is that no clay lining is applied unless proven necessary. 83. Alignment of the stream will be designed to replicate an existing natural watercourse. Realigned stream will be re-naturalised, sinuous, shallow, and have an active lateral connection to adjacent lands. Diversion of water to permanent channel must only take place from March to September, with a member of IFI present on site.
Construction	**Mitigation for Works Near Trees and Hedgerows** *Preparation Works* 84. Ground protection to protect tree roots will be introduced into area prior to introduction of equipment and machinery into areas of trees. Protection will begin along edge of root protection zones, and progress through rooting area. 85. Initially, once all ground protection has been laid, only materials required raising the crown will be allowed within these areas. 86. Fencing within root protection zones will be installed in areas shown on the Tree Protection Plan. 87. Holes for fencing will be a minimum of 50cm away from tree stems, manually excavated with hand tools, and position of hole will be altered to avoid tree roots with a diameter of 25mm. If this is not possible, 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. 88. Only after these precautions, can defence measures be installed. No alteration of the tree protection measures will take place without prior notification and consent with the on-site arboricultural consultant. *Enaction of Works* 89. Excavation or piling works in the vicinity of trees scheduled for retention are to be supervised by a qualified arborist. 90. If arborist determines the level of impact is too great and tree loss is unavoidable, works must be stopped. A full assessment of trees to be removed will be required and an assessment on the bank stability. 91. Any works that cause accidental damage to local trees that has not been planned and scheduled, will be reported to the local arboricultural consultant immediately. 92. If Ivy removal uncovers a potential bat roost, an inspection of roost and assessment of impact will be required. If a roost is present a derogation licence is required in advance of tree removal. 93. In absence of potential roost features, the tree can be removed. Removal must take place outside of bird breeding season (1st of March to 31st of August inclusive). 94. A silt trap will be placed along the bank of stream to prevent any sediment entering the stream. A geotextile sealed lining will be placed within trenches and piled excavations before any concrete is poured for foundations.

	Direct Scheduled Removal 95. In areas with scheduled removal of trees, hedges and scrub, protective measures regarding limb clearance and root protection will be repeated for neighbouring trees. Trees, hedges, and scrub scheduled for removal will be conducted between September-October. 96. If seasonal restriction cannot be observed, a check for active roosts, hibernating mammals and nests will be carried out immediately prior to any site clearance by an appropriately qualified ecologist/ornithologist. If nests are found, they will be safeguarded until chicks have successfully fledged.
Construction	**Stone Wall Preservation** 97. The stone wall between the Mill and Convent Bridge is to have its flora preserved. 98. During storage the stones will have original orientation in the sun maintained. 99. During reinstatement, stones will need to retain their original orientation in the sunlight and growth conditions.
Construction	**General Avoidance Measures** 100. Limit working hours to daylight hours. 101. Use of lighting at night must be avoided. If essential, a directional cowl must be fitted to all lights. 102. No harm must come to wildlife by maintaining the site efficiently and clearing away materials not in use. 103. Pipes must be capped when not in use (especially at night). Any excavations will be covered overnight. If that is not possible, a strategically placed plank will be used.
Construction	**Site Lighting Design** *Hours of Illumination During Works and Operational Phases* 104. Lighting utilised will be controlled by photocells which go on/off at sunrise and sunset as per set lux levels. 105. Virtual Midnight dimming will be incorporated on-site. *Light Levels and Type* 106. Lighting that meets lowest light levels permitted under health and safety will be implemented. Specification and colour of light treatments, e.g. single bandwidth lights and no UV light, are essential. LED luminaires will be used where possible. 107. Warm white spectrum (3000K) will be used in lighting located along the boundaries of site. *Column Heights of Lamp Posts* 108. Height of lamp columns will be restricted to 6m or less.

