Mountmellick
FLOOD RELIEF SCHEME

Preliminary CEMP

Final Report

September 2025

Tionscadal Éireann
Project Ireland
2040

OPW
Oifig na nOibreacha Poiblí
Office of Public Works

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S4.02 14-08-2025	Final Report	LCC Sharepoint
A3-C01 16-09-2025	OPW Comments	LCC Sharepoint
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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 Justin Nangle of JBA Consulting carried out this work.

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Purpose

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Abbreviations

CEMP	Construction Environmental Management Plan
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
CFRAM	Catchment Flood Risk Assessment and Management
DoECC	Department of the Environment, Climate and Communications
DHLGH	Department of Housing, Local Government and Heritage
DMP	Dust Management Plan
ECoW	Environmental Clerk of Works
ECWMP	Environmental and Construction Waste Management Plan
EIAR	Environmental Impact Assessment Report
ECM	Environmental Control Maps
EPA	Environmental Protection Agency
EU	European Union
FRS	Flood Relief Scheme
GIS	Geographical Information System
HVO	Hydrotreated Vegetable Oil
IFI	Inland Fisheries Ireland
INNS	Invasive and Non-Native Species
QI	Qualifying Interest
LoW	List of Waste
NBDC	National Biodiversity Data Centre
NBHS	National Built Heritage Service
NMS	National Monuments Service
NPWS	National Parks and Wildlife Services
NIS	Natura Impact Statement
NRA	National Roads Authority
pNHA	Proposed Natural Heritage Area
OPW	Office of Public Works
SAC	Special Area of Conservation
SPA	Special Protection Area

1 Introduction

1.1 General

JBA Consulting was commissioned by Laois County Council to develop a preliminary Construction Environmental Management Plan (CEMP) in relation to the proposed Flood Relief Scheme (FRS) in Mountmellick, Co. Laois (the 'proposed development'). The proposed development consists of a flood relief scheme to minimise the risks currently posed to people, the community, social amenity, environment, and landscape. The proposed planning permission relates only to the construction of fluvial flood defence assets.

1.2 Background

Mountmellick has historically been subject to fluvial flooding and as such the town was part of the Office of Public Works (OPW) Catchment Flood Risk Management (CFRAM) study programme. The proposed development will act to protect vulnerable parts of Mountmellick from fluvial flooding.

This preliminary CEMP will demonstrate that no significant impact on the integrity of the environment, habitats and species at the site will be incurred, including no disturbance to or loss of the identified habitats and species, and that there will be no long-term impact on water quality.

This will include setting out and following construction phase best practice and mitigation measures. The preliminary CEMP proposes mitigation measures designed to protect the stipulated habitats and species associated with the proposed site.

The following reports, produced by JBA, have been submitted with this preliminary CEMP as part of the planning application:

- JBA, Environmental Impact Assessment Report (EIAR)
- JBA, Natura Impact Statement (NIS)

The above reports should be read in full to ascertain the ecological and environmental constraints that may be applicable to the construction works for this project.

1.3 Objective of the Preliminary CEMP

The objective of this document is to inform all personnel (Main Contractor and sub-contractors) of their obligations with regards to environmental protection.

The preliminary CEMP seeks to:

- Provide a basis for implementing construction related mitigation measures to safeguard identified environmental issues;
- Comply with all relevant planning conditions, environmental legislation and statutory consents; and
- Promote best construction and environmental on-site practices for the duration of the works.

This preliminary CEMP defines the project-specific environmental measures that are to be put in place and procedures to be followed for the scope of construction works, both temporary and permanent, for the project. This plan and methodology seek to demonstrate how works on the project can be delivered in a logical, sensible and safe sequence with the incorporation of specific measures to mitigate the impact on people, property and the environment.

This should be viewed as a 'live' document, to be updated by the Main Contractor for implementation throughout the project in response to changing conditions on site.

This review of construction activities covers a description of:

- Duration and phasing;
- Site preparation;
- Construction methods;
- Materials source and transportation;
- Employment and accommodation;

- Dust, noise and traffic;
- Construction safety;
- Waste disposal; and
- Services Requirements.

Proposed environmental measures that will be installed on site during construction are included in this preliminary CEMP. This document will be updated to include any additional conditions proposed by the relevant local authority as a result of their review of the preliminary CEMP.

The preliminary CEMP is an integral part of the site health, safety, environmental and quality management system and constitutes a component of the Construction Health and Safety Plan documentation. The preliminary CEMP is also subject to the requirements of the site quality management system with respect to documentation control, records control and other relevant measures.

The Main Contractor will be required to produce a project CEMP (Construction Environmental Management Plan), which will ensure that their construction activities are planned and will meet the environmental requirements outlined in this preliminary CEMP. The procedures agreed in this preliminary CEMP will be audited regularly throughout the construction phase to ensure compliance.

In the event of an accident or emergency on site during the construction period, the project CEMP will be reviewed, and procedures amended if necessary. All personnel and sub-contractors will be made aware of the project CEMP during the toolbox talks. The site manager will be responsible for maintaining and updating the approved document.

2 Legislation and Guidance

Relevant legislation and best practice guidance that have been considered includes but is not limited to the following:

2.1 National and International Legislation

- European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003) which brings into effect the EU Water Framework Directive (2000/60/EC);
- European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (S.I. No. 272 of 2009;
- Local Government (Water Pollution) Acts 1977-1990;

2.2 Environment Liability Regulations

The Regulations supplement existing National and European Legislation to achieve the prevention and remediation of environmental damage. Environmental damage under the Environmental Liability Regulations 2008 means:

- Water damage that has significant adverse effects on water status under the Water Framework Directive (2000/60/EC);
- Land damage that creates a significant risk to human health as a result of the direct or indirect introduction, in, on or under land, of substances, preparations, organisms or micro-organisms; and
- Damage to protected species and natural habitats.

The Regulations represent an overarching piece of legislation that can be used in concert with all the Agency's existing powers but will only be used in the appropriate circumstances when environmental damage has occurred as a result of an incident.

2.3 Best Management Guidelines

The following Guidelines will be used, as a minimum, by the Contractor to prepare their Method Statements and Environmental Management Plan:

- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters. Inland Fisheries Ireland, (IFI, 2016);
- 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 (IFI, 2020)
- Fishery guidelines for Local Authority works. Department of Marine and Natural Resources 1998;
- CIRIA – Guideline Document C532 – Control of Water Pollution from Construction Sites;
- CIRIA – Guideline Document C642 – Development and Flood Risk – Guidance for the Construction Industry;
- CIRIA Guidance C515: 'Control of groundwater for temporary works' (Somerville *et al.*, 1986);
- CIRIA Guidance C741: *Environmental good practice on site guide* (Charles & Edwards, 2015);
- CIRIA Guidance C750D: 'Groundwater control: design and practice' (Preene *et al.*, 2016);
- CIRIA - Control of water pollution from construction sites - guide to good practice (SP156);
- CIRIA - C648 Control of water pollution from linear construction projects & Site Guide C649;
- NetRegs Guidance for Pollution Prevention for works and maintenance in or near water (NetRegs, 2017);
- Environment Agency Pollution Prevention Guidelines for construction and demolition sites (EA, 2012).
- NRA Guidelines for the crossing of watercourses during the construction of National Road Schemes (2005)
- OPW Environmental Guidance: Drainage Maintenance & Construction (Brew, T., Gilligan, N., 2019)
- OPW Article 27 Management of Soil and Stone By-Products on Flood Relief Schemes Technical Note (2023)

3 Proposed Development

3.1 Site location

Mountmellick is situated within Co. Laois, approximately 75km southwest of Dublin, between the towns of Portarlington and Portlaoise. There are four main local watercourses within its environs, namely the River Clontygar, River Barrow, River Owenass and River Pound. The latter two rivers are more central to the town, with the River Owenass also being part of a Natura 2000 site, the River Barrow and River Nore Special Area of Conservation (SAC). The site boundary is shown in Figure 3-1 below. The proposed development is focused solely on fluvial flood risk.

