



OPW Oifig na
nOibreacha Poiblí
Office of Public Works

NENAGH
Flood Relief Scheme
Engineering & Environmental
Consultancy Services
PROJECT BRIEF

FLOOD RISK MANAGEMENT SERVICES
OFFICE OF PUBLIC WORKS

PROJECT BRIEF Document Control Sheet

Project Brief

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OTHER SPECIFICATIONS & GUIDANCE

The use of the following specifications and guidance is specified within this Tender Specification, and are available on <http://www.gov.ie/opw²>.

The Consultant shall use the versions of the specifications and guidance that are current at the time at which the relevant work is being undertaken during the Project.

- COST BENEFIT ANALYSIS METHODOLOGY
- OPW FRS ENGINEERING SPATIAL DATA SPECIFICATION
- OPW FRS ENVIRONMENTAL SPATIAL DATA SPECIFICATION
- OPW FRS PROJECT WEBSITE SPECIFICATION
- OPW DEFENCE ASSET CONDITION SPECIFICATION

¹ <https://www.gov.ie/en/publication/b15dd0-technical-specifications-and-guidance-notes/>.

GLOSSARY

AA	Appropriate Assessment
AIA	Archaeological Impact Assessment
AEP	Annual Exceedance Probability (expressed as a percentage)
AFA	Area for Further Assessment
BATNEEC	Best Available Techniques not Entailing Excessive Cost
CEMP	Construction Environmental Management Plan
CFRAM	Catchment Flood Risk Assessment and Management
CIRIA	Construction Industry Research and Information Association
DAD	Defence Asset Database
DTM	Digital Terrain Model
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
FRMP	Flood Risk Management Plan
FRS	Flood Relief Scheme
HPW	High Priority Watercourse
IFI	Inland Fisheries Ireland
IRR	Individual Risk Receptors
MCA	Multi Criteria Analysis
MPW	Medium Priority Watercourse
NIAH	National Inventory of Architectural Heritage
NIS	Natura Impact Statement
NPWS	National Parks and Wildlife Service
O&M	Operation & Maintenance
PFRA	Preliminary Flood Risk Assessment

RMP	Record of Monuments and Places
SAC	Special Area of Conservation
SID	Strategic Infrastructure Development
SEA	Strategic Environmental Assessment
SMR	Sites and Monuments Record
SPA	Special Protection Area
WFD	Water Framework Directive

1 INTRODUCTION

1.1 Background

The OPW, working in partnership with Tipperary County Council and other Local Authorities, commissioned and have completed the Shannon Upper & Lower River Basin Catchment Flood Risk Assessment and Management (CFRAM) Study.

The Shannon Upper & Lower River Basin ('Shannon') CFRAM Study Area included Nenagh as an Area for Further Assessment (AFA) and identified that a flood relief scheme for the community would be appropriate to be further developed for implementation.

To advance and implement a flood relief scheme (hereafter referred to as the 'Scheme') for Nenagh, Tipperary County Council (*hereafter referred to as 'the Client'*), supported by a *Steering Group*, intends to commission a Contract, hereafter referred to as the 'Project', to develop and assist with the implementation of the Scheme. This Contract will be procured using one Consulting firm (*hereafter referred to as "the Consultant"*) to progress both the Engineering and Environmental elements of this Tender Specification.

1.2 Project Objectives

The objective of this project is the identification, design and submission for planning consent of a Flood Relief Scheme, that is technically, socially, environmentally and economically acceptable, to alleviate the risk of flooding in the community of Nenagh to a determined Standard of Protection, to complete the detailed design, and to procure, manage and oversee the construction of that Scheme.

The tasks that are to be carried out by the Consultant to fulfil this objective are described in detail within this Tender Specification.

1.3 Project Structure

Tipperary County Council is the Contracting Authority and the Client for the purposes of the Project. The Project will be carried out under direction and guidance from the Steering Group.

The Steering Group will comprise of representatives from the Tipperary County Council, the OPW, and other key stakeholders as deemed necessary by the Client. The Steering Group will oversee delivery of the Project and will monitor progress and implementation thereof. The Steering Group shall be chaired by Tipperary County Council. Following their appointment, the Consultant shall attend and service meetings of the Steering Group.

Tipperary County Council may appoint a representative to support their role as Client, who will be the primary point of contact for the Consultant.

The Project shall comprise of up to five stages, as set out below:

- Stage I: Option Identification & Preliminary Design
- Stage II: Consent Processes & Detailed Design
- Stage III: Construction Works Procurement
- Stage IV: Construction Works, including Management and Supervision
- Stage V: Handover of Works

Stage I, and, if commissioned, Stage II of the Project shall be undertaken on a lump-sum basis by the Consultant. Stages III, IV and V (if commissioned) of the Project will be based on a percentage fee of the works cost. Note the Client may re-tender consultancy services for Stage III, IV & V (either for all of the preferred scheme or for the later stages after implementation of the initial stage).

The progression of this Project beyond Stage I is dependent on a number of factors, and all stages of the Project may not be required. It is a matter for the Client to decide whether this study proceeds to a subsequent stage, i.e., from Stage I to Stage II, or from Stage II to III, etc.

A civil works Contractor/s will be procured in a competitive process. The procurement strategy for any civil works must be approved by the Steering Group prior to development of tender documents.

1.4 Scope of Services - Overview

The following sections outline the level of detail required, and provide an overview of the Scope of Services required of the Consultant, to deliver the Project Objectives. The detail of the Scope of Services is provided in the sections of this document subsequent to the overview.

1.4.1 Level of Detail

The Consultant shall carry out their own work, and carry out their duties with regard to third-party service providers, to a level of detail that meets the following requirements:

Stage I:

- Provides confidence to the Client, Steering Group, public and stakeholders in the viability of the Potential Options and Preferred Option, and,
- Provides sufficient evidence to justify the elimination of non-viable measures, and,
- Fulfils the requirements of the planning and environmental consent processes, and
- Provides Preliminary Design, and ensures no reasonably foreseeable variations arise in subsequent stages.

Stage II:

- Prepares and collates documentation required for a successful outcome to the planning and environmental consent processes.
- Provides Detailed Design;

- Satisfies any requirements attached to the planning and environmental consents achieved, and,
- Prepares Construction Tender Documents that reflect full completion of Detailed Design.

Stage III:

- Administers a transparent and competitive tender process that satisfies all public procurement legislation and guidance.

Stage IV:

- Provides rigorous management services so that construction works proceed with minimum changes to cost, minimum cause for dispute, and minimum interruption.

Stage V:

- Provides confidence to the Client, Steering Group, public and stakeholders of the effective completion of the Scheme to the required Standard of Protection.

1.4.2 Specific Service Items

Specific Service Items, whose requirements are described in this Project Brief, have been identified as likely to vary in quantity during the project, either on a 'per unit' or a 'time and rate' basis. These Specific Service Items are listed in the "Specific Service Items Rates & Quantities" spreadsheet provided, and directly reference the relevant section of the Project Brief. These items have been identified to provide a mechanism for amending the contract sum.

Those 'per unit' Specific Service Items have estimated or known minimum quantities identified, and shall be included in the total tendered sum.

Those 'time and rate' Specific Service Items, if or when required by the Client, are excluded from the total tendered sum as their scale and scope are not yet known. Adjustments to the Contract Sum shall be applied based on the agreed time input and hourly rates

Full details are included in the tender and contract documentation.

1.4.3 Overview of All Stages (as relevant and applicable)

- Data Collection and Review
- General Management Services;
- Stakeholder & Public Engagement;
- Project website;
- Contract Management Services;

1.4.4 Overview of Stage I – Option Identification and Preliminary Design

- Hydrological and Hydraulic Analyses
- Baseline environmental surveys
- Environmental Constraints Study
- Identification of Potential Options
- Identification of Preferred Option (the Scheme)
- AA Screening, Natura Impact Statement (NIS), EIA Screening (if required) and Environmental Impact Assessment Report (EIAR)
- Preliminary design, as required to support consent processes
- Provision of all specified Engineering and Environmental Spatial Datasets.

1.4.5 Overview of Stage II – Consent Processes & Detailed Design

- Provision of all documentation required to progress the Scheme through the necessary planning and other statutory processes
- Provision of responses to Further Information or Clarification requests
- Provision of support at Public Displays, Oral Hearings;
- Update Preliminary Design to reflect post-planning requirements
- Detailed Design, construction drawings and specifications
- Update of documents from Stage I (Preliminary Design Report, CCAP, CEMP, O&M Protocol, Buildability Report, CBA Report), to reflect post-planning requirements and construction details
- Prepare Construction Tender Documents using the Public Works Contract (PWC) Forms of Contract, WRD, specifications, and Bills of Quantities

1.4.6 Overview of Stage III – Construction Works Procurement

- Undertake the procurement of the works contractor/s to construct the Scheme, in line with the Capital Works Management Framework
- Preparation of Tender Report/s

1.4.7 Overview of Stage IV – Construction Works

- Construction Project Management Services, including Employer's Representative and site supervision roles, under the PWC Forms of Contract
- Collaborate with the Consultants undertaking construction stage environmental monitoring
- Provide design where changes arise on site
- Review the Contractor's Red Line Mark-up
- Support in any conciliation/arbitration processes

1.4.8 Overview of Stage V – Handover of Works

- Commissioning of the Certificate of Substantial Completion
- Finalisation/sign-off of Final Account(s)
- Provision of the Safety File
- Produce 'As-Built' spatial datasets
- Update all documentation required from Stage II to reflect completed works
- Provide training and information on the operation & maintenance of the completed Scheme
- Handover of Project Website.

2 PROJECT AREAS

2.1 Study Area

The Study Area is broadly considered to be the entire River Nenagh Catchment and shall be the area that contains the:

- Lengths of river channel / watercourse that have hydraulic influence on the area intended to benefit from, and be protected by, any feasible scheme;
- Full hydrological catchment areas draining to the downstream ends of river channels / watercourses;
- Areas that are likely to be impacted hydraulically by the Scheme (i.e. any upstream or downstream effects).
- Areas that require environmental assessments as part of the development of any options or measures.

2.2 Scheme Area

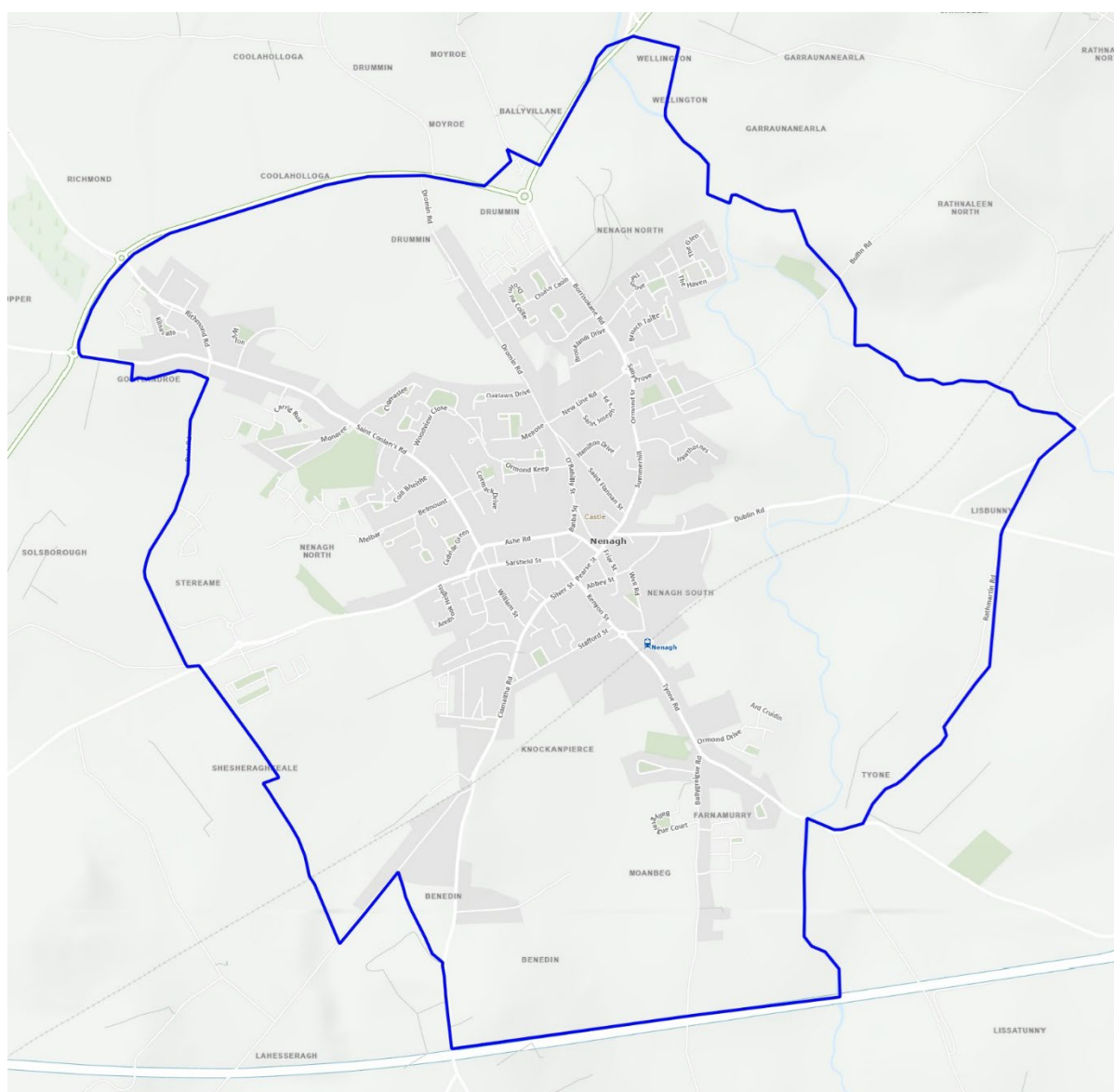
The Scheme Area shall be the area:

- within which physical works are proposed to be constructed, accessed and maintained as part of any feasible scheme;
- Areas that are intended to benefit from, and be protected by, any such scheme;

The outline Scheme Area for this Project is the town of Nenagh, situated in County Tipperary. It is broadly defined as the zoned land as per the Nenagh Local Area Plan 2024-2030, with minor amendments to include areas previously identified as at risk. See [FIGURE 2-1; OUTLINE SCHEME AREA](#).

Further information on the community, and on the sources, mechanisms and degree of flood risk in the community, are provided in the reports for the Shannon CFRAM Study.

Figure 2-1; Outline Scheme Area



2.3 Project Watercourses

The Consultant shall identify and include in the hydraulic model all watercourses within the Study Area that:

- Are required for the Design of the Scheme (and all modelling requirements set out herein), and,
- That are likely to be impacted hydraulically by the Scheme (i.e. any upstream or downstream effects).

Notwithstanding the above, the minimum lengths of primary watercourses to be included within the Hydraulic Model have been estimated in [TABLE 2-1](#) below, and illustrated in [FIGURE 2-2](#).

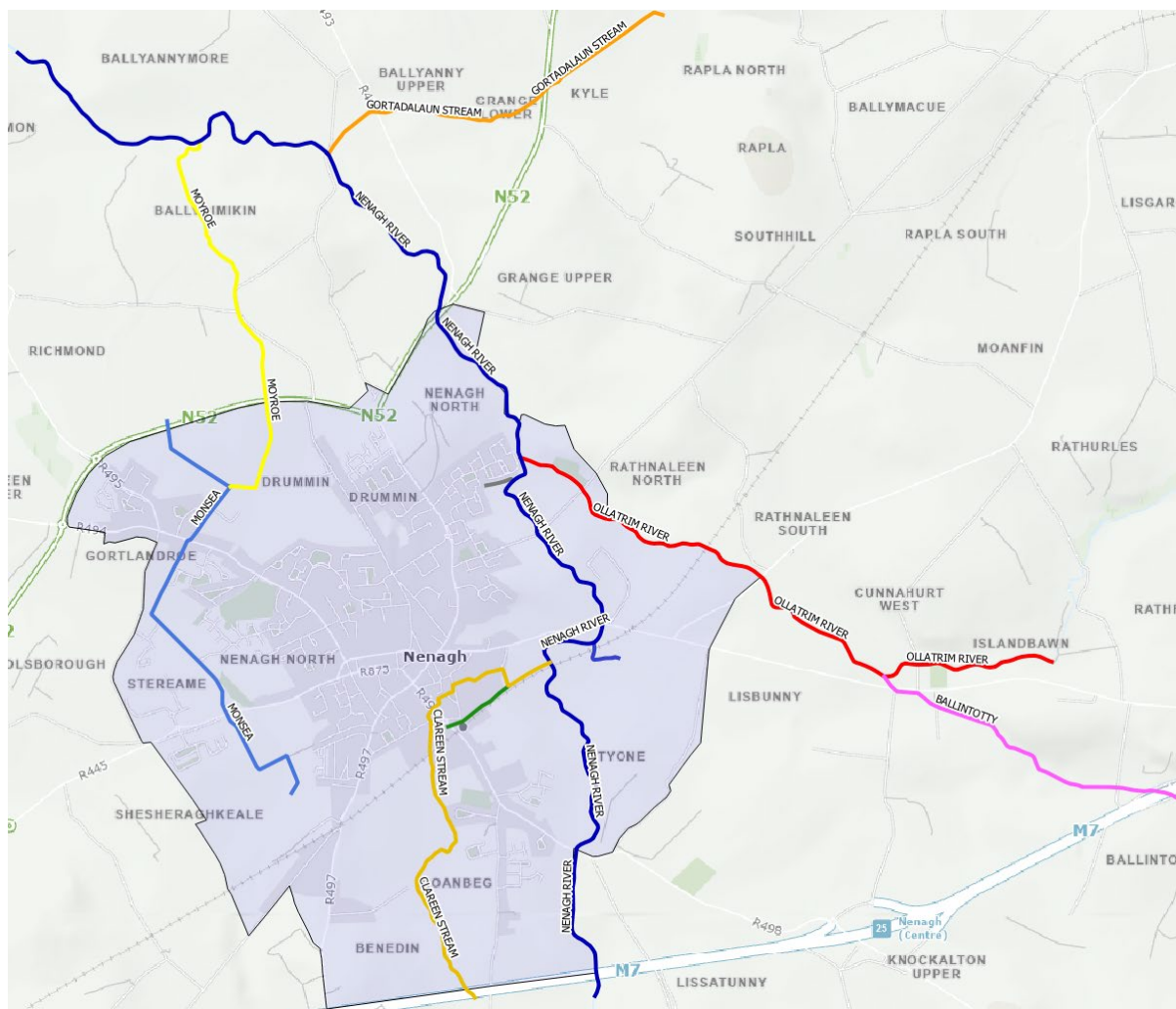
The Consultant shall apply the requirements of this Project Brief to **29** km of watercourse. Payment for variation to the length of watercourse to be included in the model build shall be instructed by the client as a change to the Services, and the Fee adjusted on a time and rates basis in accordance with clause 11.1-7 of the Conditions of Engagement.

Where such a variation occurs, it is to cover the cost of adding the additional watercourse into the model (cross sections, structures etc.) and any additional hydrological analysis needed to provide the required inputs.

Table 2-1; Project Watercourses

No.	Watercourse	Approx. Length
1	Clareen Stream (incl. Culvert	3km
2	Monsea	3km
3	Nenagh River	9km
4	Ollatrim River	4km
5	Ballintotty River	2km
6	Moyroe	3km
7	Others	3km

Figure 2-2; Project Watercourses



2.4 Project Area Information

Nenagh is the largest town in the north of Tipperary and is located approximately 35km to the north-east of Limerick City, 12km to the east of Lough Derg and the River Shannon and 10km to the north of the Silvermine Mountain range.

Tipperary County Council published the Nenagh and Environs Local Area Plan in 2024 and this sets out the local spatial planning framework for Nenagh to 2030. This is available on www.tipperarycoco.ie for download.

Census 2022 identified that the Built-up Area (BUA3) of Nenagh had a population of 9,895. Population growth in the town is driven by an increase in the density of the urban population, increasing from 1,018 persons per square km in 2016 to 1,118 in 2022, a 9.8% increase in density.

Nenagh is a well-connected town in terms of physical access to local, regional and national road networks and to national rail services. It is strategically located within the catchment of Limerick / Shannon Metropolitan Area Strategic Plan, with excellent connectivity by road and/or rail, to Dublin, Limerick, Shannon Airport and the Foynes Port areas.

Nenagh is located on the main rail line (Ballybrophy to Limerick) with a rail station within walking distance of the town centre, at the south of Kenyon Street.

Bus services are provided in the town by Bus Éireann, and private operators, Bernard Kavanagh & Sons and JJ Kavanagh. Nenagh has inter-urban links with Limerick, Dublin and Athlone, as well as more local services to surrounding towns and villages, as well as Thurles, Roscrea, Templemore and Birr.

Nenagh is well known nationally as a market town and provides services to the agricultural surroundings. The Tipperary County Development Plan has designated Nenagh as 'Key Town' with strong capacity for enterprise and employment growth building on its strengths and specialties. The town has strengths in its strong local administrative and services base, providing high-quality employment in the town. There are a number of serviced business parks in Nenagh including the Stereame Business and Innovation Park, Lisbunny Industrial Estate and Gortlandroe Industrial Park.

Nenagh has relatively diverse employment type profile, with significant numbers of people employed in retail and accommodation, public administration and education and social work. Comparative to the other key towns in Tipperary, Nenagh has high number of persons employed in public administration but a relatively low number of persons employed in manufacturing and similar industry. There are 4,903 jobs located within the settlement area of Nenagh, which accounts for almost 11% of the jobs in the County (Census 2022).

Nenagh town sits within the Nenagh Corridor Landscape Character Area (LCA 3), a significant regional area requiring protection and enhancement. Nenagh's landscape designation involves being a designated Key Town within the Tipperary County Development Plan and Regional Spatial and Economic Strategy (RSES), focusing on its historic core, cultural heritage (like Nenagh Castle), and function as a gateway town, with specific zoning categories like

'Urban Core' and 'Existing Residential' defining development areas, all within the broader Nenagh Corridor Landscape Character Area (LCA 3).

Nenagh is also notable as a heritage town with a rich historical character. It is an old rural market town and is recognised for the quality of historical assets. There are a number of iconic structures in Nenagh that define the character of the town including:

- Nenagh Castle Complex (dated to approx. 1200 – 1220) including the castle field and gardens;
- Nenagh Gaol (circa 1840);
- Nenagh Courthouse (circa 1840);
- Franciscan Friary (circa 1250);
- St Mary's Catholic Church (circa 1895)

Recorded monuments and 'Zones of Archaeological Interest' are identified in the Nenagh Local Area Plan mapping.

In order to preserve the character and identity of Nenagh, a large part of the core area of Nenagh is designated as an Architectural Conservation Area (ACA) around the town centre.

The town area itself is not covered by any national or European Union (EU) conservation designations. The nearest EU-protected site is the Lough Derg Special Protection Area (SPA), located just under 7km to the northwest.

There are no NHAs or pNHAs designated within Nenagh, but there is a total of three NHAs and eleven pNHAs designated within a 15 km buffer of Nenagh Town.

Surface water at and around Nenagh is channelled by several rivers and streams, forming part of the Lower Shannon River Catchment. The confluence of the Ollatrim and Nenagh rivers is located to the east of the Millers Brook estate. Smaller partly-culverted watercourses run through the town centre (e.g. Clareen Stream), into the Nenagh River and beyond into the Shannon water system at Dromineer. Parts of the town benefit from Arterial Drainage Schemes - details of schemes can be found on www.floodinfo.ie. A number of other watercourses to the west drain into the Shannon at Youghalarra.

The Shannon Upper & Lower River Basin ('Shannon') CFRAM Study Area included Nenagh as an Area for Further Assessment (AFA) and identified that a flood relief scheme for the community would be appropriate to be further developed for implementation.

Nenagh is served by the Nenagh Regional Public Water Supply (PWS). This PWS serves a population of 14,483 and produces 6,488 m³/day. Raw water is abstracted from Lough Derg and undergoes treatment at the Coolbawn Water Treatment Plant.

Uisce Éireann is responsible for the collection, treatment and disposal of public wastewater. A planned upgrade of the Nenagh Wastewater Treatment Plant is currently underway by Uisce Éireann to increase the capacity of the plant. Ongoing improvement works are required in the town to ensure adequate separation of foul and surface water.

2.5 Project Area Constraints

The Consultant is responsible for identifying any possible engineering and environmental constraints that may impact on the development of the scheme.

2.6 Interfacing Projects

The Consultant shall liaise and engage with any adjoining or interfacing projects. This shall include determining the impact of these projects on the proposed scheme and assisting in minimising the impact of the scheme, where possible, on any adjoining projects.

2.6.1 Nenagh Greenway

A planning application to An Coimisiún Pleanála for the *Nenagh Greenway* is due to be made in Q2 2026. The proposed Greenway route runs adjacent to the Nenagh River along the eastern side of the town, linking the R445 (old N7) with the N52. The CFRAM Study proposed embankments along this route, which means the Option(s) for the Nenagh FRS will likely require some form of measure here. It will therefore be necessary to incorporate the greenway into any proposed measure(s) along this route. Details for the Nenagh Urban Greenway are available at the following link <https://consultations.tipperarycoco.ie/nenaghurbangreenway>.

2.6.2 Lisbunny Link Road

Tipperary County Council proposes to develop a short new section of road through a greenfield site in the town of Nenagh, the Lisbunny Link Road. The scheme is located between the R445 Dublin Road to the south and the L1211 Old Birr Road to the north. A Feasibility Study has been carried out on the scheme and a preferred option for the new link has been developed up to a preliminary design stage.

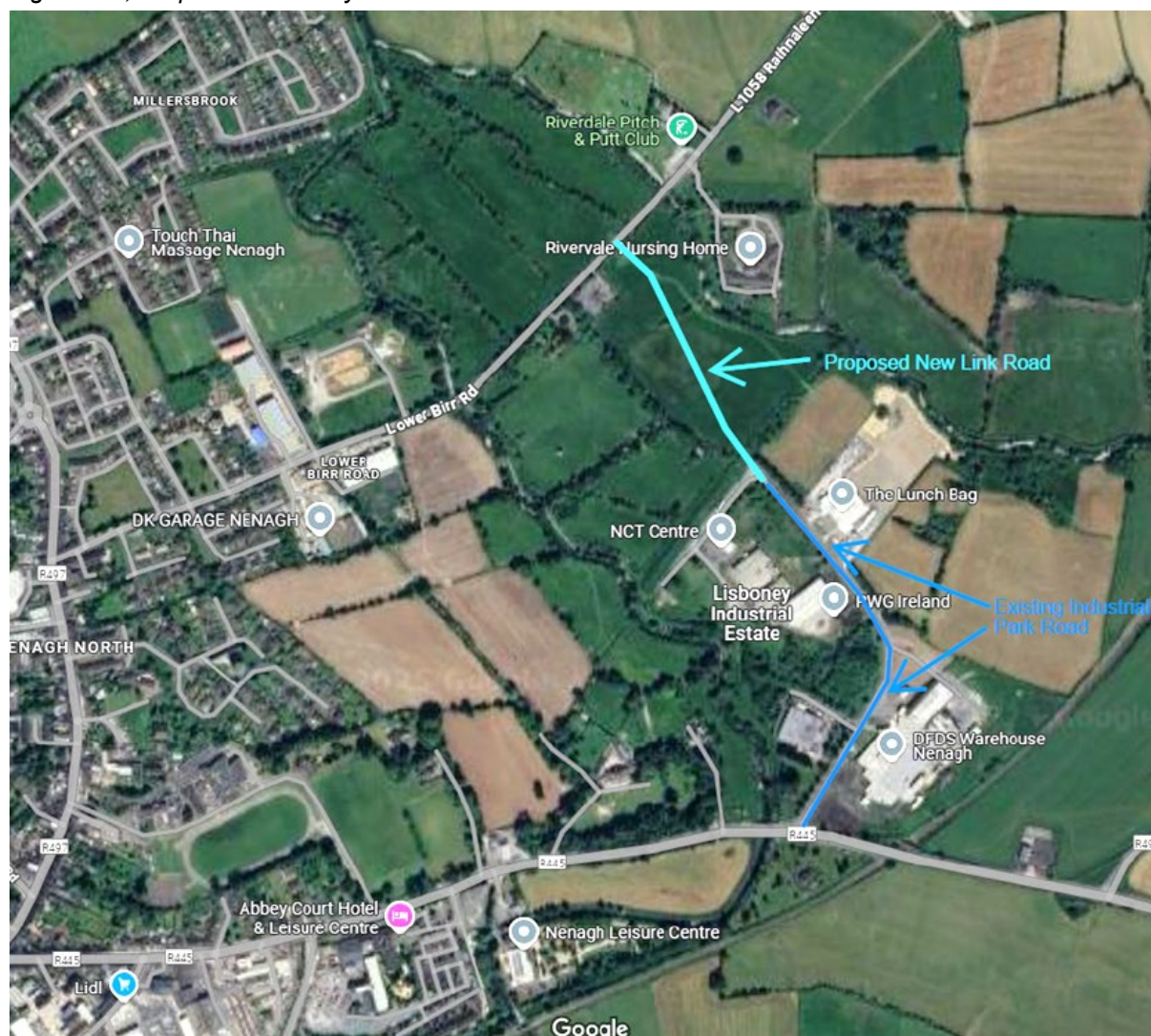
It incorporates a new extension of the existing L5146 Lisbunny Industrial Park road to join the L1211. The proposed new extension is approximately 350 metres in length. Options for the upgrade of the existing L5146 are to be examined and designed within the brief also. The length of existing road potentially to be upgraded is approximately 550 metres.

The preferred design option from the feasibility report has a cross section comprising a 6.5m carriageway and a 1.0m grass verge, a 1.75m cycleway and a 2.0m footpath to one side, with a 1.0m grass verge to the other side.

TCC is in the process of procuring Technical Advisors (TAs) to further develop the scheme. That is, to finalise the detailed design, go through any required planning processes and prepare documents to procure the construction.

As this project progresses it will be necessary to liaise with the design team to ensure a coordinated design for both schemes.

Figure 2-3; Proposed Lisbunny Link Road



2.6.3 Nenagh Centre of Excellence

The Centre of Excellence for Sustainable Energy will be located on Martyr's Road at the site of the former Abbey Machinery yard. While the project may not directly impact on the proposed Flood Relief Scheme, it is however along the route of the Clareen Culvert and will at a minimum be adjacent to the scheme.

It is anticipated that this project will be submitted for Part 8 Planning in Q4 2026, with construction expected to commence in Q4 2027 and an estimated project completion timeline of Q1 2030. The project is led by Tipperary County Council in partnership with the Tipperary Energy Agency, North Tipperary Development Company, the Technological University of the Shannon (TUS), Community Power and Siga Limited. This project will develop a Centre of Excellence for Sustainable Energy which will be the anchor and catalyst for the redevelopment of the Martyr's Road Regeneration Quarter. The Centre of Excellence will host a range of public agencies working collaboratively to deliver innovation solutions from training and development to new cutting-edge research on technologies, to incubating low-carbon social

enterprises. It will also deliver public infrastructure, civic spaces and public realm enhancement and will consolidate the linkages to the town centre and unlock the potential for the overall area. The development will transform a 10-hectare brownfield site in the heart of Nenagh into a modern, carbon-neutral hub of activity. As part of the broader vision, the surrounding area, including Friar Street and Emmet Place, will also be revitalised to create a new town centre amenity that enhances both functionality and community engagement.

<https://www.tipperarycoco.ie/sites/default/files/2022-08/Nenagh%20Centre%20of%20Excellence%20for%20Sustainable%20Energy%20-%20Concept.pdf> (copy and paste link into browser)

3 GENERAL TECHNICAL SERVICES

3.1 General Requirements

The Consultant shall undertake the duties described in this section as relevant to each Stage and within the associated Performance Periods.

The Consultant shall identify and collect all data that they require to fulfil the Project Objectives and their role as Designer of the Scheme. This shall include all data detailed in this section, but also any additional data they require, such as:

- Relevant planning and development information; including that concerning existing development, and possible future development, would be available from plans such as the National Planning Framework and other relevant documents under Project Ireland 2040, Development Plans (or Draft Development Plans), Local Area Plans, Master Plans, etc.
- Other existing survey & geotechnical data;
- Surface, foul, and combined drainage system data;
- Receptor data;
- Information on relevant third-party projects;
- Previous reports or studies concerning the flood hazard, risk or possible flood relief measures, and information on current flood risk and water management measures / practices already put in place, or other flood-related matters for the Study Area undertaken under other national programmes or other EU Directives. Sources of such reports and information might include, but not necessarily be limited to, the OPW, the Local Authorities, the EPA, universities, public libraries, or other sources.

Upon Commencement, the Consultant shall establish, and subsequently maintain throughout the Project, a Data Register that shall identify any information, data, reports or other items (such as those noted herein) that are relevant to the Project, and shall record relevant metadata, dates of request and provision, etc. The Consultant shall update the Data Register and provide with each Progress Report.

Where the Consultant requires the support of the Client in pursuing data, for example where they have not received a response from a third party to a request, the Consultant shall notify the Client in a timely manner.

Any costs associated with the provision of data from a third party (for example, archive retrieval costs or licence fees) shall be reimbursed by the Client, but require prior approval.

The Consultant shall review all collected data, to

- Ensure it allows them to fulfil the Project Objectives and their role as Designer,
- Identify gaps and weaknesses,
- Identify changes since the capture of existing data, and to,
- Inform their production of specifications.

The Consultant shall demonstrate their confidence that all data utilised within the Project is suitable and does not compromise their duties as Designer of the Scheme.

3.2 Preceding Work & Existing Data

This section provides details of any preceding work and existing data, which shall be made available to the Consultant. The Consultant may use this available data in their work on this project, but if so doing, shall demonstrate their confidence that the data is suitable and does not compromise their duties as Designer of the Scheme. The provision of a dataset by the Client or Third Party does not transfer any liability from the Consultant to the Client or Third Party. The Consultant shall only use provided datasets for the purposes of this Project, and shall reference all datasets utilised in the relevant reporting.

The inclusion of a dataset in this section does not relieve the Consultant of any of its duties in relation to Data Collection and Review (see [SECTION 3.1](#)).

While the preceding work may give information on potential options, and indications of the viability of those options, the Consultant for this project shall be fully responsible for the selection, development and design of the Nenagh Scheme. The Consultant shall not be constrained to the measures considered in these previous studies/plans, but shall assess all measures according to the process set out in [SECTION 1](#), including measures that were not considered or were rejected during the Shannon CFRAM Study, including Natural Water Retention measures (in totality or in combination with other measures).

Data that shall be provided to tenderers is indicated in subsections below.

3.2.1 Shannon CFRAM Study

The OPW, working in partnership with Tipperary County Council and other Local Authorities, commissioned and have completed the Shannon Catchment Flood Risk Assessment and Management (CFRAM) Study. The objectives of the CFRAM Study were to:

- Identify and map the existing and potential future flood hazard within the CFRAM Study Area,
- Assess and map the existing and potential future flood risk within the CFRAM Study Area,
- Identify viable structural and non-structural options and measures for the effective and sustainable management of flood risk in the Areas for Further Assessment (AFAs) and within the CFRAM Study Area as a whole,
- Prepare a set of Flood Risk Management Plans (FRMPs) for the CFRAM Study Area, and associated Strategic Environmental and, as necessary, Habitats Directive (Appropriate) Assessment, that sets out the policies, strategies, measures and actions that should be pursued by the relevant bodies, including the OPW, Local Authorities and other Stakeholders, to achieve the most cost-effective and sustainable management of existing and potential future flood risk within the Study Area, taking account of

environmental plans, objectives and legislative requirements and other statutory plans and requirements.

The Shannon Upper & Lower River Basin ('Shannon') CFRAM Study Area included Nenagh as an Area for Further Assessment (AFA) and identified that a flood relief scheme for the community would be appropriate to be further developed for implementation.

3.2.1.1 Shannon CFRAM Study Reports

The relevant Shannon CFRAM Study reports (Unit of Management 25 & 26) are available, for information purposes, from the publications section of www.floodinfo.ie, and include, inter alia, those listed below:

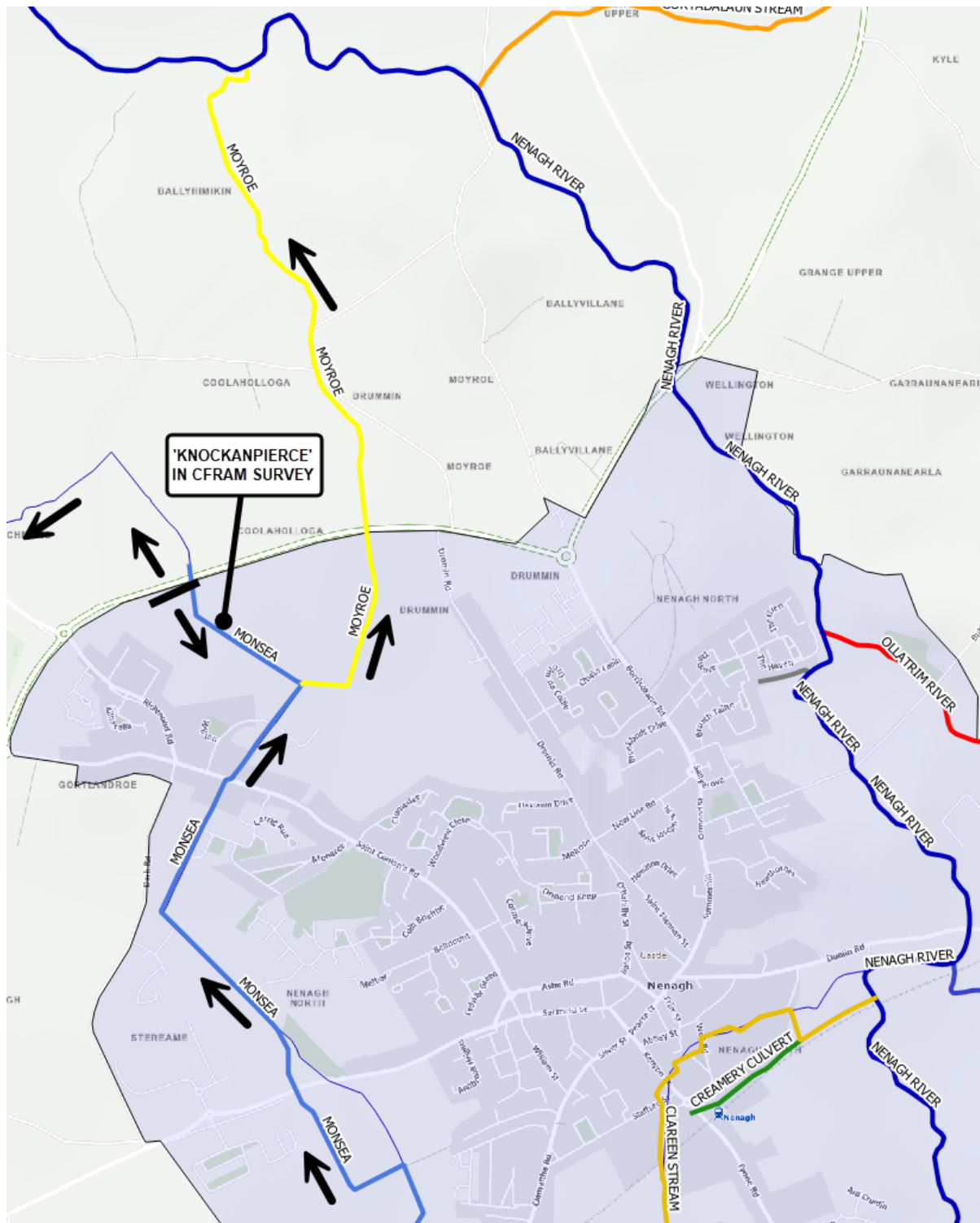
- Flood Risk Management Plan for the Shannon Upper & Lower River Basin (UOM 25-26)
- Flood Risk Review Report
- Hydraulics Report for Unit of Management (UOM 25-26)
- Hydrology Report for Unit of Management (UOM 25-26)
- Inception Report for Unit of Management (UOM 25-26)
- Level Operations Report for Unit of Management (UOM 25-26)
- Preliminary Options Report for Unit of Management (UOM 25-26)
- SEA Environmental Report for Unit of Management (UOM 25-26)
- Appropriate Assessment Determination in accordance with Regulation 42(11) of the European Communities (Birds and Natural Habitats) Regulations 2011 – 2015 for Flood Risk Management Plan for the Lower and Upper Shannon River Basin (UOM 25-26)
- Natura Impact Statement for UOM 25-26
- SEA Statement for Unit of Management 25-26
- Flood Forecasting Systems (FFWS) Scoping Report for Unit of Management 25-26

3.2.1.2 Shannon CFRAM Study Hydrology Data

The Shannon CFRAM Study Hydrology Data is limited to its Hydrology Report and appendices, and the input flow parameters as contained in the hydraulic model. Detailed calculation spreadsheets, for example, are not available.