	109. Project Ecologist will monitor the site lighting with appropriate lux meter device to ensure that there is no excessive light spillage / pollution into immediately adjacent unlit areas utilised by nocturnal wildlife.
Construction	**Biosecurity Mitigations** 110. Biosecurity measures include: ▪ Fencing-off/demarcating invasive non-native species ▪ Communicating location, risk and hazards associated with invasive non-native species to construction personnel ▪ Identifying dedicated access points into and out of fenced-off areas ▪ Installation of designated decontamination facilities ▪ Protocols around storage of infested soils ▪ Checking of boots, tyres, and tracks before they enter works site. 111. Where clearance of vegetation is necessary, Three-cornered Garlic must be removed and appropriately disposed. Removal will be done by physical/chemical control either through digging up root network or application of herbicide.
Construction	**NIS-Specific Mitigations** *Crayfish* 112. All wet gear will be checked for contaminated materials such as silt, mud, animals or plants, and removed and left on site. 113. It then must be thoroughly cleaned with disinfectant or hot water (over 60ºC). 114. Equipment will undergo a 48hr drying period. If complete drying is not possible, equipment must be soaked, sprayed or wiped down with a disinfectant such as Virkon Aquatic Virasure tablets.
Operational	**Reseeding of Grassy Verges** 115. Grassy verges damaged from machinery will be reseeded using locally sourced wildflower mixes. 116. Proposed embankments will have slopes sown with an indigenous wildflower mix that suits the precise location.
Operational	**Remedial Tree and Scrub Planting** 117. Any trees or scrub removed or damaged will be replaced after works with native plant species e.g. Alder, Birch, Scots Pine.
Operational	**Bat Boxes** 118. Bat boxes will be installed on-site where remedial tree planting is taking place. Bat boxes will be south-facing, in dark areas and at least 4m off the ground. If erecting on a mature tree, placement must be free from Ivy with no branches within a 1m radius around box. 119. A bat specialist will be consulted.

	120. New bridge over the River Owenass will have two Bat Roost Tubes / Boxes integrated into the stone façade of either side of bridge. An additional Bat Roost Box will be bolted onto the side of Mill Bridge.
Operational	**Bird Boxes** 121. Bird nesting boxes will be installed in areas of replanting of trees. 122. For every 10m of hedgerow removed, one of each of the following will be constructed: ▪ 25mm hole for Blue Tit and smaller birds. ▪ 32mm hole for Great Tit and slightly larger small birds. ▪ Open-fronted nest box for Robins. ▪ 45mm hole for Starlings and larger birds. 123. New bridge over River Owenass will have a Dipper/Grey Wagtail Nest Box bolted to underside of bridge.
Chapter 8. Land and Soil	
Construction	124. A Soil Management Programme must be installed for operations at site. Programme will contain as a minimum: ▪ Ways to minimise truck movements across site ▪ Re-use of suitable material on-site 125. Temporary pathways and roads will be constructed. 126. Temporary storage of soil will be carefully managed. Topsoil stockpiles will be covered with rapid vegetation. Material will be stored away from surface water drains. Movement of material will be minimised. 127. Stripping of earth and topsoil will not be undertaken during dry and windy weather if possible; 128. Stockpiles will not exceed 1.5m in height and must be shaped to shed water. 129. Fill material will be tested and imported from a licensed facility. 130. Drainage from the bunded area(s) will be diverted for collection and safe disposal. 131. Re-fuelling of construction vehicles and addition of hydraulic oils/lubricants to vehicles will take place in designated area which will be away from existing surface water gullies/drains, or exposed ground or excavations. 132. Spill kits and hydrocarbon adsorbent packs will be stored in refuelling areas and site compounds. All relevant personnel will be fully trained in use of this equipment. 133. A risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated stormwater to underlying subsoil; 134. Pouring of concrete will take place within designated area remote from any drains, waterbodies or geo-synthetic material to prevent concrete runoff into the soil/groundwater media. Wash down and washout of concrete transporting vehicles will take place at appropriate facility off site. 135. Waste characterisation, waste acceptance criteria, and asbestos levels of material taken off site for disposal must be carried out. Wastes in European Waste Catalogue are classified by unique 6-digit code. In this case (waste soil/stones), two List of Wastes (LoW) Codes are applicable to material that may be taken off site for disposal: ▪ 17 05 03* - Soil and stones containing hazardous substances ▪ 17 05 04 - Soils and stones other than those mentioned in 17 05 03.