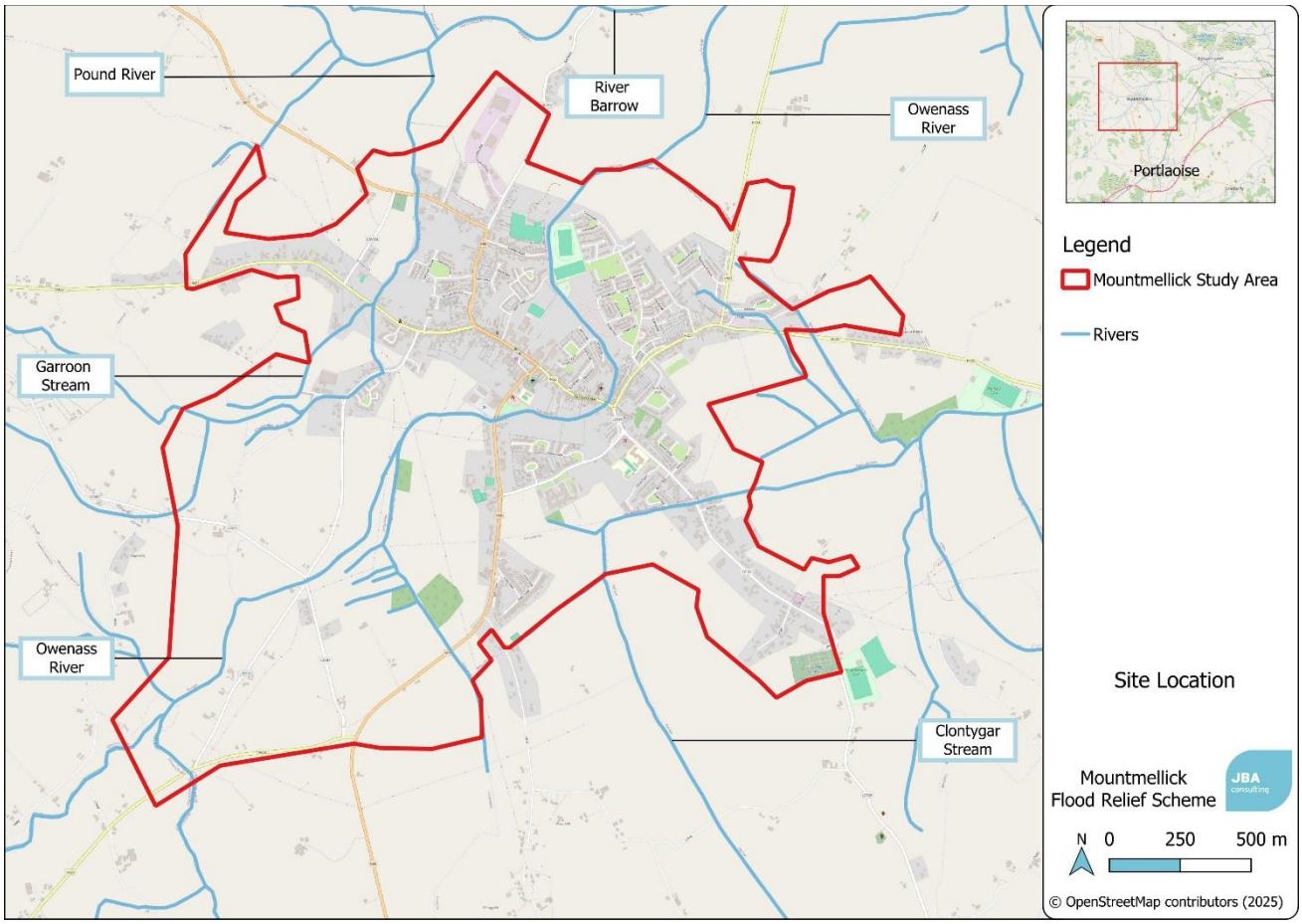


Figure 3-1: Site Location

3.2 Preliminary Engineering Elements

Generally, the proposed flood relief scheme comprises 10No. continuous flood defences to defend properties from flooding from the Owenass River, Garroon Stream, Pound River and Clontygar River. The engineering elements 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 3-2 below.

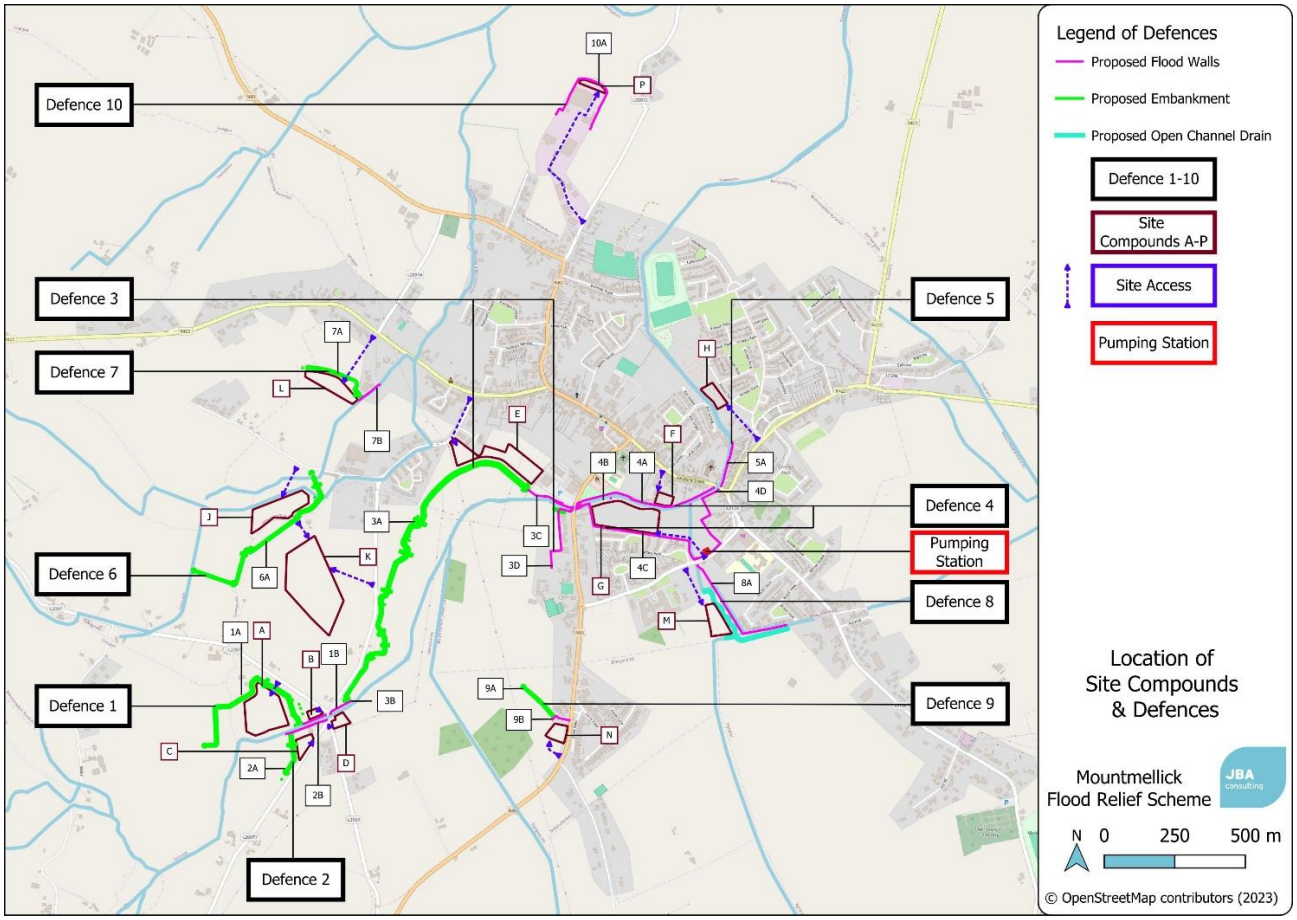


Figure 3-2: Flood Defences, Compound Locations and Access Points

The engineering elements of the proposed scheme are illustrated in the following 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

The full description of the proposed development is included in Chapter 4 of the EIAR.

3.2.1 Flood Embankment Design

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. The total embankment material volume includes above-ground infrastructure, below-ground foundations and backfill.

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.

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/).