The CFRAM Study hydrological analysis identified an issue with the mapped sub catchments from the Flood Studies Update (FSU), and hence physical catchment descriptors for three watercourses to the North West of Nenagh town – Moyroe, Monsea and Knockanpierce. It likely relates to historical naming of the Monsea as flowing north around the west side of Nenagh before heading east away from the town at the point where it connects with the Moyroe. In reality the Monsea discharges into the Moyroe at his location, with no flows heading east along the mapped route of the Moyroe. This has also lead to some inconsistencies naming across survey data and CFRAM Study reporting. See Figure 3-1 below. The consultant shall verify and address this issue as part of their full new hydrological assessment (including catchment delineation) for this project.

Figure 3-1; Actual flow directions at catchment discrepancy



3.2.1.3 Shannon CFRAM Study Survey Data

The CFRAM Study Survey data for the Nenagh area was captured in 2013 under Work Packages 1 and 2 of National Survey Contract 3 (NSC3). It captured the topographical survey of the river channel (cross-sections and long-sections) and hydraulic structures, and contains the following:

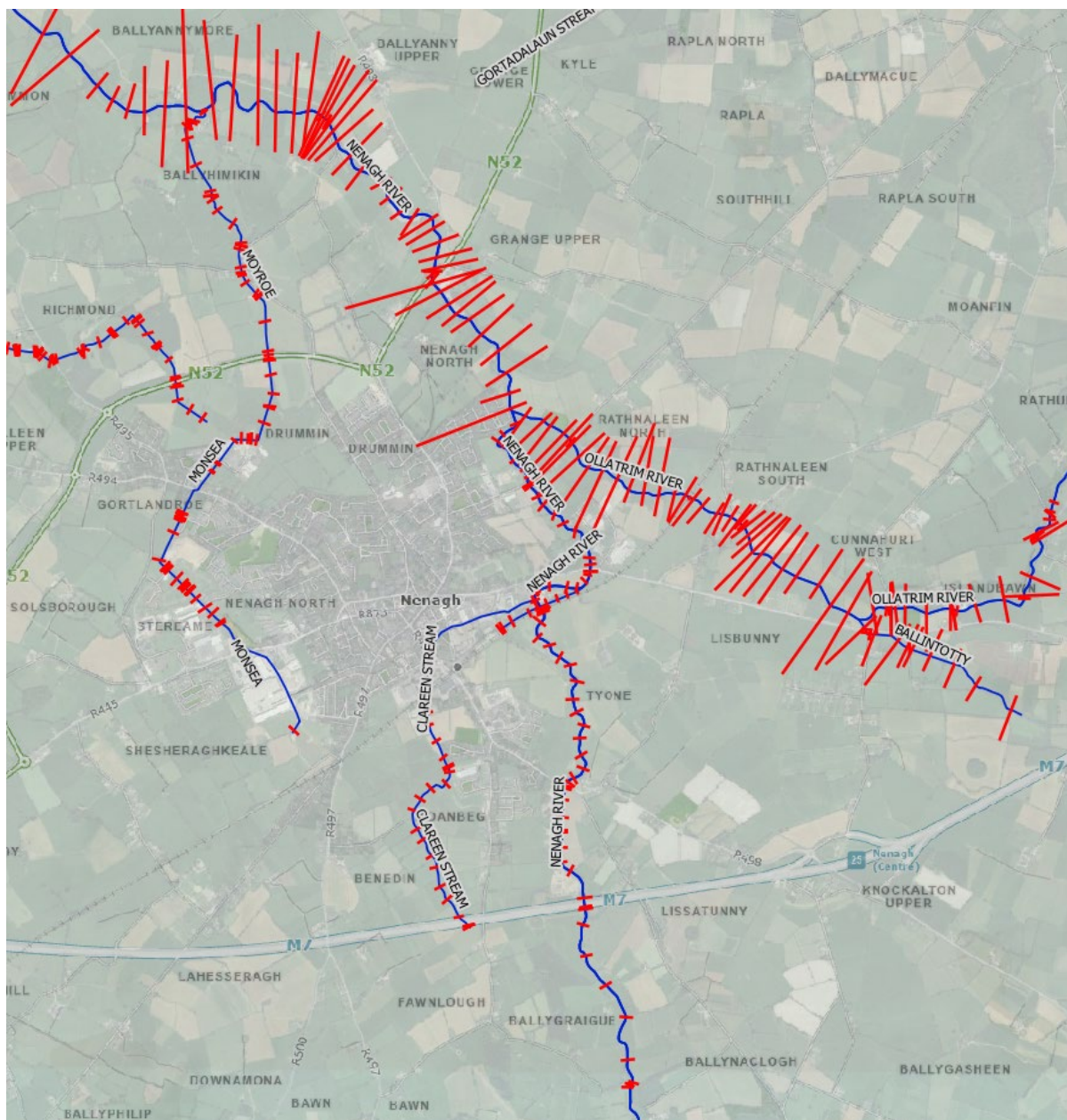
- Drawings (PDF and AutoCAD);
- Photos and videos
- GIS data
- Model input files (in ASCII, for MIKE and ISIS)

The CFRAM Study survey data is available as Open Data for direct download on <https://www.floodinfo.ie/cross-section-survey-data/>.

An initial review of this data in 2024 established it was likely not of insufficient detail to permit the detailed development and design of a Scheme as required for this Project. It was also considered beneficial to obtain the survey data as early as possible. Because of this, advance detailed survey work was recently carried out, and this is outlined in [SECTION 3.2.2.2](#).

Watercourses as surveyed for the CFRAM Study are shown in [FIGURE 3-2](#) below

Figure 3-2; Existing Surveyed Watercourses from CFRAM



3.2.1.4 Shannon CFRAM Study Hydraulic Model

The Shannon CFRAM Study hydraulic model(s) (the 'CFRAM Model') for Nenagh is provided for information purposes with the Tender Documents. The CFRAM model uses ISIS (Flood Modeller) modelling package, with TUFLOW providing the 2D element, and was developed to produce a community-scale flood map dataset and allow the preliminary assessment of potential options.

The model includes the following watercourses and associated floodplains:

- The River Nenagh from the M7 to the south of Nenagh, through the east side of the town to a point north of the town near Ballycommon.

- Clareen Stream (referred to as Benedin Stream in CFRAM) from the M7 to the south of Nenagh, through the urban southern side of the town to where it discharges to Nenagh River. The majority of the lower half of this watercourse is culverted.
- The Ollatrim River from where it crosses the railway east of Nenagh to where it discharges to the Nenagh River approximately 1.5km downstream
- The Monsea watercourse from the southwest urban extent of the town (south of Carey Glass) to Gortlandroe Industrial Estate where it becomes Moyroe watercourse, before heading north below the N52 and on to its confluence with the Nenagh River. The naming and layout of these watercourses was referenced earlier in [SECTION 3.2.1.2](#)

The modelling process is described in the Shannon CFRAM Study Hydraulic Modelling Report and its appendices.

Some specific items relating to the CFRAM Study model to highlight are:

- Omission of a bridge and small watercourse below the railway line that discharges directly to the Nenagh River to the southeast of the town (identified as UNK02 in recent survey data, [SECTION 3.2.2.2](#))

3.2.1.5 Shannon CFRAM Study Preliminary Options

The optioneering process, including the damage assessment, undertaken as part of the Shannon CFRAM Study is described in the Shannon CFRAM Study Preliminary Options Report, available on www.floodinfo.ie.

The CFRAM Study optioneering process and damage assessment were a high-level feasibility assessment process, and not suitable for the detailed assessment of the Potential Options for a Scheme, nor the design of the Scheme.

The property damage assessment data used as the basis of reporting in the Shannon CFRAM Study and generating the maps for Nenagh is not available. A recent analysis has however been carried out using the mapped flood extent and depths to establish a contemporary estimate of the damages (with 2023 Multi Coloured Manual damage data). Details are provided in

[TABLE 3-1](#), along with the CFRAM data for information purposes only. This analysis is high level and considered conservative, with a larger number of properties being identified as affected by the 1% AEP. This is primarily as a result of assuming damage occurs when flooding impacts the footprint of a building, rather than its centroid.

Table 3-1; Damage Assessment Data

Item	CFRAM Values	2023 Values
Residential PVD (1%AEP)	~€0.4m	€3.9m
Non res PVD (1%AEP)	~€9.5m	€30.4m
Total PVD (1%AEP)	€9.9m	€33m
Residential Properties affected	19	28
Non-res properties affected	41	47

Total Properties affected	60	75
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See also [SECTION 7.4.1.2](#) which outlines a potential Option not considered as part of the CFRAM Study.

3.2.2 Survey Data

3.2.2.1 *Digital Terrain Model Data*

The OPW will provide to the Consultant upon appointment Digital Terrain Model (DTM) Data for the Scheme Area and for the catchment to the Scheme Area, as is available to the OPW. This data comprises the following datasets:

- 1) LiDAR Data, including that from the CFRAM, ICPSS and ICWWS programmes, available for viewing and download from: <https://opendata-geodata-gov-ie.hub.arcgis.com/apps/17d1008a91fd46a2b85b92c26537dab5/explore>
- 2) Topographic data of specific locations within Nenagh Town where significant development has taken place post capture of CFRAM Study LiDAR data in 2010 see [SECTION 3.2.2.2](#)

The Consultant shall assess the suitability of DTM information, identify the extent of any additional DTM required, and cross-check existing and any data procured during the Project with river cross section and topographical survey data for consistency.

3.2.2.2 *Additional Topographical Survey Data*

Advance detailed topographical surveying was recently carried out in support of progressing the Nenagh FRS, to supplement the available CFRAM Study Survey Data. This comprised as follows:

- 1) Channel Cross Section / Bridge / Culvert surveys not captured for the CFRAM Study, or obtained for comparison purposes
- 2) Topographic Survey of 4 separate areas (15ha) that have been heavily developed post CFRAM, to be used in place of the available CFRAM LiDAR data.
- 3) Building Threshold Surveys of all properties identified in the CFRAM Study within or near to the flood extent for the 0.1%AEP (~370 properties)
- 4) Hydrometric Gauging Station surveys at three gauges of Tyone (25038), Gourdeen (25027) and Clarianna 25038
- 5) Manhole Survey of Clareen Culvert and Monsea Culvert consisting of location, cover level, pipe levels, pipe dimensions etc. (~40 manholes)

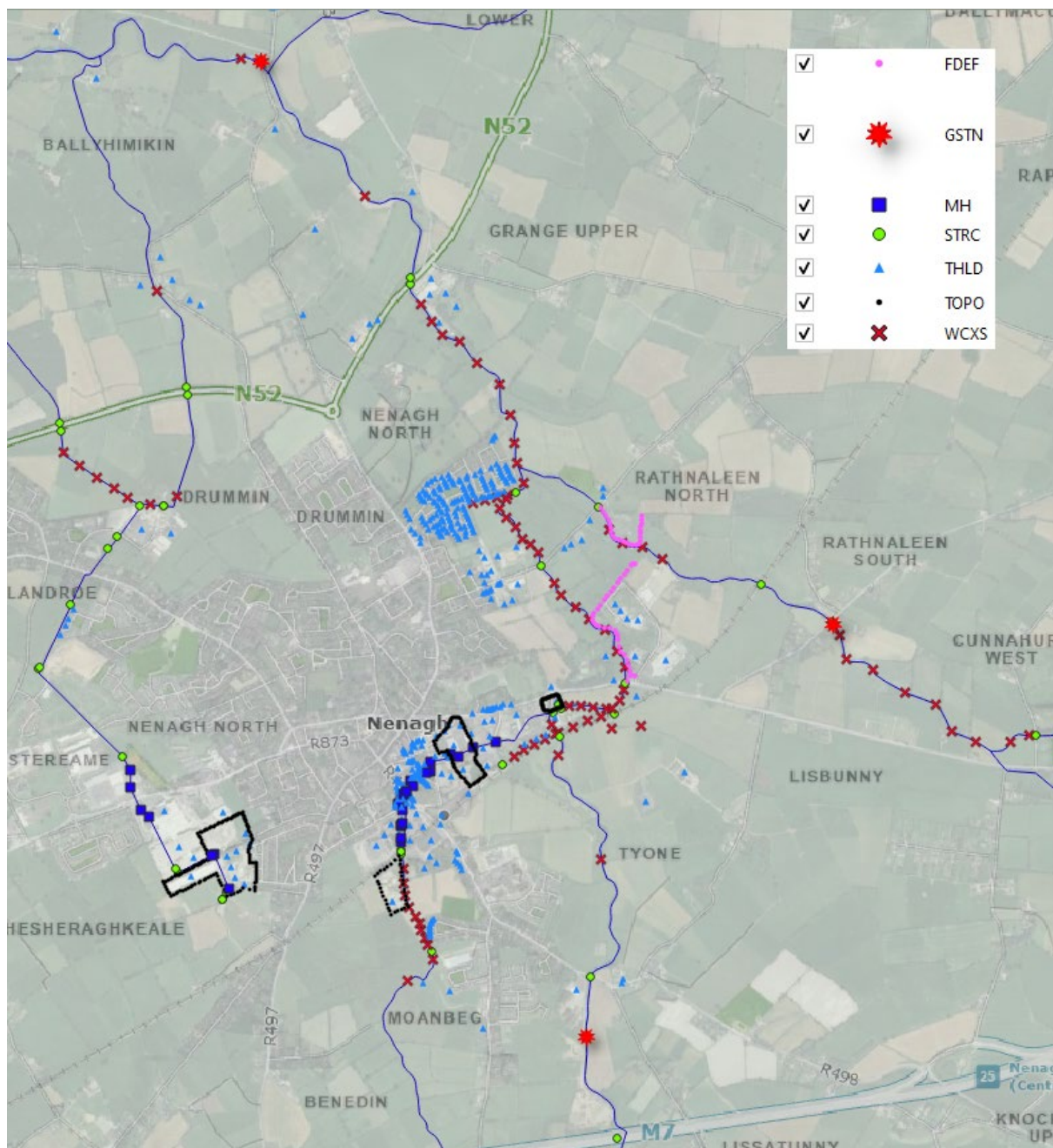
This survey data is provided with the tender, refer to [FIGURE 3-3 ADVANCE SURVEY TYPE & EXTENT](#) which shows the indicative extent of surveying carried out. For precise locations and details refer to the survey data provided.

Some channel names have been corrected or identified as part of this survey and therefore differ to those assumed in the CFRAM Study survey data. Cross section chainages may also differ and will need to be reviewed and adjusted where combining with the CFRAM data set.

This advance topographical survey data may still not capture all that is required for this project. The consultant shall fully assess the need for additional data in accordance with Section 3.1 and, where required, identify and procure additional data in accordance with [SECTION 6 CONTRACT MANAGEMENT SERVICES](#).

Note that all modelling shall incorporate both this recent survey data and that from the CFRAM Study. Where data overlaps, or there is an inconsistency, the most recent survey data shall be used.

Figure 3-3 Advance Survey Type & Extent Indicative locations

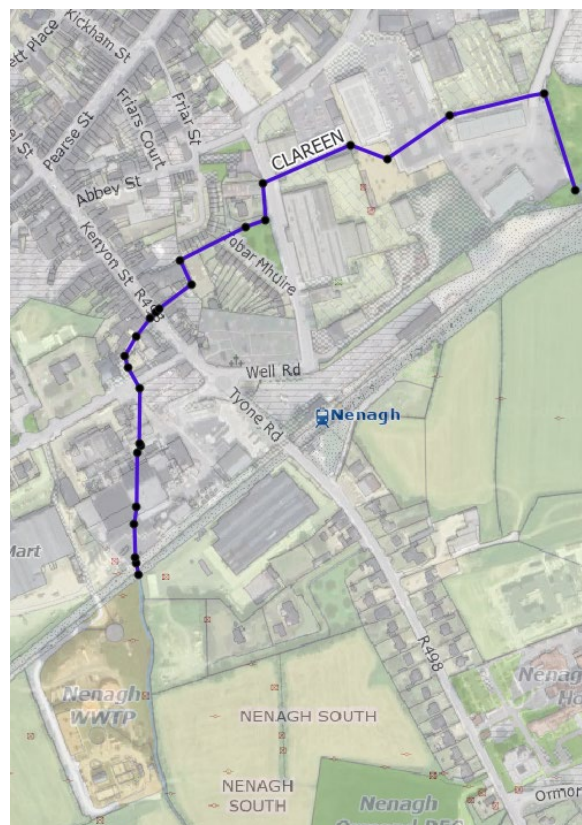


3.2.2.3 Culvert Manhole and CCTV Survey

For the CFRAM Study there were several assumptions made about the route and size of two culverts included in the model. They were the Clareen Culvert (referred to as the 'Benedin Culvert' in CFRAM) on the Clareen Stream, and the Monsea Culvert (also referred to as the Moyroe or Knockanpierce Culvert). For clarity early on in this Project, the OPW procured a Culvert Manhole and CCTV survey of these culverts to assist in verifying their route, size and condition.

Information from these surveys, along with investigations on the ground have verified the route of the two culverts as illustrated in [FIGURE 3-3](#) below.

Figure 3-4 Surveyed Culverts and Manholes



Some key findings from the surveys were:

- 1) The inlet for the Monsea Culvert is obstructed, but otherwise no issues identified
- 2) Clareen Culvert is heavily utilised by other infrastructure (ducting, cables, pipe crossings). This is particularly significant within Arrabawn Creamery (downstream of the inlet) and where the culvert crosses the main road at Kenyon Street.
- 3) The last run on the downstream end of Clareen Culvert, upstream from where it discharges to an open section near Nenagh River, is heavily silted.

The CCTV Survey Report, video footage of surveyed runs, and manhole survey sheets of individual accessible manholes, are available. These shall be utilised by the consultant to ensure the culverts are appropriately represented in the model.

3.2.3 Hydro-meteorological Data

3.2.3.1 *Hydrometric Data*

The majority of hydrometric data shall be obtained by the Consultant from the Hydrometric Sections of the OPW and EPA. Other sources may include, but not necessarily be limited to, the Local Authorities, ESB, Waterways Ireland, Universities, the Marine Institute, Harbour Masters, and the Local Authority Waters Programme.

The Consultant should note that the published annual maxima data are manually extracted rather than being derived directly from digitised data, and that in some instances discrepancies may exist between the two datasets. The Consultant shall refer to published Amax data to check for such discrepancies to obtain the correct Amax data.

Where such discrepancies occur, the annual maxima values that have been manually extracted are typically more reliable and shall be used by the Consultant.

[TABLE 3-2; EXISTING HYDROMETRIC Gauges](#) provides detail on hydrometric gauges nearby, and their locations are shown in [FIGURE 3-5; LOCATION OF HYDROMETRIC GAUGES](#).

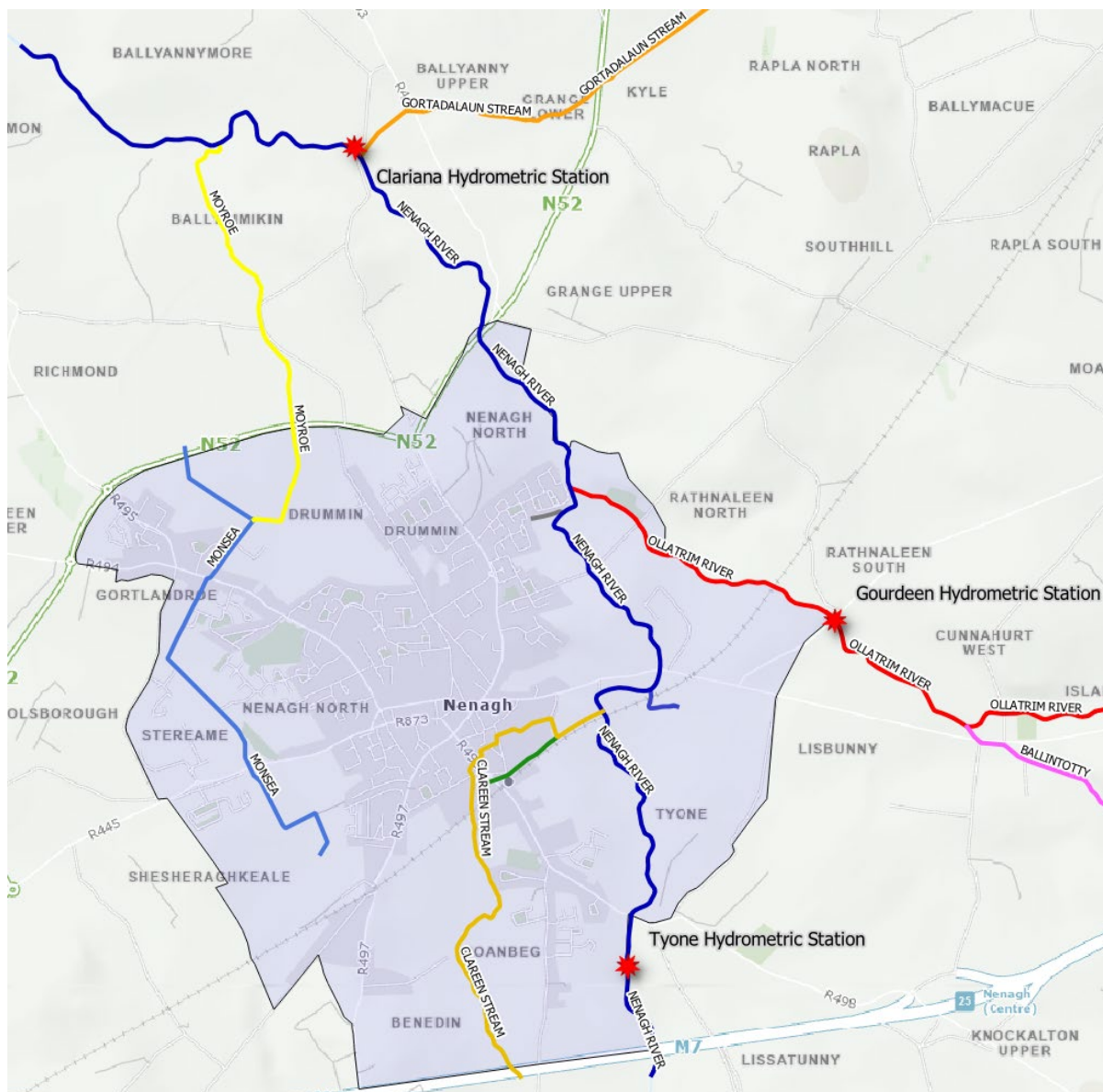
Table 3-2; Existing Hydrometric Gauges

TYONE HYDROMETRIC GAUGE:					
Station Description	Velocity Area Station with a loose stone weir acting as a control, some weed growth in summer.				
Number	25038	Name	Tyone	Location:	Nenagh River, u/s of town
Owner:	Tipperary County Council (EPA)	Status:	Active	Data Type:	Level & Flow
Data Available:	01/10/1990 - present	Rating Available:	Considered out of date	EPA Link:	EPA hydronet
Known issues:	Local fisheries install and remove loose stone weirs that significantly alter the rating. Changes in the stone weir control occurred in Sept 1990, Sept 2008 and again 2011- resulting in Rating changes each time and a gap in records from 1979-1988, and again in 2008. It appears that there have been further changes to weir structures, suggested by a recent flow gauging (post September 2025).				
Hydrometric Information:	Several rating curves have been established over the years of operation and the rating was considered stable from March 2012 up to September 2025. A recent flow gauging however suggests a substantial change, so the station has been assigned 'no rating'.				

GOURDEEN HYDROMETRIC GAUGE:					
Station Description	Velocity-Area station, 8m wide with some overhanging trees on both banks. There is a bridge immediately downstream and a railway bridge approx. 370m downstream. This gauge has a fair rating up to 0.93*QMED. There is increased scatter in medium and high gaugings since 2008. Drainage works carried out from 1955 to 1960.				
Number	25027	Name	Gourdeen	Location:	Ollatrim River, east of Nenagh
Owner:	OPW	Status:	Active	Data Type:	Level & Flow
Data Available:	02/02/2015 - present	Rating Available:	Yes	OPW Link:	OPW Link
Known Issues:					
Hydrometric Information:	<ul style="list-style-type: none"> • Primary Flow Control is a downstream bridge, with railway bridge approx. 370m downstream possibly impacting on flows • Channel Width: 8m • Channel Conditions: <ul style="list-style-type: none"> ○ Downstream, both banks overhanging trees ○ Upstream, right bank: Overhanging trees for 200m, then agricultural land ○ Upstream, left bank: Agricultural land • Rating Curve Information: <ul style="list-style-type: none"> ○ Current Rating: RC19 (2017) ○ Fair rating up to 0.93*QMED. ○ Increased scatter in in medium and high gaugings since 2008. 				

CLARIANNA HYDROMETRIC GAUGE:					
Station Description	Velocity-Area station, 18m wide with some vegetation and trees on both banks. There is a weir 3km downstream. Fair rating up to 0.57*QMED. Large uncertainty in flow estimation due to gauging gaps, scatter and strong seasonal effects. Further rating change likely but more gaugings are required to confirm this. The bridge upstream is prone to blockages. Drainage works were carried out from 1955 to 1960.				
Number	25029	Name	Clarianna	Location:	Nenagh River, d/s of town
Owner:	OPW	Status:	Active	Data Type:	Level & Flow
Data Available:	01/01/1972 - present	Rating Available:	Yes	OPW Link:	OPW Link
Known issues:	<ul style="list-style-type: none"> • Level uncertainty from April 2022 to August 2024 as the staff gauge moved some time during this period • Large uncertainty in flow estimation due to gauging gaps, scatter and strong seasonal effects. • For the 54 Hydrometric years from 1971 – 2024, 32 are complete, an additional 8 are >90% complete, and an additional 14 are <90% complete. 				
Hydrometric Information:	<ul style="list-style-type: none"> • Primary Flow Control is a weir 3km downstream • Other Controls Possibly Affecting Flows: <ul style="list-style-type: none"> ○ There is/are smaller natural weir(s) between the gauge and the main weir. ○ The bridge upstream of the gauge has been known to have blockages. • Channel Width: 18m • Channel Conditions: <ul style="list-style-type: none"> ○ Both banks, upstream and downstream are a mixture of vegetation/bushes with some overhanging trees. • Rating Curve Information: <ul style="list-style-type: none"> ○ Current Rating: RC26 (2015) ○ Fair rating up to 0.57*QMED. ○ Large uncertainty in flow estimation due to gauging gaps, scatter and strong seasonal effects. ○ Highest gauging (Feb 2020) for indicative use only. Further rating change likely but more gaugings required to confirm this. 				

Figure 3-5; Location of Hydrometric Gauges



3.2.3.2 Flood Studies Update Data

The Flood Studies Update (FSU) Programme is a substantial update of the Flood Studies Report (FSR) (NERC, 1975), for flood estimation in Ireland and the UK.

Since the launch of the FSU web portal, the OPW have been continually looking at ways to improve the FSU methodologies. This is an ongoing programme of work. Between 2014 and 2024 the FSU Web Portal was the primary means of disseminating the FSU methodologies and data. However the underlying data had remained unchanged for a number of years and was found to be outdated. As a result the OPW have since reviewed the underlying hydrometric data being used in the FSU methodologies and updated its database of suitable gauges and associated Annual Maximum series for those catchments.

This new data necessitated a re-calibration of the 7-variable QMED equation to take account for the newer data. In addition to this, the means of selecting a pooling group for flood frequency analysis was also revised.

The improved FSU methodology is now available in spreadsheet form for carrying out QMED estimation, flood frequency analysis and design flood hydrograph generation. It also incorporates rainfall depth-duration-frequency data (2km x 2km grid) taken from Met Éireann's updated rainfall Depth-Duration-Frequency model.

This spreadsheet, along with several GIS layers, is available from the OPW as the 'Flood Estimation Package' and can be downloaded from <http://www.floodinfo.ie/fsu/>. Included GIS layers are as follows:

- FSU Node Points spaced at 500m centres along the EPA river network identifying Node ID. Used to identify subject site in the FSU Spreadsheet, as well as including Physical Catchment Descriptors at each point
- Physical Catchment Descriptors for gauged locations
- Met Éireann rainfall depth-duration-frequency data (2km x 2km grid)

FSU gauged and ungauged catchment boundary data in GIS format is available separately from the OPW. Ungauged data is grouped based on each hydrometric area with sub-catchment boundaries corresponding to the ungauged location node id names.

3.2.3.3 **Meteorological Data**

The Consultant shall source meteorological data from point locations that include both Synoptic Station Data (rainfall, air pressure, wind speed and direction, temperature and potential evapotranspiration) and daily rainfall gauging station data. The Consultant shall also collect gridded meteorological data such as the gridded daily rainfall dataset and the MÉRA reanalysis dataset.

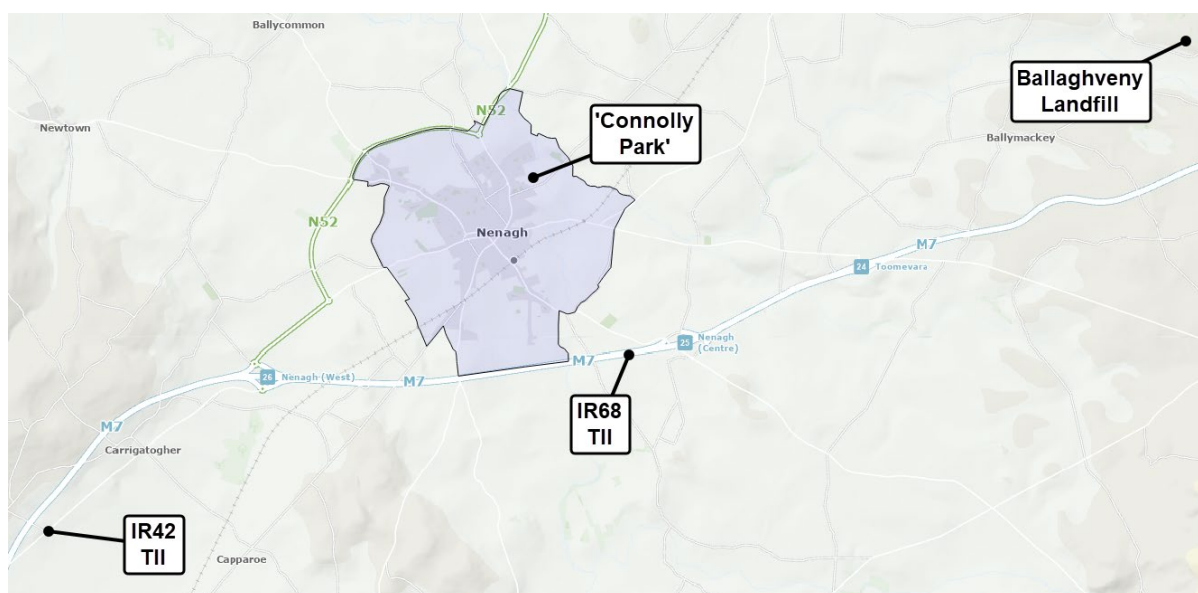
Other meteorological information from other networks may be relevant depending on the location of the study, for example the Transport Infrastructure Ireland (Previously NRA) network of rain weather stations.

ERROR! REFERENCE SOURCE NOT FOUND. below provides detail on rainfall gauges nearby, and their locations are shown in **FIGURE 3-6; LOCATION OF RAINFALL GAUGES.**

Table 3-3; Existing Rainfall Gauges

Name / Number	Owner	Data Type	Date Installed	Status	Any known issues
IR68 (M7 Nenagh)	TII	Hourly	Unknown	Active	Unknown
IR45 (R445 Ballywilliam)	TII	Hourly	Unknown	Active	Unknown
Ballaghveny Landfill -	Tipperary County Council	.	July 2019	Currently inactive	Operational issues since Sep 2025
Connolly Park (Nenagh)	Met Eireann	Daily	1971	Removed 2015	No longer in palce

Figure 3-6; Location of Rainfall Gauges



3.2.3.4 Historic Flood Data

The OPW has collated a national web-based database of past flood information including press articles, photographs and reports relating to past flood. This database is not a comprehensive catalogue of all past (fluvial/tidal) flood events in Ireland, with data provided by source bodies from their records at their discretion. Data is currently available to view and download on www.floodinfo.ie for verified events, which occurred prior to June 2022. Data relating to events post June 2022 is available on request from the OPW. The OPW will provide the Consultant upon request the GIS data for past flood events.

Data from the Copernicus EMS mapping for the 2015/2016 and other flood events is available at <https://emergency.copernicus.eu/mapping/list-of-activations-rapid>.

The Consultant shall seek other information on historic flooding, including date and time of flooding, flood extents, levels, depths, causes or mechanisms, presence of turloughs, etc. This data may be available from verbal or written reports about the flooding or may be deduced from trash marks or data recorded by local residents. Sources of data might include, but not necessarily be limited to, local residents Local Authorities and the EPA, newspaper reports, verbal reports, and online sources of historic flooding.

3.2.3.5 River Network

The “Tailte Éireann Geometric River Network” (HY.IE.EPA.WATER_RivNetRoutes) is available from the EPA at <http://gis.epa.ie/GetData/Download>. The CFRAM study also provides a record of the river network as understood at the time.

Please note that watercourses with a catchment less than 1km² were omitted from the CFRAM Study survey and modelling. The Consultant shall assess whether they require any such small watercourses to be surveyed to allow them to fulfil their role as Designer,

particularly in relation to hydraulic modelling and the design of behind-defences surface water measures.

3.2.3.6 Floodinfo website

The www.floodinfo.ie website is OPW's national flood information portal, providing location-specific access to flood risk and flood management information, including:

- Fluvial and Coastal Flood maps;
- CFRAM publications;
- Arterial Drainage Information.

3.2.4 Other Data

3.2.4.1 Land-Cover Data

The Corine land-cover dataset is available from the EPA; see <https://gis.epa.ie/GetData/Download> for more information. The PRIME2 dataset shall also be provided to the Consultant.

3.2.4.2 Environmental Data

Previously collected or currently available information, reports, studies, zoning and assessments of environmental status, issues, constraints and impacts. Sources of relevant data may include, but not necessarily be limited to, the National Parks and Wildlife Service (NPWS) (including information available from the NPWS website), the IFI, the EPA and the Local Authority Waters Programme. The Consultant will be required to identify sensitive habitats or features and other constraints adjacent to, up and/or down-stream of the Scheme Area, which could potentially affect or be affected by the flood relief options. The EPA's website, www.catchments.ie, provides a comprehensive GIS based data and information resource on Risk, Water Quality, Environmental Pressures, Protected Areas, and Susceptibility.

3.2.4.3 Soil and Geological Data

Data on soil classifications, sub-soils, geology and aquifers. Sources of data may include, but not necessarily be limited to, Teagasc and the Geological Survey of Ireland (GSI).

3.2.4.4 Tailte Éireann Data

The Consultant shall provide the Client with the required area(s) for Tailte Éireann (formerly Ordnance Survey Ireland or OSi) data in ESRI shapefile format and specify the required datasets. The Consultant will be required to sign and return a 'Contractors, Sub-contractors and Consultants' licence agreement form before any such data can be released.

The Client will provide, upon such a request, to the Consultant the Tailte Éireann datasets at the scales and formats for which they hold a licence. The map information for which the Client currently holds a licence is detailed in [APPENDIX D: SPATIAL DATA](#).

The Client will provide upon request their most current version of the PRIME2 Buildings Polygon Dataset, and can provide other specific PRIME2 data features available to the Consultant, where these datasets may aid analysis.

The Consultant shall display the Tailte Éireann licence and disclaimers on all maps and materials incorporating Tailte Éireann data.

3.2.4.5 Property Data

Georeferenced property data is required for the purpose of carrying out property damage assessment in conjunction with the Prime2 Buildings Polygon Dataset. Examples of such data are the An Post Geodirectory or Eircode ECAD products. The Client will provide the Consultant with georeferenced property data for the areas required for this project upon request.

3.2.4.6 Urban Drainage Infrastructure

The known urban drainage infrastructure layout is provided with this tender in PDF format. This information shall be utilised to inform the model, in particular in relation to the Clareen Culvert, but also in delineating catchments and ensuring storm water overflows are captured in the model. See [SECTION 7.3.2.6 HYDRAULICALLY SIGNIFICANT FEATURES/STRUCTURES](#).