	136. Any soil samples found to contain contaminants will be subjected to full quantification analysis. If waste soil is sent to a waste licenced soil recovery facility, chemical analysis of soil must meet requirements given in EPA Waste Guidance. Acceptance of this material at a licenced soil recovery facility will be subject to the approval of the facility operator.
Construction	**Accidental Spills and Leaks** 137. A Pollution Control Plan will be implemented to minimise release of pollutants into pedological, geological, and hydrological environments. This will include: ▪ Spill kits containing absorbent pads, granules and booms will be stored in site compound with easy access for delivery to site. ▪ No bulk chemicals will be stored within active construction areas. Temporary oil and fuel storage tanks will be kept in material storage area in suitable containers and will be appropriately bunded. Refuelling of vehicles and addition of hydraulic oils/lubricants to vehicles will take place in designated areas which will be kept away from surface water drains. ▪ Oil booms and oil soakage pads will be maintained on-site. These will be disposed of correctly and records will be maintained by environmental manager, of used booms and pads taken off site for disposal. ▪ Spill protection equipment such as absorbent mats, socks and sand will be available in event of an accidental release during refuelling. Training will be given to appropriate site workers in how to manage a spill event. ▪ The following mitigation measures will be taken to prevent any spillages to the ground of fuels during machinery activities: – Refuelling will be undertaken off site – Where mobile fuel bowsers are used the following measures will be taken: • Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use • Pump/valve will be fitted with a lock and will be secured when not in use • All bowsers must carry a spill kit • Operatives must have spill response training – Portable generators or similar fuel containing equipment will be placed on suitable drip trays
Construction	**Embankments** 138. Construction of embankments will require use of impermeable clay and a reinforced geogrid for stability.
Operational	139. Retainment of silt fences on soil banks will be considered if suitable growth conditions have not been reached which will be overseen by the Project Ecologist who will liaise with IFI.
Chapter 9. Water – Surface and Groundwater	
Construction	**Surface Water Runoff and Silt Control**

	140. Planning of works will be done based on weather conditions forecast and monitoring. 141. Site compound will be constructed at a location remote from any drains. 142. Storage locations and topsoil piles will be placed in appropriate places, distant to existing drains/sewerage within site. 143. All soil stockpiles will be covered (i.e., with a tarpaulin). Vegetation will be established as soon as possible on all exposed soils. 144. In event of an extended dry period, stockpiles will be dampened using water. 145. Excavations will remain open for as little time as possible before placement of fill. 146. A Storm Water Management Plan will be completed. 147. Management/Response plans will be implemented to identify mobilisation of soil particles/pollution and initiate interception and treatment of pollution/silt run-off. 148. Silt fencing or other appropriate measures will be put in place downstream of exposed soils or soil stockpiles. Silt fences will be put in place around newly constructed embankments.
Construction	**Accidental Spills and Leaks** 149. An Emergency Plan for the site will be established. As a minimum the Emergency Plan will contain contact details for statutory bodies such as NPWS and IFI. All site workers will be made aware of the plan and its location in site offices. 150. There will be no refuelling of machinery within or near the river channel. Refuelling will take place at designated locations at distances of greater than 30 metres from the watercourse. 151. No vehicles will be left unattended when refuelling and a spill kit including an oil containment boom and absorbent pads will be on site at all times. 152. Any fuel needed to be stored on site will be stored appropriately and at a location set back from the river. All other construction materials will be stored in this compound. The compound will also house the site offices and portable toilets. This compound will be located on ground that is not prone to flooding or will be surrounded by a protective earth bund to prevent inundation. 153. All vehicles will be regularly maintained and checked for fuel and oil leaks. 154. All liquids, solids and powder containers will be clearly labelled and stored appropriately in sealable containers. Storage of fuels and oils will be in main contractor's compound only. 155. Spill protection equipment will be available for use in event of an accidental spill. These will be disposed of correctly if used and replaced with new ones immediately. Disposal records for used absorbent materials will be retained by Site Manager. 156. Regular inspection of bunds and emptying of rainwater (when uncontaminated) will be carried out. Bunding must be impermeable to the substance that is being stored in the tank. 157. Use of settling lagoons, settling tanks, or equivalent, with outflow control measures may be used for interception of surface water or groundwater pumped from an active working area. 158. If a spillage of a hazardous material to groundwater occurs, groundwater will be contained and pumped to a tank or holding vessel prior to shipment off site for disposal. Contractor will maintain disposal records and will identify cause of spillage and implement mitigation measures to prevent a repeat. CEMP for site will be updated and contractors and sub-contractors will be made aware of amendments. 159. Equipment will be cleaned prior to delivery to site. Contractor will avoid using equipment which leaks fuel, hydraulic oil, or lubricant. 160. No excavation will take place below the water-table on site.