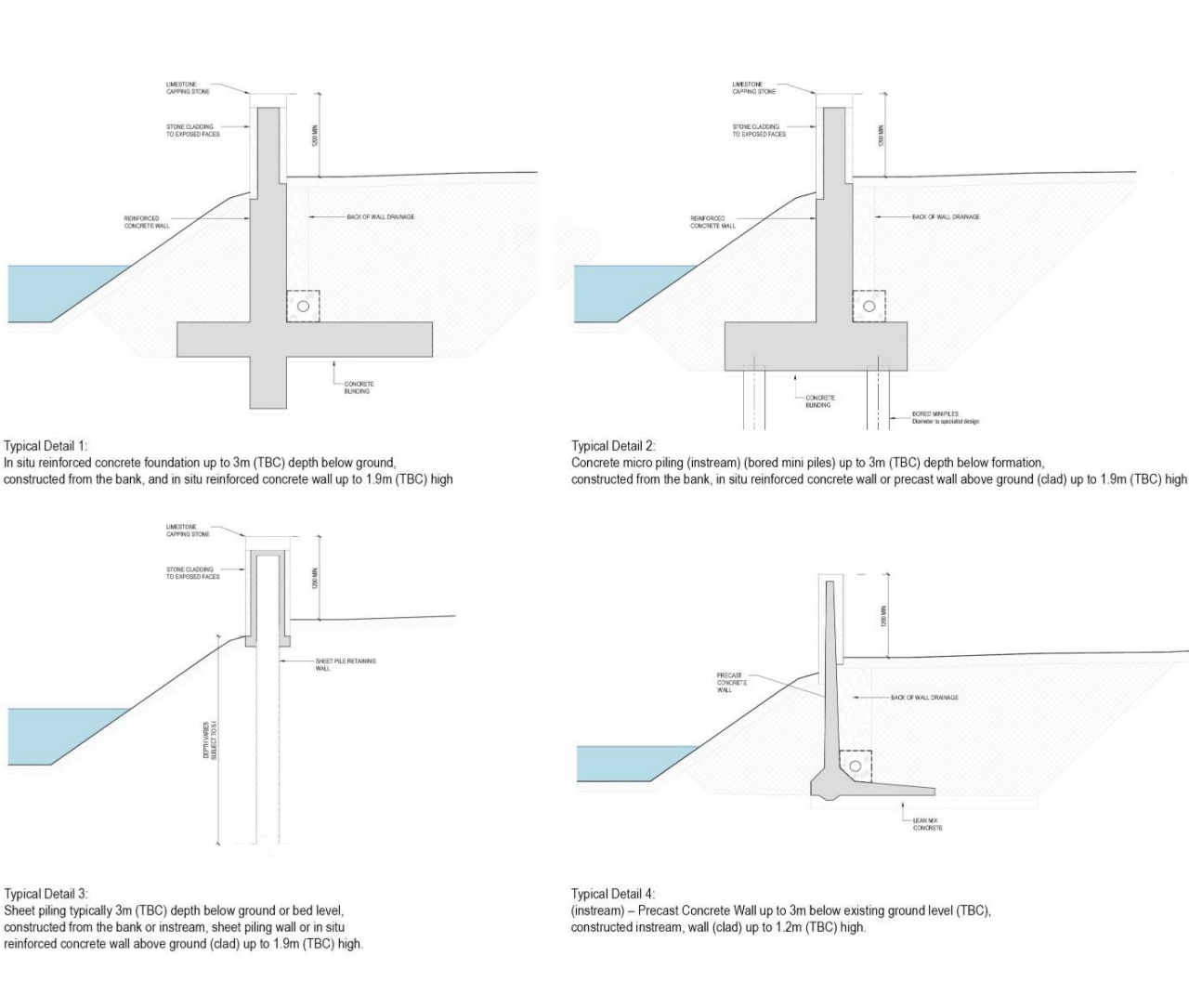
3.2.2 Flood Wall Design

Approximately 3,500 linear metres of wall will be formed. For the purposes of environmental assessment and mitigation, four types of wall construction are proposed for the proposed development, as shown on Figure 3-3 below. The final design of walls at each location will be subject to confirmation of ground conditions from site investigation at detailed design stage and construction methodology.

- Type 1 - In-situ reinforced concrete foundation up to 3m (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 be finished with stone cladding in areas adjacent to public realm, within the Architectural Conservation Areas and adjoining stone clad bridges. Elsewhere the finish will be smooth concrete.

Figure 3-3: Typical Flood Wall Details



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

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

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

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

Typical Flood Wall Details

Mountmellick Flood Relief Scheme

Not to Scale

3.2.3 Construction Compounds

Several compound areas will be established during the construction phase, for use in different geographical areas of the scheme. Construction defences (Walls and Embankments), Compound locations (A to P) and access points are shown in Figure 3-2.

The establishment of Site compounds will include the following:

- Site office.
- Site facilities (canteen, toilets, drying rooms, etc.).
- Secure compound for the storage of all on-site machinery and materials.
- Temporary car parking facilities.
- Temporary fencing.
- Site Security to restrict unauthorized entry.
- Bunded storage of fuels and refuelling area. Bunds shall 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 Contractor. The removal of rainwater from the bunded areas will be their responsibility. Records will be maintained of materials taken off site for disposal.
- Records will be maintained for all training.
- The contents of any tank will be clearly marked on the tank, and a notice displayed requiring that valves and trigger guns be locked when not in use.
- Drainage collection system for washing area to prevent run-off into surface water system; and
- All refuelling of vehicles will be carried out at the fuel stores within the main site compound and only ADR trained personnel (Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR)) will be permitted to operate fuel bowsers.

3.3 Receiving Environment

Ecological walkover surveys were conducted by JBA ecologists to assess the presence of protected or other notable species. 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), Mountmellick is located along the River Owenass.

During the ecological surveys, a range of protected fauna were recorded via visual sighting of individuals or observation of scat / spraint / prey remains. These species are protected under the Wildlife Act, 1976 and its amendments, and/or Annexes of the EU Habitats Directive and EU Birds Directive. However, only two of these species, Otter and Atlantic Salmon, are QIs of the Natura 2000 sites within the development's ZoI. Other QI species (River Lamprey, Brook Lamprey and White-clawed Crayfish) are present within the study area as confirmed by existing desktop data and communication with NPWS and IFI. The remaining protected species (Badger *Meles meles*, European Eel *Anguilla Anguilla riparian birds etc.*) are addressed in the accompanying EIAR's Biodiversity Chapter.

3.4 Invasive non-native species

Invasive non-native species (INNS) have been recorded in the area including Japanese knotweed, Three-cornered Garlic, Crocosmia sp. and Cherry Laurel *Prunus laurocerasus*. Japanese Knotweed in Mountmellick is being actively managed by Laois County Council.

There is potential for working machinery to get contaminated with fragments of invasive non-native species and spread it elsewhere within the site or outside of the site. Excavation and movement of spoil has the potential to

spread INNS across the area; any spoil removed from site has the potential to introduce INNS along the roads and at the receiving environment.

An INNS management plan will be put in place for each instance and the locations of known invasive species will be mapped by the Contractors Environmental Clerk of Works (ECoW). Each instance will be recorded on the Environmental Control Maps (ECM's) which will be prepared by the ECoW. Work will be carried out in compliance with OPW Environmental Guidance: Drainage Maintenance & Construction (Brew, T., Gilligan, N., 2019).

3.4.1 Watercourses in the Vicinity of the Proposed Site

The proposed site lies just south of the River Barrow, with the River Owenass 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.

The WFD status and Risk status of the waterbodies is as follows;

- BARROW_040 status: Moderate, risk: At Risk
- OWENASS_020 status: Moderate, risk: At Risk
- TRIOGUE_040 status: Poor, risk: At Risk

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

4 Roles and Responsibilities

The Main Contractor is responsible for ensuring that all employees and sub-contractors follow the requirements of the project CEMP. The Contractor will be required to provide training and supervision to ensure that the requirements are adhered to. It is anticipated that the main environmental responsibilities for the key staff will be as set out below.

4.1 Director of the Contracting Company

- Ensure all departments work towards project goals,
- Ensure the company complies with all legal, regulatory, and contractual obligations,
- Maintain relationships with key stakeholders including clients, regulatory bodies, and the community.

4.2 Contracts Manager

The contracts manager will:

- Oversee the project contracting process from start to finish,
- Manage contracts with clients, sub-contractors, and suppliers ensuring compliance with terms and conditions of contracts,
- Ensure all contractual obligations are met,
- Prepare regular progress reports for stakeholders.