3.3 Field Inspections

The Consultant shall carry out such field inspections and site visits as to deliver the requirements of the Project, and in particular ensuring a sufficient level of detail is available to the Consultant to fulfil their role as Designer.

The Consultant shall ensure that their Activity Lead (i.e. hydrology, hydraulics, options, environmental, etc.) **attends the field inspections to inform relevant activities**: for example, the **Lead** Hydrologist attends to inform the hydrological assessment, the **Lead** Hydraulic Modeller attends to inform hydraulic modelling, the Options **Lead** attends to inform on the assessment of Options, etc.

Information gathered during field inspections shall be recorded and used to inform both planned work and completed work carried out under the supervision of each Activity Lead. Some limited examples would be work relating to:

- Third party contract specifications
- Identifying any changes that have occurred since the capture of existing datasets
- Verifying flood mechanisms identified in model outputs
- Ground-truthing desk studies

3.4 Defence Asset Database

The existing OPW Defence Asset Database for the Shannon CFRAM does not have any entries for the Scheme Area. The consultant shall however utilise the existing database to record all defences identified or constructed as part of this Project, in addition to those listed in [SECTION 3.6 STRUCTURAL ASSESSMENT OF EXISTING STRUCTURES](#). A copy of this database is provided for reference with this tender.

The Consultant shall update the Defence Asset Database during Stage I and Stage V. In Stage V, the update shall reflect the constructed defences and any improvements made to existing structures identified during Stage I and incorporated into the Scheme; this work shall include further on-site Defence Asset Condition Survey as required ([SECTION 11.7.3 UPDATE OF THE DEFENCE ASSET DATABASE](#)).

The Consultant shall input the geometric data for the structures, and the required data from the existing conditions model (during Stage I) and the post-Scheme model (during Stage V).

The Consultant shall provide the GIS layers specified below with the DAD in Stage I, and updated in Stage V, in accordance with the OPW Defence Asset Condition Survey Requirements, available at: <https://www.gov.ie/en/publication/b15dd0-technical-specifications-and-guidance-notes/>

Table 3-4; GIS layers to be provided with DAD

Spatial Dataset	Condition
Defence (Existing, Pre-Scheme) (polygon, polyline, point)	Pre-Scheme

3.5 Defence Asset Condition Survey

Defence asset condition surveys have been carried out as per [TABLE 3-5; DEFENCE ASSET CONDITION SURVEYS](#), which includes details of the assessment and action required.

Table 3-5; Defence Asset Condition Surveys

Defence	Location	Description	Assessment / Action
Rivervale Nursing Home Embankment	North east of Nenagh on L1058 Bulfin / Lwr Birr Road, Ollatrim River right bank	400m earth embankment up to 2m high providing local protection to Nursing Home. Unknown construction and poor condition.	Not considered an effective defence. No further structural assessment required. To be EXCLUDED from baseline scenario modelling.
Lisbunny Industrial Estate Embankment	East of Nenagh off R445 (old N7) on Nenagh River right bank	~700m earth embankment of unknown construction providing local protection to Lisbunny Industrial estate (historically vulnerable to flooding). Embankment top typically ~5-6m above normal water level and ~2m above 'defended side' ground level.	Likely providing significant flood defence to Lisbunny Industrial Estate. Visually in reasonably good condition. Some minor localized scouring at base. Mostly free from heavy vegetation, with exception of short section. Carry out detailed structural assessment to determine if defence can be considered effective.

No structures have been identified within the Scheme Area to be subject to a Defence Asset Condition Survey (DACs), instead several Structural Assessments are proposed, as per [SECTION 3.6 STRUCTURAL ASSESSMENT OF EXISTING STRUCTURES](#).

A DACs shall however be carried out if an existing structure is identified on which the effectiveness of a potential option, or its operation, is to be relied on. This visual inspection of the structure shall recommend any detailed structural assessment required in order to determine its effectiveness (see also [SECTION 7.3.2.6 HYDRAULICALLY SIGNIFICANT FEATURES/STRUCTURES](#)). The Consultant shall report the findings of Defence Asset Condition Survey(s) in the Existing Structures Report.

3.6 Structural Assessment of Existing Structures

The following structures have been identified as likely to be relied upon by the Scheme to achieve the required Standard of Protection:

Table 3-6; Existing Structures for Structural Assessment

Structure	Location	Description
Lisbunny Industrial Estate Embankment	East of Nenagh off R445 (old N7) adjacent to Nenagh River	~700m earth embankment of unknown construction providing local protection to Lisbunny Industrial estate (historically vulnerable to flooding). Embankment top typically ~5-6m above normal water level and ~2m above 'defended side' ground level. <u>Proposed Approach for Scheme:</u> Embankment to form part of proposed scheme with modifications / improvements based on Structural

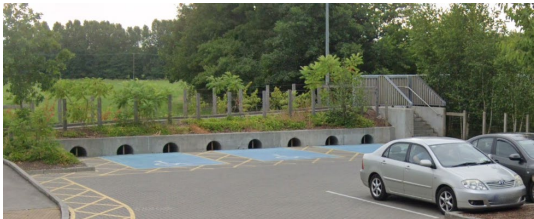
		Assessment, Geotechnical Investigation, maintenance requirements and other scheme analysis outputs.
Overflow Capture Structure	Adjacent to Nenagh River at Nenagh Town Park, near Nenagh Leisure Centre. Google map here	<p>Structure with multiple openings at car park ground level to capture out of bank flows from the left bank of Nenagh River and direct back into the channel downstream. This is a complicated structure that should be accurately represented in the model.</p> <p><u>Proposed Approach for Scheme:</u> To be removed / retained / modified as required</p> <p>Reference image:</p> 
Leisure Centre Access Bridge	Leisure Centre Access Road	<p>Single span, precast concrete bridge.</p> <p><u>Proposed Approach for Scheme:</u> Consider removal / replacement / relocation as required based on output of scheme analysis</p>
Bennett's Bridge	Nenagh River, R445	<p>Twin stone arch bridge with third high level arch at higher level. Includes contemporary modifications.</p> <p><u>Proposed Approach for Scheme:</u> Retain. Needs to be assessed for impact of scour / afflux.</p>
Kyleeragh Bridge	Nenagh River, Bulfin Road (L1058)	<p>Twin stone arch bridge</p> <p><u>Proposed Approach for Scheme:</u> Retain. Needs to be assessed for impact of scour / afflux.</p>
Nenagh Bridge (old)	Nenagh River, adjacent to N52	<p>Protected Structure. Four-arch limestone bridge, built c.1725, now disused and bypassed by new road to south east.</p> <p><u>Proposed Approach for Scheme:</u> Retain, no impact adjustments permitted as protected. Needs to be assessed for impact of scour / afflux.</p>
Nenagh Bridge (new) (aka Scott's Bridge)	Nenagh River, on N52	<p>Contemporary construction with 4 corrugated steel pipes cast in concrete with bridge deck constructed above.</p> <p><u>Proposed Approach for Scheme:</u> Retain. Needs to be assessed for impact of scour / afflux.</p>

Figure 3-7; Location of structures for assessment



The Consultant shall identify any additional existing structures on which the effectiveness of the Scheme, or its operation, may rely on.

The Consultant shall carry out detailed structural assessments of all structures, to ascertain their structural capability of providing the Standard of Protection. This assessment shall utilise afflux and flood velocities determined by the hydraulic modelling of the Options to inform the forces and likely scour at the structures in question ([SECTION 7.4.5.2](#)).

A minimum requirement of seven (7) Structural Assessments are required along with the associated services, as described in this section and listed in the table above. Payment for the specified quantity, and any additional quantity shall be in accordance with clause 11.1-7 of the Conditions of Engagement, on a cost per item basis.

The Consultant shall procure and manage any third-party services required to inform their assessment, such as coring, sampling, test pits, etc., in accordance with Sections 6.2 PROCUREMENT 6.3, CONTRACT MANAGEMENT, and 6.4 PRODUCTION OF SPECIFICATIONS, with the third-party fees to be reimbursed by the Client.

The Consultant shall provide an Existing Structures Report detailing the assessments carried out and to inform any subsequent design required on these structures (SECTION 7.4.5.9).

3.7 Flood Event Data Collection & Report

When instructed by the Client, and in the event of flooding from rivers, tidal, pluvial or groundwater sources within the Study Area, the Consultant shall, in a safe manner, record and capture the following flood event data:

- Date and duration;
- Source(s) and causes;
- Flood extents;
- Photographs and video footage (terrestrial and/or airborne);
- Levels (including those taken from wrack marks);
- Estimates of flows, probabilities (AEP of the event),
- Location of properties and infrastructure affected,
- Number of evacuees, etc.

The data shall be collected with a particular view for use in the calibration and validation of the hydrological analysis and the hydraulic model.

The Consultant shall produce a standalone Flood Event Report, containing the data as collected as per above, and shall include an investigation of the following:

- Flood routes & mechanisms;
- Antecedent Conditions and Rainfall Analysis;
- Analysis of Tidal Cycle and Levels during event, where applicable;
- Overview of Flood Extents and number of affected properties;
- Commentary on Mitigation Measures undertaken before and during the event, where applicable;
- Review of the existing infrastructure;
- Performance of any constructed flood defences & flood relief scheme;
- Collection, collation, and review of all the available flood event data (photos, videos, etc.);

- Estimate of the return period of the flood event(s);
- Conclusions/Findings.

The Flood Event Report shall be provided with a GIS deliverable of the estimated flood extent, a set of georeferenced photographs depicting flood wrack marks, affected properties/areas, other flood damage or any notable information as available.

In addition to the Flood Event Report, the Consultant shall provide both the Past Flood Event Short Form and the Past Flood Event Technical Form in accordance with the templates and guidance available on the “Past Floods; Report Past Flood” section of www.floodinfo.ie.

The Flood Event Report, its accompanying data, and the forms, shall be provided within **one month** of the flood occurring

Each Flood Event Report and its accompanying datasets are subject to the requirements of Section 4.11 REPORTING STANDARDS & QUALITY ASSURANCE, in relation to reporting standards, the examination process, digital data requirements, Quality Assurance and version control.

Payment for Flood Event Reports shall be instructed by the client as a change to the Services, and the Fee adjusted on a time and rates basis in accordance with clause 11.1-7 of the Conditions of Engagement.

3.8 Property and Structure Condition Survey & Report

The Consultant shall complete external and internal condition surveys on all properties and structures located within ten metres of any scheme works, involving transport of an abnormal nature, construction, demolition or excavation, which shall comprise of a comprehensive crack identification and classification exercise with accompanying exhaustive photographic evidence. The captured data shall be collated, labelled, and stored in a ‘raw’ format, which allows the data to be extracted on a ‘per property’ basis as required at a later date by either the Consultant or a third party.

Payment for the specified quantity, and any additional quantity of Property and Structure Condition Surveys, shall be in accordance with clause 11.1-7 of the Conditions of Engagement, on a cost per item basis.

The Consultant shall provide a Property & Structure Condition Survey Report that summarises all details and findings of the Survey, which is drawn from and based on the ‘raw’ data, for any property or structure survey as requested by the Client.

Payment for the specified quantity, and any additional quantity of Property and Structure Condition Reports, shall be in accordance with clause 11.1-7 of the Conditions of Engagement, on a cost per item basis.

The information gathered from the external and internal property/structure condition survey shall be analysed, and clearly communicated in the Works Requirements Documents to inform

and indicate the likely nature of monitoring, temporary and protective works required during construction, and to allow contractors to price accordingly.

3.9 Property & Land-Holding Schedule

The Consultant shall commence the following duties as soon as is feasible during Stage I of the Project, and shall continue them through subsequent stages (Stages II to IV), with some elements required post-construction and in Stage V.

The Consultants shall prepare and maintain throughout the Project a Schedule (in spreadsheet format) of the registered owners, rated occupiers, occupiers and/or beneficiaries of rights of way (including owners of Utilities), fishing right or other similar right (referred to from hereon as the 'owner') for individual properties and land holdings that may be affected by the construction, operation and future maintenance of the Scheme.

The Consultant shall establish ownership of all such properties and land holdings and shall research and prepare proof of title as appropriate to each property or land holding affected. The Consultant shall undertake this title research on behalf of the Client, researching and preparing proof of title as appropriate to each property or land holding affected. Further requirements, and details of where information for this research can be found, are set out in [APPENDIX C: GUIDE TO PROCEDURES AND OFFICES FOR TITLE RESEARCH](#).

The Consultant shall populate the Schedule for each of the affected properties and land holdings with the following:

- the details, including names and addresses, of each 'owner';
- A short description of the envisaged impact;
- Details of any communication, and any agreements reached, with each owner, with reference to relevant drawings;
- Specifics not yet agreed.

The Consultant shall support each entry in the Schedule with a map/drawing, comprising of the works or effect of the works superimposed on the associated OS maps (specific landownership maps) in electronic and, where required, hard copy format.

The Consultant shall develop the Schedule and its supporting information in a manner and to a level of detail that will support the Planning and CPO/land owner agreement processes, and any potential compensation processes, through the production of Property and Land Holding Impact Reports ([SECTION 3.9.1](#)).

3.9.1 Property & Land Holding Impact Reports

Where it is required to support the Planning and CPO/land owner agreement processes, and any potential compensation processes, the Consultant shall develop the material contained in the Property & Landholding Schedule in to a Property & Land Holding Impact Report. Each Report shall include the following information in addition to that drawn from the Schedule:

- Details of any communication, and any agreements reached, with each owner.
- Landowner maps/drawings;
- Dates / duration of disturbance(s);
- Description (with photographs) of lands immediately pre-works, including crops, buildings, use of land;
- Description of how the works might have impacted on the property or land holding;
- The measured area of land loss/disturbance, both temporary and permanent, and measured details of other property disturbance(s);
- Observations on loss of income/ affects due to works both during and after works;
- Efforts made by landowner to mitigate losses;
- Description of any benefits to the property or land holding coming from the direct disturbance or the works, including any accommodation works or improvements carried out as part of the Scheme;
- Any evidence of previous flooding prior to the works;
- Detailed records of any unscheduled incidents leading to losses on the part of property or land holding owners.

The details of the disturbances as described in the Reports shall form the basis for the assessment of compensation to the affected landowners and, in the event of a dispute on the level of said compensation, will be scrutinised at arbitration. The Consultant shall achieve a level of detail in the Reports such as to support these processes.

Payment for the specified quantity, and any additional quantity of Property & Landholding Impact Reports, shall be in accordance with clause 11.1-7 of the Conditions of Engagement on a cost per item basis.

The Consultant shall make available their Engineer(s) responsible for maintaining the Schedule and producing the Reports to support the Client in addressing compensation claims or other actions as may arise; these staff and other relevant staff from the Consultant may be required to attend at Property Arbitration(s). Such support and attendance shall be instructed by the client as a change to the Services, and the Fee adjusted on a time and rates basis in accordance with clause 11.1-7 of the Conditions of Engagement, and may arise before, during or after completion of the Scheme works.

4 GENERAL MANAGEMENT SERVICES

4.1 General Requirements

The Consultant shall undertake the duties described in this section as relevant to each Stage and within the associated Performance Periods.

4.2 Steering Group Meetings

The first Steering Group Meeting shall be held within two (2) weeks of appointment.

The Consultant shall attend the Steering Group Meetings, to be held every **four (4) weeks** throughout **all** stages of the project.

Meetings shall be held over VC or in person, at the discretion of the Client, but on the basis that there is an equal split over the course of the Project. In person meetings will be held within the Study Area or in the offices of the OPW (in Dublin, Trim or the relevant regional office) or Tipperary County Council Offices, as decided by the Client.

The Consultant's Project Manager shall attend all Steering Group meetings, accompanied by the Project Director and relevant technical and environmental team members as appropriate to the stage of the Project, or at the request of the Client.

The Consultant shall ensure, from the commencement of Stage IV (Construction) and throughout Stage V, the attendance of the key members of the Site Supervision and Design Teams at Steering Group Meetings.

The Client shall chair the Steering Group Meetings. In Stage I, the Client shall minute Steering Group Meetings and prepare the agenda. In subsequent Stages II – V, the Consultant shall minute Steering Group Meetings and prepare the agenda.

A draft agenda shall be prepared by the minute taker and circulated at least seven (7) days in advance of each Steering Group Meeting. The Steering Group shall review this agenda and provide additional items for inclusion within three (3) days.

Minutes shall be taken in detail, to include actions arising with associated responsibilities and deadlines, and submit the minutes to all Steering Group Members for comments and observations no later than three (3) working days after the date of the meeting. Updated minutes shall be provided within three (3) working days of receipt of such comments and observations.

Payment for preparing the agenda and minute taking, in Stage I and Stage II only, shall be in accordance with clause 11.1-7 of the Conditions of Engagement on a cost per item basis

For each Steering Group Meeting, the Consultant shall prepare and submit a Progress Report ([SECTION 4.4](#)), not more than **five (5)** and not less than **three (3)** working days in advance of

each meeting. A reporting template shall be agreed with the Client; this will include a section on rationale for project slippage and mitigating actions proposed or taken.

4.3 Weekly Progress Updates

The Consultant's Project Manager shall provide by e-mail a weekly update in the form of a memo to the Client during all stages of the project, covering the following items at minimum:

- Progress of work undertaking during the preceding week;
- Any delays encountered and reasoning;
- Planned work for the following week;
- Brief comparison to baseline Programme.

4.4 Progress Reports

The Progress Reports, provided as outlined in [SECTION 4.2](#), shall be produced by the Consultant and will include all aspects of the project including the areas of engineering, environment, planning, architecture, archaeology, etc. The Progress Reports shall outline the work undertaken during the period since the previous Progress Report was submitted, and shall detail technical findings, proposals and any problems and/or risks encountered or foreseen, with associated proposed solutions. The Progress Report shall highlight critical dates for delivery of information, decisions or other inputs from the engineering and environmental teams, the OPW, other members of the Steering Group or other parties.

Each Progress Report shall be accompanied by up-to-date versions, highlighting any changes made since the previous version, of the following documents:

- Health and Safety Hazard and Risk Assessments ([SECTION 4.10.3](#))
- Data Register ([SECTION 3.1](#)), that shall include all relevant data identified with a brief description, data owners, responsibility and required date for collection, etc.
- Project Programme, including a clear indication of all critical path tasks;
- A complete list and description of any instances of slippage since the preceding Progress Report;
- A Table of the resources (staff and time engaged by those staff on this project) applied by the Consultant in the preceding period;
- Project Risk Register (a document setting out risks to the success of the Project in meeting the defined objectives on time, along with indicators of likelihood, consequence and risk, proposed or enacted mitigation measures, and who is responsible for managing the risk)
- Issues and Actions Register (a document setting out issues raised at Progress Meetings or otherwise by the Client, Steering Group, Stakeholders or the Consultant, the actions required or enacted to address the issues, along with required timescales / closure dates, and the person responsible for the action)

- Design Decision Register (a register setting out design assumptions, basis of assumption, associated uncertainty and impact of assumption, and design mitigation required for each asset/structure/element as appropriate). The Design Decision Register shall be sufficiently detailed such that the Client and the Contractor fully understand the assumptions made throughout design development and detailed design. The Consultant shall update Design Decision Register throughout stages I-V.
- Stakeholder Register, including relevant contact(s) for each and key comments affecting the design/construction
- Information on consultation with stakeholders as relevant to the Stage of the Project, such as presentations/updates to Elected Members of the Local Authority, liaison with Gardai in relation to traffic management, and other relevant communications;
- Description of any Local Authority or Consultant communication with landowners or landowner issues, including updates to the Property & Land Holding Schedule required under [SECTION 3.9](#);
- Financial/cost report setting out the current project fees cost estimate and risks surrounding those estimates, and possible measures to mitigate those risks.

During Stage IV of the Project, the Progress Reports shall also include:

- A Construction Risk register that shall be maintained and monitored by the Consultant throughout. This should form a part of the agenda at Steering Group Meetings;
- A Works Completion Register, that indicates the % completion of all elements of the Scheme, and that clearly shows any outstanding elements;
- A Financial Update section of the Progress Report, to include information on Value Engineering proposals, a list of interim payment applications, notifications of claims and a budgetary overview of project;
- A list of specialists, subcontractors, and material suppliers employed on the scheme;
- A photographic record of works with reference to location and works elements.

4.5 Programme Requirements

The Consultant shall provide a programme that delivers each Stage according to the following Stage durations (Performance Periods); refer to the Instructions to Tenderers and Form of Tender and Schedule for further detail.

- Stage I 30 months, from its commencement.
- Stage II 24 months, from its commencement.
- Stage III 12 months, from its commencement.
- Stage IV 24 months, from its commencement.
- Stage V 18 months, from its commencement

The determination of the Performance Periods has taken account of the safe delivery by the Consultant of all duties specified herein, review periods as specified in this document, and reasonable provision of resources by a medium to large sized Consultancy. It does not include

for circumstances that cannot be reasonably foreseen (eg. legal challenges, or unreasonable actions or engagement by third parties). The Consultant shall, however, undertake their duties in such a manner as to minimise the risk of such occurrences.

The Consultant shall resource, plan, and phase their duties specified herein, as well as the procurement of any third party procurement processes and contract durations, in order to:

- Meet the above Performance Periods, and,
- Achieve the level of detail as set out in [SECTION 1.4.1](#).

The quantities of Specific Service Items identified in the tender documents, either known or estimated, shall be included in the Programme.

The project is estimated to start in **Q1 2027** and the Consultant shall schedule their programme accordingly. If the start date is changed, the Consultant shall be allowed a period to adjust their programme to reflect seasonality and to allow the provision of the tendered resources. This, in effect, shall pause commencement of the project, without cost to either party.

The Consultant shall not alter the programme durations from tendered Performance Periods without detailed justification and approval from the Client.

4.6 Programme Management

The Consultant shall programme and manage all their activities in a manner to deliver the project within the Performance Periods specified within [SECTION 4.5 PROGRAMME REQUIREMENTS](#).

The Consultant shall be responsible for providing their resources to deliver the programme to the Performance Periods, and any additional resources agreed under the delivery of Client's Changes.

The Consultant shall proactively identify potential risks to programme, and implement effective mitigation measures to counteract those risks where possible; this process shall utilise the Project Risk Register ([SECTION 4.4](#)), and with updates included in each Progress Report.

The Consultants shall provide an up-to-date version of the programme in PDF and MS Project-compatible formats with each Progress Report ([SECTION 4.4](#)).

4.7 Team Changes

The Consultant will request the Client's approval in advance of any changes to team-members assigned to the project, in accordance with the Management Services included in the Tender and Schedule.

4.8 Change Management

The Consultant shall provide a Change Order Request to the Client, either in response to a requested by the Client (Client's Change) or where the Consultant believes a change to the scope of the services specified herein is required to deliver the objectives of the project. Change Order Requests shall:

- Be submitted four weeks in advance of the work associated with the change being carried out,
- Include a description of the work,
- Include a breakdown of the costs proposed, and,
- Include a revised programme that include for the works.

The Consultant shall not commence the work subject of the Client Change Request without the approval of the Client.

The Consultant shall keep up to date with all updates and changes to relevant legislation, guidance, and best practice. The Consultant shall inform the Client of immediately any updates or changes, and no later than 4 weeks of the change, and shall advise on any implications to the scheme.

The Client is responsible for observing and following public procurement legislation and will document the processes followed when considering the requirement for additional work to be undertaken by the Consultant.

4.9 Workshops

Technical workshops shall be held during key areas of work throughout the Project, with the following objectives:

- Clarify the technical requirements of the Project,
- Make all parties aware of methodologies, approaches, and outcomes of work completed by the Consultant
- Allow design requirements and considerations to feed into the Project from relevant work areas within Tipperary County Council; for example, Heritage/Architecture/Conservation Officers, Engineers, Planners, and Scientists.
- Allow for the input of other OPW work areas (Environment Section, Regional Staff, etc.) where they are not full time members of the Steering Group, or cannot attend Technical Workshops
- Allow for the input of the Steering Group and Client and OPW-appointed Project Specialists (for example, Project Archaeologist, a Project Ecologist, etc.)
- Discuss proposed approaches to technical aspects of the Project,
- Discuss draft findings and outcomes of the Project,
- Capture out-of-scope works,
- Aid in the delivery of the Project in a timely manner, and,

- Capture the requirements/impacts with the various directorships/section within the local authority structure.

The stages, and key areas of work, at which a Technical Workshop shall be held, are defined as:

Table 4-1; List of Technical Workshops

Stage I	Survey Specification (SECTION 6.4.1)	Workshop 1
	Hydrology (SECTION 7.2.4)	Workshop 2
	Hydraulics (SECTION 7.3.2.11)	Workshop 3
	Potential Options (SECTION 7.4.2.2)	Workshop 4
	Preferred Option (SECTION 7.4.4.1)	Workshop 5
	Environmental Opportunities & Constraints (SECTION 7.5.11)	Workshop 6
	Preliminary Design (SECTION 7.4.13.1)	Workshop 7
	Buildability (SECTION 7.4.6.1)	Workshop 8
	O&M (SECTION 7.4.7.1)	Workshop 9
Stage II	Post-Consent and Detailed Design Workshop (SECTION 8.5.1)	Workshop 10
	Environmental Opportunities & Constraints (SECTION 7.5.11)	Workshop 11
	Buildability Review (SECTION 8.5.2)	Workshop 12
	O&M Review (SECTION 8.5.3)	Workshop 13
	Other Works (SECTION 8.5.5)	Workshop 14
	Contractual Commercial Risk Management (SECTION 8.6.2)	Workshop 15
	Construction Tender Documents (SECTION 8.6.5)	Workshop 16
Stage IV	Pre-commencement Construction Methodology (SECTION 10.3.1)	Workshop 17
	Environmental Opportunities & Constraints (SECTION 7.5.11)	Workshop 18
	O&M Protocol (SECTION 10.4.1)	Workshop 19
	O&M Training (SECTION 10.4.2)	Workshop 20

The Consultant's Project Manager shall attend all Technical Workshops, accompanied by, as appropriate to the stage of the Project or at the request of the Client, the Project Director and relevant technical and environmental members of the Consultant's team. These relevant team members shall include the Project Leads and experts for hydrology, hydraulics, scheme analysis and development, environmental assessment, etc.

Representatives from Tipperary County Council, the OPW, and other relevant authorities, and advisors as appropriate shall attend the Technical Workshops.

The Workshops shall be held either at the offices of the Consultant, the OPW or Tipperary County Council, or at an alternative suitable venue in or near the Scheme Area, as decided by the Client.

For each Technical Workshop the Consultant shall prepare and submit at least **five (5)** working days in advance of each Workshop) an agenda and supporting documentation (e.g. technical notes describing the pertinent issues, approaches and methodologies, drawings, other material appropriate as appropriate) that shall summarise discussion topics, and that may include technical clarifications.

The Consultant shall produce a Summary for each Technical Workshop, including minutes, and submit to all attendees and the Steering Group Members for comments and observations no later than three (3) working days after the date of the meeting.

A minimum requirement of twenty (20) Technical Workshops are required, along with the associated services, as described in this section and listed in the table above. Payment for the specified quantity, and any additional quantity shall be in accordance with clause 11.1-7 of the Conditions of Engagement, on a cost per item basis.

It is to be noted that the Technical Workshops are separate to the Collaborative workshops as described in [SECTION 5.4](#).

4.10 Safety, Health & Welfare Requirements

The management of Safety, Health & Welfare, and the management of risk generally, is a key priority for the Client and Steering Group on this Project. The identification and management of hazards and of any risks to employees, visitors, members of the public, and any other persons who may be affected by any aspects of the Project, is an integral part of this priority. The commitment to these issues will continue throughout the duration of the Project to completion.

The Consultant must fully comply with the requirements of the Safety, Health and Welfare at Work Act 2005 and any regulations made thereunder, including, in particular, the Safety, Health & Welfare at Work (Construction) Regulations 2013 and all other safety, health and welfare legislation, regulations, codes of practice and standards, and their revisions.

4.10.1 General and Legal

The Consultant shall advise the Client on any matters of Health and Safety, particularly in relation to current law, which may have implications for the Client, or require action by, or on behalf of, the Client in connection with the Project.

A discussion of Health & Safety issues, and the Consultant's duties in relation to Health and Safety, will take place during the first Steering Group meeting, and shall be a standing item for all subsequent Steering Group Meetings.

4.10.2 Safety Statement

The Consultant shall maintain an up-to-date and relevant Safety Statement, compliant with current Health, Safety & Welfare legislative requirements, and shall produce Method Statements to cover specific tasks within their duties where they deem necessary. The Consultant shall provide copies of these documents to the Client upon request.

4.10.3 Hazard and Risk Assessments

A preliminary, non-exhaustive list of potential hazards for field investigations, survey supervision and other on-site activities for the Project is included in [APPENDIX B:11.10 APPENDIX B: LIST OF POTENTIAL HAZARDS AND RISKS FOR FIELD INSPECTIONS](#).

The Consultant shall produce Hazard and Risk Assessments to cover relevant activities of their staff, in line with legislative requirement and best practice. The Consultant shall provide copies of any of these Hazard and Risk Assessments to the Client upon request.

The Consultant shall maintain an up-to-date copy of the Hazard and Risk Assessments, and any Method Statements prepared, in the Project safety folder.

The Consultant shall put in place all mitigation measures identified in the Hazard and Risk Assessments prior to their staff undertaking any of the relevant activities.

4.10.4 Accidents and Dangerous Occurrences

The Consultant shall immediately advise the Client verbally, and afterwards in writing, of any accidents or dangerous occurrences, loss or damage to any personnel, third parties or property arising during the execution of their duties in relation to this project. Such accident reporting to the Client shall not relieve the Consultant of their statutory responsibilities for accident reporting to the relevant statutory authorities and/or insurers.

4.10.5 Duty of Designers

The Consultant shall undertake all duties of Designer as required by the Statutory Instrument No 291 of 2013, namely Safety, Health & Welfare at Work (Construction) Regulations 2013, or any subsequent revisions.

The Consultant shall keep concise records, using Design Assessment Record (DAR) forms, of the key and/or significant hazards and risks that they consider in their design, the design decisions reached, and the basis for those decisions, to clearly demonstrate that they have exercised reasonable care and professional judgement, and taken account of the general principles of prevention.

The Consultant shall use the template DAR form as available from www.acei.ie (or a similar and compatible version). While these forms are essentially the Consultant's in-house record, they shall be also provided to the Client, and shall be used by the Consultant to manage information between their design team(s). It is not intended that generic or routine issues be recorded.

The Consultant shall enter each DAR into the Design Decision Register ([SECTION 4.4](#)).

4.10.6 Duties as PSDP

The Consultant shall undertake all duties of Project Supervisor Design Process (PSDP) for all Stages of the project as required by the Statutory Instrument No 291 of 2013, namely Safety, Health & Welfare at Work (Construction) Regulations 2013, or any subsequent revisions. The Consultant shall, upon appointment, submit to the Client written confirmation of acceptance of the appointment as the PSDP.

4.10.7 Safety File

The Consultant shall provide a Safety File upon completion of the Project that complies with all relevant legislation, and all relevant guidance from the Health and Safety Authority (HSA).

Where residual risk remains for the operational and maintenance stage of the Scheme, the Consultant shall provide appropriate method statements / emergency procedures to manage the residual risks for inclusion in the Safety File.

4.11 Reporting Standards & Quality Assurance

4.11.1 Reporting Standards & Formats

All reports, draft and final, submitted to the Client/Steering Group by the Consultant shall be written in an appropriate technical manner, be detailed and clear, and laid out in a logical structure. The Consultant shall check and proof-read all material prior to submission to eliminate any technical, grammatical or typographical errors. Reports and deliverables shall:

- Provide full and comprehensive descriptions of the topic and the work completed for that topic,
- Detail any assumptions made, including the requirement for the assumption and the justification for the assumption made,
- Support any statements made with relevant discussion and justification,
- Provide (in appendices if necessary) all data, maps and information relevant to the topics covered.
- Any specific material as set out in subsequent sections.

The Consultant shall provide any material specified within the Project Brief to accompany a report (e.g. GIS layers, hydraulic model, calculation sheets, drawings, etc.) in full with all draft versions of the relevant report.

The Consultant shall provide all reports, information leaflets, notices, technical notes, etc. in a PDF-compatible print-ready format.

Where printed hard copies are required, these shall be a reimbursable cost.

All written material provided to the Client shall be produced by the Consultant's staff and not generated utilising AI (artificial intelligence).

4.11.2 Review of Key Deliverables

The requirements below shall apply to the following key deliverables and their accompanying datasets:

- Defence Asset Condition Survey ([SECTION 3.4](#));
- Existing Structures Report ([SECTION 3.6](#))
- Flood Event Report ([SECTION 3.7](#));
- Hydrological Method Statement ([SECTION 7.2.3](#));
- Hydrology Report ([SECTION 7.2.15](#));
- Hydraulics Report ([SECTION 7.3.7](#));
- Option Development Report ([SECTION 7.4.11](#));
- Geotechnical Design Report ([SECTION 7.4.5.8](#));
- Buildability Report ([SECTION 7.4.6](#) and [SECTION 8.5.2](#));
- O&M Protocol ([SECTION 7.4.7](#) and [SECTION 8.5.3](#));
- Design Reports ([SECTION 7.4.13.3](#) and [SECTION 8.5.6](#))
- Constraints Study Report ([SECTION 7.5.3](#));
- NIS ([SECTION 7.5.5](#));
- EIAR ([SECTION 7.5.6](#));
- Construction Environment Management Plan ([SECTION 7.5.7](#));
- Planning Documentation ([SECTION 8.2](#));
- Construction Tender Documents ([SECTION 8.6.4](#));
- Construction Tender Report ([SECTION 9.2](#))
- Safety File ([SECTION 4.10.7](#) and [SECTION 11.5](#))
- Scheme Completion Report ([SECTION 11.10](#)).

Within **two (2)** weeks of receipt of a draft deliverable, including any accompanying datasets, the Client shall carry out an initial examination to ascertain whether the provided material is complete according to the requirements of the Contract, and that, based on the initial examination only, the quality assurance requirements set out below have been applied. The Client shall return material found not to comply with those requirements, without the provision of further observations/comments, to the Consultant for correction.

The Client shall provide observations/comments to the Consultant within **four (4)** weeks of a successful initial examination. These observations/comments will include those of the Steering Group or other external relevant parties if deemed by the Client to be necessary and appropriate. The Consultant shall review the observations/comments, make any amendments to the report/deliverable necessary to address the observations/comments, and provide a revised report/deliverable to the Client within **two (2)** weeks of receipt of the

observations/comments. The Consultant shall provide with the revised deliverable, a brief written response to each comment in the document as provided by the Client. The revised deliverable shall be referred to as the 'Second Draft'. This process shall be repeated on a two-week-review – two-week-response basis if the Client is not satisfied that the original observations/comments have been addressed satisfactorily. A Draft report/deliverable shall be accepted as Final when all observations/comments on the draft report have been addressed to the satisfaction of the Client.

The provision of interim material for the purposes of workshops shall not constitute achieving a milestone as set in the Form of Tender and Schedule.

The examination or otherwise of reports or deliverables by the Client shall not alleviate the Consultant's responsibility to carry out adequate quality assurance procedures and checks during the Project and shall not alleviate the Consultant's responsibilities as Designer and PSDP.

4.11.3 Client Review of Other Deliverables

The Consultant shall provide all other output (i.e. output in addition to, and not listed in, [SECTION 4.11.2](#)) to the Client for their review and comment; this shall include, for example, investigation/survey tender and contract documents, technical specifications, technical notes, methodologies, etc. The Client shall review and provide comment within **two (2)** weeks of receipt of the output, and the Consultant shall submit a revised output addressing those comments within **one (1)** week of receipt of comments.

4.11.4 Quality Assurance

The Consultant shall operate in full compliance with their in-house quality standards and ISO standards or equivalent. The Consultant shall check and quality assure all outputs before issue to the Client and Steering Group.

It is required that all deliverables listed in [SECTION 4.11.2](#) and [SECTION 4.11.3](#) shall be checked, approved and signed off by the Project Director. Evidence of same shall be made available on request.

Other relevant project-specific quality assurance requirements are specified within the relevant sections of this project brief, for example, in relation to the hydraulic modelling process.

4.11.5 Digital Data Requirements

Noting the spatial nature of much of the work involved in this Project, and the role of spatial data and GIS, the Consultant shall be required to make extensive use of, and deliver, digital data in undertaking the Project (including spatial and non-spatial datasets).

The Consultant shall provide all spatial datasets as required by this document in compliance with the OPW '*Engineering Spatial Data Specification*' and the '*Environmental Spatial Data*

Standard, both of which are available on www.gov.ie/opw. In the event that a spatial dataset is not defined in either specification, the Consultant shall agree its content with the Client and Steering Group in advance of providing its initial draft version.

The inclusion of any references to specific aspects of the GIS Specifications within this document (for example, in the tables of GIS deliverables) do not relieve the Consultant of their responsibility to ensure that provided datasets comply with all requirements of the Specifications.

The detailed metadata and interoperability requirements of all spatial data shall also align with the Metadata and Interoperability responsibilities for Public Authorities, as set out in Articles 5 & 6 and, insofar as possible, Articles 7-10 of the European Union Directive 2007/2/EC (the “Inspire” Directive). All other (non-spatial) digital deliverables shall be submitted in a suitable digital format as specified herein, or if not so specified, in an editable format that is compatible with Microsoft Office.

The design team will be required to manage the information generated for the project in accordance with the requirements of ISO 19650, utilising a Common Data Environment. The exact CDE is to be agreed with the Client. Coding for information shall use either the Uniclass coding, or another system agreed with the Client.

BIM data generated for the project shall be IFC compatible to ensure that data can be shared between stakeholders.

4.11.6 Version Control

The Consultant shall clearly mark all deliverables and material produced under this Project with a version number, revised for **all** subsequent iterations.

4.11.7 Naming Convention

The Consultant shall adhere to OPW’s naming convention for all works / defence assets as part the Scheme through Stages I-V. Guidance is provided in the document at [APPENDIX F: STANDARD ABBREVIATIONS FOR WORKS / DEFENCE ASSETS FOR FLOOD RELIEF SCHEMES](#) (OPW, Jan 2020).

The Consultant shall apply the naming convention and abbreviations to all drawings, specifications, and other relevant deliverables throughout the entire project, and in all Operation & Maintenance documentation for the Scheme. The ‘as built’ drawings, GIS files, operation & maintenance plan, asset register etc. shall be consistent to allow easy cross-referencing.

5 STAKEHOLDER & PUBLIC ENGAGEMENT

5.1 General Requirements

The Consultant shall carry out the duties outlined herein in a manner that shall develop healthy, constructive and proactive relationships with stakeholders and the public during all stages of the Project. The Consultant shall undertake these duties as relevant to each Stage and within the associated Performance Periods.