	161. Management/Response plans will be implemented to identify mobilisation of soil particles/pollution and initiate interception and treatment of pollution/silt runoff. 162. Precast elements will be maximised to avoid wet concreting in close proximity to water.
Construction	**Demolition and Replacement of the Owenass Bridge** 163. During demolition and replacement of Owenass Bridge, the following mitigation measures will be put in place: ▪ A heavy-duty tarpaulin will be secured across length of the Owenass Bridge. Installation points to secure tarpaulin will include underside of the bridge and existing and/or temporarily installed fixtured points on either bank side. The tarpaulin must be upright (0.5m above the height of the wall) and tight to the wall. Fragments from wall are to be removed by hand. ▪ Additional silt fences will be installed at all bank access points from the sides of the bridge. Following demolition of Owenass Bridge, extension works must prioritise utilisation of pre-cast concrete elements. The heavy-duty tarpaulin is to be extended outward to cover the expanse of the new section of the bridge until completion. ▪ The Project Ecologist will be present for the entirety of these works.
Construction	**Instream Works** 164. All works will be supervised by Project Ecologist and safe concreting measures during wall construction will be implemented. 165. Silt fencing will be installed prior to commencement of construction works. Shallow interceptor trenches will be installed in front of these silt fences. Silt fences will be repaired and/or replaced as necessary. 166. Flood wall and foundations will be built with poured cement. 167. 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. 168. Oil booms will be on hand when construction activities are located beside aquatic habitats. 169. For works in the salmonid spawning reach downstream of Convent Bridge, Inland Fisheries Ireland (IFI) will advise on the required specification for the instream. Design advice will be incorporated into instream working downstream of Owenass Bridge.
Construction	**Flooding During Construction** 170. Conditions that may cause inundation will be monitored: ▪ In event of a storm event, temporary flood barriers can be erected at exposed locations. ▪ All works undertaken near banks will be fully consolidated to prevent scour and run-off of silt. ▪ Consolidation includes use of protective and biodegradable matting or geotextiles on the banks and the sowing of grass seed on bare soil. ▪ Earth works will take place during the driest season.

Chapter 10. Cultural Heritage	
Construction	**Built Heritage** *Project Conservation Engineer* 171. Project conservation engineer/conservation architect will be retained during detail design, construction and reinstatement. 172. Conservation engineer will ensure that methodologies outlined in EIAR Appendix 10.7 are carried out in full and will liaise with NBHS throughout design and construction stage. *Recording* 173. Upstanding built heritage features to be removed will be recorded in advance of construction i.e. Owenass Bridge and stone boundary walls (CH2), 174. The recording will include a written and photographic record and scaled drawings. *Methodology and Specifications* 175. Masonry of property boundary walls (CH5, CH6) will be cleaned of vegetation and recorded, noting capping stones, coursing of original masonry, and where it exists/is preserved. 176. Random rubble masonry will require retention of all pinning stones and where it is built to courses, the same attention to coursing is essential. 177. Dismantling will be carried out by hand and walls will be rebuilt to match original wall construction. Project engineer will provide a detailed methodology and will review and advise on works as they are being carried out. Same detail will be recorded at Owenass Bridge as form of the structure will be replicated in new build. 178. A methodology and specification for demountable barrier at Convent Bridge (RPS 701), will be developed by the project conservation engineer. The proposals for the barrier will be submitted to the NBHS for approval.
Construction	**Project Archaeologist** 179. A Project Archaeologist will advise on the archaeological aspects, mitigations and reporting requirements.
Construction	**Archaeological Testing** 180. Archaeological test excavation will take place across three sites identified in the geophysical survey (GS1-GS3). A programme of archaeological testing will occur across the embankments and compound areas in greenfields where geophysical survey was not possible. 181. Archaeological features revealed by test-trenching, directly impacted by the proposed works and cannot be avoided (preserved in-situ), will be preserved by means of archaeological excavation, recording and publication of results.