4.3 Site Manager

The Site Manager/Site Engineer will be required to:

- Prepare the project CEMP; this will include the key elements as outlined in this preliminary CEMP.
- Be responsible for ensuring that adequate equipment, adequate control measures and adequate resources are made available to meet the requirements of the project CEMP;
- Manage the preparation of method statements and will be responsible for implementing these on-site;
- Retain all training records;
- Retain all records on the quantities of material that leaves the site for disposal, and all disposal records; and
- Continuous monitoring of the site will be performed by the site manager.

4.4 Environmental Clerk of Works (ECoW)

The Environmental Clerk of Works ECoW will be appointed by the Contractor. The roles and responsibilities to be carried out by the Environmental Clerk of Works include the following:

- Monthly environmental site audits for potential impacts and control measures relating to items such as the following:
- Waste management and recycling, general water quality, run-off, contaminated soil or water, root zone impacts, energy use/wastage, water use/wastage, dewatering activities, noise and vibration, dust suppression, dirty roads, light spill, chemical spills, visual impacts, invasive species, and general housekeeping.
- Water Quality Monitoring Programme: Baseline and ongoing monthly water quality monitoring for parameters such as total suspended solids, ph, dissolved oxygen, temperature, electrical conductivity, total

dissolved solids and turbidity. As turbidity suspended solids are linked, their relationship needs to be calibrated before setting a limit for Turbidity for use on-site. This calibration will be completed prior to any works.

- Preparation and submission of water quality monitoring reports to Inland Fisheries Ireland on a monthly basis.
- Review of the EIAR, all associated planning documents/drawings, conditions from An Board Pleanála and preparation of the project CEMP.
- The project CEMP includes site specific Environmental Control Maps (ECMs).
- Updating the project CEMP and ECMs as required if design changes occur, legislation changes occur, or if new environmental constraints are identified during construction.
- Carry out:
    - Invasive species surveys and preparation of Invasive Species Management Plans.
    - Environmental training via the preparation of toolbox talks.
    - Preparation and delivery of environmental presentations on various topics.
    - Site investigation and reporting following pollution incidents.
    - Input to method statements for in-stream works and supervision of such works.
    - Provision of general environmental advice and legislation guidance as required.
    - Keep staff informed on all key environmental and governmental policy changes and relevant pollution incidents as they occur.

4.5 Project Ecologist

The Project Ecologist will be appointed by the Local Authority. The roles and responsibilities to be carried out by the Project Ecologist include the following:

- Monthly environmental site audits for potential impacts and control measures relating to items such as the following:
- Report to the Client and is responsible for advising on the protection of sensitive habitats and species encountered during the construction phase of the project.
- Liaise with IFI when instream works are on-going.
- Provision of specialist input and supervision, where necessary, of construction activities in relation to habitats and species. Examples may include surveys or advisory for sensitive species such as otter, bat, badger, salmon, trout, lamprey or crayfish etc.
- Site inspections and the provision of specialist advice on ecological monitoring, and conduct surveys, monitoring. Examples may include for potentially ecologically sensitive activities such as tree clearing activities or in-stream works.
- Liaison with the National Parks and Wildlife Service (NPWS) as required. Examples may include for application for derogation licenses such as for the disturbance of otter holts.
- Advice on the installation of ecologically beneficial items such as bat boxes, artificial otter holts, floating nesting platforms and integrated constructed wetlands etc.

4.6 Waste Manager

The waste manager will be responsible for waste management during the construction phase and will be required to:

- Implement the mitigation measures in this preliminary CEMP related to waste management and prepare a Waste Management Plan which will form an Appendix of the project CEMP;
- Ensure that waste management procedures and methods comply with local and national regulations
- Track waste generation, handling and disposal and report on performance of waste management regularly;
- Promote and implement waste reduction;
- Update the preliminary CEMP waste management procedures as needed as the program progresses.

4.6.1 Staff and Operators

Staff and operators will be responsible for;

- Ensuring that mitigation measures are in place before the work commences;
- Reporting any environmental incidents to the Site Manager and the ECoW; and
- All site personnel will undertake site induction prior to carrying out any activity. Induction topics to be covered include:
    - Duties and responsibilities;
    - Emergency response procedure;
    - Site rules;
    - Environmental best practice; and
    - Waste management and housekeeping.

5 Construction Operations

5.1 Programme of works

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. The sequence of defences that are not located on the River Owneass is flexible to suit the Contractor resources.

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.

5.2 Equipment, machinery and works

Equipment to be used during the construction of the works will be typical of a project of this scale. The precise configuration of on-site plant will be determined by the Contractor. In general, the following machinery will be used:

- Excavators 360 3T-35T
- Site dumpers, 1T-25T
- Telehandlers fixed and 360
- Mobile Crane 100T-250T
- Crawler Crane
- Pilling Hammer
- Silenced Diesel Pumps 75mm - 200mm
- Diesel Generators 3KV - 30KV
- Tractors
- Dust Suppression Units
- Road Sweepers
- Wheel wash
- 4x4 Personnel Transport
- Low loader
- Fuel Bowser

The main construction activities on site will involve construction of the new riparian zone and habitats, and diversion of the stream, and construction of flood walls.

5.3 Site Confines

Site establishment by the Contractor will be limited to the following:

- Setting up of access control to the site;
- Construction traffic management and alert signage, including pedestrian management;
- On-site toilet facility, site offices and site canteen;
- Temporary fencing, hedgerow/tree protection fencing, silt (watercourse protection) fencing and site security;
- Bunded storage of fuels and refuelling area; and
- Storage of materials.
- Waste and recycling skips, spill kits, concrete washout areas, etc.

Mitigation measures associated with site and compound establishment are outlined in Section 6.1.

5.4 Method Statements

In advance of any operations commencing at the site the appointed Contractor will prepare Method Statements for the works. These will include:

- Location of site compounds, storage areas, and car parking facilities for workers;
- Site security fencing and hoarding, including fencing off of sensitive ecological features;
- Traffic management plan;
- Waste disposal plan;
- Details on vegetation clearance and earthworks;
- Landscape Plan;
- Biosecurity Plan;
- Controls stipulated by stakeholders such as IFI;
- Silt management controls;
- Storm Water Management Plan; and
- Bunding/drip tray proposals for fuel storage & vehicles as required, outside the 10m riparian zone.

6 Environmental Impacts and Mitigation Requirements

During the construction and operational stages of the development there are potential risks to ecological features from the following;

- Potential leakage of hydrocarbon/lubricants;
- Increased surface water runoff and sediment loading;
- Physical and noise disturbance to habitats and species;
- Dust deposition;
- Noise;
- Vibration; and
- Lighting disturbance.

Measures will be proposed in the following sections to mitigate against any potentially significant impacts on the surrounding environment in the vicinity of the site and downstream of the site. These measures were developed in and as a result of the EIAR and NIS prepared for the development.

6.1 Toolbox talks and Environmental Management

A suitably qualified ECoW will be appointed to oversee all site installation activities with respect to the environment. This shall include preparation and delivery of toolbox talks to on-site personnel. Topics covered will include spill control, working on or near watercourses, silt management, storage of waste, working around trees and hedgerows, nesting birds, protected species and invasive non-native species.

6.1.1 Environmental Management of Site Compounds

The principal Contractor will be required to ensure good environmental management within the site compounds. refer to Figure 3-2 for location of the compounds. The below list of measures will be incorporated into site compound environmental management:

- Site compounds will use existing hard-standing areas as a priority to reduce the level of ground disturbance. An emergency response plan will be drawn for implementation in the event of a predicted storm or weather event with the potential to cause flooding;
- Site compounds, spoil heaps and welfare facilities will not be within Flood Zones A or B https://www.floodinfo.ie/map/floodmaps/ , where possible. Where this is not possible, special attention will be paid to bunding and siting of storage areas, with the highest available ground chosen preferentially;
- Only plant and materials necessary for the construction of the works will be permitted to be stored at the compound locations;
- Site establishment by the Contractor will include the following:
    - Site offices;
    - Site facilities (such as 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; and
    - Site Security to restrict unauthorized entry.
- All sub-contractors will be given induction talks and toolbox talks so that they are aware of material storage arrangements and site details;
- 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 shall be 110% capacity of the largest vessel contained within the bunded area;
- A chemical storage plan will be in place as required, including spill kits;

- 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 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 manager 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;
- Stockpiling of spoil and spoil-like materials will be appropriately located within the compounds to minimise exposure to prevailing winds and risk of runoff; and
- All refuelling of vehicles will be carried out at the fuel stores within the site compounds and a minimum of 10m away from any watercourse and only ADR trained personnel will be permitted to operate fuel bowsers.