Upon appointment, the Consultant should make themselves aware, through communication with their environmental team and Client, of all previous stakeholder interaction to this point. This includes an identification of all existing known and stakeholder requirements and issues to that point. The Consultant shall provide their view on these requirements/issues and on the overall approach to stakeholder consultation at the first Steering Group meeting.

5.2 Project Website

The Consultant shall develop and update as necessary a Project Website for the Project throughout the duration of the Project (Stage I to V). The Project Website, including structure, format, look-and-feel and content, shall be developed by the Consultant in accordance with the template provided in Part 1 of '*Flood Relief Scheme: Project Website Template Specification*' (see specification available on <https://www.gov.ie/en/publication/b15dd0-technical-specifications-and-guidance-notes/>). The Consultant shall work with the Client and with OPW in respect of the design and branding of the Project Website.

The Consultant shall be responsible for the development and secure hosting of the Project Website. The Consultant may avail of a Project Website Template developed and hosted by the OPW, or by another party as arranged by the OPW, as specified in Part 2, '*Flood Relief Scheme: Project Website Template Specification*'. The Consultant shall be provided with access rights to the content management system for the Project Website, should they choose to use the OPW-developed Project Website Template. The OPW-hosted Project Website Template has been developed in accordance with Part 1 of '*Flood Relief Scheme: Project Website Template Specification*' and contains a content management system and a basic web site structure. If the OPW developed Project Website Template is utilised, the Consultant shall be responsible for developing any additional structure and containers beyond what is available in the template as well as updating and/or removing existing dummy containers as required.

Whether the Consultant develops and hosts the Project Website directly or uses the Project Website Template developed and hosted by the OPW, the Consultant shall prepare the Project Website for placing into the public domain within three (3) weeks of Commencement of the Project. If using the OPW-developed Project Website Template, a minimum notice of two (2) weeks must be given to the OPW by the Consultant to allow setting up the template and granting user permissions to the Consultant.

The Consultant shall submit a completed pre-check form for review by the Steering Group before the FRS Project Website is launched. The Consultant must use the template form, as provided by the Steering Group. All discussions and agreements in relation to the website shall be made through the Steering Group.

5.2.1 Website Content Management

The Consultant shall keep the content of the Project Website up-to-date at all times throughout the duration of the Project, and shall promptly (within two (2) working days as relevant to a specific event) prepare text and material as necessary to update the content as the Project develops and as instructed by the Client. By way of example, the Consultant shall make updates prior to and after any public participation event, when any report becomes publicly available, as the Project advances to a new Stage or approaches or achieves a milestone of note within a Stage, or at any other point where there is an occurrence in the progression of the Progress that would be of interest to the public. Updates to website content shall be approved by the Client in advance of publication on the Project Website.

During Stage IV, the Consultant shall update the website weekly. The text shall be a general overview of works undertaken and a look ahead, including key items such as road closures, traffic restrictions, etc.

The Consultant shall prepare documents, drawings and other relevant material for the Project Website, including but not limited to cover all aspects of the Project Website structure and contents as described in Part 1, '*Flood Relief Scheme: Project Website Template Specification*'.

The Consultant shall upload to the Project Website, in a file of not more than 5Mb in the case of each report or document, any report or document approved for public release.

The Consultant shall include the Project Newsletters on the website in a manner to facilitate their download by users of the website in .pdf format.

The Consultant shall make any new material or text to be placed on the Project Website user friendly, appealing and easily understandable to members of the public, and shall be subject to approval by the OPW and/or Steering Group as appropriate before upload into the public domain.

The Consultant shall be responsible for capturing suitable, high quality photographs or other images to be placed on the project Website.

The Consultant shall maintain a public-information section on the website during Stage IV detailing operations that may affect the public, such as road closures.

The Consultant shall be responsible for updating the website. The Client shall be provided with access rights (and training if required) so that they may update the website if required.

If the OPW-developed '*Flood Relief Scheme: Project Website Template Specification*' is utilised, the Consultant shall be responsible for developing any additional structure and containers beyond what is available in the template.

5.2.2 Website System Specification

The Project Website shall facilitate the publication of disclaimers and user guidance notes, the text of which shall be provided by the Client.

The Project Website shall have secure access via username and password over a secure HTTPS connection.

All materials, including but not limited to websites, reports and documents, produced during the FRS Project are required to meet the standards as listed in Directive (EU) 2016/2102 of the European Parliament, the “EU Web Accessibility Directive” and any additional and/or subsequent requirements as defined within national legislation, unless specifically listed as exempt within the Directive and national legislation.

FRS Project Websites, related materials, and documents must comply with SI 358 of 2020, and reach a minimum ‘Double A’ rating according to WCAG 2.1 standard, as detailed in the Harmonised European Standard EN 301 549 ‘Accessibility requirements for ICT products and services’.

Unless specifically exempt in the Directive or National Legislation the following non-exhaustive list include examples of materials that ordinarily must meet the minimum standards on Web Accessibility:

- Websites of public sector bodies not published before 23 September 2018: from 23 September 2019;
- Websites of public sector bodies published before 23 September 2018: from 23 September 2020;
- Mobile applications of public sector bodies: from 23 June 2021;
- Office file formats* not published before 23 September 2018;
- Office file formats* published before 23 September 2018, if such content is needed for active administrative processes relating to the tasks performed by the public sector body concerned;

* Office file formats should be understood as documents that are not intended primarily for use on the web and that are included in web pages, such as Adobe Portable Document Format (PDF), Microsoft Office documents or their (open source) equivalents.

The Consultant shall provide a detailed report to the Steering Committee at the start of the FRS Project that clearly outlines how each of the affected types of materials will be set up to meet the required standards.

Additionally, the Consultant shall provide a compliant statement, “Web Accessibility Statement”, on the FRS Project Website outlining;

- The measures taken to ensure that the website and linked documents meet the required standards;
- An explanation concerning those parts of the content that are not accessible, and the reasons for that inaccessibility and, where appropriate, the accessible alternatives provided for;

- A description of, and a link to, a feedback mechanism enabling any person to notify the public sector body concerned of any failure of its website or mobile application to comply with the accessibility requirements and to request the information excluded;
- A link to the enforcement procedure set out in the Directive to which recourse may be had in the event of an unsatisfactory response to the notification or the request.

The Consultant shall also provide a detailed Web Accessibility Compliance Report to the Steering Committee on completion of the website detailing the various aspects and the level of standard achieved. The Consultant shall be responsible for maintaining the website for the duration of the Project and applying appropriate software updates (including security updates) as required.

The Project Website must be capable of operating with full functionality in all major browsers including, but not limited to; Google Chrome, Mozilla Firefox, Safari and Internet Explorer. Responsive design must be used to achieve responsive design and full compatibility with mobile devices including, but not limited to, smart phones and tablets. Web development must be to HTML5 standard.

The Consultant must provide to the Client and OPW a full database schema of the system along with all other relevant documentation once it goes live.

Website software design and development shall reference the Open Web Application Security Project (OWASP) framework (https://www.owasp.org/index.php/Main_Page) to address the “top ten” vulnerabilities.

The Consultant must have robust backup procedures in place; to backup data at least daily, recover data on demand in a timely fashion, and retain data for a period agreed with the Client.

5.2.3 Website Ownership and Handover

Ownership of all website code, content and data uploaded to the Project Website and of all web domain addresses rests with the OPW and the Client.

At Stage V – Handover, the Consultant shall handover the Project Website and all its content to the Client and OPW together with a description of the system architecture and final database schema.

5.3 Public Participation Days (PPDs)

5.3.1 Content of PPDs

The Consultant shall prepare for, arrange and manage three (3) Public Participation Days (PPDs) in Stage I, including preparing all supporting information. The Consultant shall agree the date of each PPD with the Steering Group. The content of each of the PPD's is outlined below.

PPD 1 - Opening:

A first (opening) PPD shall be held within **8 weeks** of commencement of the Project. The purpose of the Opening PPD shall be to seek initial view from the public and other interested parties in relation to:

- The key issues that the Constraints Study should address,
- The options to manage the flood risk in the area,
- To highlight points of local importance that might constrain the design and/or viability of any potential flood alleviation measures, and to,
- Collate any other relevant information, including any flood events that have occurred since the CFRAM Study was undertaken.

As this PPD is quite early in the Project, it may be appropriate to defer until work is more progressed. This shall be at the discretion of the Client.

PPD 2 - Potential Options:

A second Potential Options PPD shall be held to present all measures and options assessed for the Scheme, including options that are not viable but do offer a technical solution. The Consultant shall share the advantages and disadvantages of each option with the attendees.

PPD 3 - Preferred Option:

A third (proposed Scheme) PPD, shall be held once a Preferred Option has been identified and agreed with the Steering Group to close out the public participation events for Stage I of the Project. This closing PPD shall outline the dimensions of the proposed works, likely impacts during construction, the public realm and place-making aspects, and the wider benefits offered by the Preferred Option. The PPD shall be held once the Client comments on the Draft Buildability Report and Draft O&M Protocol have been reviewed and discussed, such that likely issues affecting the community during construction can be shared at the third PPD. The comments and queries raised at the PPD shall be considered in the Scheme design and during the preparation of the EIAR.

5.3.2 PPD Event Requirements

5.3.2.1 Notifications

In addition to the other notifications/advertising specified herein, the Consultant shall directly notify all parties that have interacted with the Project prior to any subsequent PPD including, for example, landowners who have been contacted to provide access for field inspections / survey work / ground investigation.

5.3.2.2 Presentation to Councillors

Immediately before the opening of each of the PPDs to the public, the Consultant, with both their engineering and environmental representatives, shall present the Project (including the preferred Scheme for the Closing PPD) to Councillors. This shall include the preparation and delivery of a presentation to the Councillors in plenary, and a tour of the PPD in smaller groups

to answer specific questions. It is expected that the presentation to the Councillors and the tour should last approximately 1 hour for each PPD.

5.3.2.3 Event Arrangements

The Consultant, subject to approval from the Steering Group, shall make any necessary arrangements for the conduct of each PPD event as considered necessary including, but not limited to, the following:

- Organise an appropriate venue/date and make reservations as appropriate. Venue hire will be considered a reimbursable cost
- Prepare advertisements for the event to be provided to the local media (newspapers and local radio). Note that the Consultant shall not be expected to pay any charges related to the placement of such advertisement in the media.
- Write to local organisations advising them of the event at least two weeks in advance.
- Prepare and print
 - A brief information leaflet to be given to visitors to the event, and which might be made available more widely within the Scheme Area in advance of the event. (approx. **200 copies**, normally a folded A3 colour print on high-quality paper)
 - Information posters to inform the public of the event (approx. **20 copies**, normally an A1 colour print on high-quality paper).
 - Simple questionnaire to be issued at the event (approx. **200 copies**, normally an A4 colour print on high-quality paper)
 - Freepost envelopes, pre-addressed, for the return of questionnaires (approx. **200 copies**).
 - Printing and freepost expenses will be considered a reimbursable cost. Quantities of each to be agreed in advance with the Client.
- Provide a visual display for the event outlining the purpose of the Project and the event, demonstrating the types of measures that are typically used for flood alleviation, using photomontages as appropriate ([SECTION 7.5.6.2 Photomontages](#)) and also provide visual displays using GIS data as per [SECTION 7.3 Hydraulic Analysis](#) and [SECTION 7.4 OPTION IDENTIFICATION & PRELIMINARY DESIGN](#) (including Defended and Benefiting Areas). Large format posters as a minimum.
- Provide staff, including the Project Manager, to attend the event to assist the public and answer, where possible, any questions arising.

5.3.2.4 PPD Post Event Report

The Consultant shall prepare and submit to the Client a post-event review report within fifteen (15) working days of the event. This report shall include, but is not limited to, the following information: number of attendees, details of all relevant information obtained, an evaluation of all relevant information obtained, any lessons learned from the event that may inform more effective event plans for future events.

5.3.2.5 Payment

A minimum requirement of three (3) PPD Events are required, along with the associated services as described in this section. Payment for the specified quantity, and any additional quantity, shall be in accordance with clause 11.1-7 of the Conditions of Engagement on a cost per item basis.

5.4 Collaborative Workshops

The Consultant shall prepare and manage three (3) Collaborative Workshops in Stage 1 with representatives from a small number of public stakeholder bodies. The purpose of the workshop includes but is not limited to establishing goals and objectives from stakeholders and each relevant section within Tipperary Council and from other sectors (e.g., planning, enhancement of public realm, heritage, recreation, biodiversity, etc.), and determine if and how these goals and objectives may inform design features for a Scheme that would bring added value to the Project through a joined up approach to public sector works that would provide multiple benefits and result in a more locally valuable and acceptable Project.

For each Collaborative workshop:

- The Collaborative Workshops will be attended by the Consultant (Project Manager, consultant's engineering and environmental representatives and other key staff as appropriate to the stage of the Project).
- The Consultant shall invite all relevant stakeholders not less than three weeks in advance of the workshop and telephone invitees to confirm attendance or otherwise, and if possible encourage or identify alternative representatives for any non-respondents.
- The Consultant shall engage with relevant work areas within OPW and Tipperary County Council; for example, Heritage/Architecture/Archaeology/Conservation Officers, Engineers, Planners, and Scientists and incorporate their design requirements.
- Allow for the input of Client-appointed Project Specialists (for example, Project Archaeologist, Project Ecologist, etc.)
- The Consultant shall liaise with their Environmental Team, the Client and the Steering Group to clearly communicate the purpose of the event and the relevant invitees, the indicators of success and the expected outputs from the process. The Consultant shall prepare an event plan that specifies the process for the event and each task or activity in that process, the input required for each task or activity and any output management system that may be required. The event plan shall be submitted to the Client for review not less than 4 weeks in advance of each of the Collaborative Workshops.
- The Consultant shall estimate and provide the number of team members required and their roles, (technical staff, facilitator, moderator, chair, info recorder etc.), and make all team members aware of the event plan in advance. The staff shall include not less than two appropriately senior staff, including the project manager and a senior member of the environment team, who have been closely involved with the Project to attend the workshop and respond to questions arising from the public and stakeholders.

- For the event itself, the Consultant shall prepare the venue in advance, in accordance with the agreed event plan and with enough time to make adjustments if necessary following a review of set up by the Client.
- After the event, the Consultant shall prepare and submit to the Client a short Post Collaborative Workshop Review Report. This report shall include, but is not limited to, the following information; number of attendees, details of all relevant information obtained, an evaluation of all relevant information obtained, any lessons learned from the event that may inform more effective event plans for future events.
- The Consultant shall use the information gained at the workshop, including information on environmental matters to inform a 'workshop feedback event' for those stakeholders that attended this workshop.

A minimum requirement of three (3) Collaborative Workshops are required, along with the associated services as described in this section. Payment for the specified quantity, and any additional quantity, shall be in accordance with clause 11.1-7 of the Conditions of Engagement on a cost per item basis.

5.4.1 Opening Collaborative Workshop

An opening Collaborative Workshop shall be held shortly after the opening PPD in order to, within the context of the purpose of the workshops as set out above, identify and discuss any particular issues, constraints and opportunities that could inform the development of the Scheme, and any potential features that could be considered to create multiple benefits and/or meet objectives other than flood risk management.

5.4.2 Options Collaborative Workshop

A second Collaborative Workshop will be held as part of the scheme analysis and design in order to discuss how stakeholder issues, constraints and opportunities can inform the identification of the preferred option and the design of the Scheme.

For the Options Collaborative Workshop, the Consultants shall prepare drawings and in collaboration between their engineering and environmental team, photomontages as relevant to the Workshop.

5.4.3 Preliminary Design Collaborative Workshop

A third Collaborative Workshop shall be held as part of the scheme analysis and preliminary design in order to demonstrate how the particular issues, constraints and opportunities and any potential features previously identified have been addressed through the intervening work.

For the Preliminary Design Workshop, the Consultants should prepare drawings and in collaboration between their engineering and environmental team, photomontages as relevant to the Workshop.

5.5 Responding to Queries from Third Parties

The Consultant shall receive, register and maintain relevant details of all queries related to the Project; either by email, post, via the website or by other means. The Consultant shall prepare and issue appropriate draft responses to all queries, and forward same to the Client for review and approval prior to issue. All responses shall also be added to the register of queries. The Consultant shall meet with interested parties as necessary, which may include meetings outside of normal office hours. Payment for meetings required to address queries shall be in accordance with clause 11.1-7 of the Conditions of Engagement on a cost per item basis.

5.6 Project Newsletters and Briefing Notes

The Consultant shall carry out the following duties:

- Every three (3) months, issue a draft newsletter to the Steering Group for review, incorporate responses to comments, re-issue to the Steering Group for its agreement and, once agreed, provide to the Client. Each newsletter shall be aimed at non-technical stakeholders and members of the public that outlines activities undertaken during the preceding six months, activities planned for the following six months and other information relevant at the time of preparation. The newsletter shall be prepared in colour and to a high standard of presentation, and shall include relevant images.
- Once agreed with Steering Group, make the newsletters available on the Project Website and issue the newsletters by email to any stakeholder who has requested electronic receipt of the newsletters.
- Every three (3) months, prepare Briefing Notes for the Tipperary County Council Councillors and similar stakeholders that shall provide a brief summary of progress, next steps, projected key milestone dates, key issues and other matters that may be of relevance and interest to such stakeholders. The format of this briefing note is to be agreed at the first steering group meeting.

Where hard copies of newsletters or briefing notes are required, the printing costs shall be a reimbursable item.

5.7 General Data Protection Regulations

In the course of the Project, the Consultant shall be a Processor of personal data, and shall comply at all times throughout the duration of the Project with its obligations under all applicable Irish and EU data protection Law, including the requirements of the General Data Protection Regulations (REGULATION (EU) 2016/679), the Data Protection Acts 1988 to 2018, any amendments to such legislation, and with any instructions issued by the Client as the Controller of the personal data.

The Consultant shall complete a Data Processing Agreement, with the consultant taking on the role of Data Processor and the Client taking on the role of Data Controller. A sample Data Processing Agreement (DPA) is included in the Information Pack provided, and a project specific DPA will need to be completed and signed by both parties.

5.8 Irish Language Obligations

The Nenagh Flood Relief Scheme is not within or adjacent to a Gaeltacht area and the Nenagh River and its tributaries do not encroach into a Gaeltacht area. The Consultant shall comply with the requirements of the Official Languages Act 2003.

6 CONTRACT MANAGEMENT SERVICES

6.1 General Requirements

The Consultant shall undertake the Contract Management Services described in the sections below for all third-party contracts, including their duties as PSDP (4.10.6 DUTIES AS PSDP), required to deliver the requirements of the Project. The Consultant shall pay particular attention to ensuring a sufficient level of detail is available to the Consultant from the commissioned contracts to progress the development, costing, appraisal and design of the Scheme and fulfil their role as Designer.

The Consultant shall undertake these duties described in this section as relevant to each Stage and within the associated Performance Periods.

The Client, subject to the requirements of SECTION 6.3, shall pay all third party contractors' fees.

The Consultant shall carry out the duties specified herein (Sections 6.2 PROCUREMENT, 6.3 CONTRACT MANAGEMENT and 6.4 PRODUCTION OF SPECIFICATIONS) for the contracts listed in TABLE 6-1; LIST OF THIRD-PARTY CONTRACTS below.

Table 6-1; List of Third-Party Contracts

No.	Contract Description	Notes
1	Geotechnical Survey 1	Typically to inform the Optioneering process.
2	Geotechnical Survey 2	Typically to inform the detailed design process, but may be incorporated into earlier Survey where deemed appropriate
3	Environmental Baseline Survey 1	Allowance for one of the detailed Baseline Surveys identified in TABLE 7-8
4	Environmental Baseline Survey 1	Allowance for one (a second) of the detailed Baseline Surveys identified in TABLE 7-8
5	Invasive Species treatment Contract	Noted that Giant Hogweed is present at multiple locations along the Nenagh River, in particular between Lisbunny and the N52
6	As-built Survey	For as built modelling, post construction. See SECTION 11.7.1

A minimum requirement of the management of 6 Third Party Contracts is required along with the associated services, as described in this section and listed in TABLE 6-1; LIST OF THIRD-PARTY CONTRACTS.

In recognition of the varying nature of the contracts, payment for the on-site supervision and engagement element of the Contract Management Services shall be treated separately to the other Contract Management Services as outlined. Payment for the on-site supervision and engagement shall be on a per day basis, payment for all other Contract Management Services shall be on a per contract basis, all in accordance with clause 11.1-7 of the Conditions of Engagement.

6.2 Procurement

The Consultant shall:

- 1) Outline in advance their proposed procurement strategy for each contract to the Steering Group, with that strategy paying particular attention to complying with the project programme;
- 2) Provide a cost estimate of the proposed services to the Steering Group in advance of the procurement of each contract;
- 3) Prepare the technical specifications/scopes of services ([SECTION 6.4](#)).
- 4) Prepare the tender and contract documents for each contract. Each procurement process shall include a Safety, Health & Welfare Competency Assessment and environmental criteria as appropriate
- 5) All procurement shall fully comply with Tipperary County Council Procurement Procedures, including Tipperary County Council's Green Public Procurement Strategy 2024-2026 which details the Green Public Procurement and Reduction of Embodied Carbon measures to be implemented. Further details are provided in the Information Pack.
- 6) Provide responses to the Client for queries/clarifications sought during tender periods.
- 7) Review and evaluate tenders received, provide a procurement process report to the Client, including a recommendation of the preferred tenderer, for each procurement process.

The Client shall publish all documents arising from the procurement process: for example, the Prior Information Notice (PIN), Contract Notice and tender documents, clarifications, Contract Award Notice, etc. Where applicable, the Consultant will draft a Regulation 84 report for the Client's approval.

6.3 Contract Management

The Consultant shall:

- 1) Carry out general liaison with the contractors, such that the Consultant has ongoing access to the level of compliance with the specification and proactively steers the Contractor depending on site findings
- 2) Provide on-site supervision and engagement with Contractors (including Ground Investigation); payment for the on-site supervision and engagement element of the Contract Management Services shall be treated separately to the other Contract Management Services as outlined, on the basis of the number of days the Consultant is on site supervising and engaging with the Contractor, as agreed with the Client, and in accordance with clause 11.1-7 of the Conditions of Engagement.
- 3) Manage programme and progress including weekly reporting on same to the Client and Steering Group, highlighting details of any slippage;

- 4) Contact land owners as necessary and arranging for access for surveyors and service providers, and responding to queries from property owners in relation to survey activities,
- 5) Review and carry out quality control of the results, outputs and reports, and managing prompt remedial action where the quality of results, outputs and reports are not to the required standard,
- 6) Ensure the timely delivery of good quality data that is appropriate for the intended purpose for contracts
- 7) Review and provide approval of submitted invoices, for submission to the Client for payment,
- 8) Review and recommend action in relation to any claims arising,
- 9) Provide final approved datasets to the Client and OPW on completion of Contracts.

6.4 Production of Specifications

The Consultant shall develop and provide detailed technical specifications in relation to any Survey contracts required to fulfil the requirements of the Project, and in particular ensuring a sufficient level of detail is available to the Consultant to progress the development, costing, appraisal and design of the Scheme and fulfil their role as Designer.

The Consultant shall utilise the following to assist in the identification of survey and other service contract needs:

- Their review of all existing data ([SECTION 3.2](#));
- Field inspections ([SECTION 3.3](#));
- Input from the Steering Group;
- Information gathered from meetings with relevant authorities e.g. utility providers.

The Consultant shall include the requirements specific to particular contract activities as provided in the following sub-sections.

6.4.1 Survey Specification Workshop

At the earliest opportunity after the first Steering Group Meeting, and prior to the production of survey specification(s), including Ground Investigation, the Consultant shall organise and attend a Survey Specification Workshop with the Steering Group.

At the Survey Specification Workshop, the Consultant shall

- Present the procurement approach ([SECTION 6.2](#));
- Present the extent of survey for each of the survey contracts; and
- Present to the Client a strategy designed to ensure consistency with regard to the Ordnance Survey Geoid Model (OSGM). The CFRAM Study data was captured to OSGM02, whereas, unless specified otherwise, it is likely that new data will be captured to OSGM15. The Consultant shall ensure their strategy is reflected in the survey

specifications(s), and shall work proactively to ensure the strategy is implemented in the work of the survey contractor, and by the construction contractor in Stage IV.

6.4.2 General Surveys

The Consultant shall ensure that, at a minimum, the requirements of the OPW Survey Specification are included in their production of any survey specification, in particular in relation to accuracy, resolution, data formats, naming convention, and folder structures. The OPW specification is available online:

<https://www.gov.ie/en/publication/b15dd0-technical-specifications-and-guidance-notes/>

The Consultant shall specify such survey contracts as required to fulfil the requirements of the Project, and in particular ensuring a sufficient level of detail is available to the Consultant to progress the development, costing, appraisal and design of the Scheme and fulfil their role as Designer. These shall include, for example:

- Topographical Surveys, to include where required:
- Channel and hydraulic structures;
- Property Threshold survey(s) to fulfil the requirements of Section 7.3.2.5 REPRESENTATION OF BUILDINGS and Section 7.4.10 Cost Benefit Analysis;
- Flood defences (geometric data, see SECTION 3.4);
- CCTV and Man-hole Survey;
- Utility Survey;
- Aerial (LiDAR) Survey.

6.4.3 Ground Investigation

Following the Commencement Meeting, the Consultant shall prepare a strategy for the procurement and timing of the Geotechnical Survey(s), and present this strategy in a suitable document to the Steering Group. This strategy shall endeavour to provide the Geotechnical data and report in such a manner as to:

- Avoid unnecessary delay to the overall progression of the Scheme,
- Provide a level of detail sufficient for the selection of the Preferred Option, and the Preliminary Design required to support the consent process,
- Provide a level of detail and for the Design Detailing allowing tendering of the Construction Works contract.

The Consultant shall provide an assessment of the risks and mitigations offered by their strategy, and any required statutory screening processes and their likely outcomes, within the document presented to the Steering Group.

The Consultant shall specify such ground investigation as they require in order to fulfil their role as Designer; this shall include, as appropriate to the nature of the Scheme, any ground

stability, bearing capacity, seepage, groundwater, or other geotechnical aspects required for their Design.

The Consultant shall carry out AA and AIA screening of Ground Investigation Survey.

The Consultant shall include the provision of a Ground Investigation (Factual) Report (GIR) by the Ground Investigation Survey Contractor in any specification issued.

6.4.4 Invasive Species Treatment

The Consultant shall utilise their Invasive Species survey ([SECTION 7.5.1](#)) and their preparation of the Invasive Species Management Plan ([SECTION 7.5.2](#)) to specify Invasive Species Treatment contract(s). The Consultant shall progress this at the earliest opportunity, to minimise delay to the progression of the Scheme, and particularly its construction.

6.4.5 Environmental Baseline Surveys

A range of Environmental Baseline Surveys are to be carried out by the Consultant using competent experts in the relevant disciplines as part of their lump-sum tender. Where other/specific detailed baseline environmental surveys are required to make a sufficient level of detail available for development, appraisal and design of the Scheme, these will be specified, procured and managed by the Consultant with the cost of any third party fees paid for by the Client. This is outlined in [SECTION 7.5.1 ENVIRONMENTAL SURVEYS](#).

6.4.6 As-built Surveys

This survey is to capture the topographical survey data as necessary to reflect the changed physical conditions with the Scheme completed and any other relevant physical changes since project commencement that may influence flood levels, flows and/or extents (referred to as the 'As-Built' conditions). This survey is separate to the as-built survey as generally undertaken by a Contractor. The requirements for this survey are outlined in [SECTION 11.7.1](#)

7 SCOPE OF SERVICES – STAGE I (OPTION IDENTIFICATION AND PRELIMINARY DESIGN)

7.1 General Requirements

The Consultant shall provide the duties in relation to Sections 2.6.3 NENAGH CENTRE OF Excellence

The Centre of Excellence for Sustainable Energy will be located on Martyr's Road at the site of the former Abbey Machinery yard. While the project may not directly impact on the proposed Flood Relief Scheme, it is however along the route of the Clareen Culvert and will at a minimum be adjacent to the scheme.

It is anticipated that this project will be submitted for Part 8 Planning in Q4 2026, with construction expected to commence in Q4 2027 and an estimated project completion timeline of Q1 2030. The project is led by Tipperary County Council in partnership with the Tipperary Energy Agency, North Tipperary Development Company, the Technological University of the Shannon (TUS), Community Power and Siga Limited. This project will develop a Centre of Excellence for Sustainable Energy which will be the anchor and catalyst for the redevelopment of the Martyr's Road Regeneration Quarter. The Centre of Excellence will host a range of public agencies working collaboratively to deliver innovation solutions from training and development to new cutting-edge research on technologies, to incubating low-carbon social enterprises. It will also deliver public infrastructure, civic spaces and public realm enhancement and will consolidate the linkages to the town centre and unlock the potential for the overall area. The development will transform a 10-hectare brownfield site in the heart of Nenagh into a modern, carbon-neutral hub of activity. As part of the broader vision, the surrounding area, including Friar Street and Emmet Place, will also be revitalised to create a new town centre amenity that enhances both functionality and community engagement.

<https://www.tipperarycoco.ie/sites/default/files/2022-08/Nenagh%20Centre%20of%20Excellence%20for%20Sustainable%20Energy%20-%20Concept.pdf>

GENERAL TECHNICAL SERVICES, 4 GENERAL MANAGEMENT SERVICES, 5 STAKEHOLDER & PUBLIC ENGAGEMENT, 6 CONTRACT MANAGEMENT SERVICES, as relevant to this stage (Stage I).

The Consultant shall undertake as part of Stage I such studies, analyses, assessments, investigations and other work as necessary to meet the Project Objectives and within the associated Performance Period. These services are set out within this section.

The Consultant shall achieve the following level of detail in Stage 1 (repeated from SECTION 1.4.1 LEVEL OF DETAIL), such that their work:

- Provides confidence to the Client, Steering Group, public and stakeholders in the viability of the Potential Options and Preferred Option, and,
- Provides sufficient evidence to justify the elimination of non-viable measures, and,
- Fulfils the requirements of the planning and environmental consent processes, and
- Provides Preliminary Design, and ensures no reasonably foreseeable variations arise in subsequent stages.

7.2 Hydrological Analysis

The Consultant shall undertake all such hydrological analysis as necessary to fulfil their role as Designer, to meet the Project Objectives, and to robustly determine the requirements, design and viability of an appropriate Scheme. The hydrological analysis shall include flood flow estimation for the relevant project watercourses, and the calibration of hydrological models.

The requirements of the Hydrological Analysis are set out below.

7.2.1 Relationship with Hydraulic Modelling

The Consultant shall be cognisant of the iterative relationship that can exist between Hydrological Analysis and Hydraulic analysis. Hydrological analysis may require adjustment and review on foot of completion of the hydraulic modelling, including calibration. Hence, material that is required within the Hydrological Method Statement (SEE SECTION 7.2.3) may require revision within the Hydrology Report (SECTION 7.2.15), and material provided within the Hydrology report may require revision within the Hydraulics Report (SECTION 7.3.7). This is particularly relevant in the assessment of historic flood events, where hydraulic modelling is required as part of a rating review, or in the case of rainfall run-off modelling where the analyses can be intrinsically linked.

Notwithstanding the requirements of the brief, the Consultant shall take account of this iterative relationship in the timing, content, and frequency of method statement(s), reports, workshops, and interim information.

7.2.2 CFRAM Study Hydrological Analysis

The Consultant shall review all available documents and information pertaining to the hydrological assessment undertaken as part of the Shannon CFRAM Study and the resulting flow data. The Consultant shall highlight in the Hydrology Method Statement where their approach is likely to differ from the CFRAM Study, and shall include in the Hydrology Report differences in output from the CFRAM Study, and the reasons for those differences. Refer to details provided in [SECTION 3.2.1.2](#)

7.2.3 Hydrological Method Statement

The Consultant shall provide, at the earliest opportunity that allows for the meaningful inclusion of the material described below, a Hydrological Method Statement that:

- Describes the Project Watercourses ([SECTION 2.3](#)), and includes them in a GIS layer;
- Sets out a detailed method statement for completing the objectives of the Hydrological Analysis;
- Details where the proposed approach is likely to differ from the CFRAM Study, and the likely implications for flow values;
- Provides initial considerations on the proposed methodology's relationship with their Design approach, for example, in relation to accounting for statistical error or uncertainty (see [SECTION 7.2.10 FLUVIAL DESIGN EVENT ESTIMATION METHODS](#));
- Reports on the review and update of data carried out to date, in relation to the Hydrological Analysis;
- Provides detail of the proposed rating review methodology;
- Makes any other relevant recommendations on their approach.

The Consultant shall provide the Hydrological Method Statement five (5) working days in advance of the Hydrological Assessment Technical Workshop.

The Hydrology Method Statement and its accompanying spatial datasets are subject to the requirements of [SECTION 4.11.2 REVIEW OF KEY DELIVERABLES](#), in relation to reporting standards, the examination process, digital data requirements, Quality Assurance and version control.

7.2.4 Hydrological Assessment Technical Workshop

The Consultant shall organise and attend a Technical Workshop (see [SECTION 4.9 WORKSHOPS](#)). The objective of the Technical Workshop is to facilitate discussion on the Hydrological Assessment, and in particular the Hydrological Method Statement. The workshop shall take place within the review period of the Hydrological Method Statement ([SECTION 7.2.3](#)).

7.2.5 Past Flood Data Analysis

Making use of all relevant data referred to in [SECTION 2.6.3](#), the Consultant shall analyse all available past flood events within the Study Area, with that analysis to include:

- Determination of estimates of peak levels, peak flows and flood extents during those flood events, including determination of input flows for calibration and verification model runs;
- Estimation of the annual exceedance probabilities of those events using appropriate methodologies, including estimation of rainfall event frequency using the FSU gridded rainfall dataset in conjunction with recorded meteorological data;
- Ranking of all past flood events in terms of magnitude.

The Consultant shall carry out any qualitative analysis required to reconcile the past flood event analysis with the statistical analysis, including where changes in the catchment (e.g. changes in maintenance regime or other channel change, construction of defences, etc) have occurred since the historical events.

The Consultant shall utilise the outcomes of this analysis in:

- 1) Gaining an understanding of the flood history and mechanisms present within the Study Area,
- 2) Derivation of hydrological inputs to calibration model runs;
- 3) The calibration of the hydrological flows and hydraulic model, and
- 4) The derivation of the Design Flood Parameters.

The Consultant shall provide full reporting of the analysis of past flood data in the Hydrological Method Statement and in the Hydrology and Hydraulic Reports as appropriate.

7.2.6 Rating Review

There are three (3) Hydrometric Gauging Stations within the Study Area, each of which have the potential to provide a significant contribution to the Hydrological Analysis in the form of rating reviews. They are:

- Clarianna 25029
- Tyone 25038
- Gourdeen 25027

Details of these Stations, including their known limitations and comments on the data are outlined in [SECTION 3.2.3.1](#)

The Consultant shall carry out a standalone review of the rating curves, from low flows up to the highest gauged flow, and shall extrapolate the rating curves beyond the highest gauged flow, at each of the above listed gauging stations.

In carrying out the rating review, the Consultant shall:

- Visit the hydrometric station site, to gain an understanding of the hydraulic conditions of the channel, relevant structures, and the flood plain, and to inform the specification of any additional survey requirements;
- Review the gauge history, its data, and historic rating equations, and identify temporal variability of the stage discharge relationship, and potential reasons for these variations;

the Consultant shall utilise this knowledge in the overall review of the ratings, including in the hydraulic modelling of the gauge and its calibration;

- Construct a detailed localised hydraulic model for the gauge site, incorporating the channels and floodplains up- and down-stream of the gauging station as necessary to represent accurately the conditions at the gauging station and with reference to the temporal variability of ratings. The Consultant shall calibrate the modelled rating to the recorded flow gaugings (as deemed reliable and temporally appropriate) up to the maximum gauged flows, and use surveyed data and supporting information (e.g. from their field inspections) to derive the best estimate of the extrapolation of the rating above the maximum gauged flows based on hydraulic modelling of the gauging station;
- Carry out sensitivity testing of the rating review model;
- Establish a stage-discharge relationship (equation(s)) based on the calibrated model;
- Plot the recorded and modelled stage-discharge values, and the existing and model-derived rating curves on normal and double log plot for comparison purposes;
- Where no gauged flow data exists (for example, above the highest recorded flow gauging), carry out the rating review based on the most appropriate in-channel and out of bank roughness parameters and structure coefficients (attained via field inspections and best available information etc.).

The Consultant shall place particular emphasis on the upper range and the temporal variability of the stage-discharge relationship, to ensure appropriate understanding of the quality and limitations of the flood flow data and reduce any uncertainty associated with the upper limits of the rating curves. The Consultant shall utilise the review in part to inform their approach in addressing the uncertainty associated with extrapolation of the rating curves beyond the highest gauged flow in their estimation of design flows, in the hydraulic modelling, and their design of the Scheme.

Where the Consultant recommends that a new rating curve should be applied in their design, and that recommendation is accepted by the Client, the Consultant shall recalculate all flows for that gauge and produce a revised set of flow values (instantaneous flows, Annual Maxima, QMED values, etc.). The Consultant shall use these revised values in their derivation of the design flood parameters.

The Consultant shall examine the gauge data for evidence of trend over time in its Annual Maxima and resultant QMED, and in the event of a trend being identified, make recommendations supported by justification as to whether allowing for that trend in the calculation of the design flows is appropriate.

The revised set of rating curves must be in the power law format i.e. $Q = C(h-e)^\beta$ Where Q is discharge; h is the gauge height of the water surface; e is the gauge height of zero flow for a control of regular shape, or of effective zero flow control for a control of irregular shape; (h-e) is head or depth of water on the control; C is the discharge when the head (h-e) equals 1.0; β is slope or the rating curve (ratio of the horizontal distance to the vertical distance).

The Consultant shall present the rating review in the Hydrology Report.

7.2.7 Update and Creation of Hydrological Datasets

The Consultant shall create any hydrological datasets, or update existing datasets, that they require to carry out the hydrological analysis to deliver the Project Objectives and fulfil their role as Designer of the Scheme. The Consultant shall include descriptions of the creation or update of any datasets in the Hydrology Report.

The Consultant shall provide these datasets to the Client with the draft and Final Hydrology Reports, in accordance to the OPW FRS Engineering Spatial Data Specification (available on <https://www.gov.ie/en/publication/b15dd0-technical-specifications-and-guidance-notes/>).

7.2.7.1 *Meteorological Data Analysis*

The Consultant shall analyse the collated meteorological data in terms of rainfall depths and volumes etc. and shall estimate probabilities for major and recent events.