	182. Archaeological testing will be carried out as soon as it is feasible. 183. An archaeological testing strategy will be developed in consultation with the Project Archaeologist and will be submitted to the National Monuments Service for approval. A method statement and licence or consent applications will be submitted to the NMS for review and approval.
Construction	**Archaeological Monitoring** *Earthworks* 184. All earthmoving activities will be subject to archaeological monitoring under licence from the NMS of the DHLGH. 185. Licensed archaeologist will have provision to inspect all excavation to the formation level for the proposed works and to temporarily halt the excavation work. Provision will be given to ensure temporary protection, recording and removal of any features of archaeological importance identified. 186. NMS and the National Museum of Ireland (NMI) will be notified of any discovery of archaeological finds. The area will be investigated, with no further development until the site is identified, recorded and excavated. This will be accounted for in Project programme and budget, and will be undertaken at the earliest phases of the development. 187. Laois County Council will make provision for necessary archaeological monitoring, inspection and excavation works. *Material Excavated from the River* 188. An archaeological assessment of dredged/excavated spoil removed from riverbeds, streambeds, alluvial environments, and other waterways will be carried out. 189. All dredged spoil from areas within Zone of Archaeological Potential will be assessed by spreading, searching for objects, and licenced metal detection, before bulk excavations occur. Other scheme areas require a 25% volume assessment. 190. Sufficient archaeological personnel will be on site to monitor all aspects of works. Suitably qualified underwater archaeological personnel will be available for rapid inspections following underwater discoveries.
Construction	**Construction/Traffic Management Plan** 191. The Construction Plan and Traffic Management Plan will include measures to protect cultural heritage receptors.
Chapter 11. Landscape and Visual Impact Assessment	
Construction	192. Construction hoarding will be installed to reduce visibility into the construction works. Hoarding will have viewing windows towards the River Owenass to maintain views. Replacement planting will be implemented in first planting season for quick regeneration.

Operational	193. Design of the proposed flood wall along Owenass bridge and Covent bridge and finish of replacement Owenass Bridge will reuse parts of existing wall and replicate its style. Where this is not possible, a similar looking finish will be used.
Chapter 12. Material Assets	
Construction	**Roads, Traffic and Transport** *Construction Vehicle Movements* 194. Appointed Contractor will prepare a Construction Traffic Management Plan (CTMP) which will address following requirements: ▪ Scheduling of materials' deliveries outside times of peak traffic flows ▪ A wheel wash will be installed at proposed pumping station on Davitt Road and construction compound locations. ▪ Roads used by construction traffic will be monitored visually and a road sweeper used to remove debris. ▪ Loads of materials leaving site will be assessed and covered where necessary. ▪ Deliveries will be limited to working hours (08:00 to 19:00 Monday to Friday, 08:30 to 14:00 Saturday, and none on Sundays or public holidays) ▪ Temporary access roads will be constructed from site compounds and works areas. Construction vehicles will use designated haul routes. ▪ A wheel wash facility will be setup with periodic road cleaning around the site. *Temporary Road Closures and Private Access Impacts* 195. Signage will be erected informing public of the road closure and directions to alternative route during road closures at Owenass Bridge and Irishtown Road. 196. Appropriate levels of staff parking and compounding will be provided. Any vehicles associated with the works are not permitted to park, idle or queue on the public road network; 197. Construction traffic routes to/from the site and times of day will be agreed with Laois County Council prior to commencement of constructions activities. 198. Tracked excavators will be moved to/from site on low-loaders and will not be permitted to drive on street pavements.
Construction	**Utilities** 199. Utility detection will be carried out to identify precise locations of underground utilities prior to excavation on-site. 200. Any disruptions to services will be agreed with service providers and will be communicated in advance to property owners. *Water Infrastructure*