6.2 Planned Erosion and Sediment Control Practices

6.2.1 Protecting Water Quality - Surface Water Controls

In order to protect surface water throughout the proposed development site, the principal Contractor will be required to develop and implement a Surface Water Management Plan and Pollution Control Plan to be included within the project CEMP.

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 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)
    - European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988).
- The ECoW will oversee the protection of water quality and manage the prescribed mitigation measures;
- 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 Foreman 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;
- The use of lean mix concrete will not be permitted near any watercourse to avoid leach out;
- 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;

- Temporary stockpiles will be monitored for leachate generation. These stockpiles will be placed within designated areas and not located within 10m 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 suspected contaminated soils should be WAC Tested and will then be classified as clean, inert, non-hazardous, or hazardous in accordance with the EC Council Decision 2003/33/EC before being transferred to the appropriate licenced waste facility. Furthermore, the Contractor will ensure that no cross-contamination with clean soils happens elsewhere throughout the development site;
- Silt fencing Figure 6-1, will be installed along the edges of watercourses prior to the commencement of any construction works in order to prevent silt runoff and the protecting these identified water features;
- Silt fences will be repaired and/or replaced as necessary by the principal Contractor as part of the on-going environmental monitoring programme;
- Where possible, vegetation will be preserved during regrading by carefully excavating and reinstating turf. This should be feasible in many cases, due to the estimated short timelines on excavation and reprofiling, with storage times for excavated turves in timeframes of days/weeks; and
- Embankments to be reseeded / covered with saved turf excavated from the field when stream rerouting takes place.

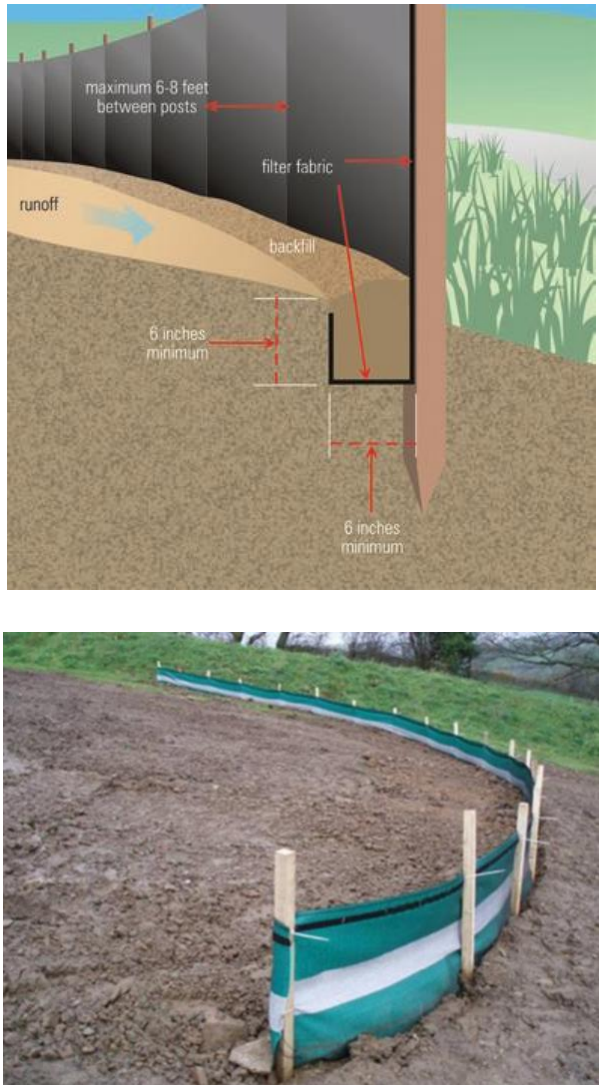


Figure 6-1: Examples of suitable silt fence mitigation ensuring maximum safeguarding efficiency

Concrete Management Procedures

A concrete management plan will be drawn up at the outset of the project to ensure that the use of concrete is limited where possible, that safe management of concrete pours, management of concrete lorries and washing of materials used in concrete construction etc. It will cover at minimum the points below:

- Washout of concrete plant will occur at a designated impermeable area with waste control facilities and not adjacent to any watercourse.
- 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.
- 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.
- Wherever reasonably possible, pre-cast concrete features should be utilised to minimise the risk of a concrete-based pollution event.
- Controlled release or pre-washing of installed culverts to ensure the first release of water through culverts does not result in a washing through of concrete (and other built-up debris).
- 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.

6.2.2 Pollution Control Plan

The Contractor will ensure that the following mitigation measures are in place in order to protect against accidental spills or leaks:

- Hydrotreated Vegetable Oil (HVO) to be used where possible to reduce GHG emissions.
- 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 10 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;
- Regular inspections and maintenance of plant and machinery checking for leaks, damage or vandalism will be made on all plant and equipment.
- Emergency response awareness training for all Project personnel on-site works.
- 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.
- 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.
- All used spill materials e.g., Absorbent pads, will be placed in a bunded container in the Contractor's compound. The material will be disposed of by a licenced waste Contractor at a licenced facility. Records will be maintained by the environmental site manager.
- 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 the site compound.
- All tank and drum storage areas on the site will, as a minimum, 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.

- 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).
- 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.
- Damaged or leaking containers will be removed from use and replaced immediately.

Dust Management Plan

Where works are being conducted under dry and windy weather conditions, the following measures will be implemented to prevent excavation- and cement-based dusts entering the local surface water network and QI supporting ex-situ habitats:

- Water spraying of conveyors/conveyor transfer points, stockpiles and roads;
- Dust suppression measures will be implemented. Dust suppression kits and the water cart will both be available at all compounds;
- Wheel washing of vehicles leaving the site, covering of fine dry loads, or spraying of loads prior to exiting the site, and if necessary regular cleaning of public roads in the vicinity of the entrance;
- Traffic management measures will be implemented for Concrete Mixers arriving / waiting on site (this will be detailed in the construction stage Traffic Management Plan);
- 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.

6.2.3 Flooding During Construction

There is a possibility that a flood will occur during the construction phase. 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. Where possible and practical, earth works will take place during the driest season, to reduce the risk of flooding which could result in mobilisation of significant quantities of unconsolidated material.

An emergency response plan will be drawn for implementation in the event of a predicted storm or weather event with the potential to cause flooding.

6.3 Site Specific Ecological Mitigation Measures for Construction Phase

6.3.1 Construction of the Walls

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 adjacent 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.

Bankside Construction

There are proposed walls running along sections of either bank of the River Owenass, or on lands setback from the banks. Silt fencing may not be feasible in certain areas due to the presence of existing trees. 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 should 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. Note Lean mix concrete must not be used near any watercourse to avoid it leaching out.

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.

Instream Works

There will be scheduled instream works along the River Owenass Figure 6-2, 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 and Otter, and non-QI species, such as Eel.

All instream works will be approved by IFI and overseen by the Project Ecologist for its duration. All instream works will follow the guidance in:

- Guidelines on protection of fisheries during the construction works in and adjacent to waters (IFI, 2016)
- OPW Environmental Guidance: Drainage Maintenance & Construction (Brew, T., Gilligan, N., 2019)