The probabilities for these events shall be estimated by reference to the Flood Studies Update Depth-Duration-Frequency model and due consideration to antecedent conditions should be given when carrying out this analysis.

The Consultant shall use the outputs of this analysis to inform the work described in other sections of this Project Brief, including but not limited to [SECTION 7.2.5 PAST FLOOD DATA ANALYSIS](#), [7.2.9.2 FLUVIAL DESIGN EVENT PARAMETERS](#) (for rainfall runoff modelling), [7.2.13 PLUVIAL ASSESSMENT](#), [7.4 OPTION IDENTIFICATION & PRELIMINARY DESIGN](#)), and [7.4.13 PRELIMINARY DESIGN](#).

7.2.7.2 *Flood Studies Update Physical Catchment Descriptors*

The Consultant shall review the Flood Studies Update (FSU) Physical Catchment Descriptors PCDs for correctness in conjunction with the catchment boundaries, the “Tailte Éireann Geometric River Network” (HY.IE.EPA.WATER_RivNetRoutes), PRIME2 dataset, and other relevant mapping to identify any discrepancies, recalculate/correct these discrepancies, and create an updated dataset that reflects the updated PCDs at each Hydrological Estimation Point (HEP).

The Consultant shall update the Physical Catchment Descriptors dataset to reflect any updates they make to other hydrological datasets (eg. catchment boundaries, river network, etc) and shall ensure consistency between all datasets.

7.2.7.3 *Catchment Boundaries*

The Consultant shall create a new catchment boundary dataset using the available LiDAR / Topographical Data.

The Consultant shall identify and delineate any catchments of less than 1km² in area required to deliver the Project Objectives and fulfil their role as Designer of the Scheme (for example, where these provide a significant hydrological inflow or where required for the design of ancillary works to manage behind-defences surface water accumulation).

The Consultant shall identify and delineate any relevant urban catchments, or catchment delineations created by urban drainage infrastructure, that are not present within the catchment boundary dataset, and add to the updated dataset.

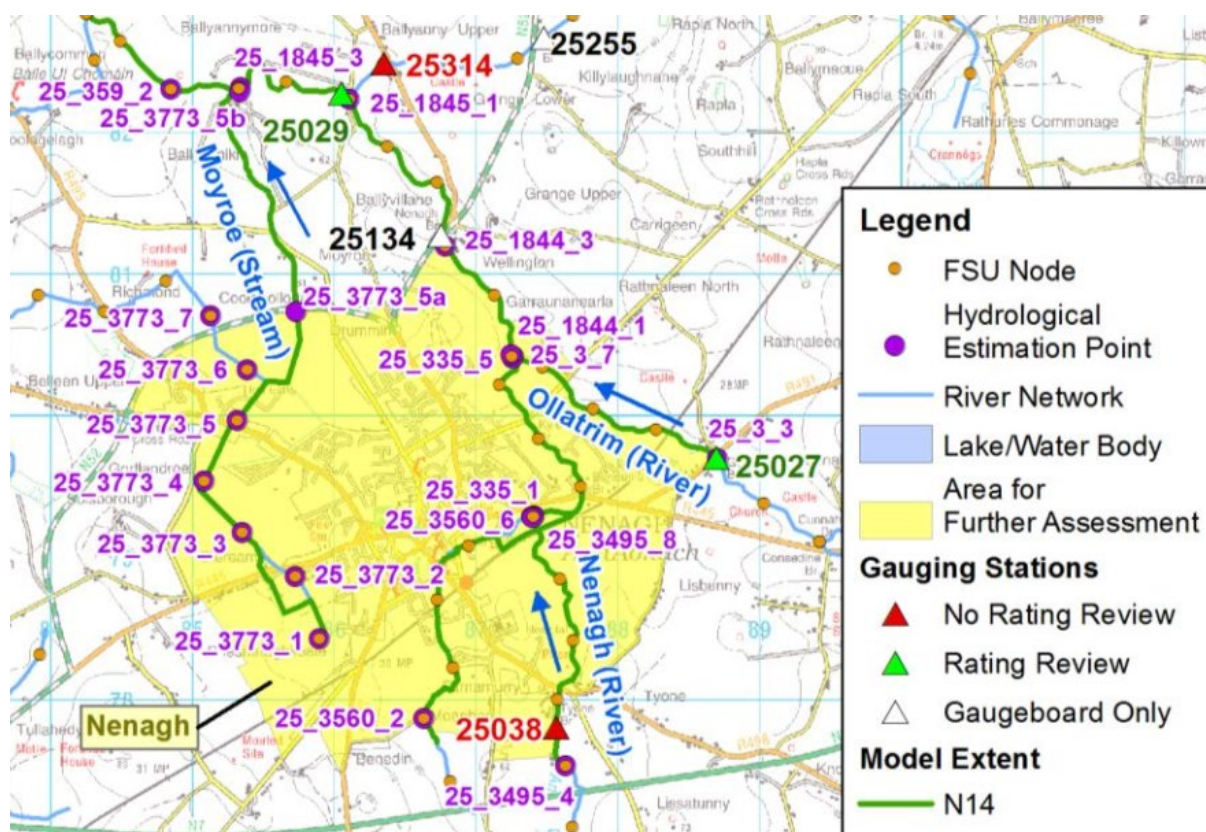
7.2.7.4 River Network

The Consultant shall review the “Tailte Éireann Geometric River Network” (HY.IE.EPA.WATER_RivNetRoutes) and/or watercourse layers in the PRIME2 dataset using available LIDAR/topographical data, Tailte Éireann mapping and their field inspections, identify any discrepancies, and amend the river network to address these discrepancies (including the addition of new watercourses), and create an updated dataset.

7.2.8 Hydrological Estimation Points

The location of the Hydrological Estimation Points (HEPs) as defined for the Shannon CFRAM Study are shown in the Figure.

Figure 7-1; Shannon CFRAM Study Hydrological Estimation Points (HEPs)
(extract from Appendix B14 of Hydrological Report)



The Consultant shall review the location of the HEPs as determined for the Shannon CFRAM Study, and as necessary, amend or establish and justify the location of HEPs within the Study Area to deliver the Project Objectives and fulfil their role as Designer of the Scheme. The HEPs shall be located to include all of the following:

- upstream boundaries of all modelled watercourses,

- points on receiving channels upstream and downstream of the confluence of any tributary,
- point on tributaries upstream of the confluence with the receiving channel,
- at each hydrometric gauging station (Clarianna 25029, Tyone 25038 and Gourdeen 25027)
- locations as necessary to accurately represent the inflows, additional to tributaries, along the modelled watercourses,
- other points at suitable locations as necessary, and particularly on smaller watercourses, such that there is at least one Hydrological Estimation Point every 2 kms along all modelled watercourses.

The Consultant shall drive the hydrological flow values for the flood event probabilities specified in [SECTION 7.2.9.1](#), and shall provide the associated hydrological data (Physical Catchment Descriptors, catchment boundaries) at each HEP ([SECTION 7.2.15](#)).

The Consultant shall use the HEPs as ‘anchoring’ or ‘check’ flows to achieve flows that are consistent and non-divergent with the flows within the hydraulic model(s). The Consultant shall investigate instances where significant differences occur, and make amendments if required, or provide suitable justification for the differences.

The Consultant shall provide the HEP dataset, including its flow values, with the Hydrology Report.

7.2.9 Design Event Parameters

7.2.9.1 *Design Event Probabilities*

The range of probabilities for which the Consultant shall derive design flood parameters as set out herein shall include those with an annual exceedance probability (AEP) of 50%, 20%, 10%, 5%, 2%, 1%, 0.5% and 0.1%, and for the Current, Mid-Range, and High End Future Scenarios.

7.2.9.2 *Fluvial Design Event Parameters*

The Consultant shall determine, for the full range of design event probabilities, design fluvial event parameters including peak flows, hydrographs, flood volumes and other design flood parameters, such as downstream boundary levels, as necessary to deliver the requirements of the Project. The Consultant shall determine the appropriate timing of any inflows to the model, for example in tributaries, in part through the Joint Probability Assessment ([SECTION 7.2.11 JOINT PROBABILITY ANALYSIS](#)). The Consultant shall utilise the methodologies as set out in [SECTION 7.2.10 FLUVIAL DESIGN EVENT ESTIMATION METHODS](#) in the determination, calibration and validation of these design event parameters.

The Consultant shall produce the relevant design event parameters for each HEP ([SECTION 7.2.8 HYDROLOGICAL ESTIMATION POINTS](#)), and as input data for the hydraulic modelling ([SECTION 7.3 HYDRAULIC ANALYSIS](#)).

The Consultant shall provide the design event parameters as finalised prior to their adjustment in the hydraulic modelling process in the Hydrology Report; full details of any such adjustments, including revised design event parameters, shall be provided with the Hydraulic Report ([SECTION 7.3.7 HYDRAULICS REPORT AND DELIVERABLES](#)).

7.2.10 Fluvial Design Event Estimation Methods

The Consultant shall determine the fluvial design event parameters using at least three (3) methodologies as appropriate to the catchments and data availability, and for the purposes of comparison, including, but not necessarily limited to:

- Flood estimation methods for estimating index design flood flows, hydrograph shapes and growth curves. It is anticipated that the Flood Studies Update (FSU) methodologies shall be mainly used, but the Consultant shall other methodologies if the FSU methodologies are not appropriate to the subject catchments, and for the purposes of comparison,
- the full use, and statistical analysis, of historic gauged levels and flows, including those where records might exist but for which there may be no gauged level or flow data, and shall determine and justify appropriate flood event Growth Factors (Curves) for the range of events for each of the HEP's. Hydrometric data up to and including the latest possible date shall be included in all analyses and application of gauged data, and,
- Rainfall-runoff modelling,
- Assessment, justification, and incorporation where appropriate, of the different critical storm durations and joint probabilities (see [SECTION 7.2.11 JOINT PROBABILITY ANALYSIS](#)).

The Consultant shall examine and justify the calibration and verification event/s flows, and shall take due steps to produce design event flows that are appropriate for the design of the Scheme, and where necessary / appropriate, apply adjustment using engineering judgement.

The Consultant shall derive and highlight any uncertainty boundaries for the range of event flows through the Study Area.

Where rainfall-runoff modelling is utilised, the Consultant shall ensure that the model does not present unrealistic amounts of pluvial 'ponding', and that the flows in the modelled watercourses and surface water system are realistic.

Where the Consultant recommends a short-term rainfall and flow monitoring programme to support a rainfall-runoff modelling approach, this shall be specified, procured and managed in accordance with Sections [6.2 Procurement](#), [6.3 Contract Management](#), [6.4 PRODUCTION OF SPECIFICATIONS](#).

The Consultant shall consider and make recommendations to the Steering Group on the inclusion (or not) of adjustments to the design event flows to account for the statistical error and uncertainty associated with their methodologies and appropriate for the design of the Scheme.

The Consultant shall fully justify the preferred methodologies, and demonstrate their appropriateness for the locations for which they are used.

7.2.11 Joint Probability Analysis

The Consultant shall undertake, subject to the agreement of the Steering Group, dependency and joint probability analyses of the coincidence of the following:

- Fluvial-fluvial flood flows (i.e. between joining watercourses, and between watercourses and their tributaries), to determine the appropriate design flood parameters;
- Fluvial flood flows and pluvial events, to fulfil the development & design requirements as set out in [SECTION 7.4 OPTION IDENTIFICATION & PRELIMINARY DESIGN](#), particularly in relation to, for example, the design of ancillary works for behind-defences surface water accumulation;

This analysis shall include literature reviews and assessment of any relevant recorded data, to detect any dependencies, and sensitivity tests to assess the potential impacts of possible combinations. Further guidance on the approach is provided in “A Guide to Best Practice (Environment Agency UK, R&D Technical Report FD2308/TR2)” and Flood Studies Update Work Package 3.4 Guidance for River Basin Modelling (Final Report, June 2010). The sensitivity testing may require the need to complete hydraulic model runs to provide sufficient level of detail so as to justify the approach being recommended by the Consultant.

The Consultant shall present the findings from the assessment and analysis of joint probability at the Hydrology Workshop and include details in the Hydrology Report.

7.2.12 Groundwater Assessment

The Consultant shall carry out a desktop assessment of the potential for groundwater flooding within the Scheme Area including the identification of any modelling requirements. The Consultant shall identify, collect and utilise any relevant data e.g. historical maps, Geological Survey of Ireland (GSI) datasets, etc.

7.2.13 Pluvial Assessment

The Consultant shall derive pluvial parameters events with an annual exceedance probability (AEP) of 50%, 20%, 10%, 5%, 2%, 1%, 0.5% and 0.1%, and utilise these parameters as required to support the hydrological analysis, and in the design of ancillary works for behind-defences surface water accumulation.

The Consultant shall analyse a range of standard storm durations of 30, 60, 90, 120, 240, 480 minutes to identify which events are the most critical for the urban catchments in the Scheme Area.

The Consultant shall carry out an assessment of the potential for pluvial flooding within the Scheme Area including an estimation of rainfall depths and intensities for a range of design rainfall events, and of point discharges from urban storm water drainage systems. The analysis shall include those events with an annual exceedance probability (AEP) of 50%, 20%, 10%, 5%, 2%, 1%, 0.5% and 0.1%.

7.2.14 Climate and Catchment Changes

The Consultant shall calculate design flood parameters with appropriate allowances for two possible future scenarios, namely the Mid-Range Future Scenario (MRFS) and the High End Future Scenario (HEFS) that take account of possible future changes such as future development, land use changes and climate change, in accordance with the requirements set out below. The Consultant shall calculate the future scenario design flood parameters for each of the eight AEP events described in [SECTION 7.2.9.1 DESIGN EVENT PROBABILITIES](#).

Table 7-1; Allowances for Future Scenarios

ITEM	MRFS	HEFS
Extreme Rainfall Depths	+ 20%	+ 30%
Flood Flows	+ 20%	+ 30%
Mean Sea Level Rise	+ 500 mm	+ 1000 mm
Land Movement	- 0.5 mm / year1	- 0.5 mm / year1
Urbanisation	No General Allowance – Review on Case-by-Case Basis	No General Allowance – Review on Case-by-Case Basis
Forestation	- 1/6 Tp2	- 1/3 Tp2 + 10% SPR3
<p>Note 1: Applicable to the southern part of the country only (Dublin – Galway and south of this)</p> <p>Note 2: Reduce the time to peak (Tp) by a third: This allows for potential accelerated runoff that may arise as a result of drainage of afforested land</p> <p>Note 3: Add 10% to the Standard Percentage Runoff (SPR) rate: This allows for increased runoff rates that may arise following felling of forestry.</p>		

7.2.15 Hydrology Report and Deliverables

The Consultant shall submit a Hydrology Report that fully describes the hydrological analysis undertaken under this Project. The Hydrology Report (including draft versions) shall be accompanied by:

- The spatial data specified in the Table below;
- Hydrological calculation spreadsheets with details of the methodologies applied, any rating curves derived (provided in power law format) and flows computed
- Reporting on decision making in relation to exclusion of significant hydrometric data (e.g. high flow gauging's) or in relation to interpretation of temporal variability of ratings must be justified.
- Hydrological Model files (where such models have been developed)
- Recommendations for the locations of future hydrometric gauges and rain gauges that will be used for ongoing monitoring, modification of The Scheme, flood forecasting, or for future iterations of the Floods Directive.

Table 7-2; Hydrology Report – Spatial Data

Spatial Dataset	Condition	Scenario	AEP	GIS Spec. Ref.
Hydrological Estimation Points	Existing (baseline)	Current MRFS HEFS	All All All	C2.30
Catchment Boundaries	Existing (baseline)	N/A	N/A	C2.31
Physical Catchment Descriptors (PCDs)	Existing (baseline)	N/A	N/A	C2.30
River Network	Existing (baseline)	N/A	N/A	N/A

The Hydrology Report and its accompanying datasets are subject to the requirements of [SECTION 4.11.2 REVIEW OF KEY DELIVERABLES](#), in relation to reporting standards, the examination process, digital data requirements, Quality Assurance and version control.

7.3 Hydraulic Analysis

The Consultant shall undertake all such hydraulic modelling as necessary to fulfil their role as Designer, to meet the Project Objectives, and to robustly determine the requirements, design and viability of an appropriate Scheme.

The hydraulic modelling shall be undertaken in three distinct phases. These phases are:

- To establish and replicate the existing (baseline) hydraulic conditions;
- To assess the performance of potential options and the preferred Scheme, and inform the design of the Scheme;
- To establish and replicate the ‘as-built’ conditions following construction of the Scheme.

The requirements of the Hydraulic Analysis and Modelling are set out below.

7.3.1 Fluvial Model Software

The hydraulic models shall be developed using one of the following preferred modelling software packages:

- Flood Modeller Pro, Tuflow
- MIKE (DHI) packages
- Innovyze ICM
- HEC-RAS.

Hydraulic modelling software packages other than those listed above may not be used in undertaking this element of the Project, unless agreed in advance with the Steering Group. It shall be the Consultant’s responsibility to demonstrate that any alternative modelling software package proposed is of an equivalent standard to those listed above.

7.3.2 Requirements for Fluvial Modelling

7.3.2.1 *General Modelling Objectives*

The Consultant shall develop dynamic 1D-2D hydraulic models for the specified watercourses, estuaries and the coastline, and their associated floodplains, for the purposes of:

- Rating review (see [SECTION 7.2.6](#));
- Calibration and validation, of both the hydrological inputs and the hydraulic conditions;
- Identifying flood extents, and hazards, such as depths and overland flow velocities;
- Delineating Benefitting and Defended Areas ([SECTION 7.3.2.8](#));
- Assessing and appraising effective flood risk management options, and identifying a preferred option ('the Scheme') (see [SECTION 7.4](#), and its relevant sub-sections);
- Assessment of the hydraulic performance of the scheme under design flood conditions (see [SECTION 7.4.5](#));
- Informing the Scheme Climate Change Adaptation Plan ([SECTION 7.4.9](#));
- Calculation of flood damages and potential benefits (see [SECTIONS 7.4.10](#));
- Informing the design of the Scheme;
- For producing post-scheme (as-built) flood maps (see [SECTION 0](#));
- For future use, once adapted to the 'as-built' condition, in assessing the performance of the scheme following construction;
- For possible future adaptation as a flood forecasting model and system.

The Consultant shall develop hydrodynamic models for the watercourses, as required for the purposes specified herein.

The hydraulic models shall take account of the potential for long duration or multiple flood events, and the joint probabilities between main channel and tributaries and/or point inflows and between fluvial flows and the potential range of tidal downstream boundary levels. The 2D domain shall have a cell-size resolution small enough to fulfil the requirements specified herein. The Consultant shall extend the models sufficient distances upstream and downstream, to eliminate the potential impact of any instabilities or other effects, such as downstream boundary effects or upstream overland flow path routes, from within the area of the scheme.

7.3.2.2 *Model Runs*

The Consultant shall run the fluvial model(s) to determine flood levels, extents, flows, and other parameters as necessary for the Consultant to fulfil their role as Designer and the requirements of this Brief.

The Consultant shall run the baseline (existing condition) models for design events of the full range of probabilities specified in [SECTION 7.2.9.1](#) for the Current scenario, the MRFS, and for the HEFS.

The Consultant shall run the models as required to demonstrate model calibration and validation, in relation to the requirements of [SECTION 7.4 OPTION IDENTIFICATION & PRELIMINARY DESIGN](#), [SECTION 0 SUPPORT AND ATTENDANCE AT PROPERTY](#) Arbitrations, shall be instructed by the client as a change to the Services, and the Fee adjusted on a time and rates basis in accordance with clause 11.1-7 of the Conditions of Engagement.

Post-Consent Update & Detailed Design and [SECTION 11 SCOPE OF SERVICES – STAGE V \(HANDOVER OF WORKS\)](#)

The Consultant shall post-process the outputs of the models before production of the flood extent and depth GIS deliverables to remove, for example, anomalous holes, ponds, and slivers.

7.3.2.3 *Hydraulic Model Boundary Conditions*

The Consultant shall develop boundary conditions in the hydraulic models based on appropriate flow and/or water level values.

7.3.2.4 *Hydraulic Model Parameters*

The Consultant shall determine and input to the model appropriate values for all hydraulic model parameters, including roughness, structure coefficients, and boundary conditions, based on:

- Flows ([SECTION 7.2 HYDROLOGICAL ANALYSIS](#));
- Survey data;
- Field Inspections ([SECTION 3.3](#));
- Expert modeller judgement;
- Model Calibration ([SECTION 7.3.4](#));
- All other relevant data and information.

The Consultant shall demonstrate, through a sensitivity analysis, the appropriateness of their chosen parameters.

7.3.2.5 *Representation of Buildings in Hydraulic Models*

The Consultant shall ensure that their chosen methodology for representing buildings in the hydraulic models is appropriate to the level of detail specified herein, and shall provide justification of their chosen method within the hydraulic reporting.

The model shall allow the assessment of flood risk to properties that are located within the floodplain. The Consultant shall include full details in the Hydraulics Report of overland flow paths, for the range of events analysed that result in flood risk to properties. The hydraulic model shall also allow for the calculation of flood depths within properties to inform the damage assessment as specified in [SECTION 7.4.10 COST BENEFIT ANALYSIS](#).

Buildings shall be shown as flooded on the flood maps only if their determined floor levels are less than the predicted flood level; similarly bridges are only to be shown as flooded if the deck level (obtained from the topographical survey or LiDAR) is below the predicted flood level.

7.3.2.6 *Hydraulically Significant Features/Structures*

The Consultant shall include in the models all hydraulically significant features/structures and existing flood defences, which they deem to be effective. The Consultant shall use the Defence Asset Condition Survey ([SECTION 3.4](#)) and the Assessment of Existing Structures ([SECTION 3.6](#)) to inform their recommendations on the effectiveness of the defences and structures, and hence their inclusion in the existing condition model(s).

The Clareen Culvert is a significant structure that shall be considered in detail as part of the Hydraulic analysis. It is approximately 1km long, of varying dimensions and depth. It is crucial that the culvert is appropriately represented in the model, including pipe dimensions, manhole structures, cover levels, changes in direction, inflows, discharges from CSOs, etc. A suitable modelling approach using appropriate software shall be selected by the consultant to ensure that flows are accurately represented in the model and resultant flood extent is realistic. The issues identified in the CCTV survey shall be utilised to inform the proposed modelling approach for the culvert, which shall specifically consider limiting the available capacity of the culvert based on the issues identified.

The overflow structure adjacent to Nenagh River at Nenagh Town Park shall be represented in the existing condition model,

The Consultant shall determine the appropriate baseline condition of bridges / culverts, in terms of bed silt levels, presence of obstructions, or other factors determining the baseline conveyance capacity of such structures, by utilising the topographic and CCTV survey ([SECTION 6.4.2](#)) and their Hydraulic Modeller Field Inspections ([SECTION 7.3.2.10](#)). It is to be noted that this is a separate exercise from the Blockage Assessment of the Preferred Option ([SECTION 7.4.5.6](#)).

The areas benefitting from defences, ('Defended Areas', see [SECTION 7.3.2.8](#)) shall be determined by modelling and be included in the outputs of modelling of the existing conditions.

7.3.2.7 *Hydraulic Model Nodes*

The Consultant shall extract the flow and water level values from the model at node points for use in the analyses described in this document and for the production of the flood maps.

The Consultant shall ensure that the flows presented in the Hydraulic Model Nodes GIS layer are representative of the full-valley-flow across both the 1D and 2D model domains at each point.

The node points shall be located at each of the HEPs, but the Consultant shall allow for additional model nodes such that data can also be extracted for any significant hydraulic features within the model, in order to fully inform the design of the Scheme.

The co-location of HEPS and model nodes is also to allow for the comparison of the ‘anchoring’ hydrological flows to the modelled flows.

The Consultant shall provide flow and water level values for each AEP for any model run undertaken to fulfil the requirements specified within this document, and including model runs for calibration, verification, existing condition (baseline), potential and preferred options, and as-built conditions, and for current and future scenarios.

The naming of the HEPS and model nodes shall be designed to allow for easy comparison between the HEPS and nodes.

7.3.2.8 **Benefiting Areas and Defended Areas**

A **Benefitting Area** is defined as the area that benefits from the implementation of all of the measures within an Option or Scheme, including improvements to conveyance such as channel widening or deepening, and culvert upgrades and raised defences.

A **Defended Area** is defined as the area defended by raised defences only (i.e. with any conveyance improvements or storage remaining in place).

The Consultant shall carry out whatever hydraulic modelling is required to delineate the Benefitting Areas and Defended Areas for the following scenarios:

Benefitting Areas	For the assessment of Potential Options For the Preferred Option (i.e. the Scheme) Post Scheme (i.e. ‘As-Built’ conditions)
Defended Areas	Pre-Scheme conditions (i.e. the Lisbunny Embankment, however note the benefits from this existing defence will still be accrued in the scheme) Post Scheme (i.e. ‘As-Built’ conditions)

In cases where the defences extend over significant distances along the watercourse (e.g., where there are successive linear defences along a given river), it may be necessary to run multiple undefended scenarios (for the appropriate effective SOP) iteratively, so as to avoid notable impacts on the simulated hydrological routing of the model.

This will be relevant in cases where, for example, removal of significant lengths of defences upstream of the model will result in such hydrologically significant attenuation that the downstream levels are notably lower than for the defended run. In such an instance, iterative removal of defences or defence groups through multiple models runs is necessary and the outer extent envelope of the multiple runs should be taken as the Benefitting Area/Defended area

7.3.2.9 **Model Instabilities/Other Issues**

The Consultants shall eliminate model instabilities as far as is reasonable, demonstrating that any remaining instabilities have no significant impact on the model outputs is required in the Hydraulic Report.

The modelling process shall include all best-practice model checks (e.g., mass-balance, instabilities, etc). Any issues identified shall be rectified in so far as is reasonably possible,

with reporting on any residual issues and their impact on the accuracy of the outputs of this Project provided.

7.3.2.10 *Hydraulic Modeller Field Inspections*

The Consultant's hydraulic modellers, and any other relevant members of the Consultant's team, shall carry out whatever field inspections are required to inform the hydraulic modelling process, and to fully satisfy themselves that the hydraulic model and its outputs meet with the required objectives and level of detail. The Consultant shall carry out pre-survey site inspections at the earliest opportunity after commencement so as to allow efficient procurement of the required data (see [SECTION 6.4 PRODUCTION OF SPECIFICATIONS](#)). The hydraulic modellers shall also carry out such field inspections as are necessary during the modelling process to achieve the required level of detail and accuracy in the models. These field inspections shall comply with the requirements of [SECTION 3.3 FIELD INSPECTIONS](#).

7.3.2.11 *Hydraulic Modelling Technical Workshop*

The Consultant shall organise and attend a Technical Workshop (see Section 4.9) to inform, and facilitate discussion, on the hydraulic modelling.

The timing of this workshop shall be agreed with the Steering Group. To inform the workshop, the Consultant shall provide on an interim basis (i.e. not constituting completion of a project milestone) data such as GIS layers of flood outlines, and flows and water levels at model nodes, and details of the calibration and validation processes.

7.3.3 Development of Coastal Process Models

Not Required

7.3.3.1 *Wave and Water Level Data*

Not Required

7.3.3.2 Wave Overtopping Assessment and Analysis

Not Required

7.3.4 Model Calibration

The Consultant shall ensure that the design flows within the hydraulic models are calibrated to the design flow estimates at the Hydrological Estimation Points, to achieve hydrological continuity (taking account of flood attenuation explicitly simulated within the hydraulic modelling) and that the design flood flows for each AEP that are maintained along all lengths of relevant watercourses. Such adjustment might be, for example, by the provision of appropriate lateral inflows and ensuring appropriate inflow values and timing of inflows from tributaries, or by running the hydraulic models for individual reaches, or with tidal influences removed for those model runs.

The Consultant shall calibrate the fluvial and coastal process models(s) to past flood events, by utilising the following in the modelling of calibration events and their analysis:

- Hydrological inputs derived for each calibration event;
- Recorded level data from hydrometric gauges;
- The presence of informal flood defences /hydraulically significant structures (that might not be included in the baseline model);
- Blockage;
- Other surveyed or recorded levels, and evidence of level or extent;

The Consultant shall make appropriate adjustments to the model parameters, including geometry, to achieve the calibration requirements as set out below.

Where the availability of data allows, the Consultant shall verify the hydraulic models(s) to past flood events, using a similar model build and run process as (but independent of) the calibration models, and without adjustment of model parameters.

In calibrating and verifying the model(s) the Consultant shall also utilise all other available data, including, but not limited to, photographs, videos, press articles and anecdotal information provided by local authority staff and other stakeholders. The Consultant shall utilise the outputs of the past flood data analysis ([SECTION 7.2.5](#)) in the calibration and verification of the models, and shall give particular emphasis to ensuring consistency between the historic flood events and modelled design events and to the estimated annual exceedance probabilities of those events. The Consultant shall be responsible for attaining all flood event data for use in the calibration and verification process. The Consultant shall include details of each flood event and reporting on the reliability of each flood event data point, in the Hydraulics Report, with GIS layers of the extent and level (at the nodes) for each event.

The Consultant shall assess the potential for blockage to have influenced past flood events, and consequently determine the bridge/culvert blockage ratios for past flood events, and apply these as appropriate for the purposes of calibration, verification, and sensitivity testing of the models. The Consultant shall report this process in detail in the Hydraulics Report.

The Consultant shall aim for the calibrated models to have vertical accuracies of $\pm 0.1\text{m}$, but not greater $\pm 0.2\text{m}$, when compared to recorded flood event point data, sea level and wave data.

Where such direct calibration and verification is not possible (for example, where changes in the catchment have occurred since the data was captured), the Consultant shall still use the available data to 'reality-check' the model, with presentation of photos, comparison of extents, justification of methodology, etc, in the hydraulic reporting, in order to build confidence in the model outputs.

It may be beneficial to carry out the damage assessment element of the Cost Benefit Analysis (SECTION 7.4.10) as it can inform the validation of the hydraulic model. This shall be discussed, and carried out where agreed, with the Steering Group.

The Consultant shall advise the Steering Group of the calibration and verification process on an ongoing basis and in advance of the submission of the Hydraulics Report. Where the initial model calibration runs indicate that the model is not achieving the calibration and verification targets, the Consultant shall provide the Steering Group with reasoning for the discrepancies, and present justification for proceeding with the modelling process or proposed alternative approaches, seeking agreement to proceed. This process shall be included in the Hydraulic Modelling Technical Workshop.

Demonstration of the accuracy of the model, and the representation of historical flooding by the model outputs, is required of the Consultant in the Hydraulic Report; this shall comprise of comparisons of time-traces, comparisons of modelled extents against aerial photography or historical outlines, and comparisons of modelled versus recorded fluvial or coastal flood levels.

The Consultant shall provide the calibration event flood extents in GIS format with the Hydraulics Report.

7.3.5 Review of Flood Mechanisms

The Consultant shall review the model outputs to identify the key flood mechanisms that give rise to areas of risk that shall be subject of the design of the Scheme. This work shall include examining the progression of flooding from high probability to low probability events, and the rate of onset. Details of this analysis shall be included in the Hydraulics Report.

The Consultant shall identify and include in the Hydraulics Report any existing structures or features that have a significant influence on the hydraulic behaviour of the river and flooding system.

The Consultant shall provide a preliminary outline of the potential flood risk receptors within the flood extents, including the AEP at which they appear to become to be at risk.

The Consultant shall present this work, with suitable supporting information drawn from the model (eg. long-sections) and their Field Inspections (including photographs) in the Hydraulics Report (SECTION 7.3.7).

The reporting shall demonstrate a full understanding of the source and pathway of flooding, the operation of the network and cause of the flooding prior to proceeding to optioneering and design of the Scheme.

7.3.6 Quality Assurance Information Sheets

The Consultant shall produce Quality Assurance (QA) information sheets as part of the modelling process. The format for these sheets shall be agreed with the Client at the start of the project; however, as a minimum they shall:

- Allow easy assessment of the data and modelling processes carried out, and,
- Describe the decisions made by the modeller, and,
- Provide justification for those decisions.

The QA Information Sheets shall contain enough information to inform the Client and future users of the model in all aspects of the model build process.

7.3.7 Hydraulics Report and Deliverables

The Consultant shall produce a Hydraulics Report that fully describes the hydrological analyses and hydraulic and coastal modelling undertaken under this Project. The Consultant shall include details of, but not be limited to, the following in the Hydraulics Report:

- Any revisions to design flood parameters;
- Comparative time-series plots of water level and flow calibration;
- Mass balance values;
- Longitudinal and cross sectional plots of flood profiles, including highlighting locations for structures, formal flood defences and informal effective flood defences;
- Plots of modelling stability;
- Detailed commentary in the model files including model headings that clearly identify purpose and revision and include detail of modelling approach at each structure;
- Locations of formal flood defences and hydraulically significant structures/features;
- A full and detailed discussion on the survey data used with a full outline of what survey was used;
- A full and detailed discussion on what hydrometric data was used and if data was excluded, provision of a detailed rationale for such decisions;
- All limitations contained within the model outlined in full;
- Details of any assumptions made, including the requirement for the assumption and the justification for the assumption made;
- Identification and geographical sequencing of the locations of all modelled nodes and/or cross-section locations, with a background of suitability scaled OS mapping. Also, for each node and/or cross-section location, provide in tabular form the flow, velocity and Froude number, for each of the range of events, design event and the calibration events.
- Full reporting, including long-sections, extents and point-levels, of the Sensitivity Analysis;

- Full reporting in respect of model calibration and validation work undertaken to demonstrate model accuracies expected and achieved;
- Description of flood mechanisms ([SECTION 7.3.5](#)).

The Hydraulics Report (including its draft versions) shall be accompanied by the spatial data specified in the Table below. Where the Consultant updates any hydrology spatial deliverables during the hydraulic modelling process, the Consultant shall also provide these updated datasets with the Hydraulics Report.

Table 7-3; Hydraulics Report – Spatial Data

Spatial Dataset	Condition	Scenario	AEP	GIS Spec. Ref.	Comment
Study Area	N/A	N/A	N/A	C2.1	
Scheme Area	N/A	N/A	N/A	C2.1	
Modelled River Centreline	Existing (baseline)	N/A	N/A	C2.6	Contains some CFRAM terminology - eg MPW, HPW - these fields can be left blank for Schemes.
Modelled Coastline	Existing (baseline)	N/A	N/A	C2.33	
Nodes (flow and level)	Modelled Calibration Conditions	N/A	Calibration event AEPs	C2.7	Denote Calibration Runs using Run Type – see Appendices A1, B1 and C2.7 Field 7
Nodes (flow and level)	Existing (baseline)	Current MRFS HEFS	All All All	C2.7	Denote Baseline Runs using Run Type ('Design Run') – see Appendices A1, B1 and C2.7 Field 7
Flood Extent	Modelled Calibration Conditions	N/A	Calibration event AEPs	C2.8	Denote Calibration Runs using Run Type – see Appendices A1, B1 and C2.8 Field 7
Flood Extent	Existing (baseline)	Current MRFS HEFS	All All All	C2.8	Denote Baseline Runs using Run Type ('Design Run') – see Appendices A1, B1 and C2.8 Field 7
Flood Depth	Existing (baseline)	Current MRFS HEFS	All All 10%, 1% 0.1%	N/A	Section 2.3 and App C1 of the Specification cover rasters. The baseline to be denoted by Run

					Type ('Design Run') - File Naming -Appendix A1, File name Code - Appendix B1
Flood Velocity	Existing (baseline)	Current	All	N/A	Section 2.3 and App C1 of the Specification cover rasters. The baseline to be denoted by Run Type ('Design Run') - File Naming -Appendix A1, File name Code - Appendix B1
Defended Area (existing)	Existing (baseline)	Current	SOP	C2.11	Baseline to be denoted using Run Type - 'File Naming - Appendices A1, B1 and C2.11 Field 7 (using 'Design' for baseline)
Defence (modelled) - (existing) (polygon, polyline, point, level)	Existing (baseline)	N/A	N/A	C2.13, C2.14, C2.15, C2.16	Baseline to be denoted using 'Comments' (C2.13 Field 16, C2.14 Field 18, C2.15 Field 17, C2.16 Field 10).

The Hydraulics Report (including its draft versions) shall be accompanied by all hydraulic model digital files in a ready-to-run condition. These files shall include, but not be limited to, calibration, verification, design run and sensitivity analysis model and results files, for the work detailed herein.

The Consultant shall facilitate the handover of the model files to the Client and OPW, and allow for a demonstration of the model(s) in a hand-over session to the Client and OPW, to include:

- A walkthrough and explanation of all final models
- Loading model files into modelling software
- Setting up model files for runs
- Running model files
- Reviewing outputs

This handover session shall be for one (1) full day, lead by the Senior Hydraulic Modeller for the Project and held in person either in the Client's office or those of the Consultant, to be decided at the discretion of the Client.

The Hydraulics Report and its accompanying datasets are subject to the requirements of [SECTION 4.11.2](#), in relation to reporting standards, the examination process, digital data requirements, Quality Assurance and version control.

7.4 Option Identification & Preliminary Design

The Consultant shall, through the following steps and the duties described in this document, identify a preferred option (the Scheme) to protect the areas at flood risk within Nenagh against a flood event to the defined Standard of Protection ([SECTION 7.4.5.1](#)):

- Screening of Measures ([SECTION 7.4.2.1](#));
- Identification of Potential Options ([SECTION 7.4.2](#));
- Identification of Preferred Option ([SECTION 7.4.4](#));
- Preliminary Design of the Preferred Option ([SECTION 7.4.13](#)).

The Consultant shall utilise the following work activities, as appropriate to each step, to achieve the level of detail as specified in sections [1.4.1 LEVEL OF DETAIL](#) and [7.1 GENERAL REQUIREMENTS](#):

- Consultation with the Client and the Steering Group;
- Environmental Services ([SECTION 7.5](#));
- Stakeholder & Public Engagement ([SECTION 5](#));
- Contract Management Services ([SECTION 6](#));
- Development & Design Requirements ([SECTION 7.4.5](#));
- The Multi-Criteria Assessment (MCA) ([SECTION 7.4.3](#));
- The Cost Benefit Analysis (CBA) ([SECTION 7.4.10](#));
- Full engagement with the Client and Steering Group;
- Liaison with the public, landowners and stakeholders.

The Consultant shall proactively identify means and corresponding wider benefits under the environmental and social objectives, which may be delivered by the Scheme, and shall present such opportunities and corresponding benefits in conjunction with the more traditional economic and technical benefits. These wider benefits shall include, for example, environmental opportunities ([SECTION 7.5](#)), the measures to enhance the Public Realm ([SECTION 7.4.5.12](#)) and fisheries ([SECTION 7.4.5.2](#)).