	201. Instream works will require creation of dry working space for operatives along flood defence walls. A cofferdam will be required to avoid interaction with existing river flows.
Construction	**Waste** 202. All construction waste will be segregated and removed to an approved location. 203. A Resource & Waste Management Plan (RWMP) will be produced. 204. The strategy will follow the Waste Management Hierarchy: ▪ Prevention; ▪ Minimisation; ▪ Reuse; ▪ Recycling; and ▪ Disposal. *Construction Waste Management* 205. Procedure to identify and classify all waste arising at the site in accordance with the List of Waste (LoW) Code will be implemented. 206. Waste materials generated will be segregated into hazardous and non-hazardous labelled storage containers at designated points within site compounds. All waste generated will be handled by an approved waste contractor holding a current waste collection permit. 207. For each waste stream identified, the contractor will identify the following: ▪ The appropriate LoW Code ▪ A suitable Waste Collection Contractor with a valid Waste Collection Permit for the collection of the waste within Co. Laois ▪ Waste recovery or disposal site and method 208. Only contractors with a valid Waste Collection Permit will collect waste from site. The contractor responsible for the waste will ensure that the Waste Collection Contractor: ▪ Is permitted to collect the particular waste ▪ Is permitted to collect waste within Co. Laois ▪ Uses a waste collection vehicle identified on the Waste Collection Permit ▪ Transfers the waste to a licenced waste facility identified on the Waste Collection Permit. 209. Contractor will ensure the following information is provided and available upon request: ▪ Transfer notes for controlled waste and consignment notes for hazardous waste must include an accurate description of the type, quantity and containment of waste, Standard Industrial Classification, the LoW Code, and details of licensed waste carrier ▪ Sufficient information to ensure waste disposal operator is aware of potential hazards of the substance ▪ Returns for consignment notes are to be collected and retained ▪ Transfer notes will be retained for a minimum of two years and consignment notes for a minimum of three years

	210. If contractor acts as the Waste Collection Contractor, it will have Waste Collection Permit(s) in place prior to commencement of construction and will advise consenting authority of this position
Operational	211. Waste arising in the operational phase will follow the Waste Hierarchy and the principles outlined in the CEMP and the RWMP
Chapter 13. Construction Impacts: Noise/Vibration, Air/Dust, Climate	
Construction	**Air Quality and Dust** *General Measures* <u>Communications:</u> 212. Develop and implement a stakeholder communications plan that includes community engagement 213. Display name and contact details of person(s) accountable for air quality and dust issues on the site boundary. 214. Display head or regional office contact information. 215. Implement a Dust Management Plan (DMP) <u>Site Management:</u> 216. Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions, and record measures taken. 217. Make complaints log available to local authority when asked. 218. Record any exceptional incidents that cause dust and/or air emissions and action taken to resolve situation in logbook. 219. Hold regular liaison meetings with other high risk construction sites within 500m of site boundary. <u>Preparing and Maintaining the Site:</u> 220. Plan site layout so that machinery and dust causing activities are located away from receptors 221. Erect solid screens/barriers around dusty activities or the site boundary as high as any stockpiles on site. 222. Fully enclose site or specific operations with a high potential for dust production and extensive active period. 223. Avoid site runoff of water or mud. 224. Keep site fencing, barriers and scaffolding clean using wet methods. 225. Remove materials with a potential to produce dust from site as soon as possible, unless being re-used. If being re-used, cover as described below. 226. Cover, seed or fence stockpiles to prevent wind whipping. <u>Operating Vehicles/Machinery and Sustainable Travel:</u>