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

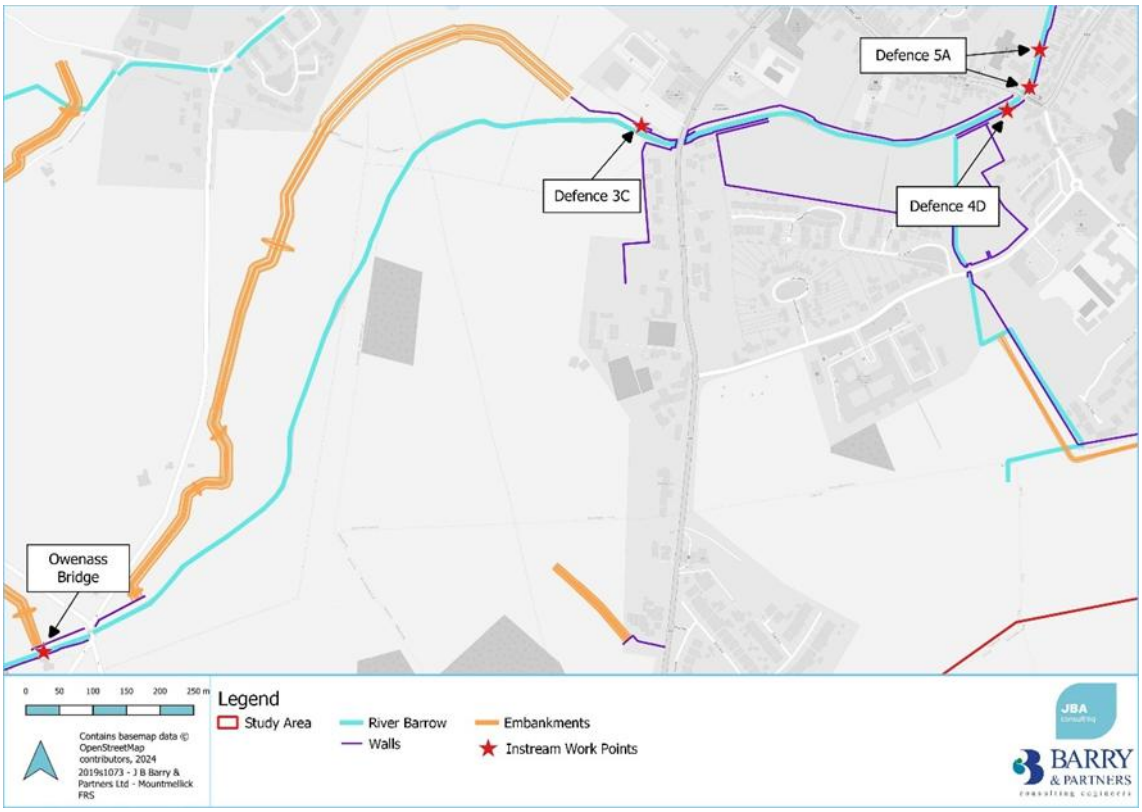


Figure 6-2: Areas of instream works

River pumping during dry cell works

All instream works will be done in accordance with IFI and OPW guidelines, and subject to IFI approval. Stream realignment works will be overseen by Project Ecologist who will monitor all stages of instream works, with regular reporting to IFI.

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

Clontygar Stream realignment

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

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

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

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

IFI present on site when the watercourse is initially diverted. A construction method statement and a detailed work plan will be required for the electrofishing licence.

6.3.2 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.

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 should be introduced back into the river only after suspended sediment has settled and/or filtered from the water, this should be approved by IFI where instream works are occurring and monitored by the Project Ecologist.

One approved method involves pumping water into a created settling pond more than 30m from the river, before slowly spilling the water through silt bag traps into a discharge point located on the edge of the local river. 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 Project Ecologist will be there to secure them and ensure their safe return to the River Owenass.

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

Monitoring of noise and vibration will be required by the ECoW to mitigate impacts to nearby sensitive receptors.

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

6.3.3 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)’ and OPW Environmental Guidance: Drainage Maintenance & Construction (Brew, T., Gilligan, N., 2019). 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 a method statement. 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.
7. The dry cell will be removed, and the river will be allowed to flow again, **before** steps 1-6 are to be repeated for the demolition of the second half of the bridge.

Following this, the construction elements of the bridge can begin. Construction of the bridge will require similar mitigations for the protection of the river habitat and local 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.

6.3.4 Culverts

There will be installation of new culverts along the River Pound and realignment of the Clontygar Stream, along with a series of 14 temporary culverting along the land drains throughout the scheme.

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

- A gradient of 5% should never be exceeded, with 3% being the preferred upper limit
- Be positioned such that both the upstream and downstream invert shall be 500mm below the upstream and downstream riverbed invert levels respectively.
- Piped culverts should be avoided wherever possible, with inverted U shape or box culverts over the existing stream bed being the preferred option. A piped culvert should be avoided wherever possible. 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 should 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 should, 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 or suitable native species) 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 150Wm^3.
- Head drops should 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 should be adequately spaced to approximately 230mm to allow for fish passage. Mesh screens should be avoided.

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

6.3.5 Construction of Embankments

In areas where works are anticipated to be adjacent to trees, scrub and hedges of the SAC, but not directly involving their removal (such as works along the banks of the River Owenass), the following mitigation measures will be put in place:

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 arboricultural consultant.

Enaction of Works

- Excavation or piling works in the vicinity of trees scheduled for retention are to be supervised by a qualified arborist, in order to monitor the level of root severance if at the time of works. A schedule for removal of vegetation is outlined within the accompanying EIAR biodiversity chapter, as this section pertains to local birds and bats, and does not relate to any QI species of the River Barrow and River Nore SAC.
- If it is determined by the arborist that the level of impact is too great and that the stability of these trees and tree loss is unavoidable works must be stopped, a full assessment of trees to be removed will be required as well as an assessment on the bank stability, looking specifically at the link between the tree roots and how they support the bank.
- Any of the works that cause accidental damage to local trees that has not already been planned and scheduled, will be reported to the local arboricultural consultant immediately.

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.

6.3.6 Stone Wall Preservation

The stone wall identified that runs between the Mill and Convent Bridge will have its flora preserved as much as possible through the manual dismantling of the wall prior to works in the area,

If the stones are to be stored during the time between the dismantling and reuse elsewhere in the site, the stones shall have their original orientation in the sun maintained, if possible (and no removal of vegetation on the stones), to allow the established communities to retain their tolerated growth conditions.

6.3.7 General Avoidance Measures

Although it has been identified that there will be no permanent impact through disturbance to wildlife during the work, it is advised that general avoidance measures be undertaken to protect wildlife while the works are being carried out.

General avoidance measures that should 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 should be avoided. If the use of lighting is essential, then a directional cowl should be fitted to all lights to prevent light spill and to be directed away from all treelines / wooded areas.
- Contractor s 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 should be capped when not in use (especially at night) to prevent local fauna becoming trapped. Any excavations should be covered overnight to prevent animals from falling and getting trapped. If that is not possible, a strategically placed plank should be placed to allow animals to escape.

6.3.8 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 4 years, some lighting guidelines are included in the event that working at night takes place.

Hours of illumination during works and operational phases:

Any 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.

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 should be used where possible due to their sharp cut-off, lower intensity, and dimming capability. A warm white spectrum (3000K) should be used in the lighting located along the boundaries of the site to reduce the blue light component.

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 should be restricted. A height of 6m or less is necessary to avert lighting impacts.

6.3.9 Fish - Eel

Fish salvage and translocation works will need to take place in advance of dewatering.

Fish in the area will likely leave through disturbance, however, if any become entrapped, they will also require removal. 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)[1]. 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 the Project Ecologist under license - Section 14 of the Fisheries (Consolidation) Act, 1959 as substituted by Section 4 of the Fisheries (Amendment) Act, 1962.
– The precise location of the proposed piling must be communicated with the electrofishing lead who will conduct the translocation work in tandem with the piling efforts. Stop nets reaching to the river bottom will be erected around affected areas.
– The electrofishing lead will assess the substrate conditions to determine if appropriate habitat is present before by fishing the areas using a zigzag pulse and draw manner with a minimum effort of 1 minute's fishing per sq. m.

[1] 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.

- 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 should be returned to the river as soon as they are caught. Others that may be caught during fishing efforts should be moved to an aeration system before being transported to a section of the River Owenass with appropriate habitat. Fish should not be kept within the aeration system for more than 2 hours.
- Fishing efforts should continue until 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% and less than 120%. 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.

6.3.10 Otter

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

- Limit the hours of working to daylight hours, to limit disturbance to nocturnal and crepuscular animals.
- Contractor s 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 should be capped when not in use (especially at night) to prevent local fauna becoming trapped. Any excavations should be covered overnight to prevent animals from falling and getting trapped. If that is not possible, a strategically placed plank (at an angle no greater than 45 degrees) should be placed to allow animals to escape.

6.3.11 Crayfish Plague

Prior to the entry and exit of the areas of instream works, the equipment used should undergo the Check, Clean and Dry protocol. This work should also follow OPW Environmental Guidance: Drainage Maintenance & Construction (Brew, T., Gilligan, N., 2019) in relation to Biosecurity measures. Only licensed personnel can handle and relocate native crayfish. Additionally:

- All wet gear should be checked for potentially contaminated materials such as silt, mud, animals or plants, and removed and left on site.
- It then should be thoroughly cleaned with disinfectant or hot water (over 60ºC).
- Equipment should then undergo a 48hr drying period. If complete drying is not possible, the equipment should be soaked, sprayed or wiped down with a disinfect and such as Virkon Aquatic Virasure tablets.