7.4.1 Identified Potential Measures and Options

7.4.1.1 *Shannon CFRAM*

The Consultant shall review in detail the relevant reports, documentation and data produced through the Shannon CFRAM Study, with regards to the measure proposed for Nenagh in the Flood Risk Management Plan (FRMP), paying particular attention to the information gathered

during the public consultation, Strategic Environmental Assessment (SEA) and programme-level Natura Impact Statements (NIS).

The measure proposed in the FRMP for Unit of Management 25-26 for Nenagh, was developed through the Shannon CFRAM Study for the purpose of providing the preliminary business case for progressing a measure through a subsequent scheme-delivery project.

Within this project, the Consultant shall consider all measures and shall not be constrained to the measures and options identified in the FRMP. Note that in the CFRAM Study, use of the words ‘measures’ and ‘options’ was not consistent due to how they were defined in the EU Floods Directive. For clarity, in relation to Flood Relief Schemes a ‘measure’ is one or more parts that make up an ‘option’ for the scheme as a whole.

The Consultant shall be fully responsible for the selection, development and design of the Nenagh Scheme, satisfying all duties as Designer and the requirements under environmental legislation to consider and assess alternatives.

7.4.1.2 Potential Option identified post CFRAM Study

Post completion of the CFRAM Study, the outline of a potential Option was identified by OPW, consisting of the following measures as follows:

- 1) Construction of a second bypass channel on the Nenagh River, parallel to the existing bypass channel, but on the opposite (southern) side of the railway line. This would run from the Nenagh River to the existing watercourse 250m downstream, where it would pass below the rail line and back in to the original Nenagh channel.
- 2) Possible upgrades to existing culvert under railway
- 3) Over-pumping of the Clareen Stream at the outlet from the Culvert
- 4) Bypass culverts on Nenagh River at Bennetts Bridge on the R445 and at Kyleeragh Bridge on the Bulfin Road (L1058) to augment capacity (see [FIGURE 3-7](#) to identify locations)
- 5) Embankments along Nenagh River (approx. 2500m)

The consultant shall consider the measures identified in this option, as a whole, or in part, but with the focus on the viability of including the additional bypass channel.

7.4.1.3 Impact of Leisure Centre Access Bridge

There is anecdotal evidence that the existing access bridge over the Nenagh River to the Nenagh Leisure Centre has a significant impact on the capacity of the river during high flow events. As part of the Identification of Potential Options, specific modelling shall be carried out to determine the impact on the flood extent by removing this bridge. The results of this modelling can then be used to inform if raising and/or relocating the bridge is viable as part of an overall option.

7.4.2 Identification of Potential Options

7.4.2.1 Screening of Measures

The Consultant shall screen all flood risk management measures, and from those measures found to be viable, identify Potential Options that could provide flood relief against fluvial flooding to the Scheme Area to the defined Target Standard of Protection (see [SECTION 7.4.5.1](#)). A Potential Option shall consist of a single measure where that measure achieves the Standard of Protection in its own right, or of a combination of measures that together achieve the Standard of Protection.

A non-exhaustive list of flood risk management measures, which the Consultant shall consider in their identification of Potential Options, is provided below:

- Do Nothing (i.e., implement no new flood alleviation measures)
- Non-Structural Measures
- Installation of a flood warning system
- Individual property protection
- Restrictions on development in the Flood Plain in line with Planning guidelines on Flood Risk Management and the Planning System
- Relocation of Properties and/or infrastructure
- Reconstruction of Properties and/or infrastructure to a higher level
- Flow Diversion
- Diversion of entire river
- Flood flow bypass channel
- Flow Reduction
- Upstream catchment management (i.e. reduce runoff)
- Upstream flood storage (single site or multiple sites)
- Nature-Based Solutions ([SECTION 7.4.8](#))
- Flood Containment through Construction of Flood Defences
- Walls or embankments
- Demountable defences
- Increase Conveyance (upstream and / or through and / or downstream of the town)
- Change the channel section and / or grade
- Change the floodplain section and / or grade
- Remove or reduce local key constraints, e.g. bridges, bends, throttles, infill material on a floodplain, etc.
- Reduce the roughness of the channel / floodplain (removal of vegetation, lining, etc.)
- Specify ongoing channel / floodplain maintenance
- Sediment Deposition and Possible Sediment Traps
- Pump storm waters from behind flood defences

- Measures Specific to the Study Location

The Consultant shall present the Potential Options, with the following supporting information, at the Potential Options Workshop (SECTION 7.4.2.2) and the Potential Options Public Participation Day (SECTION 5.3):

- Drawings and maps outlining the Potential Options;
- The MCA spreadsheet;
- The Property Damage GIS layer;
- The BCR of each Potential Option;
- Details of the assessment of Climate Change Adaptation Measures for the Potential Options.

7.4.2.2 Potential Options Workshop

In addition to the requirements set out in SECTION 4.9 WORKSHOPS, the purpose of the Workshop shall be to:

- Outline all measures and options assessed and detail reasons why certain measures/options are likely to be ruled out of the project;
- Discuss how the Potential Options were derived, the conceptualisation of each option, and key advantages/disadvantages of each option with respect to the requirements of SECTION 7.4 OPTION IDENTIFICATION & PRELIMINARY DESIGN;
- Discuss findings of SECTION 7.4.8 NATURE-BASED SOLUTIONS FEASIBILITY ASSESSMENT;
- Present findings of the Constraints Report (SECTION 7.5.3.1) and discuss optimum design and build strategies that will help to minimise the impact on the environment during construction and O&M;
- Review opportunities already identified by stakeholders and discuss enhancements that will add value to the community and its environment.
- Calculate the 'Carbon Cost' of the Potential Options (see SECTION 7.4.5.11 for further information).

The Workshop shall be scheduled to take place in advance of the Potential Options PPD and in agreement with the Steering Group.

7.4.3 Multi-Criteria Analysis

The Consultant shall undertake and produce a MCA (Multi-Criteria Analysis) in collaboration with their Environmental team, to include potential impacts, risks and benefits to people, infrastructure, the environment, cultural heritage and the economy for possible options for the preferred Scheme. The Consultant shall undertake the MCA using as a basis the specification set out in the document "Technical Methodology Note - Option Appraisal and the Multi-Criteria Analysis (MCA) Framework" (OPW, September 2018) provided on <https://www.gov.ie/en/publication/b15dd0-technical-specifications-and-guidance-notes/>, developed as appropriate to reflect the project-specific and site-specific needs of the appraisal process.

Details of the MCA as undertaken as part of the Shannon CFRAM Study are provided in the relevant Preliminary Options Report on www.floodinfo.ie.

The Consultant shall use and present the MCA to assist primarily in the selection of the Preferred Option from the Potential Options, but also in the screening of measures and to inform the subsequent development and design of the Scheme. The Consultant shall provide the MCA in spreadsheet format and summarised in the Options Development Report.

7.4.4 Identification of Preferred Option

The Consultant shall, in collaboration with the Steering Group, identify the Preferred Option (the Scheme), using the analyses set out in this document.

7.4.4.1 Preferred Option Workshop

To assist in the identification of the Preferred Option, the Consultant shall hold the Preferred Option Workshop (See SECTION 4.9 for general Workshop requirements), for the purpose of:

- Reviewing comments from the Opening and Potential Options PPDs (SECTION 5.3) and from the Collaborative Workshop (SECTION 5.4.1);
- Informing, and facilitating input from, the Client and Steering Group on the opportunities and risks associated with the Potential Options;
- Presenting any material updated as a result of the PPDs, for example, the MCA;
- Informing and facilitating input from the Client and Steering Group on the selection of Preferred Option;
- Calculating the 'Carbon Cost' of the Preferred Option (see SECTION 7.4.5.11 for further information).

The Consultant shall liaise with the Client as to the makeup of this meeting and the Client shall provide a list of attendees prior to meeting. This workshop shall include:

- Key stakeholders within Local Authority, including but not limited to the County Architects department, the Heritage Officer, the County Archaeologist and Planning Officers;
- Client-appointed Project Specialists (for example, Project Archaeologist, Project Ecologist, etc);
- Steering Group (for example design, buildability, operation and maintenance requirements);
- OPW and County Council Mechanical Engineering and Field Services in relation to mechanical installations and their future operation & maintenance (APPENDIX E: POLICY – FIXED MECHANICAL INSTALLATIONS AND EQUIPMENT ON OPW-FUNDED FLOOD RELIEF SCHEMES).

7.4.5 Design Requirements

7.4.5.1 *Standard of Protection*

The Standard of Protection (SoP) of the Scheme is to prevent flooding of properties and assets within the Scheme Area during flood events with a 1% annual exceedance probability (AEP) for fluvial floods, often referred to as 1 in 100-year floods.

If so instructed by the Client, the Consultant shall consider and undertake the analysis in Stage I, for alternative SoPs for the preferred Scheme for the relevant source of flood waters. Such services shall include those in [SECTION 7.3 HYDRAULIC ANALYSIS](#) and [SECTION 7.4 OPTION IDENTIFICATION & PRELIMINARY DESIGN](#). Where consideration of an alternative SoP is required this shall be instructed by the client as a change to the Services, and the Fee adjusted on a time and rates basis in accordance with clause 11.1-7 of the Conditions of Engagement.

If so instructed by the Client, the Consultant shall adopt an alternative SoP for the Scheme for Stages II to V of the Project. The adoption of the alternative SoP shall not be deemed to constitute a variation and shall not amend the fees payable for the services under these Stages, and only one SoP shall be adopted for the Scheme for Stages II to V of the Project.

7.4.5.2 *Effectiveness and Impacts of Options*

The Consultant shall utilise hydraulic modelling as necessary during the identification of the Potential Options, the identification of Preferred Option, and the design of the Scheme, to carry out the following:

- 1) Demonstrate the effectiveness or otherwise of the measures, potential options, and of the preferred option (the Scheme) in protecting the areas at flood risk within Nenagh against a flood event to the defined standard of Protection;
- 2) Delineate the Benefitting Areas ([SECTION 7.3.2.8](#)), and carry out the Damage Assessment ([SECTION 7.4.10 COST BENEFIT ANALYSIS](#));
- 3) Determine the parameters required to inform the Structural Assessment of Existing Structures ([SECTION 3.6](#));
- 4) Minimise or eliminate potential upstream and downstream effects that would otherwise be caused by the construction of the potential options and the preferred option, such as increases in water level or flow;
- 5) Determine, where possible avoid, and otherwise mitigate against negative impacts to, or enhance, the fishery amenity of the Project Watercourses, including fish passage, spawning grounds, etc;
- 6) Determine, where possible avoid, and otherwise mitigate against negative impacts to, or enhance, the hydro-morphology regime, and other environmental objectives and legislation, including during high and low flow conditions as appropriate;
- 7) Identify and assess Adaptation Measures and Adaptation Pathways, and any assumptive allowances, to inform the development of an appropriate Scheme Climate Change Adaptation Plan ([SECTION 7.4.9](#)).

The Consultant shall assess the impact of the Preferred Option on other sources of flood risk (e.g. urban storm-water that may accumulate behind walls and be unable to drain). The Consultant shall utilise in this assessment the relevant aspects of the Hydrological Analysis, including that relating to [SECTION 7.2.11 JOINT PROBABILITY ANALYSIS](#), [SECTION 7.2.12 Groundwater Assessment](#), [SECTION 7.2.13 Pluvial Assessment](#), and the design water levels identified through the hydraulic modelling of the Preferred Option.

The Consultant shall identify and design ancillary works to mitigate any impacts of the Scheme on these other source of flood risk, including such measures as storage or pumping. This work excludes the development of measures to address other sources of risk that are remote from, and not impacted on or caused by the Scheme.

7.4.5.3 Freeboard

The Consultant may assume initial freeboard heights of 500mm for walls and 700mm for embankments in determining defence crest levels for the Potential Options. These values are to account for uncertainty, and to provide conservative defence levels for the purposes of assessing, and consulting on, the Potential Options.

In developing and designing the Preferred Option, the Consultant shall update the Potential Option freeboard values based on:

- Preferred Option Sensitivity Assessment ([SECTION 7.4.5.4](#));
- The Consultant's assessment of the degree of risk associated with flood events of a magnitude greater than the determined Standard of Protection ([SECTION 7.4.5.15 RESIDUAL RISK](#)).
- An assessment of other factors, as relevant to the Scheme, such as settlement, boat wash, wave run-up, the consequences of over-topping, survey accuracy.

The Consultant shall present their Preferred Option freeboard methodology, including the proposed parameter changes, before proceeding, to the Steering Group for their agreement.

The Consultant shall present the outcomes of the freeboard assessment, including the sensitivity assessment ([SECTION 7.4.5.4](#)), in long-section format, showing the upper and lower bound water levels, and proposed freeboard and defence crest levels, with particular attention around key hydraulic structures. Notwithstanding the outcomes of the sensitivity assessment, minimum freeboard values of 300mm for walls and 500mm for embankments (excluding topsoil) shall be maintained for the Preferred Option.

In case of a direct defence options, 'glass walls' would be appropriate to assess sensitivity of the various parameters, and to inform the assessment of freeboard in the hydraulic model.

Within 1D reaches the Consultant shall provide a long section water level profile including the floodwater energy gradient at the Design fluvial event.

The Consultant shall ensure in their design that raised defences 'run into' high ground, with the level of that ground being at least equal the crest level of raised defences, including freeboard.

7.4.5.4 Preferred Option Sensitivity Assessment

The Consultant shall carry out a sensitivity analysis of the Preferred Option for the Standard of Protection flood event, and shall examine the following:

- Hydrological (design flow) uncertainty; the Consultant shall ensure that, where uncertainty in the hydrology has been included in the design flows themselves, hydrological uncertainty shall be included in the Preferred Option Sensitivity Assessment in a manner that does not result in an overly-conservative freeboard (i.e. hydrological uncertainty is not double-counted in the freeboard);
- The effects from the variations of land and watercourse roughness values,
- The effects (including on afflux) from the variations on structure hydraulic parameters (e.g. bridge, culverts, weirs, revetments, seawalls, etc.).
- The effects (including on afflux) from changing the modelled structure units (e.g. bridge, culverts, weirs) type. Use at least one other unit type to that of what is used in the preferred model structure e.g. modelling a bridge unit as a culvert or as another bridge unit type.
- Within 1D reaches, the effects from ineffective flow areas around vegetation and structures e.g. where vegetation exists adjacent to a flood defence line, and areas flooded with a volume of water but where the water may be static and pooling.
- The effects from the variations of the 2D cell size in the 2D models,
- The effects of the addition of Climate Change flows (refer to [SECTION 7.2.14](#))
- Super-elevation effects.

The Consultant shall ensure that the changes in parameters used in the above sensitivity analysis are within realistic bounds, and appropriate to the parameter being tested. These bounds must be justified by the Consultants and agreed with the Steering Group before proceeding.

7.4.5.5 Culvert Design

The Consultant shall design any culverts in accordance with the OPW Section 50 Guidance (see ‘*A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945*’), or based on the Consultant’s own proposed design factors and agreed with the Steering Group.

7.4.5.6 Blockage

Following identification of the Preferred Option, the Consultant shall carry out an assessment of the likelihood and significance of deposition/erosion along the watercourses and culvert/bridge blockage by flood-borne debris, and determine appropriate blockage ratios, based on:

- Historical evidence,
- Existing maintenance regime,
- Presence of trash screen/trash screen design,

- Sedimentation and erosion,
- Hydro-geomorphological regime,
- Cross-sectional area,
- Culvert capacity, and,
- Catchment characteristics;
- Measures included in the design of the Preferred Option to reduce the probability of blockage.

The Consultant shall include the structures listed in the table below in their blockage assessment; payment for those listed, and any additional quantity, shall be in accordance with clause 11.1-7 of the Conditions of Engagement on a cost per item basis.

Table 7-4; Structures for Blockage Assessment

Location	Description
Clareen Culvert inlet	Blockage at upstream inlet

The Consultant shall, through their development and design of the Preferred Option and informed by their assessment of blockage, seek to minimise the risk of blockage of culverts or other flow conveyance structures, including through the specification of debris and silt traps, screens, and the maintenance regime ([SECTION 7.4.7 OPERATIONS & MAINTENANCE \(O&M\)](#)).

The Consultant shall present to the Steering Group a Blockage Assessment Report detailing any structures where they believe there to be a significant residual probability of blockage (i.e. where the Consultant believes that significant risk may remain after inclusion of measures in the design of the preferred option).

Subject to approval of the Client, the Consultant shall carry out modelling of the Preferred Option with blockage in place, quantify the residual risk in terms of increases in water level, and make any design amendments to the Preferred Option required to address that risk (i.e. increase freeboard in the vicinity of the relevant structure).

Additional modelling and design shall be instructed by the client as a change to the Services, and the Fee adjusted on a time and rates basis in accordance with clause 11.1-7 of the Conditions of Engagement.

The Consultant shall report on the blockage assessment, and any additional modelling and design, in detail in the Option Development Report.

7.4.5.7 Design Life

The Scheme shall have a 50 year design life, unless otherwise agreed with the Steering Group.

7.4.5.8 Geotechnical Design

The Consultant shall undertake a desktop geotechnical assessment to inform on risks associated with the Potential Options and the identification of the Preferred Option.

The Consultant shall carry out all detailed geotechnical design required to deliver the Scheme, including but not limited to, any ground stability, bearing capacity, seepage, groundwater, source material or other geotechnical aspects required for the design of the Preferred Option. The Consultant shall consider the receiving ground, and structures such as embankments, that will rely on fill material in the construction stage.

The Consultant shall provide in detail their interpretation of the geotechnical survey data, the implications for the design, and their design decisions, in a Geotechnical Design Report.

7.4.5.9 Existing Structures

The Consultant shall, based on their assessment of existing structures ([SECTION 3.6](#)), identify any remedial works required to ensure those existing structures are structurally capable of providing the Standard of Protection in conjunction with the Preferred Option.

Where it is not cost-effective or technically feasible to upgrade existing structures as required for the overall Scheme to provide the Standard of Protection, the Consultant shall identify replacement or alternative structures.

The Consultant shall design the remedial works or replacement/alternative structures for the Scheme.

7.4.5.10 Mechanical and Electrical Design

The Consultant shall consider the Mechanical and Electrical (M&E) requirements ([APPENDIX E: POLICY – FIXED MECHANICAL INSTALLATIONS AND EQUIPMENT ON OPW-FUNDED FLOOD RELIEF SCHEMES](#) and through discussion with the Steering Group), including sizing, footprint, operational scenarios and O&M requirements in the identification of the Preferred Option.

The Consultant shall use all available information, including requirements identified at Potential Options and Preferred Option workshops to design the M&E elements of the Scheme. The Consultant shall consult with M&E suppliers to check the feasibility of their performance design specification and to understand its installation and O&M requirements. The Consultant shall complete this prior to the Preliminary Design Workshop ([SECTION 7.4.13.1](#)).

7.4.5.11 Carbon Cost Assessment

The Consultant shall calculate the foreseen baseline ‘Carbon Cost’ of the Potential Options in terms of both the tonnes of Carbon Dioxide (CO₂) that the options will generate and the financial cost of this quantity of CO₂ based on current Government of Ireland rates or, if this is not available, rates to be agreed with the Client and Steering Group, taking into account

relevant information from the EU and other countries in Europe. The calculation of the Carbon Cost shall include:

- The quantities of different types of materials to be used for the option or Scheme;
- The quantity of CO₂ embodied in each type of material through sourcing, production, etc.;
- The quantity of CO₂ that would be generated through the construction process;
- The quantity of CO₂ that would be generated per year in operation and maintenance of the option and scheme, such as through the operation of pumps, maintenance operations, etc.

The calculation and results of the Carbon Cost assessment shall be presented at the Preferred Option Workshop, and reported as a specific, identifiable cost, in the Cost Benefit Analysis Report.

The Consultant shall, in the development of the Preferred Option, identify and implement measures to reduce the Carbon Cost of the Scheme, in its construction, operation, and maintenance, and measures to offset the remaining Carbon Cost. The Consultant shall calculate a reduced Carbon Cost for the Scheme based on the outcomes of this work.

The Consultant shall present the carbon reduction measures in the Preliminary Design Workshop (7.4.13.1) and in the Design Reports for Stages I and II.

The Consultant shall use the Office of Government Procurement's Cost Control and Carbon reporting templates, which incorporate International Cost Management Standards (ICMS3). These templates should be used throughout project planning, execution and analysis.

7.4.5.12 Public Realm

The Consultant shall, in their identification and development of the Preferred Option, identify design opportunities within the public realm that will assist to embed the Scheme into, and enhance, its receiving environment. This work shall focus, for example, on the following aspects:

- Providing additional social and amenity uses in suitable areas adjoining the Scheme;
- Improving the existing landscape, streetscape, and visual amenity of suitable areas adjoining the Scheme;
- Provide and improve physical linkages to other existing public facilities and infrastructure;
- Provide cultural and historical linkages between the Scheme and the location, relevant to the location.

The specific locations where the Consultant shall undertake this work are listed in the table below.

Table 7-5; Public Realm Design Locations

Location	Comment
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Nenagh Leisure Centre / Public Park	Potential link from Greenway at Lisbunny (R445), through undeveloped land adjacent to Nenagh River, to link into existing public park and Leisure Centre.
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The Consultant shall, following agreement with the Steering Group, progress the identified opportunities in the design of the Scheme.

The Consultant shall ensure that their design of any public access areas within the remit of the Scheme comply with all accessibility requirements.

The Consultant shall estimate the costs of any public realm works separately from the core costs of the Scheme, and provide these costs to the Steering Group for consideration

7.4.5.13 Finishes & Landscaping

The Consultant shall design and detail the finishes for all works and structures for completion under the Scheme, in a manner cognisant of and sympathetic to the existing surroundings and receiving landscape, consistent with the requirements of [SECTION 7.5 ENVIRONMENTAL SERVICES](#), and taking account of the views of the Client and as expressed during Public and Stakeholder Consultation.

The Consultant shall design and detail all landscaping required to fulfil the requirements of [SECTION 7.4.5.12 PUBLIC REALM](#) and for areas requiring reinstatement due to construction of the Scheme, and shall provide a detailed landscape design and planting scheme.

The Consultant shall detail all street furniture, lighting, signage etc, required to fulfil the requirements of [SECTION 7.4.5.12 PUBLIC REALM](#) and for areas requiring reinstatement due to construction of the Scheme, taking account of relevant standards.

The Consultant shall endeavour, in so far as the receiving environment allows, attempt to integrate raised defences into the existing landscape/streetscape, using where possible the existing topography, so that raised defences have minimum visual impact and cause minimum disruption of (or improve) the link between the locality and the river.

7.4.5.14 Utilities

In the identification of Preferred Option, the Consultant shall undertake service mapping of existing drainage and infrastructure assets to identify third party risks. Where the use of advance survey contracts to minimise risk to main contract/s is necessary in this regard, e.g. Ground Penetrating Radar survey to identify existing services, the Consultant shall specify, procure, and manage such surveys in accordance with [SECTION 6 CONTRACT MANAGEMENT SERVICES](#).

Where conflict between existing services and the scheme proposal is identified, the Consultant shall carry out the necessary design and co-ordination of works to relocate the service in consultation with the utility owners, or complete the design of scheme in a manner to minimise or eliminate the interaction.

7.4.5.15 Residual Risk

The Consultant shall identify, through hydraulic modelling, the residual risk arising from not less than two greater-than-design flood events, which shall include the 0.1% AEP HEFS event, where a flood occurs that gives rise to the significant exceedance of the Standard of Protection of the Scheme. The Consultant shall:

- Assess the identified residual risk, including factors such as extent, levels, depth, onset time and risk to life
- Design the Scheme to minimise the risk of sudden failure in the event of significant exceedance of the Standard of Protection, with examples of such failure being collapse of raised structures or the sudden release of retained volumes of water

The Consultant shall then provide material suitable for inclusion in the Local Authority Emergency Response Planning in relation to remaining residual risk, setting out how the risk is to be managed should a greater-than-design flood event occur.

7.4.5.16 Auxiliary Works

In the identification of Preferred Option, the Consultant shall identify dependencies and impacts on assets belonging to other organisations. The Consultant shall support the Client in engaging with those organisations and shall design auxiliary works for the Scheme.

Auxiliary works shall include those not directly required by the Scheme but that which may have significant and relevant local and public benefit or those arising from scheme works/enabling works e.g. reinstatement of roads that may require joint action with Local Authority.

7.4.6 Buildability Assessment

The Consultant shall assess the Buildability / Constructability of the Scheme, building on the identification of the Preferred Option as described in [SECTION 7.4.4](#) to a level of detail that delivers a Scheme that is 'buildable', is appropriate for its receiving environment, considers feedback received during the option selection and development process and Technical Workshops, and takes account of the following:

- Construction methodology and sequencing;
- M&E installation;
- Interaction with existing utilities;
- Ancillary and auxiliary works;
- Phasing and sequencing of the works;
- Indicative material volumes;
- Sourcing of materials;
- Disposal of excavated and/or waste material;
- Temporary works requirements;
- Site compound requirements;

- Access routes for construction;
- Management of materials & plant;
- Impact on existing properties and structures;
- Road closure and traffic management requirements;
- Instream works;
- Environmental issues during construction;
- Minimisation of the carbon cost of construction;
- Other possible Contracts or Construction Works in the area;
- Flood risk management constraints during construction;
- Long-term operations and maintenance ([SECTION 7.4.7](#)).

The Consultant shall report on their assessment of the buildability of the Preferred Option, as described herein, in the Buildability Report. The Buildability Report is subject to the requirements of [SECTION 4.11 REPORTING STANDARDS & QUALITY ASSURANCE](#) in relation to reporting standards, the examination process, digital data requirements, Quality Assurance and version control.

7.4.6.1 Buildability Workshop

The Consultant shall organise and attend a Technical Workshop (see [4.9 WORKSHOPS](#)), with the purpose of:

- Facilitating discussion on buildability of the Scheme;
- Presenting the design to the attendees;
- Demonstrating the buildability of their design;
- Presenting the proposed sequencing for the design.

The workshop shall be held to inform the production of the Buildability Report in Stage I.

The workshop shall include a presentation by the Consultant on key risk items in terms of buildability/constructability and shall include a site walkover in advance of the discussion.

7.4.7 Operations & Maintenance (O&M)

The Consultant shall ensure in the determination and development of the Preferred Option that, while being the most appropriate solution for its receiving environment, the operation and maintenance of the resulting Scheme is feasible. The Consultants shall take account of the comments and feedback in relation to operation and maintenance received during the option selection and development process from the Steering Group, and through the Technical Workshops.

The Consultant shall assess and develop the Operations & Maintenance (O&M) requirements for all elements of the Scheme, building on the identification of the Preferred Option as described in [SECTION 7.4.4](#) and the comments from the Potential Options and Preferred Option Workshops. The Consultant shall carry out the assessment and development to a level of

detail that delivers O&M requirements that are appropriate for their receiving environment, and take account of the following:

- Operation and maintenance requirements for all scheme elements and safety of staff while carrying out these requirements;
- Access and utility requirements for staff and plant to carry out their duties with regards to O & M;
- Dependencies and impacts of Scheme on assets belonging to other organisations;
- Disposal of excavated and/or waste material generated as part of O&M;
- Minimisation of the carbon cost of O&M;
- Monitoring and maintenance schedule and requirements for all elements (Frequency for all maintenance activities/requirements);
- Hard stand requirements for plant/maintenance vehicles;
- Access routes for maintenance;
- Management of materials & plant during O & M;
- Takes account of the typical lifespan of individual flood management measures and scheme dependent equipment throughout the design life of the scheme and provision required for the replacement and update of same when and where required;
- Impact on existing properties/roads etc. during O & M;
- Management of instream O&M works where required;
- Identified and/or any potential Environmental and Ecological issues during O & M;
- Long-term O & M procedures;
- Procedures for measuring settlement in defences/Embankments and monitoring programme for same;
- Protocol outlining actions prior to, during and after a flood event, including triggers or actions that have to be undertaken for the scheme to continue to function to the Standard of Protection;
- O&M considerations for climate change adaptation.

The Consultant shall assess potential risk/residual risk associated with the inclusion of any demountable defences or flood-gates proposed within the Scheme. This shall include an assessment of deployment times, failure, failure to deploy, and include modelling of such scenarios and quantification of the risk based on hydraulic modelling.

The Consultant shall produce an Operations & Maintenance Protocol, taking account of the outline provided in [APPENDIX G: OPERATION & MAINTENANCE PROTOCOL DOCUMENT](#). The Operations & Maintenance Protocol is subject to the requirements [OF SECTION 4.11 REPORTING STANDARDS & QUALITY ASSURANCE](#), in relation to reporting standards, the examination process, digital data requirements, Quality Assurance and version control.

7.4.7.1 O&M Workshop

The Consultant shall organise and attend a Technical Workshop (see [4.9 WORKSHOPS](#)), with the purpose of:

- Facilitating discussion on operation and maintenance of the Scheme;
- Presenting the design to the attendees;
- Presenting the O&M requirements for the design.

The workshop shall be held to inform the production of the Operation and Maintenance Protocol in Stage I.

7.4.8 Nature-based Solutions Feasibility Assessment

The Consultant shall carry out a Nature-based Solutions (NbS) feasibility assessment to determine if NbS can contribute to flood reduction in the Scheme Area, or to the mitigation of the environmental impacts of the Scheme.

The Consultant shall produce Potential for NbS Maps covering the Study Area by adapting the methodology applied by the Scottish Environment Protection Agency (SEPA (2013), Identifying Opportunities for Natural Flood Management, SEPA Corporate Office, Stirling; https://www.sepa.org.uk/media/163410/nfm_summary.pdf), using comparable available or derivable Irish datasets.

The Consultant shall propose datasets to use in the production of the Potential for NbS Maps at the Hydrological Assessment Technical Workshop.

The Potential for NbS Maps shall map areas that have the potential for the following categories of NbS:

- runoff reduction,
- floodplain storage,
- sediment management,

Potential for NbS Maps shall be provided to the client in both PDF and GIS formats.

The consultant may propose an alternative methodology for the production of the Potential for NbS Maps to the Steering Group for consideration.

Building upon the Potential for NbS Maps, the Consultant shall carry out an NbS Feasibility Assessment to assess the feasibility of implementing specific types of NbS, as listed in the table below, to provide some degree of flood risk reduction within the Study and/or Scheme Area.

The Consultant shall report the findings of this feasibility assessment in an NbS Feasibility Report, as an appendix to the Options Development Report. The NbS Feasibility Report shall include for context: a brief summary of flood risk to the study and scheme areas, and a description of the catchment characteristics (hydrology, slope, land use, soils, and water quality). It shall include an assessment of the costs and likely delivery routes for NbS, as well as their potential:

- to reduce flood risk within the Study Area,

- to reduce flood risk within the Scheme Area,
- to mitigate the flood risk impacts of Climate Change,
- to mitigate the environmental impacts of options for a preferred Scheme,
- to meet objectives other than flood risk management, including water quality, habitat creation, climate regulation, and the provision of amenity

The answers to the above questions shall form the key conclusions of the NbS Feasibility Report. Costing is only required for NbS measures that offer flood risk benefit and are potentially viable for inclusion in the Scheme.

In assessing the potential of NbS to meet objectives other than flood risk management, the Consultant shall liaise with relevant bodies in other sectors, including the EPA, Local Authority Water Programme (LAWPRO), relevant Local Authorities, NPWS, and the Department of Agriculture, Food and the Marine to determine if there are any ongoing projects in the Study Area that provide opportunities for synergies.

Where it is feasible for NbS to contribute to flood reduction in the Scheme Area, or to contribute to the mitigation of the environmental impacts of the Scheme, the Consultant shall progress these measures as appropriate through the Option Assessment process.

The Scheme may include NbS that do not provide protection to the full-required SoP of the Scheme, but that may reduce the scale of structural protection works required as part of the Scheme.

The Table below shows the NbS measures identified as being particularly beneficial for flood risk that shall be used, where relevant, for the NbS Opportunity Map and the Feasibility Assessment.

Table 7-6; Nature-based Solutions

Measure Group	Specific NbS	Main Action
Woodland creation	Catchment woodlands	Runoff reduction
	Floodplain woodlands	Runoff reduction/floodplain storage
	Riparian woodlands	Runoff reduction/floodplain storage
Land management	Peatland restoration	Runoff reduction
	Non-floodplain wetlands	Runoff reduction
	Overland sediment traps	Runoff reduction/sediment management
River and floodplain restoration	River morphology and floodplain restoration	Floodplain storage/sediment management
	Instream structures (e.g. large woody debris)	Floodplain storage
	Washlands and offline storage ponds	Floodplain storage
Coastal restoration	Mudflat/Saltmarsh creation and restoration	Estuarine surge attenuation and wave energy dissipation
	Sand dune restoration	Wave energy dissipation
	Beach nourishment	Wave energy dissipation

7.4.9 Climate Change Adaptation

The Consultant shall assess and consider the potential impacts of climate change in the selection and development of the options, and in the design of the resultant Scheme, and shall produce a Scheme Climate Change Adaptation Plan (SCCAP), in accordance with the guidance of the Client and Steering Group and the ‘Scheme Climate Change Adaptation Plans – Technical Methodology Note for New Flood Relief Schemes (OPW, 2023) provided on:

<https://www.gov.ie/en/publication/b15dd0-technical-specifications-and-guidance-notes/>

The SCCAP shall include the identification of the potential amendments or additions to the Current Scheme (designed to address current, or present-day flood risk) that might be necessary at the time of initial design and construction or over time into the future to maintain the Target Standard of Protection (SoP), or in other ways mitigate potential future risk, in a cost-efficient and locally acceptable manner under potential future scenarios

The Consultant shall carry out such technical analysis and modelling as required to deliver the requirements of the Technical Methodology Note.

The Consultant shall produce a draft Scheme Climate Change Adaptation Plan (SCCAP) in accordance with the Technical Methodology Note. The Consultant shall develop the SCCAP in tandem with the Option Development Report, and provided in draft format with the draft Option Development Report.

The draft SCCAP shall be kept as a live document that is to be reviewed and amended during the course of the project, as required, and finalised during Stage V.

7.4.10 Cost Benefit Analysis

The Consultant shall undertake a Cost Benefit Analysis (CBA) and shall prepare and provide a Cost Benefit Analysis Report detailing this work. The requirements of this analysis are set out below.

The Consultant shall undertake a detailed calculation of the flood damages and benefits in accordance with the Interim Technical Guidance Note “Economic Appraisal of Flood Relief Schemes - Interim Technical Guidance Note - Jan 23” provided on:

<https://www.gov.ie/en/publication/b15dd0-technical-specifications-and-guidance-notes/>

As referenced in SECTION 7.3, the flood damage assessment element of the CBA may be carried out as part of the baseline hydraulics analysis to inform the validation of the hydraulic model. This shall be discussed and agreed with the Steering Group at that time.

The Consultant shall also calculate the benefits required to inform the Scheme Climate Change Adaptation Plan (SECTION 7.4.9).

The Consultant shall utilise a Chartered Quantity Surveyor within their team, from commencement of the project, through Detailed Design, and construction, and to handover, to calculate construction and Project Whole Life costs for the Potential and Preferred Option,

and for the Scheme. The Consultant shall utilise percentage allowances and fixed sums (to be provided by the Client), and add them to their calculated construction cost to determine the Project Whole Life costs; the Consultant shall, however, calculate the maintenance costs for the Options and the Scheme as appropriate for the Option / Scheme, and not using a standard percentage of construction costs.

The Consultant shall develop the costs to a level of detail appropriate for the assessment and design of a scheme. The level of detail for the costs shall be appropriate to the step in the process – for example, a lower level of detail shall be acceptable at screening of measures, further assessment and a higher degree of detail is required for the Potential Options, and a high degree of detail and confidence is required for the Preferred Option.

Within the Cost Benefit Report, the Consultant shall also present non-economic benefits expected to be provided by the Scheme that have not been provided for within the Cost Benefit Assessment. These shall include, where relevant:

- Wider benefits as identified through the MCA objectives and sub-objectives ([SECTION 7.4.3 MULTI-CRITERIA ANALYSIS](#));
- The estimated reduction to a risk to life;
- The reduction of a risk of failure of critical infrastructure due to flooding, that would otherwise have consequential impacts (e.g. failure of electricity asset due to flooding that would lead to a loss of power to a hospital or a water-treatment plant);
- The reduction of significant periods when access is prevented;
- The reduction of risks to key cultural, historical or social features.

At all stages of evaluation, planning and management (including economic appraisal), the project shall fulfil the requirements of the Infrastructure Guidelines and the Capital Works Management Framework. The OPW has developed “Sectoral Guidance for the Delivery of Flood Relief Schemes” to provide clarity in relation to these requirements, which is available at:

<https://www.gov.ie/en/policy-information/5b609-major-flood-relief-schemes/>

Methodology and outputs relating to project budgets, financial appraisals, cost-benefit analyses and MCA must also align, and be compatible, with the Infrastructure Guidelines. During the project lifecycle, the CBA will ordinarily be revised by the Consultant three times: i.e. at each Approval Gate of the Infrastructure Guidelines:

- Strategic Assessment & Preliminary Business Case
- Pre-tender – Project Design, Planning and Procurement Strategy
- Post Tender – Final Business Case.

7.4.11 Option Development Report and Datasets

The Consultant, shall produce an Option Development Report, that shall provide a detailed description of the work undertaken and findings of the scheme analysis and development, as set out herein, including the identification and development of the preferred Scheme.

The Option Development Report (including draft versions) shall be accompanied by the following:

- Hydraulic models with option development runs;
- MCA Analysis Spreadsheets;
- CBA Report;
- Option Cost Spreadsheets (Potential Options and Preferred Option);
- CCAP;
- The spatial data specified in the table below.

The Option Development Report and its accompanying datasets are subject to the requirements of [SECTION 4.11 REPORTING STANDARDS & QUALITY ASSURANCE](#), in relation to reporting standards, the examination process, digital data requirements, Quality Assurance and version control.