	227. Ensure all vehicles switch off engines when stationary - no idling vehicles. 228. Avoid use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment 229. Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas. 230. Produce a Construction Logistics Plan to manage sustainable delivery of goods and materials. <u>Operations:</u> 231. Only use cutting, grinding or sawing equipment fitted with suitable dust suppression techniques 232. Ensure an adequate water supply on site for effective dust/particulate matter suppression/mitigation, using non-potable water 233. Use enclosed chutes and conveyors and covered skips. 234. Minimise drop heights from conveyors, loading shovels, hoppers and other loading/handling equipment and use fine water sprays 235. Ensure equipment is readily available on site to clean any dry spillages and clean up spillages using wet cleaning methods. <u>Waste Management:</u> 236. Waste Material to be disposed of at appropriately licensed facility. *Measures Specific to Demolition* 237. Ensure effective water suppression is used during demolition operations i.e. handheld sprays or high volume water suppression systems 238. Avoid explosive blasting 239. Bag and remove any biological debris or damp down material before demolition. *Measures Specific to Earthworks* 240. Re-vegetate earthworks and exposed areas/soil stockpiles 241. Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil 242. Only remove cover in small areas during work and not all at once. *Measures Specific to Construction* 243. Avoid scabbling (roughening of concrete surfaces) 244. Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure appropriate additional control measures are in place. 245. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems

	246. For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately *Measures Specific to Trackout* 247. Use water-assisted dust sweeper(s) on access and local roads, to remove material tracked out of the site. 248. Avoid dry sweeping of large areas. 249. Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. 250. Inspect on-site haul routes for integrity and instigate necessary repairs to the surface 251. Record all inspections of haul routes and any subsequent action in site logbook. 252. Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned. 253. Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). 254. Ensure an adequate area of hard surfaced road between wheel wash facility and site exit 255. Access gates to be located 10 m from receptors
Construction	**Noise and Vibration** 256. Working hours will be restricted to daytime hours from 07:30 hours to 16:30 hours (Monday to Friday) and from 08.00 hours to 13.00 hours (Saturdays). Evening and night-time work is not expected to take place although limited 24-hour working may be required to take place, with prior agreement of Laois County Council. 257. On-site speed limit will be enforced for all traffic. 258. Quiet working methods and the most suitable plant will be selected for each activity 259. Operators will use “noise reduced” plant and/or will modify their construction methods so that noisy plant is unnecessary. 260. Noisy plant will be positioned away from noise sensitive receivers, using earth mounds and/or stockpiles of material or perimeter hoarding as a physical barrier 261. Mechanical plant used on site will be fitted with effective exhaust silencers. Vehicle reverse alarms will be silenced appropriately 262. All plant will be maintained in good working order. Machines will be operated at low speeds and will be shut down when not in use. 263. Compressors will be of “noise reduced” variety and fitted with lined and sealed acoustic covers. 264. Engine and/or machinery covers will be closed whenever machines or engines in use. 265. All pneumatic percussive tools will be fitted with mufflers or silencers. All mechanical static plant will be enclosed by acoustic sheds or screens. 266. Employees will be informed about requirement to minimise noise and will undergo training on the following aspects: ▪ Proper use and maintenance of tools and equipment. ▪ Positioning of machinery on-site to reduce emission of noise to noise sensitive receivers. ▪ Avoidance of unnecessary noise when carrying out manual operations and when operating plant and equipment. ▪ Use and maintenance of sound reduction equipment fitted to power pressure tools and machines.

	267. Temporary wooden hoarding/acoustic screening to be installed at 2m around areas of construction where loud noise levels occur. 268. Selected low vibration piling method will protect against cosmetic damage from vibration frequency 269. Contractor will appoint a responsible and trained person who will be present on site and willing to answer and act upon complaints and queries from public. 270. If items of plant (e.g. dewatering pumps and similar) are in use during night-time hours they will be chosen, sited and enclosed such that levels at the nearest properties do not exceed the measured background noise levels.

Offices at:
Dublin
Limerick
Cork
Castlebar

JBA Registered Office
24 Grove Island
Corbally, Limerick
Ireland
+353 61 345463
info@jbaconsulting.ie
www.jbaconsulting.ie

JBB Registered Office
Classon House
Dundrum Business Park
Dundrum, Dublin 14
Ireland
+353 1 485 1400
info@jbbarry.ie
www.jbbarry.ie