6.1 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:

6.1.1 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.

Areas that are scheduled to have embankments present, are planned to be grass seeded or sown with an indigenous wildflower mix to suit the location.

6.1.2 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, in particular in the areas of scrub removal within the SAC boundary.

6.1.3 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. If possible, these bat boxes should 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. Also refer to EP 26 in OPW Environmental Guidance: Drainage Maintenance & Construction (Brew, T., Gilligan, N., 2019). A summary on installing bat boxes can be summarised as:

- Suggested locations include areas with mature trees within treelines.
- All bat boxes should 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.

6.1.4 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. A selection of the following is recommended:

- 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.

6.1.5 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.

6.2 Dust and Air Quality

The following mitigation measures are to be implemented during the construction phase:

6.2.1 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 Site Manager/Site Engineer.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.

Dust Management Plan

Where works are being conducted under dry and windy weather conditions, the following measures will be implemented to prevent excavation- and cement-based dusts entering the local surface water network and QI supporting foraging habitats:

- Limit the breaking of the topsoil or earth stripping from occurring during dry and windy weather.
- Water spraying of conveyors/conveyor transfer points, stockpiles and roads;
- Wheel washing of vehicles leaving the site, covering of fine dry loads, or spraying of loads prior to exiting the site, and if necessary regular cleaning of 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

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.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active 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 km/h on surfaced and 10 km/h 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.

6.2.2 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.

6.2.3 Measures specific to earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or tackifiers 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.

6.2.4 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.

6.2.5 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.
    - If a programme of air quality monitoring shall be implemented at the site boundaries for the duration of construction phase activities to ensure that the air quality standards relating to dust deposition and PM10 are not exceeded, the following limits are recommended;
- Dust Deposition Rate limit = 350 mg/m2/day (averaged over a 30+/-2-day period using Bergerhoff Gauge Method).
- Dust Deposition Rate limit affecting sensitive ecological receivers = 1,000 mg/m2/day
- PM10 24 Hour Mean concentration limit = 50 µg/m3 not to be exceeded more than 35 times a calendar year
- PM10 Annual Mean concentration limit = 40 µg/m3
- PM2.5 Annual Mean concentration limit = 25 µg/m3

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 Site Manager/Site Engineer and in the event of a complaint relating to dust nuisance, an investigation shall be initiated.

6.3 Noise and Vibration

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 hours 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 manufactures. 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.

6.4 Materials Source and Transportation

6.4.1 Material Sourcing

In so far as possible, construction materials will be from local sources. All imported material that will be used on site will be procured from approved sources.

All construction products will be subject to the European Union (Construction Products) Regulations 2013. CE marking will be mandatory for all construction products placed on the market for which harmonised standards are in place. The Construction Products Regulation aims to ensure that reliable performance-related data is made available, by means of Declarations of Performance, in relation to construction products being placed on the European market.

6.5 Material Storage

Materials stored on site must be in a waterproof and secured protected storage area.

6.5.1 Transportation of Materials

Transportation of building materials can significantly contribute to their environmental impact, particularly in relation to use of fossil fuels and emissions of pollutants and carbon dioxide. For this reason, insofar as possible, construction materials will be sourced from local suppliers.

Construction of the proposed scheme will require the delivery to site of typical quantities of construction materials. The bulk of these materials will be associated with the construction of embankments and walls.

6.6 Traffic

Construction vehicles will be required to adhere to the Construction Traffic Management Plan (CTMP) to be prepared by the appointed Contractor. The CTMP will 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.

6.6.1 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 6-3). 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 Grove Park 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.

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, sub contractor'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.

6.6.2 Construction Vehicle Movements

During construction, there will be an estimated total of 7389 truck movements throughout the 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 defence 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.

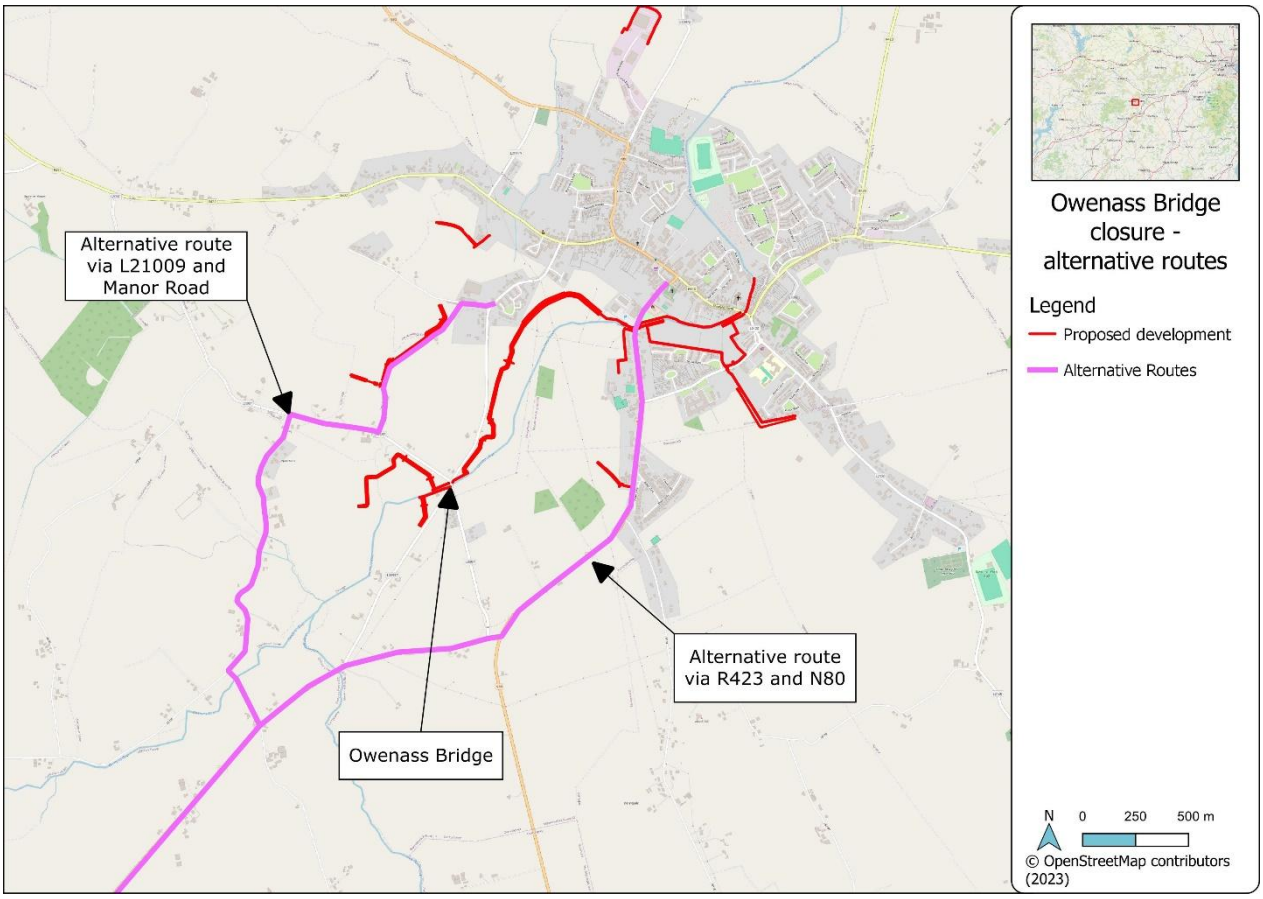


Figure 6-3: Diversion routes during the Owenass Bridge Replacement

6.7 Cultural Heritage

6.7.1 Built Heritage

Project Conservation Engineer

As recommended by the NBHS a Project Conservation Engineer will be retained during the detail design, construction and reinstatement stages of the FRS scheme. The Project Conservation Engineer will ensure that the methodologies that are outlined in EIAR Chapter 10 Appendix 10.7 are carried out in full, and that the work is of the highest standards. They will continue to liaise with NBHS throughout the detailed design and construction stage of the development.

Boundary Walls -Methodology and Specifications

Prior to the dismantling of the short sections of property boundary walls (CH6 reference Chapter 10 of EIAR) 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 reference Chapter 10 of EIAR) 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.