Table 7-7; Options Development Report – Spatial Data

Spatial Dataset	Condition	Scenario	AEP	GIS Spec. Ref.	Comment
Modelled River Centre-line (proposed)	All modelled Options	N/A	N/A	C2.6	Required if updated from baseline, to be denoted by suitable text in 'Comments' C2.6 Field 10
Nodes (flow and level) (proposed)	All modelled Options	All modelled scenarios	All modelled AEPs	C2.7	Options runs to be denoted using Run Type - 'File Naming - Appendices A1, B1 and C2.7 Field 7
Flood Extents (proposed)	All modelled Options	All modelled scenarios	All modelled AEPs	C2.8	Options runs to be denoted using Run Type - 'File Naming - Appendices A1, B1 and C2.8 Field 7
Flood Depth	Preferred Option	Current MRFS HEFS	All All 10%, 1% , 0.1%	N/A	Section 2.3 and App C1 of the Specification cover rasters. Options runs to be denoted by Run Type (File Naming - Appendix A1, File name Code - Appendix B1)
Defended Areas (existing & proposed)	All modelled Options	Current	SOP	C2.11	Options runs to be denoted using Run Type - 'File Naming - Appendices A1, B1 and C2.11 Field 7
Benefiting Area (proposed)	All modelled Options	Current	SOP	C2.12	Options runs to be denoted using Run Type - 'File Naming -

					Appendices A1, B1 and C2.12 Field 7
Defences (existing & proposed) (polygon, polyline, point, level)	All modelled Options	N/A	N/A	C2.13, C2.14, C2.15, C2.16	Options can be denoted using 'Comments' (C2.13 Field 16, C2.14 Field 18, C2.15 Field 17, C2.16 Field 10).
Property Damage (Benefits)	Existing (baseline)	All modelled scenarios	All modelled AEPs	C2.28	

7.4.12 Planning Route Report

The proposed Planning Route and other relevant information is outlined in [SECTION 8.2](#). The Consultant shall prepare a Planning Route Report, outlining their recommendation to the Steering Group, which confirms or amends the preferred statutory delivery route, and the basis for how the recommendation was determined. This may be based on their assessment of any risks and opportunities associated with the Scheme, including environmental aspects, programme and cost delays.

Following consideration of the Planning Route Report, the Client and the Steering Group shall confirm or otherwise the statutory delivery route that will be followed, having regard to the Consultant's recommendation.

The Consultant shall also identify the required licences and consent associated with the Scheme (e.g. OPW statutory consents, Maritime Area Consent under the Maritime Area Planning Acts 2021 and 2022, etc.).

7.4.13 Preliminary Design

The Consultant shall undertake preliminary design the Scheme, its ancillary works, including all relevant disciplines, e.g. hydraulics, environmental (mitigation and enhancements), geotechnical, buildability, O&M, structural, civil, mechanical and electrical, in so far as is required to support the consent processes.

The Consultant shall incorporate into the preliminary design the requirements identified in the Buildability and Operation and Maintenance Workshops ([SECTIONS 7.4.6.1](#) and [7.4.7.1](#)) and Other Meetings ([SECTION 7.4.13.2](#)).

The preliminary design shall be to a level of detail such that:

- Allows for submission of the Scheme to the required consent processes with reasonable expectation of a successful outcome and with an expectation of minimum alterations arising through those processes;
- Allows for the production of a fully compliant EIAR and NIS, taking into account the short-term (construction) and long-term (permanent works) environmental impacts of the scheme.

7.4.13.1 Preliminary Design Workshop

The Consultant shall organise and attend a Preliminary Design Workshop (see [SECTION 4.9 WORKSHOPS](#)), with the purpose of:

- Presenting the key aspects of the preliminary design to the Steering Group,
- Facilitating discussion and input on the detail of the preliminary design,
- Demonstrating how the preliminary design supports the requirements of the consent processes.

The workshop shall include a presentation by the Consultant and shall include a site walkover to inform the discussion.

7.4.13.2 Stakeholder Preliminary Design meetings

The Consultant is required to meet with other stakeholders as required to deliver the preliminary design, e.g.

- Asset owners that may be temporarily or permanently impacted, e.g. utility owners
- Other interested parties, e.g. users of the river/harbour
- Elected representatives
- Landowners

Consultation with these stakeholders shall be led by the Client.

Payment for preliminary design meetings shall be in accordance with clause 11.1-7 of the Conditions of Engagement on a cost per item basis.

7.4.13.3 Preliminary Design Report

The Consultant shall detail the work undertaken in the Preliminary Design process (i.e. between the Options Report and the Scheme as submitted for consent) in a Preliminary Design Report.

The Consultant shall summarise comments received from stakeholders and the public and provide a description of how each comment has been addressed (or not, with justification) in the Preliminary Design.

The Consultant shall provide an updated copy of the Design Decision Register with the Preliminary Design Report (including its draft versions).

The Preliminary Design Report and any supporting material are subject to the requirements of [SECTION 4.11 REPORTING STANDARDS & QUALITY ASSURANCE](#), in relation to reporting standards, the examination process, digital data requirements, Quality Assurance and version control.

7.5 Environmental Services

The Consultant's engineering and environmental teams shall work in collaboration with each other, have a two way flow of information and take into account the requirements of the EIAR, NIS, other statutory environmental requirements, and national policy, in the assessment of the flood risk management options, and in the identification, development and design of a preferred option (the 'Scheme'), for Nenagh.

The Consultant shall employ full and continuous collaboration between their engineering and environmental teams to integrate environmental requirements into the design process, in tandem with developing the required environmental assessments.

The Consultant shall fully integrate the information and knowledge gained from the environmental assessments, and the outcomes of the statutory environmental consent processes, with the technical assessments, in particular in the selection and development of the preferred option, and the design of the Scheme.

The Consultant shall, in line with the Aarhus convention, accurately record the integration of the SEA / EIA / AA / national legislation and good practice with the decision making process. Within that process, the Consultant shall take full account of the principal of the Dresden Declaration on Flood Protection for Historic Sites 2014 and integrate this principal similarly.

7.5.1 Environmental Surveys

The Consultant shall undertake the baseline environmental surveys, scheduled to take account of seasonal requirements and to ensure no delays in the programme. Baseline surveys shall be appropriately scoped to fulfil the requirements of the EIA and in line with national guidance and standards.

The Consultant shall, for all applicable environmental aspects, carry out the following tasks, using competent experts in the relevant disciplines, as part of their lump-sum tender:

- All associated survey management, desk studies and consultations with all relevant stakeholders,
- Habitat and species walkover surveys, including invasive species,
- Baseline surveys for all environmental disciplines as appropriate to address the requirements of the EIA Directive and relevant guidance;
- Field Investigations and ground truthing
- Reporting for the above.

The Consultant shall carry out the following baseline surveys, as part of their lump-sum tender:

- Habitat surveys and habitat mapping including habitat surveys of Annex I habitats;
- Species surveys, including species surveys for Annex II species and species protected under the Wildlife Act e.g. otter survey, badger survey,
- Fish, invertebrate & freshwater aquatic species surveys
- Bat surveys

- Noise & vibration surveys
- Air quality surveys
- General ornithological surveys
- Landscape and visual assessment
- Invasive species - aquatic & terrestrial
- Water quality surveys
- Hydromorphology surveys (see [SECTION 7.5.4.1 HYDROMORPHOLOGICAL ASSESSMENT](#))
- Cultural heritage surveys (architectural/built heritage surveys)
- Archaeological surveys (terrestrial), and intangible heritage for example folklore and history
- Review and identify potential contaminated ground using historical and current maps showing locations of industry, information from Ground Investigation.

Where other/specific detailed baseline environmental surveys are required to make a sufficient level of detail available for development, appraisal and design of the Scheme, these will be specified, procured and managed by the Consultant in accordance with [SECTION 6 CONTRACT MANAGEMENT SERVICES](#); the cost of any such approved additional surveys (i.e. the third party fees) will be paid for by the Client.

The following is a non-exhaustive table of detailed baseline environmental surveys which shall be procured in accordance with [SECTION 6](#), and paid for by the Client as third-party costs

Table 7-8; Potential detailed baseline environmental surveys

Archaeological geophysical surveys
Underwater Archaeological Impact Assessment (UAIA, including dive survey where appropriate)
Tree surveys
Freshwater pearl mussel surveys
Ornithological surveys including general nesting birds survey, wintering birds, migrating birds
Contaminated ground surveys
Other surveys to facilitate potential Wildlife Act licences, Archaeological licences or consents etc. e.g. otter holt monitoring, badger sett monitoring

The Consultant shall be responsible for obtaining any licences or other authorisations required to undertake the surveys and the associated cost shall be included in the Fee.

7.5.2 Invasive Species Management Plan

It is known that the Nenagh River is heavily infested with Giant Hogweed between Lisbunny and the N52.

Following the completion of the baseline invasive species survey, the Consultant shall develop biosecurity requirements for the Scheme Area and prepare an Invasive Species Management Plan for the Project including, but not limited to, the following:

- Details of the location and extent of invasive species within the Scheme Area, including maps,

- Consideration of both aquatic and terrestrial invasive species,
- An assessment detailing the risk posed by invasive species to the Project including, but not limited to, cost and programme risks,
- Treatment options for all invasive species identified including a cost estimate for each treatment option,
- A recommendation on the treatment option for each invasive species identified.

Treatment of invasive species shall commence immediately after the commencement of the Project, to avoid posing risk to the progression of the Project. The Consultant shall prepare, specify, procure and manage any contracts for the treatment of invasive species, based on the recommendations of their environmental team

It is important to note that although the baseline survey shall be undertaken during Stage I, the treatment of invasive species, and therefore the preparation, procurement and management of any invasive species treatment contracts shall also be required during Stages II and III. The Consultant shall carry out ongoing monitoring of invasive species during the duration of the Contract, and shall review and update the Invasive Species Management Plan on an annual basis. The review shall include, but is not limited to, updating the maps, risk assessment, treatment options and recommendations of the management plan. The review shall also provide details of the effectiveness of any treatment carried out in the previous period.

7.5.3 Constraints Study

The Consultant shall identify the key environmental issues associated with the development of the Scheme which may be impacted upon by possible flood alleviation measures and/or which may inform option selection and impose constraints on the viability and/or design of these measures. The scope of the issues considered shall reflect the scope of an Environmental Impact Assessment (EIA), in accordance with the requirements of the EIA Directive 2014/52/EU:

- 1) Population & Human Health
- 2) Biodiversity
- 3) Land, Soil, Water, Air and Climate
- 4) Material Assets, Cultural Heritage and the Landscape
- 5) The interaction between the factors referred to in points 1) to 4).

The Consultant shall undertake a series of desk studies, consultations with all relevant stakeholders, and organise preliminary field investigations as necessary to identify issues that might be relevant to, or impose constraints on, the design, construction, operation, and maintenance of the scheme. A number of the potential environmental issues are detailed below:

- In terms of Population and human health, flood-related social or socio-economic issues, the Consultant shall include such aspects as tourism, recreational use, amenity and connectivity to the waterway.

- In relation to Biodiversity, the Consultant shall identify the key species, the location of relevant habitats, and the aspects of the species or habitat that could potentially be impacted upon, or constrain, the design and construction of a flood alleviation scheme. Biodiversity enhancement measures shall be identified and due consideration be given to the National Biodiversity Plan 2023-2030 particularly to Action 4.3.1 Ensure that Flood Risk Management (FRM) planning and associated SEA, EIA and AA, minimises loss of biodiversity and ecosystem services through policies to promote more catchment-wide and non-structural flood risk management measures.
- In terms of Land & Soils, the Consultant shall have regard to the areas where the scheme design may require disturbance or excavation that overlap with suspected contaminated ground, and include any such areas in the procurement of site investigation contractors for further investigation.
- In relation to Water, the Consultant shall identify water quality elements and hydromorphological quality elements that could be impacted upon or act as a constraint to the scheme design, and identify opportunities for improvements (e.g. barrier removal, channel improvements).
- The Consultant shall identify archaeological, architectural and cultural heritage aspects, such as known sites (SMR, RMP, national monuments, sites with Preservation Orders, Register of Historic Monuments, Register of Protected Structures (RPS), Architectural Conservation Areas (ACA), features and areas of archaeological and / or heritage importance and potential, and cultural heritage site types and areas designated in local authority development plan objectives. For known sites, the Consultant shall identify a zone of avoidance around the site, if relevant.
- The landscape study shall include identifying the significant features in the landscape, which determine its character, with particular reference to the river, and adjacent banks.

The Consultant shall organise an opening Public Participation Day (PPD) within the timeframe as specified in [SECTION 5.3](#). The Consultant shall invite the relevant consultees to attend the PPD or to make any views known by way of a questionnaire and by general correspondence.

7.5.3.1 Constraints Report

The output from the Constraints Study shall be a report, including graphics, which shall identify the constraints and issues arising and provide a full account of the findings of the study and Opening PPD, the topics and geographic areas covered, the documents referred to and the organisations and people consulted. The Consultant shall brief the Steering Group on the findings of the study and be available to answer further queries, if necessary. This briefing shall include the feedback from the Opening Public Participation Day.

7.5.4 Environmental Assessment of Viable Options

The range of flood alleviation measures/options typically considered as part of the Scheme Analysis and Development, and which would need to be considered in relation to possible impacts or constraints are listed in [SECTION 7.4.2 IDENTIFICATION OF POTENTIAL OPTIONS](#).

Following completion of the Constraints study, the Consultant shall assess and report on the potential environmental impacts associated with each measure/option assessed in the optioneering process. The Options Assessment should be informed by a combination of desk studies and field surveys, focusing on key sites features or areas that appear to be of particular value for the relevant environmental discipline. This assessment shall be included in the selection of the preferred option (the 'Scheme'), the development and design of the Scheme and to identify mitigation measures. The potential impacts, both positive ('opportunities') and negative, shall be described in terms of quality, significance, duration and type, as defined in the Descriptions of Effects in the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2017). Mitigation measures, should they be considered effective, may be used in assessing the impact of any particular option and arrive at the preferred scheme. The Consultant shall use the assessment to supply the environmental information for the Multi-Criteria Analysis used in identifying the preferred scheme (see SECTION 7.4.3), and shall record the assessment in the Option Development Report (SECTION 7.4.11) so as to satisfy the needs of the EIA Directive, 2014 with regard the assessment of alternatives.

7.5.4.1 Hydromorphological Assessment

The Consultant shall carry out baseline hydromorphological survey for the existing channels within the study area. The Consultant shall use the River Hydromorphology Assessment Technique (RHAT) to complete the same and shall be in accordance with the following guidance or the latest version of the same, as guidance is periodically updated:

- River Hydromorphology Assessment Technique (RHAT), Training guide, Version 2. (Environment Agency Northern Ireland, 2014).

The RHAT scores shall give insight to physical habitat quality/condition, and shall be carried out at a site-scale. An output from the survey shall include a review of condition and vulnerabilities of the river channel(s) as well as opportunities for river restoration or enhancement within the study area. The survey shall inform all stages of the EIA (including optioneering).

The Consultant shall identify existing EPA monitoring stations relevant to the study area and liaise with EPA to gather all existing RHAT scores and other morphological information such as Morphological Quality Index (MQI) scores where available.

The Consultant shall use the above findings to form part of the considerations in the selection of the Preferred Option, and will integrate the findings into the hydromorphological assessment of the Proposed Scheme within the EIAR as appropriate.

The hydromorphological impact assessment shall be carried out, on the proposed Scheme, by competent experts with an appropriate background and sufficient skills in fluvial geomorphology. The assessment shall be produced with regard to relevant EIAR chapters, identified during scoping and will include consideration of WFD compliance in the EIAR.

7.5.4.2 Reasonable Alternatives Test in EIA

The Consultant shall carry out the mandatory assessment of Reasonable Alternatives as outlined in the Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU). The EIAR shall include a narrative on the reasonable alternatives considered and a comparison of the environmental effects of these.

The option selection by MCA (see [SECTION 7.4.3 MULTI-CRITERIA ANALYSIS](#)) shall consider the reasonable alternatives.

The Options Development Report ([SECTION 7.4.11](#)) shall document this assessment of alternatives and demonstrate that this has been taken into account by setting out the (environmental) reasons that the preferred option was chosen.

The [STAGE I FINAL REPORT 7.6](#) shall summarise the consideration of the reasonable alternatives.

7.5.5 Natura Impact Statement

The Consultant shall prepare a Screening Statement for a NIS. This shall be done in line with 'Appropriate Assessment of Plans and Projects in Ireland – Guidance from Planning Authorities' (DoEHLG 2010) and the 'Appropriate Assessment Screening Methodology for the Maintenance of Arterial Drainage Schemes' (OPW 2014) or an equivalent methodology approved by the Steering Group. The NIS Screening shall consider the likely impacts of the preferred Scheme on relevant Natura Sites and conclude with a recommendation on whether a full NIS is required, with the completion of the NIS in Stage I.

Subject to the results of the Screening for an NIS and instruction from the Client to proceed, the Consultant shall undertake a NIS, based on best scientific knowledge, to assess the potential impacts of the preferred flood relief scheme measures on identified Natura 2000 sites in the context of the conservation objectives of those sites. A competent expert, employed by the Consultant, is required to undertake all stages of the NIS. The NIS shall be produced in line with relevant components of the current environmental guidelines. A non –exhaustive list of current guidelines is as follows and the NIS shall be in accordance with the same or the latest version of the same, as guidance is periodically updated:

- National Guidance such as: Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities (DEHLG, 2010),
- General Commission Guidance such as: 'Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC' (European Commission 2019 (In draft)),
- Relevant Specific Sector Guidance such as: 'Implementation of the Birds and Habitats Directives in estuaries and coastal zones' (European Commission 2011) and 'Inland waterway transport and Natura 2000' (European Commission 2012),
- Relevant Commission Notices and Case Studies such as: 'Commission Notice - Managing Natura 2000 sites - The provisions of Article 6 of the Habitats Directive 92/43/EEC' (European Commission 2018).

The Consultant shall engage and consult with the National Parks and Wildlife Service (NPWS), Inland Fisheries Ireland (IFI) and other relevant stakeholders at an early stage and during the process as required.

The Consultant shall be required to produce the NIS, which assesses the preferred scheme and prescribes mitigation and environmental improvement measures, and bring the preferred flood relief scheme to the conclusion that the Project shall not adversely affect the integrity of any Natura 2000 site, either alone or in combination with any other plans or projects.

The Consultant shall reflect the latest understanding stemming from case law in the NIS, including that which has interpreted that mitigation cannot be considered in the NIS screening decision, its methodology and conclusions.

While there is no explicit requirement for environmental monitoring for the implementation of projects on Natura 2000 sites under the Habitats Directive, where monitoring is proposed as part of the NIS process, the Consultant shall devise the monitoring programme to allow for the assessment of the impact of the preferred engineering flood relief scheme option on identified Natura 2000 sites. The Consultant shall integrate any such monitoring programme into both the monitoring requirements set out in the EIAR and the Stage I Construction Environment Management Plan (CEMP) (see [SECTION 7.5.7](#)).

7.5.6 Environmental Impact Assessment

The EIAR shall be in line with relevant components of the current guidelines. A non – exhaustive list of current EIA related guidelines is as follows and the process shall be in accordance with the same or the latest version of the same, as guidance is periodically updated:

National Guidance such as:

- ‘Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports’ (EPA, 2017).
- ‘Draft Advice Notes for preparing Environmental Impact Statements’ (EPA 2015).
- ‘Guidelines for Planning Authorities and An Coimisiún Pleanála on carrying out Environmental Impact Assessment’ (DoCLG 2013)

General Commission Guidance such as:

- ‘Environmental Impact Assessment of Projects Guidance on Screening’ (European Commission 2017).
- ‘Environmental Impact Assessment of Projects Guidance on Scoping’ (European Commission 2017)
- ‘Guidance on the preparation of the Environmental Impact Assessment Report’ (European Commission 2017)

Relevant Specific Sector Guidance such as:

- ‘Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment’ (European Commission 2013)

The Consultant also shall take full account of the principal of the Dresden Declaration on Flood Protection for Historic Sites 2014 and integrate this principal into the development of any flood risk management options.

7.5.6.1 EIA Scoping and Consultation

The Consultant shall consult the relevant statutory and non-Governmental Organisations (NGOs) with interest in the specific aspects of the environment likely to be affected by the Scheme (refer to Table below). The EIA Scoping shall be in line with relevant components of the current guidelines. The Consultant shall prepare an EIA Scoping Report. The Scoping Report shall set out the key characteristics of the project, the sensitivities likely to be present in the receiving environment and the key potential environmental aspects of the project.

The Consultant shall also organise PPDs (refer to [SECTION 5.3](#)). The purpose of the PPDs shall be to provide information to the local community on the potential options and preferred Scheme. The comments and queries raised at the PPDs shall be considered in the scheme design and during the preparation of the Environmental Impact Assessment Report (EIAR).

Listed below is a non-exhaustive list of possible organisational stakeholders. The Consultant shall identify any further relevant stakeholders.

Table 7-9; List of relevant stakeholders

1. Most relevant Government Departments
Department of Agriculture, Food and the Marine
Department of the Environment, Climate and Communications
Department of Public Expenditure, NDP Delivery and Reform
Department of Housing, Local Government and Heritage
Department of Transport
2. Primary Stakeholders
Local Authorities
Local Authority internal departments (Architecture, Archaeologist, Heritage, Conservation Officers, Roads, County Engineer, Public Lighting, Housing, Economic Development, Tourism, Traffic & Transportation, Fire Service, Planning and Environment)
Environmental Protection Agency
Regional Authorities
Office of Public Works
3. Secondary Stakeholders
An Taisce
Angling Clubs
Birdwatch Ireland
Boating Clubs or Associations
Gas Networks Ireland
Bord Na Móna
Chambers of Commerce
Climate Action Regional Office
Coastal Marine Resources Centre

Coillte Teoranta (Forest Service)
County Development Boards
Eir Networks
ESB
Fáilte Ireland
Geological Survey Ireland
Heritage Council
Iarnród Éireann
Inland Fisheries Ireland
Irish Creamery Milk Suppliers Association (ICMSA)
Irish Environmental Network
Irish Farmers Association
Uisce Éireann
Landscape Alliance Ireland
Local Authority Waters Programme
Marine Institute
Regional Assemblies
River Trust or other River Community Group
Sustainable Water Network Ireland (SWAN)
Teagasc
Transport Infrastructure Ireland
The National Water Forum (An Forám Uisce)
Water Policy Advisory Committee

7.5.6.2 Photomontages

The Consultant shall prepare photomontages, which are representative of the proposed scheme to illustrate the impact of post-implementation. The Steering Group shall determine the number and location of the photomontages to be prepared. The Consultant shall utilise the photomontages at the Public Participation Days, the workshops, within the Option Development Report, and EIAR.

Payment for the production of photomontages shall be in accordance with clause 11.1-7 of the Conditions of Engagement on a cost per item basis.

7.5.6.3 Environmental Impact Assessment Report

The Consultant shall prepare an Environmental Impact Assessment Report (EIAR), including a Non-Technical Summary, for the preferred scheme. The EIAR shall be prepared to meet the requirements of the EIA Directive 2014/52/EU.

While the EIAR and Non-Technical Summary shall be produced to meet the statutory requirements, these publications shall also be an important source of information on the preferred scheme for the general public and shall therefore be prepared with particular attention given to ease of use, clarity, and high quality graphics.

In accordance with the EPA Draft Advice Notes 2015, the Project shall be type 12A. The Consultant shall have regard to the advice notes, relevant guidance and the EIA Directive 2014/52/EU, in determining the topics to be addressed in the preparation of the EIAR. The EIAR shall be tailored to the specific circumstances of the Project and focussed on the likely significant environmental impacts. As part of the EIA process, the following aspects shall be assessed and integrated with the EIAR as follows:

- In terms of the environmental effects in relation to Water, the Consultant shall consider and support the Water Framework Directive (WFD) objectives in the EIAR, including a specific section in the EIR covering the assessment of the Scheme in relation to the WFD. The Consultant shall utilise the hydro-morphological assessment of the Scheme (see [SECTION 7.5.4.1](#)) and assess the impact on the relevant water body and any resultant potential change in water quality elements and ecological status and may include sediment modelling etc. The assessment should include, but not necessarily be limited to, any available information, historical records or evidence on erosion or deposition, an analysis of the topography, sub-surface materials, site visits and modelled reach velocity profiling for the range of events and for drought and dry flow conditions.
- The assessment shall also identify potential hydromorphological enhancement opportunities such as river continuity improvements and have regard to potential for synergies as described in the 'Links between the Floods Directive and Water Framework Directive' (European Commission 2014). The assessment shall make judgement if the Scheme could prevent a water body achieving good status or lead to a deterioration of quality elements. In the case where a derogation is identified, under Article 4(7) of the WFD for new modifications to the physical characteristics of a body of surface water, the Consultant shall integrate within the EIAR, how the Project satisfies the prescribed conditions for the application of Article 4(7).
- In terms of the environmental effects in relation to Climate, the Consultant shall utilise assessment and findings of the Flood Risk Management Climate Change Adaptation Plan ([SECTION 7.4.9](#)), when assessing the impacts of climate change on the Scheme.

The EIAR is to be prepared by competent experts and the introduction to the EIAR should include a list of the experts who have contributed to the EIAR, showing which parts of the EIAR they have worked on, their qualifications, experience and any other relevant credentials. Experts are required to be suitably qualified and have sufficient expertise in the relevant field that upon examination by the competent authority, shall show that the information provided in the EIAR is complete and of a high quality.

Where the Client appoints Project Specialists to advise on and oversee particular elements of the Project (for example, Project Archaeologist, Project Ecologist, etc), the Consultant shall collaborate with same during the Environmental Assessments, the production of the NIS and EIAR, and in the development and design of the Scheme.

7.5.6.4 Monitoring

In accordance with statutory EIA monitoring requirements, the Consultant shall devise the monitoring programme for the monitoring of significant adverse effects on the environment, having regard to the nature, location and size of the scheme, the significance of its effect on the environment and the use of existing monitoring being conducted under other requirements.

It may be appropriate, where relevant, to propose monitoring to take place post-construction, in order to demonstrate that the Project in practice conforms to the predictions made during the EIAR. The monitoring programme shall be presented by the Consultant including the relevant indicators, the type of monitoring, the methodology, the frequency, thresholds, and the lifespan of the monitoring.

7.5.6.5 Mitigation

Mitigation measures are to follow the established EIA mitigation strategies of avoidance, prevention, reduction and offsetting. The principle of Best Available Techniques Not Entailing Excessive Costs (BATNEEC) shall apply to proposed mitigation measures and the Consultant shall propose mitigation measures that are practical, buildable and meet industry best standards. The Consultant will take a proactive approach to the identification of practicable environmental enhancement opportunities, e.g. fisheries instream river enhancement practises, removal of weirs or fish passage improvement works, species enhancement such as artificial otter holt, bat boxes, kingfisher nest cliffs, through to terrestrial enhancement with wildflower seed mixes and native tree riparian planting. With regard to cultural heritage, all proposed mitigation should be to professional standards, and the Consultant shall identify opportunities for public awareness of the archaeological and architectural importance of the scheme, including public talks, publication of results, potential for public realm presentment of elements of discoveries, etc. The Consultant shall produce a schedule of environmental commitments for inclusion in the EIAR.

7.5.7 Construction Environment Management Plan

The Consultant shall prepare and produce a Construction Environment Management Plan (CEMP), in accordance with the guidance contained in the handbook published by the Construction Industry Research and Information Association (CIRIA), Environmental Good Practice on Site Guide, 4th Edition (CIRIA, 2014), or a similar approved document. The CEMP shall capture all environmental requirements in one document.

The Consultant shall produce the Stage I CEMP to include:

- All foreseeable environmental requirements for both the construction stage and permanent works.
- Details of all mitigation measures stemming from all environmental sources such as: NIS, EIAR.
- Environmental requirements resulting from foreseeable activities such as, likely borrow pits, potential site compound locations, expected attenuation ponds etc.
- Foreseeable construction stage requirements such as Waste Permit application by the Contractor.
- Threshold limits for all mitigation measures proposed.
- Details of all monitoring required during the construction of the works and any ongoing long-term monitoring required.
- Agreements with statutory environmental stakeholders e.g. NPWS, IFI, etc.

- Identify any requirements for construction stage environmental liaison with other parties e.g. IFI, community groups etc.
- Define the various Client, Consultant and Contractor responsibilities.

The Consultant shall prepare spatial data relating to Potential Access Routes (Specification Ref. C2.2) and Indicative Extent of Work Areas (Specification Ref. C2.3) in accordance with the OPW FRS Engineering Spatial Data Specification (available on <https://www.gov.ie/en/publication/b15dd0-technical-specifications-and-guidance-notes/>).

These spatial datasets shall accompany the CEMP (including its draft versions).

The Consultant shall update the CEMP in Stage II with the Planning Conditions/Development Consent Conditions (including any addendums, Coimisiún Pleanála Further Information responses), other licences/consents (e.g. Wildlife Licences, Archaeological Licences, Maritime Area Consent) and the outcomes of the construction detailing process. The Stage II CEMP shall become part of the Works Requirements Documents for the Construction Works procurement process.

7.5.8 Licences

The Consultant shall carry out the following duties:

- Identify the need for other environmental assessments and requirements, such as Wildlife Act Licence consents, archaeological licences/consents, waste management consents, or other assessments on specific sensitivities or features. The Consultant shall immediately progress the requirement for a Wildlife Licence, to minimise potential programming related issues and delays in project delivery.
- Obtain all environmental licences or other statutory requirements required for submission of the Planning documents.

It is important to note that all environmental licences acquired for Stage I, shall also be required during all other Stages.

7.5.9 Environmental Spatial Data

The Consultant shall collate and provide to the Client the Flood Relief Scheme environmental information in a series of GIS layers as follows:

- Invasive Species Flora (e.g. American skunk-cabbage, a red alga, etc.),
- Invasive Species Fauna (e.g. American oyster drill, Asian oyster drill, etc.),
- Habitat Maps (area),
- Habitat Maps (line),
- River Enhancements (e.g. existing rock and gravel used, rock and gravel imported, etc.),
- Ecological Enhancements (e.g. badger sett – artificial, bat box, etc.),
- Key Environmental Data (e.g. badger sett, bat roost, common club-rush, etc.),
- Supplementary Environmental Data (e.g. amphibian – any, badger – any, bat – any, etc.).

These GIS layers shall be produced and provided in accordance with OPW FRS Environmental Spatial Data Specification (available on <https://www.gov.ie/en/publication/b15dd0-technical-specifications-and-guidance-notes/>). The environmental spatial datasets are subject to the requirements of SECTION 4.11 REPORTING STANDARDS & QUALITY ASSURANCE, in relation to reporting standards, the examination process, digital data requirements, Quality Assurance and version control.

The Consultant shall update the National Biodiversity Data Centre with any relevant environmental data gathered while undertaking surveys or during other work at any stage of the Project. The Consultant shall seek the approval of the OPW Environment Section prior to updating, in order to facilitate national consistency.

7.5.10 Biodiversity Plan

The Consultant shall develop a Biodiversity Plan for the Scheme that details how all design elements of the flood relief scheme integrate with surrounding habitats. The Plan shall include measures for ecological enhancement within both the terrestrial and aquatic footprint of the scheme. The Consultant (engineering and environmental teams) shall review relevant reports and liaise with specialists involved in hydro-morphology assessment, pre-construction or other ecology related surveys that inform the Scheme on potential enhancements opportunities as necessary. The Consultant shall consult with stakeholders (IFI, NPWS, LA Biodiversity Officer etc.) on the development of ecological enhancements.

The Consultant shall gather information from the ENVIRONMENTAL CONSTRAINTS & OPPORTUNITIES WORKSHOPS 7.5.11 and incorporate ecological innovation to improve biodiversity wins for the design of the Scheme. This plan shall be woven into the design elements of the Scheme and referenced in the Environmental Reports required for planning.

The Consultant shall update the Biodiversity Plan during construction tender document preparation and construction stages of the Scheme.

7.5.11 Environmental Constraints & Opportunities Workshops

To continuously improve environmental guidance in the development of flood relief schemes, the Consultant shall allow for one workshop for each of Stage I, Stage II and Stage IV with OPW Environment Section, the Local Authority environmental & planning representatives and relevant Steering Group members.

The scope for each Workshop will include three stages –

- 1) Pre-workshop – content and workshop preparation
 - Project team will prepare, with relevant specialists (ecology specialists e.g. ornithologist, aquatic ecology and bat specialist, landscape specialists, archaeologist/built heritage specialist), where potential environmental opportunities are identified and discussed.
 - The potential opportunities identified above are reviewed by the Consultant, with regards to their feasibility in relation to the preferred scheme and constraints.

- Consultation with Inland Fisheries Ireland (IFI) and other relevant stakeholder to discuss the potential enhancement opportunities (e.g. for aquatic habitats).
- 2) Workshop
- Discussion of wider issues (planning – space for rivers, Biodiversity Plans – LA & OPW, etc.)
 - Discussion of works Area by Area with predefined goals of enhancing such items like biodiversity, landscape, cultural heritage, low carbon design, circular economy principles, social value.
- 3) Workshop summary and recommended next steps

The workshop in Stage I shall take place when a Preferred Option has emerged, and the outcomes of the workshop may be implemented as part of the Scheme design. An update should then be included at the completion of the stage to capture all improvements and learnings.

The meetings shall be held either at the offices of the OPW or Tipperary County Council, or at an alternative suitable venue in or near the Study Area, as decided by the OPW and Tipperary County Council. In advance of each workshop (5 working days), the Consultant shall prepare a short report summarising the environmental issues, lessons learnt, a brief description of any innovative environmental approaches proposed, a synopsis of the natural water retention measures considered, details of good work practices and a record of other environmental learning that could inform OPW and the Local Authority, as part of continuous environmental improvement for flood relief schemes.

7.6 Stage I Final Report

The Consultant shall produce a comprehensive Final Report detailing the work undertaken and the findings of Stage I of the Project, incorporating scaled drawings and plans of the preferred Scheme, including areas likely to be inundated during flood storage, if appropriate, and maps of the benefiting areas. The Consultant shall also provide to the Client and Steering Group all information and data collated or generated as part of Stage I of the project in a suitable digital format.

The Final Report shall include, but not necessarily be limited to:

- An executive summary
- An introductory section detailing the background and context of the Project
- A detailed description of the hydrological analysis and of the hydraulic analysis and modelling undertaken
- Details of the surveys and condition and structural assessments undertaken
- A detailed description of the Scheme analysis and development, including the options considered, the cost-benefit and multi-criteria assessments of the options, how the environmental assessments have influenced the determination of the preferred Scheme, and a detailed description of the preferred Scheme.
- A summary of the consideration of the reasonable alternatives.

- Summary of the Scheme Climate Change Adaptation Plan for the preferred scheme
- Buildability and Preliminary O&M summary for the preferred scheme
- The proposed phasing (i.e., number of works contracts) of the scheme should be taken into account in this report.
- A detailed description of the public and stakeholder engagement undertaken, and how this has influenced the determination of the preferred Scheme
- Conclusions and recommendations

The Final Report is subject to the requirements of [SECTION 4.11 REPORTING STANDARDS & QUALITY ASSURANCE](#), in relation to reporting standards, the examination process, digital data requirements, Quality Assurance and version control.

8 SCOPE OF SERVICES – STAGE II (CONSENT PROCESSES & DETAILED DESIGN)

8.1 General Requirements

The Consultant shall provide the duties in relation to Sections [4 GENERAL MANAGEMENT SERVICES](#), [5 STAKEHOLDER & PUBLIC ENGAGEMENT](#), [6 CONTRACT MANAGEMENT SERVICES](#), [3.9.1 Property & Land Holding Impact Reports](#), and [7.5 ENVIRONMENTAL SERVICES](#), as relevant to this stage (Stage II).

The Consultant shall undertake as part of Stage II such studies, analyses, assessments, investigations and other work as necessary to meet the Project Objectives and within the associated Performance Period. These services are set out within this section.

The Consultant shall achieve the following level of detail (repeated from [SECTION 1.4.1 LEVEL OF DETAIL](#)), such that their work:

- Prepares and collates documentation required for a successful outcome to the planning and environmental consent processes, and,
- Provides Detailed Design, and
- Satisfies any requirements attached to the planning and environmental consents achieved, and,
- Prepares construction tender documents that reflect full completion of Detailed Design.

8.2 Consent Applications

The Consultant shall prepare and collate all documents, maps, drawings and sections, required as necessary to secure consent under Part 10 of the Planning and Development Act 2000 (as amended, and associated Regulations), or if enacted prior to submission of the application, Chapter 6 of Part 4 of the Planning and Development Act 2024.

This documentation shall include as relevant that prepared under Section 7.5 ENVIRONMENTAL SERVICES; for example, the EIAR, NIS, CEMP, Invasive Species Management Plan, other environmental licences, documents, and assessments, and ecological assessments.

The Consultant shall also prepare and collate all documents, maps, drawings and sections, required as necessary to secure consent under relevant sections of the Arterial Drainage Act 1945, as amended (the Nenagh River catchment is arterially drained).

The Consultant shall provide all documentation for the consent applications in draft form at least eight (8) weeks before the programmed date for planning submission.

The Consultant shall provide the final documents in both soft and hard copy at least four (4) weeks before planning submission.

8.2.1 Planning Consultation

8.2.1.1 Presentation to Client / OPW / Stakeholders

The Consultant shall present the Scheme to Client / OPW / other stakeholders in advance of submission for consent. Payment shall be in accordance with clause 11.1-7 of the Conditions of Engagement on a cost per item basis.

8.2.1.2 Public Information Sessions

The Consultant shall be responsible for the notification, advertisement, preparation and set-up of any public information sessions considered necessary prior to submission to An Coimisiún Pleanála. The Consultant shall prepare any necessary documentation and display material and boards such as maps, drawings, photomontages, video presentations, etc, and to set up the event space in a logical and user-friendly manner. The Consultant shall also attend at such sessions.

Payment for preparation for and attendance at Public Information Sessions shall be in accordance with clause 11.1-7 of the Conditions of Engagement on a cost per item basis.

Where photomontages are required they shall be provided in accordance with 7.5.6.2 PHOTOMONTAGES and paid for in accordance with clause 11.1-7 of the Conditions of Engagement on a cost per item basis.

Venue hire shall be a reimbursable cost.

The Consultant shall submit a summary report to the Client detailing the events including details of attendance, effectiveness, comments received, etc.

8.2.1.3 Council Meetings

The Consultant shall attend Council meetings and Council Committee meetings as directed by the Client, and provide support to the Client in advance and at such meetings, by providing

information and advice on progress, technical and environmental issues, and all other aspects in relation to the Project that arise. Payment for attendance at Council and Council Committee Meetings shall be in accordance with clause 11.1-7 of the Conditions of Engagement on a cost per item basis.

8.2.2 Planning Responses & Support

The Consultant, in collaboration between their engineering and environmental teams, shall:

- Consider the submissions received as part of the consent processes, and prepare responses for the Client, including any material required in response to Requests for Further Information (RFIs) from An Coimisiún Pleanála.
- Provide any additional documentation as may be required for any Oral Hearing, if required. The Consultant shall attend at Oral Hearings and provide presentation of material and expert advice if required
- Provide any further supporting information, additional to responses to submissions and RFIs, required as part of the consent processes.