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 reference Chapter 10 of EIAR). This will include a written and photographic record and scaled drawings and will serve to provide a record of the past.

6.7.2 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.

6.7.3 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.

The testing should take place well in advance of the construction phase of the development to inform. 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. The results of the testing will inform detailed design and construction stage programme and will allow for the appropriate timing of the archaeological resolution (excavation) to take place in advance of construction.

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.

An archaeological testing strategy will be developed in consultation with the OPW Project Archaeologist and will be submitted to the National Monuments Service for approval. A method statement and licence or consent applications will then be submitted to the NMS for review and approval.

6.8 Waste Management

All construction waste will be segregated and removed to an approved licenced soil recovery facility, there are seven licenced sites within Co Laois that have been sourced to have capacity to receive unsuitable material (https://facilityregister.nwcpo.ie/). A Resource & Waste Management Plan (RWMP) and a Construction Traffic Management Plan (CTMP) 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
- 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
- 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 Health and Safety Management.

6.8.1 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 will be segregated at the main site compound for recycling by waste type, i.e. metal waste, timber waste, plastic waste and general waste (landfill). Waste materials will also 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.
- The recovery or disposal method for the waste.

Only Contractor s 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.
- 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.
    - 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.

6.8.2 Clearance and Excavation

A key waste reduction strategy will be reuse of material where feasible. Over one third of excavated soil will be reused as backfill on site. The Contractor will also explore other reuse options off-site, such as reuse as a byproduct under Article 27. These strategies will reduce the amount of material being exported off-site as a waste. It is assumed that there will be a wastage of approximately 10% of all waste generated on site.

Encounters with contaminated ground are not anticipated. Excess inert soils and sub-soils will be recovered off-site. Soil will only be removed by authorised waste collectors to an authorised site. Any material excavated at the site, which is deemed to be contaminated (i.e., non-hazardous or hazardous) will be stored separately to the inert material, sampled and tested, in order to appropriately classify the material as non-hazardous or hazardous in accordance with EC Council Decision 2003/33/EC10, which establishes the criteria for the acceptance of waste at landfills before being transported to an appropriately authorised facility by permitted Contractor s.

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 should 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 should 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 (Summary of Soil Trigger Levels for Soil recovery Facilities) of the Environmental Protection Agency's Draft Publication – Waste Acceptance Criteria and Development of Soil Trigger Values for EPA-Licenced Soil Recovery Facilities, December 2017.

OPW's Technical Note ENV02_Article 27 Management of By-Products on FRS 2023 https://www.gov.ie/en/publication/b15dd0-technical-specifications-and-guidance-notes/ will also be taken into consideration.

The acceptance of waste at a licenced soil recovery facility will be subject to the approval of the facility operator.

6.9 Pest Control

It is recommended that a rodent and pest control plan is put in place to manage and limit any potential disturbance to populations that may utilise the site. The pest control plan should be in accordance with the following guidelines:

- Chartered Institute of Environmental Health (CIEH) "Pest minimisation: Best practice for the construction industry" or a similar appropriate standard.

A Pest Control Plan for the construction phase shall be completed and included in the project CEMP written by the Contractor.

6.10 Soils and Geology

- The Contractor is 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 negative 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.
- Stockpiles will not exceed 1.5m in height and shall be shaped to shed water.
- A waste sampling strategy will be included for fill material, testing and importing 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 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 using a geo-synthetic material to prevent concrete runoff into the soil/ groundwater media. Wash down and washout of concrete transporting vehicles will take place in a designated bunded concrete washout area.

6.11 Biosecurity

Biosecurity measures will be adhered to, these include: 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.

These will be included in the INNS Management Plan will be put in place for each instance and the locations of known invasive species will be mapped by the Contractors Environmental Clerk of Works (ECoW). Each instance will be recorded on the Environmental Control Maps (ECM's) which will be prepared by the ECoW.

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.

Work will be carried out in compliance with OPW Environmental Guidance: Drainage Maintenance & Construction (Brew, T., Gilligan, N., 2019) Section 3.

Following the recommendations outlined by All About Trees Ltd. & NM Ecology Ltd. (2023), should the works be begun prior to 2026, it is recommended that the remaining Japanese Knotweed within the footprint is resolved either by being excavated and sent off-site or buried in a lined pit. Subject to the agreed method of removal this may require the application of a derogation license through NPWS.

7 Monitoring during Construction

7.1 Water Quality Monitoring

Water quality monitoring must be carried out prior to and during construction in order to establish baseline water quality metrics, evaluate the impacts of the construction whilst ongoing, and how the works impact water quality once the site has been restored. Monitoring and assessment should follow EPA guidance. The data will be submitted to IFI in Quarterly Water Quality Monitoring Reports.

The parameters that are measured for OPW ERC flood relief schemes during construction are indicator parameters, including pH, temperature, DO, EC, TDS and turbidity. Turbidity/Suspended Solids (TSS) is also measured as part of the baseline water quality monitoring report and a turbidity correlation is calculated. Turbidity is then measured on a monthly basis in the field. Monthly monitoring rounds are carried out with reports submitted to IFI on a quarterly period.

These metrics will be collected on all streams within the construction area. Monitoring during construction will be within the remit of the ECoW, who will have a stop-works power to halt activity as needed. In-field/live analysis of results such as:

- pH,
- Dissolved Oxygen,
- Conductivity
- Turbidity/Suspended Solids

will be undertaken by the ECoW to allow reactive management, especially during instream works, and where releasing water after working in the dry, or other high impact situations. Discharge standards for pH, dissolved oxygen and turbidity will meet Surface Water Regulation Standards, while the turbidity/suspended solids threshold will follow the25mg/l limit outlined in the Salmonid Water Regulations, or comparable to water quality standards achieved upstream, as determined by baseline.

7.2 Dust and Air Quality Monitoring

Monitoring of Air Quality and Dust related impacts will be required during the construction stage only of the proposed development. The monitoring activities are to:

- Undertake daily on-site and off-site inspection, where receptors (including schools, residential properties and roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority if and when requested. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.
- Carry out regular site inspections to monitor compliance with the dust management measures, record inspection results, and make an inspection log available to the local authority if and when requested.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree dust deposition and/or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site.

Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.

7.3 Archaeological Monitoring

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 (refer to EIAR chapter 10).

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 to 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.

Material excavated from the river

An archaeological assessment of 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 should 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 should 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 should 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.

8 Pollution/Incident Response Plan

8.1 Objective

If an environmental emergency or incident arises, the Contractor will implement the Environmental Emergency Procedures. The procedure will be prepared and agreed with Laois County Council in advance of work proceeding at the site. The most likely causes of an environmental emergency may arise:

- Discharge of potentially polluting materials;
- Rupturing of a silt fence or curtain during heavy periods of rain;
- An uncontained spillage in the Contractor's compound;
- Storm/adverse weather;
- All Contractor s and sub-Contractor s will be made aware of the Emergency/Incident Response Plan. The Emergency/Incident Response Plan will address, as a minimum:
    - Fuel handling procedures;
    - Silt curtain construction details;
    - Adequate supplies of spill control equipment;
    - Notification procedures; and
    - Measures to protect water in the event of a spillage.
- In the event of a spill the Contractor will ensure that the following procedures are in place:
    - Emergency response awareness training for all Project personnel on-site works.
    - 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.
    - Spill kits will be stored in the site compound with easy access for delivery to site in the case of an emergency. A minimum stock of spill kits will be maintained at all times and site vehicles will carry spill kits at all times. 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 booms; and
        - Absorbent mats/cushions.
        - Spill kits will contain gloves to handle contaminated materials and sealable disposal sacks.
        - Track mats will be provided to ensure access following heavy rainfall.
    - Any contaminated materials/soil media will be segregated, analysed and disposed of by a licensed waste disposal Contractor.

8.2 Environmental Emergency Contacts

Provided below are some contact details for organisations/statutory bodies that should be contacted if an environmental emergency arises on site. The appointed Contractor will add to this as needed.

- Laois County Council Environmental Protection Department Tel: (057) 867 4312
- Laois County Council Emergency Telephone Contact Outside Office Hours: dial 999 / 112,
- Laois County Council General Telephone Contact (057) 86 64000
- Inland Fisheries Ireland, 3044 Lake Drive, City West Business Park, (01) 884 2600
- Local Conservation officer, NPWS, 90 North King Street, Dublin, (065) 6846307

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