Payment for these items shall be instructed by the client as a change to the Services, and the Fee adjusted in accordance with clause 11.1-7 of the Conditions of Engagement.

8.2.3 Maritime Area Consent (MAC)

Not applicable.

8.3 Land Acquisition

The Consultant shall prepare a CPO Schedule, CPO deposit maps, orders, and notices, in accordance with [APPENDIX A: PLANNING AND CPO REQUIREMENTS](#).

The Consultant shall provide all technical and management services required to assist the Client in securing a CPO of all lands necessary (both temporarily and permanently) for implementation of the Scheme.

Payment for this work shall be instructed by the client as a change to the Services, and the Fee adjusted on a cost per item basis in accordance with clause 11.1-7 of the Conditions of Engagement

The Consultant shall prepare a Land Acquisition Report certifying that the lands contained in the CPO Schedule are necessary and sufficient for constructing the scheme, and recommending that the CPO be published.

8.4 Landowner Liaison

The Consultant shall support the Client in engaging with any affected landowners, building on their engagement in Stage I.

The Consultant shall continue to provide the duties in relation to the production of Property and Land Holding Impact Reports, and the duties in relation to addressing compensation claims and Property Arbitrations, in accordance with [SECTION 3.9](#) and [SECTION 3.9.1](#).

Support and attendance at Property Arbitrations, shall be instructed by the client as a change to the Services, and the Fee adjusted on a time and rates basis in accordance with clause 11.1-7 of the Conditions of Engagement.

8.5 Post-Consent Update & Detailed Design

The Consultant shall fully review the preliminary design of the Scheme against any planning/development and environmental consent conditions, to identify any re-design required resulting from those conditions. The Consultant shall complete any re-design required.

The Consultant shall complete the detailed design to allow tendering of the Construction Works contract(s), including structural design, detailing of architectural finishes, public realm and landscape detailing, and fixings (e.g. detailing associated with fixing cladding to a wall, interfaces between existing walls and additional structures above etc.).

Where additional surveys are required to support any re-design or detailed design, the Consultant shall specify, procure and manage this work in accordance with the requirements of [SECTION 6](#). Payment shall be in accordance with clause 11.1-7 of the Conditions of Engagement on a cost per item basis. (This shall not apply where a Consultant tendered on the basis of multiple Ground Investigation contracts).

8.5.1 Post-Consent Update and Detailed Design Workshop

During the post-consent update and detailed design process, the Consultant shall organise and attend a Technical Workshop (see [SECTION 4.9 WORKSHOPS](#)), with the purpose of:

- Informing the Client and Steering Group on the outcomes of the planning and development, and environmental, consent processes, and any attached conditions;
- Informing and facilitating input from the Client and Steering Group on any resultant re-design proposals and possible knock on impacts on other parts of the Scheme design, the Stage I Buildability Report, O&M Protocol, and CEMP;
- Co-ordinating with relevant work areas within Tipperary County Council on the Detailed Design (for example, Heritage/Architecture/Conservation Officers, Engineers, Planners, and Scientists) and with Client-appointed Project Specialists (for example, Project Archaeologist, Project Ecologist, etc.).

8.5.2 Buildability Review Workshop

The purpose of this workshop is to allow the Consultant to present the draft construction drawings and specifications to the attendees, and for the Consultant to demonstrate the buildability of their detailed design.

Attendees may include Engineers from ongoing Flood Relief Schemes, together with personnel from the OPW, Local Authority and the Consultant's design team members and others deemed appropriate. The format will be a one day workshop (see [SECTION 4.9 WORKSHOPS](#)). The workshop shall include a presentation by the Consultant on key risk items in terms of buildability/constructability and shall include a site walkover with relevant members of the Steering Group in advance of the workshop.

The Consultant shall identify any monitoring requirements for properties and structures surveyed, that they deem as being prudent to carry out during the Construction of the Scheme; the Consultant shall include such requirements, subject to the Agreement of the Steering group, in the Works Requirements Documents (WRD), including any requirement for monitoring.

The Consultant shall update the Buildability Report from Stage I to address any changes or developments in Stage II.

8.5.3 O&M Review Workshop

The purpose of this workshop is to allow the Consultant to present the construction drawings and specifications to the attendees and for the Consultant to demonstrate the feasibility of their proposed Operation and Maintenance (O&M) protocol for the Scheme following any changes made to facilitate planning conditions and the detailing process.

The Consultant shall hold a workshop with OPW Regional Engineering Staff & Mechanical Field Engineering Services and County Council Engineering staff in relation to Operation & Maintenance of the proposed scheme.

The Consultant shall update the O&M Protocol from Stage I to address any changes or developments in Stage II.

The technical pack for the O&M Review Workshop shall include the draft Stage II O&M Protocol, the draft Stage II Design Report and the draft Stage II CEMP. The pack shall be submitted a minimum of two (2) weeks in advance to enable sufficient time for attendees to review.

8.5.4 Construction Works Sequencing

The Consultant shall identify any programming and sequencing constraints that their design relies upon. The Consultant shall be responsible for the planning and co-ordination of the works programmes in compliance with EIAR and NIS requirements and constraints. This shall involve, inter alia, developing an overall detailed works programme for executing the works in

phases to comply with the EIAR and NIS and other constraints and recommending alternative phases / options to minimise disruptions to or by the works.

The Consultant shall organise and facilitate meetings with utility owners/service providers where required and shall prepare any schedule of works associated with services to be prepared for inclusion in the tender package for Contractors.

The Consultant shall identify where the planning and phasing of works may, in consultation with the Client and Steering Group, facilitate or require the use of advance works contracts to minimise risk to main contract/s. These could include (a) Invasive Species Management (b) Diversion of Utilities (over-ground and underground) (c) diversion of public lighting and (d) other. Where such advance contracts are agreed as necessary, the Consultant shall produce an enabling works programme, and their duties in specifying, managing, and procuring such works shall be instructed by the client as a change to the Services, and the Fee adjusted on a time and rates basis in accordance with clause 11.1-7 of the Conditions of Engagement.

8.5.5 Other Works Workshop

The Consultant shall identify other construction contracts or local schemes that are ongoing or in development that could impact or influence the detailed design, construction stage, or operation stage. As part of this work, the Consultant shall arrange and lead a focused Other Works Workshop (see [SECTION 4.9 WORKSHOPS](#)) with relevant bodies (such as Local Authority staff, OPW, TII, Uisce Eireann (Irish Water), other service providers, others as appropriate). The aim of this workshop shall be to assist the Consultant to identify potential construction constraints, collaboration opportunities or benefits associated with the inclusion of additional auxiliary works to that of the flood relief scheme, which may have significant and relevant local and public benefit. Any opportunities or proposals shall be presented to the Client with associated costs.

8.5.6 Stage II Design Report

The Consultant shall support any re-design and the detailed design through populating the Design Decision Register and provision of updated Scheme documents, reports, and drawings (including the O&M Protocol, Buildability Report, CEMP, and CBA), revised from Stage I where appropriate. The document control record shall indicate where changes to documents are post-consent revisions.

The Consultant shall provide a Stage II Design Report to act as the overarching document for the Preliminary Design, post-consent design updates due to consent conditions, and the Detailed Design. It shall link to technical notes, calculation sheets, drawings, reports and specifications, which shall describe and support the overall design of the Scheme.

8.6 Construction Procurement Services

8.6.1 Contractual Commercial Risk Management Plan

To minimise and manage construction contractual and commercial risk the Consultant in preparation for the following workshop will produce a Contractual Commercial Risk Management Plan.

8.6.2 Contractual Commercial Risk Management Workshop

The purpose of this workshop is to discuss the procurement strategy to procuring the construction contract to deliver the Scheme, including the requirements of the relevant Capital Works Management Framework construction tender and contract documents, and shall:

- Set out and discuss the Contractual Commercial Management Plan;
- Inform in relation to an appropriate Construction Tender Dispute Resolution Strategy;
- Inform and facilitate input from the Client and Steering Group on the construction procurement strategy;
- Inform and facilitate input from the Client and Steering Group on the Works Requirements Documents, Bill of Quantities, Methods of Measurement, etc.
- Inform and facilitate input from the Client and Steering Group on the construction works sequencing ([SECTION 8.5.4 CONSTRUCTION WORKS SEQUENCING](#)).

8.6.3 Tender Drawings and Specifications

The Consultant, following their completion of all elements of the detailing, shall provide the Client with prescriptive construction (tender) drawings and specifications for the Scheme, including ancillary, auxiliary, and enabling works.

The Consultant shall ensure that the construction (tender) drawings incorporate and remain consistent with all outputs from Stage I, unless as amended post-consent in Stage II as set out herein, including affected landowners, buildability and O&M proposals, environmental impacts, planning conditions, design flow values, defence levels, freeboard, factors of safety values.

The Consultant shall produce construction drawings in a fully annotated format, and to a level of detail for direct inclusion in the Works Requirement Documents ([SECTION 8.6.4 CONSTRUCTION TENDER DOCUMENTS](#)).

The Consultant shall clearly flag on all drawings any requirements in relation to the geoid model (OGSM 02 or OGSM 15).

8.6.4 Construction Tender Documents

The Consultant shall prepare all construction tender documents for the Scheme, including construction drawings and specifications for one or more contracts, of which documents, drawings and specifications shall be suitable for use with the relevant Public Works Contract under the Capital Works Management Framework and suitable to issue as the tender documents. As outlined in Circular 33/06, there should be no amendments to the standard forms of contract.

The Consultant shall prepare the construction tender documents for procurement under the Public Works Contract for Civil Engineering Works Designed by the Employer (PW-CF3), i.e. representing full prescriptive design completion.

The Consultant shall produce method statements for the construction phase, taking account of the Stage II Buildability Report and proposed sequencing of the works ([SECTION 8.5.4](#)).

The Consultant shall prepare the Works Requirements Document (WRD). The WRD shall include assumptions that the Designer has made in relation to the sequencing/phasing of works, including any associated risks. Where a particular sequence/phasing of works is required this shall be explicitly stated. The WRD shall seek a Method Statement/ Flood Risk Assessment from the Contractor on closing the flood defences, including a programme. The WRD shall provide a template or outline minimum required content for programmes (fully resourced) and progress reports, which the Contractor/s shall be required to submit monthly.

The Consultant shall ensure the WRD reflect any requirements arising from the Property and Structure Condition Surveys ([SECTION 3.8](#)), to inform and indicate the likely nature of temporary and protective works required during construction, and to allow contractors to price accordingly.

The Consultant, using a Chartered Quantity Surveyor, shall prepare accurate and comprehensive Bills of Quantities in accordance with standard/approved methods of measurement, which reflect all works as described in the Works requirements.

The Consultant, using a Chartered Quantity Surveyor, shall prepare a pre-tender Estimate of Costs for the proposed works. This cost estimate shall be the basis of the calculation of Excess Percentage, in accordance with Clause 12 of the Conditions of Engagement.

8.6.5 Green Procurement

Tipperary County Council's Green Public Procurement Strategy 2024-2026 shall be followed throughout the procurement and construction process.

The Consultant shall specify low carbon construction methods and low carbon cement material in accordance with the guidance document "Annex Guidance to Public Bodies on Reducing Embodied Carbon in Cement and Concrete through Public Procurement", issued by the Minister for Enterprise, Trade and Employment and the report "Reducing Embodied Carbon in Cement and Concrete Through Public Procurement in Ireland" published by the Department of Enterprise, Trade and Employment (DETE).

The requirements for carbon cost assessment are outlined in [SECTION 7.4.5.11](#).

The following relevant documents are provided in the Information Pack.

- Circular 17/2025: Updated Green Public Procurement Instructions for Public Sector Bodies
- Tipperary County Council Green Public Procurement Strategy 2024-2026
- Annex “Public procurement guidance to promote the reduction of embodied carbon in construction”
- Report “Reducing Embodied Carbon in Cement and Concrete through Public Procurement in Ireland”

8.6.6 Construction Tender Documents Workshop

The purpose of this workshop is to discuss and address comments that the Steering Group have on the construction tender documents. The Consultant shall highlight any potential risks to the contract sum and duration and how the Consultant intends to mitigate these risks through the documents.

The Consultant shall submit the construction tender documents 4 weeks in advance of the Workshop. In advance of this submission, the Consultant shall have undertaken a complete review of the construction tender documents, ensuring the removal of all duplication, ambiguities, inconsistencies, correct references, clarity of language, etc.

The Steering Group shall return their comments within 2 weeks following the workshop. The Consultant shall address the Steering Group’s comments within 2 weeks of receipt of comments.

The Consultant shall seek final approval from the Client prior to proceeding with the tender process.

9 SCOPE OF SERVICES – STAGE III (CONSTRUCTION WORKS PROCUREMENT)

9.1 General Requirements

The Consultant shall provide the duties in relation to Sections 4 GENERAL MANAGEMENT SERVICES, 5 STAKEHOLDER & PUBLIC ENGAGEMENT, 6 CONTRACT MANAGEMENT SERVICES, 3.9.1 Property & Land Holding Impact Reports, and 7.5 ENVIRONMENTAL SERVICES, as relevant to this stage (Stage III).

The Consultant's duties with regard to the Scheme construction works procurement are set out below and in the subsequent sections.

The Consultant shall achieve a level of detail (repeated from SECTION 1.4.1 LEVEL OF DETAIL), such that their work allows for a transparent and competitive tender process that satisfies all public procurement regulation and guidance.

The Consultant shall undertake the duties described herein for this Stage within the associated Performance Period.

9.2 Tender & Procurement

The Consultant shall advertise for, through the Client's procurement services, administer, and evaluate (as part of the overall Tender Evaluation Board) tenders received, including pre-qualification procedure, if required. The approach taken shall be in line with the procurement strategy that has been approved by the Client and Steering Group.

The Client will publish all documents arising from the procurement process: for example, the Prior Information Notice (PIN), Contract Notice and tender documents, clarifications, Contract Award Notice, etc.

The Consultant shall draft a Tender Assessment Report (i.e. the Regulation 84 report, if applicable) for the Client's approval. This will outline the procurement process, setting out clearly the process followed, the selection & award criteria and tender assessment, with a clear recommendation of a preferred tenderer, based on the Most Economically Advantageous Tender in line with public procurement policies, guidelines or regulations in force at the time of said procurement.

The Consultant shall arrange for a pre contract-signing meeting to be held with the Client, Contractor, and any other relevant parties. The Consultant shall minute this meeting, agree the minutes with the attendees and append the agreed minutes (together with any other post-tender communications/clarifications) to the contract documents.

9.3 Construction Contract Documents

The Consultant shall prepare all construction contract documents for approval by the Client and Steering Group. As outlined in the Capital Works Management Framework, the construction contract documents shall include, but not be limited to, the following:

- Works Requirements (Volume A)
- The Contractor's completed Form of Tender & Schedule (Volume B),
- Works Proposals (if any) identified in the Schedule
- Completed Pricing Document (Volume C)
- Any novated documents (Volume D)
- Standard Contract Conditions
- Letter of Acceptance.

The Consultant shall be responsible for identifying and incorporating any changes that may have arisen during the tender process, including:

- Changes as a result of tender clarifications,
- Change of land use,
- Change of ground conditions
- Changes in landowners, and,
- Additional services.

In doing so, the Client shall consider whether any changes are substantial such that a new procurement procedure would be required under public procurement legislation. For the purpose of this Project Brief, it shall be assumed that this will not arise.

9.4 Post-tender Services

The Consultant shall update the Cost Benefit Analysis Report in light of updated scheme and / or tenders received (Changes should only affect costs and ultimately the benefit/cost ratio). The financial governance of all stages of this Project shall be required to align with the requirements of the Infrastructure Guidelines and the Capital Works Management Framework. Methodology and outputs relating to project budgets, financial appraisals, cost-benefit analyses and MCA must align, and be compatible, with the Infrastructure Guidelines, except where explicitly stated otherwise. Having regard to the potential for different funding sources for different elements of the project, the Consultant shall differentiate budget estimates between core, functional flood-defence elements of the Project, and non-core elements of the Project (e.g. public realm enhancements, storm-water drainage infrastructure, etc.), as and when required and advised by the Steering Group.

The Consultant shall calculate the foreseen 'Carbon Cost' of the preferred Scheme in terms of both the tonnes of Carbon Dioxide (CO₂) that the Scheme (taking account of any amendments to the Scheme since Stage I) will generate and the financial cost of this quantity of CO₂ as detailed in [SECTION 7.4.5.11 CARBON COST ASSESSMENT](#).

9.5 Landowner Liaison

The Consultant shall support the Client and the Contractor in engaging with any affected landowners, building on their engagement in the preceding stages.

The Consultant shall continue to provide the duties in relation to the production of Property and Land Holding Impact Reports, and the duties in relation to addressing compensation claims and Property Arbitrations, in accordance with [SECTIONS 3.9](#) and [3.9.1](#).

Support and attendance at Property Arbitrations, shall be instructed by the client as a change to the Services, and the Fee adjusted on a time and rates basis in accordance with clause 11.1-7 of the Conditions of Engagement.

9.6 Site Team Proposals

Prior to the commencement of Stage IV, the Consultant shall make a proposal to the Steering Group on the required site supervision team, developed to cover the expected duration of the contract. The Consultant is responsible for proposing a site team with suitable qualifications and experience appropriate to the size, scale and complexity of the scheme, but it must include named individuals for the following roles at a minimum:

- Senior Resident Engineer (full-time, minimum 8 years' experience);
- Resident Engineer (full-time minimum 5 years' experience);
- Assistant Resident Engineer (full-time, minimum 3 years' experience);
- Chartered Quantity Surveyor (full-time, minimum 5 years' experience);
- Clerk of Works. (full-time, minimum 3 years' experience);

The Consultant shall include in their total tendered sum all overheads and costs associated with the engagement, appointment, management and provision by the Consultant of the site supervision team as outlined above. Their gross salaries and expenses (travel/subsistence) shall be included in the tendered percentage rate for Stages III, IV & V. Payment for the Site Team shall be in accordance with clause 11.1-7 of the Conditions of Engagement.

10 SCOPE OF SERVICES – STAGE IV (CONSTRUCTION WORKS)

10.1 General Requirements

The Consultant shall provide the duties in relation to Sections 4 GENERAL MANAGEMENT SERVICES, 5 STAKEHOLDER & PUBLIC ENGAGEMENT, 6 CONTRACT MANAGEMENT SERVICES, 3.9.1 PROPERTY & LAND HOLDING IMPACT REPORTS, and 7.5 ENVIRONMENTAL SERVICES, as relevant to this stage (Stage IV).

The OPW may, where it is expedient and in consultation with the Steering Group provide Direct Managed Contractor Services for elements of or all of the construction works; in such cases, contract management, design support, PSDP and supervision services are still required of the Consultant.

The Consultant shall achieve the following level of detail (repeated from SECTION 1.4.1 LEVEL OF DETAIL), such that their work:

- Provides rigorous management services so that construction works proceed with minimum changes to cost, minimum cause for dispute, and minimum interruption.

The requirements in relation to the Consultant's role in the construction of the Scheme are set out in detail in the sections below.

The Consultant shall undertake the duties described herein for this Stage within the associated Performance Period.

10.2 Construction Project Management Services

The Consultant shall provide the Construction Project Management Services detailed in the following sections.

10.2.1 Client's Option for Third Party Construction Project Management Services

At the start of Stage IV, before the contractor commences on site and at the Client's sole discretion, an independent third party Employer's Representative (ER) may be appointed. In this event, the Consultant will be required to liaise with the independent ER. If a third party ER is appointed:

- The Consultant's fee shall be reduced by the amount identified for the provision of an ER in accordance with clause 11.1-7 of the Conditions of Engagement.
- A fee for liaison with the third party ER for Stages IV – V shall be paid to the Consultant in accordance with clause 11.1-7 of the Conditions of Engagement.

10.2.2 Employer's Representative Services

If an independent third party Employer's Representative is not appointed, the Consultant shall undertake the role and duties of Employer's Representative in accordance with the provisions of the Public Works Contract, including site supervision of the works ([SECTION 10.2.3 SITE SUPERVISION](#)), and all associated Employer's Representatives (ER) Services.

The Consultant shall act fairly and impartially when carrying out the duties of ER and in administering the Contract.

The Consultant shall ensure that, in undertaking the role of Employer's Representative, there is a clear two-way flow of information between their office-based teams and the site supervision team. This is to ensure that, as a whole, the Consultant has a clear understanding of the works being undertaken and any issues encountered on site at first-hand, and the site supervision team fully understands the design requirements.

10.2.3 Site Supervision

The Consultant shall provide the site supervision team agreed with the Steering Group as set out in [SECTION 0](#), unless the Client enacts the provision made in [SECTION 10.2.1](#). This team shall undertake all site supervision duties on behalf of the Client in relation to the construction of the Scheme. The ER, accompanied by other members of the site supervision team as appropriate, shall attend Steering Group meetings ([SECTION 4.2](#)).

As part of the records taken on site, the site supervision team shall use geo-referenced and date-time stamped digital photographs to support their on-site activities, including but not limited to description of progress, issues on site, and evidence that may be useful to support financial administration.

The site supervision team shall make the Contractor fully aware of the geoid used (OSGM02 or OSGM15), such that all setting out on site is carried out using the correct geoid.

10.2.4 Contract Administration

The Consultant shall review and certify for payment the Contractor's invoices. If invoices are in order this certification shall be carried out within 14 days of receipt of invoice. If not in order, the Client shall be notified of this in writing within said 14 days of receipt of invoice. If, following certification, a sum is due to the Contractor, the Contractor shall then send an invoice for that sum to the Client.

The Consultant shall provide a Progress Report in advance of each Steering Group Meeting, as outlined in [SECTION 4.4](#). The financial governance of all stages of this Project shall be required to align with the requirements of the Infrastructure Guidelines and the Capital Works Management Framework. The Consultant shall report budget estimates and certification of expenditure in a format and to a level of detail such as to facilitate the Client / Steering Group in meeting the requirements the Infrastructure Guidelines and the Capital Works Management Framework.

Having regard to the potential for different funding sources for different elements of the project, the Consultant shall be required to differentiate certification of expenditure between core, functional flood-defence elements of the Project, and non-core elements of the Project (e.g. public realm enhancements, storm-water drainage infrastructure, etc.), as and when required and advised by the Steering Group.

10.2.5 Dispute Resolution

It is expected that the Consultant shall meet with the Standing Conciliator regularly. The Consultant shall be required to attend at meetings with Standing Conciliator(s) and to take the lead role in the meetings, in arguing and defending the employer's position and responding to contractor arguments and conciliators queries, and the provision of all required information to the Client in preparation for the meetings with the Project Board. Payment for the preparation and attendance at meetings with the Standing Conciliator(s) shall be instructed by the client as a change to the Services, and the Fee adjusted on a time and rates basis in accordance with clause 11.1-7 of the Conditions of Engagement.

The Consultant, in their capacity as Employer's Representative, shall undertake the lead role in the management of all conciliation/arbitration processes carried out in accordance with the provisions of the relevant construction works contract and its clauses. This shall include preparation of the employer's statement for the conciliator, provision of all required information to the client in preparation for the conciliation/arbitration hearings, attending at conciliation/arbitration meetings, and taking the lead role in the meetings/hearings in arguing and defending the employer's position and responding to contractor arguments and conciliators queries. The RE staff, as appropriate, shall support the Consultant as required (this will be a reimbursable cost).

10.3 Other Construction Stage Services

10.3.1 Pre-Commencement Construction Methodology Workshop

On commencement of Stage IV – Construction Stage, before works progress, the Consultant shall arrange and facilitate a workshop with the Contractor and Local Authority to review the proposed constructions methodologies and identify all auxiliary works e.g. reinstatement of roads that may require joint action with the Local Authority, including any potential additional auxiliary works that may have significant and relevant local and public benefit, or any value engineering proposals which the Contractor may propose. The Client may also request the attendance of relevant Local Authority colleagues and OPW personnel at the workshop, however attendance shall be prior agreed through steering group meetings.

The Consultant shall present in detail any opportunities, such as value engineering, identified to the Client and funding authority, accompanied by associated cost estimates.

10.3.2 Specialist Monitoring Services

If specified in the EIAR, the CEMP, or Planning Conditions/Development Consent Conditions, or if deemed appropriate by the Steering Group, the Client shall engage specialist consultants e.g. Archaeologists, Ecologists, Heritage or Conservation specialists, Environmental Monitoring Consultants, etc. to manage and oversee the implementation of any environmental requirements during construction. Where such specialist consultants are required, they will be specified, procured and managed by the Consultant in accordance with [SECTION 6 CONTRACT MANAGEMENT SERVICES](#), with the cost of the approved additional specialist consultants (i.e. the third party fees) paid for by the Client.

The Consultant shall fully brief the specialist consultants in the monitoring requirements as required under the consents and as set out in the environmental reporting and CEMP.

10.3.3 Design Support for Construction Stage

The Consultant shall review any design-changes requested by the Contractor due to unforeseen conditions encountered on site, and shall make recommendations on whether such changes are appropriate to the Client. Where it is accepted that a change is required, payment for any such re-design shall be instructed by the client as a change to the Services, and the Fee adjusted on a time and rates basis in accordance with clause 11.1-7 of the Conditions of Engagement.

The Consultant shall populate the Design Decision Register in Stage IV to record any changes to the detailed design, supported by technical notes, reports, specifications and drawings as appropriate.

The Consultant shall review all M&E proposals by the Contractor and confirm that they are in accordance with the agreed design and requirements of the Policy for Fixed Mechanical Installations and Equipment on OPW-funded Flood Relief Schemes ([APPENDIX E: POLICY – FIXED MECHANICAL INSTALLATIONS AND EQUIPMENT ON OPW-FUNDED FLOOD RELIEF SCHEMES](#)).

During construction, the Consultant shall provide advice to the Client as regards whether flood risk issues have been addressed in the Contractor's phasing of works. In doing so, the Consultant shall update the Client as regards whether the Contractor's flood event management plans are in place.

The Consultant shall provide other services as are reasonable and which may be required. This may include preparation of alternative designs and appraisal of value engineering options as requested by the Client. Payment for Value Engineering Proposals shall be instructed by the client as a change to the Services, and the Fee adjusted on a time and rates basis in accordance with clause 11.1-7 of the Conditions of Engagement.

10.3.4 Landowner Liaison

The Consultant shall support the Client and the Contractor in engaging with any affected landowners, building on their engagement in preceding Stages.

The Consultant shall continue to provide the duties in relation to the production of Property and Land Holding Impact Reports in accordance with [SECTIONS 3.9](#) and [3.9.1](#).

Support and attendance at Property Arbitrations, shall be instructed by the client as a change to the Services, and the Fee adjusted on a time and rates basis in accordance with clause 11.1-7 of the Conditions of Engagement.

10.4 Operation & Maintenance

The Consultant shall identify any Environmental Monitoring that is required to be continued post construction, having regard to commitments made in the Constructional Environmental Management Plan and environmental issues that arose during construction.

The Consultant shall update the O&M Protocol, which shall also be included in the Safety File. The Protocol shall be consistent with the findings of the Defence Asset Condition Survey and the Defence Asset Database ([SECTIONS 3.4 AND 11.7.3](#)), and shall include any additional tasks (e.g. vegetation maintenance).

10.4.1 O&M Protocol Workshop

The Consultant shall be required to provide a one (1) workshop (see [SECTION 4.9](#)) to Local Authority and OPW staff. A draft final version of the O&M Protocol Document shall be provided not less than 2 weeks in advance of this workshop (see [SECTION 7.4.7 OPERATIONS & MAINTENANCE \(O&M\)](#)). The Protocol shall be consistent with the findings of the Defence Asset Condition Survey and the Defence Asset Database ([SECTION 3.4](#)).

This O&M protocol workshop shall take place at the 75% completion mark of Stage IV, unless otherwise agreed by the Steering Group.

10.4.2 O&M Training Workshop

The Consultant shall be required to provide a one (1) day training workshop (see [SECTION 4.9](#)) to Local Authority, OPW staff including any ground crews involved in the O&M, on the operation and maintenance of the completed scheme. Additional training days may be required, if requested by the Client, and if the operation of the scheme includes flood forecasting or deployment of demountable defences. Payment for the specified quantity, and any additional quantity of training days / information days shall be in accordance with clause 11.1-7 of the Conditions of Engagement on a cost per item basis.

This training workshop shall take place BEFORE Substantial Completion of the scheme. This is to communicate to all personnel taking over the O&M of the scheme the necessary information, knowledge and training (where appropriate) on all aspect of the scheme.

10.5 Review of Red Line Mark-up Drawings

The site supervision team shall review the Contractor's red line mark-up drawings to ensure consistency with design changes and observations during site supervision.

11 SCOPE OF SERVICES – STAGE V (HANDOVER OF WORKS)

11.1 General Requirements

The Consultant shall provide the duties in relation to Sections 4 GENERAL MANAGEMENT SERVICES, 5 STAKEHOLDER & PUBLIC ENGAGEMENT, 6 CONTRACT MANAGEMENT SERVICES, and 7.5 ENVIRONMENTAL SERVICES, as relevant to this stage (Stage V).

The Consultant shall undertake as part of Stage V such studies, analyses, assessments, investigations, and other work as necessary to provide the Certificate of Substantial Completion, agree the final account with the Contractor and Client, and complete the Safety File and within the associated Performance Period. The Consultant shall follow the steps outlined in the Public Works Contract in order to issue the Certificate of Substantial Completion, once the Contractor has requested this. The Certificate of Substantial Completion will list any defects and outstanding work to be undertaken by the Contractor.

The Consultant shall achieve the following level of detail (repeated from SECTION 1.4.1 LEVEL OF DETAIL), such that their work:

- Provides confidence to the Client, Steering Group, public and stakeholders of the effective completion of the Scheme to the required Standard of Protection.

The requirements in relation to the Consultant's role in the Handover of Works are set out below.

11.2 Commissioning

The Consultant shall supervise the commissioning of the completed works including the management of any testing that might be required, including the Consultant to sign off confirming that all key planting and landscaping has been sufficiently developed.

The Consultant shall be responsible for the close out of all relevant documents ahead of project handover and shall be responsible for the handover of Safety File.

11.3 Financial Administration

The Consultant shall prepare a Financial Analysis Report. The report shall record all aspects of the expenditure on the project, including a comparison and record of the change in fees from tender submission and the reasons for it, site investigations (how outturn compared to tender/s and estimate), site supervision and in particular how construction costs compared to estimate and tender and the reasons for change, and a track of all additional works/claims through the lifetime of the project.

The Consultant shall prepare the final account(s) for the works.

The prepared report(s) shall include, but not be limited to the following;

- Summary, including Project Description, Pre-Tender Details, Post Tender Details, Finance Details including tender price, any compensation events agreed and final costs;
- Project Particulars, including Description of the Principal elements and quantities. The performance period of the Contract including commencement date, date of substantial completion and date of taking over certificate;
- Payment Certificates;
- Final Account Details, including Final Account Assessment, summary of the Contractor's claims, the ER's assessment and final outturn resulting from Employer - Contractor Agreements. Details of the Contract Sum. Compensation. Dispute Management Procedure, Outline of the dispute management procedure taken, including details of any findings &/or recommendations given. Final Outturn Cost.
- Key Contract Correspondence, including the Contractor's Tender, Letter of Acceptance, Certificate of Substantial Completion and Contractor's Final Statement.

11.4 Consultation

The Consultant shall be required to input to community education at substantial completion. As such the Consultant shall:

- Prepare and distribute an information package to all stakeholders (distribution list to be agreed at Steering Group Meeting). The package shall include, at a minimum, a summary of the final scheme layout, any operational or maintenance information of note and typical do's and don'ts associated with flood relief scheme assets e.g. restrictions on land use and livestock grazing around flood embankments.
- Prepare and make presentations to, for example, schools, community groups and communities local to the Scheme; the presentations shall be appropriate for the audience, interactive, and promote the benefits and environmental aspects of the Scheme. Payment for such presentations shall be in accordance with clause 11.1-7 of the Conditions of Engagement on a cost per item basis.

11.5 Safety File

The Consultant shall provide the Safety File for review in accordance with [SECTION 4.10.7](#).

11.6 Landowner Liaison

The Consultant shall support the Client and the Contractor in engaging with any affected landowners, building on their engagement in preceding Stages.

The Consultant shall continue to provide the duties in relation to the production of Property and Land Holding Impact Reports, and the duties in relation to addressing compensation claims and Property Arbitrations, in accordance with [SECTIONS 3.9](#) and [3.9.1. 4](#)

Support and attendance at Property Arbitrations, shall be instructed by the client as a change to the Services, and the Fee adjusted on a time and rates basis in accordance with clause 11.1-7 of the Conditions of Engagement.

11.7 As-Built Survey & Modelling

11.7.1 Survey and Modelling Requirements

Following completion of the Scheme, the Consultant shall specify and manage topographical surveys, in accordance with [SECTION 6](#), to capture the topographical survey data as necessary to reflect the changed physical conditions with the Scheme completed and any other relevant physical changes since project commencement that may influence flood levels, flows and/or extents (referred to as the 'As-Built' conditions).

The management of such surveys is to be included in the Consultant's total tendered sum as per [SECTION 6](#) with the survey contract fees being paid by the Client.

This survey is separate to the as-built survey as generally undertaken by a Contractor.

The Consultant shall produce an 'as-built' hydraulic model using the captured survey data. In undertaking this work, the Consultant shall adhere to the requirements of [SECTION 7.3 HYDRAULIC ANALYSIS](#) as relevant to this work.

The Consultant shall run the 'as-built' hydraulic model and deliver the spatial data as detailed in [SECTION 11.10 SCHEME COMPLETION REPORT](#).

11.7.2 Provision of the 'As-built' Hydraulic Model

The Consultant shall provide all hydraulic model digital files associated with the as-built scheme in a ready-to-run condition. These files shall include, but not be limited to, calibration, verification, design run and sensitivity analysis model and results files, for the work detailed herein.

The Consultant shall facilitate the handover of the model files to the Client and OPW, and allow for a demonstration of the model(s) in a hand-over session to the Client and OPW, to include:

- A walkthrough and explanation of all final models
- Loading model files into modelling software
- Setting up model files for runs
- Running model files
- Reviewing outputs

This handover session shall be for one (1) full day, lead by the Senior Hydraulic Modeller for the Project and held in person either in the Client's office or those of the Consultant, to be decided at the discretion of the Client.

11.7.3 Update of the Defence Asset Database

The Consultant shall carry out the duties specified in [SECTION 3.4](#) in relation to the update of the Defence Asset Condition Survey and Defence Asset Database to reflect the completed Scheme. The Consultant shall ensure consistency between the DACS, DAD, O&M Protocol, and the as-built drawings, modelling and mapping.

11.7.4 Provision of As Built Drawings

The Consultant shall produce a set of as-built drawings using the 'Red Line' mark-up drawings and the as-built survey for inclusion in the Safety File.

The Consultant shall also provide GIS file of as-built scheme and O&M access lands. The GIS file shall be in compliance with the OPW FRS Engineering Spatial Data Specification (available on <https://www.gov.ie/en/publication/b15dd0-technical-specifications-and-guidance-notes/>.) and [SECTION 4.11.7 NAMING CONVENTION](#) – refer also to Table 11-1 in [SECTION 11.10 SCHEME COMPLETION REPORT](#).

11.8 Hydrometric Monitoring Recommendations

The Consultant shall prepare a Hydrometric Monitoring Report setting out recommendations as to where hydrometric monitoring stations would enable the cost-effective monitoring and validation of the performance and impact of the Scheme. The performance and impact of the Scheme shall be measured in terms of flows and/or levels as relevant to the location, within the area benefitting from the Scheme and for areas that might be impacted by changes in flows and levels up- and down-stream of the Scheme. The report shall set out the type and priority of each recommended monitoring station.

11.9 Update of Climate Change Adaptation Plan

The Consultant shall, by reference to any changes in the 'As-Built' Scheme from the Scheme as proposed during Stage I of the Project, identify whether any changes are necessary to the draft Scheme Climate Change Adaptation Plan, and shall prepare a Final Scheme Climate Change Adaptation Plan that shall set out how it may be necessary to adapt and amend the Scheme to maintain the defined Standard of Protection as the potential impacts of climate change may be realised over time.

The Consultant shall update the Carbon Cost of the Preferred Option ([SECTION 7.4.5.11](#)) to reflect the actual carbon cost of the completed project.

11.10 Scheme Completion Report

The Consultant shall, upon completion of the works, develop and provide a Scheme Completion Report. This report shall:

- Detail the Consultant's work in Stages II – V, and in particular,
- Describe the development of the Design in Stages II and subsequent to Stage II,
- Detail key decisions within the Detailed Construction Design and Construction phases,
- Detail the production of the 'As-Built' model and mapping,
- Make recommendations for hydrometric monitoring, and,
- Describe any key lessons learned during the Project.

The Scheme Completion Report (including its draft versions) shall be accompanied by the spatial data specified in the Table below.

Table 11-1; Scheme Completion Report – Spatial Data

Spatial Dataset	Condition	Scenario	AEP	GIS Spec. Ref.	Comments
Modelled River Centreline	As-built	N/A	N/A	C2.6	'As-built' to be denoted by Scheme Stage - 'File Naming - Appendices A1, B1 and C2.6 Field 5
Nodes (flow and level)	As-built	Current MRFS HEFS	All	C2.7	'As-built' to be denoted by Run Type and Scheme Stage - File Naming - Appendices A1, B1 and C2.7 Fields 5 and 6
Flood Extent	As-built	Current MRFS HEFS	All	C2.8	'As-built' to be denoted by Run Type and Scheme Stage - File Naming - Appendices A1, B1 and C2.8 Fields 7 and 10
Flood Depth	As-built	Current MRFS HEFS	All All 10%, 1%, 0.1%	N/A	Section 2.3 and App C1 of the Specification cover rasters. 'As-built' to be denoted by Run Type and Scheme Stage (File Naming -Appendix A1, File name Code - Appendix B1).
Flood Velocity	As-built	Current	All	N/A	Section 2.3 and App C1 of the Specification cover rasters. 'As-built' to be denoted by Run Type and Scheme Stage (File Naming -Appendix A1, File name Code - Appendix B1).
Flood Zone	As-built	Current	1% (and 0.5% coastal) (Zone A), 0.1% (Zone B)	C2.9	'As-built' to be denoted by Run Type and Scheme Stage - File Naming - Appendices A1, B1 and C2.9 Fields 7 and 10

Defended Area	As-built	Current	SOP	C2.11	'As-built' to be denoted by Run Type and Scheme Stage - File Naming - Appendices A1, B1 and C2.11 Fields 7 and 10
Benefitting Area	As-built	Current	SOP	C2.12	'As-built' to be denoted by Run Type and Scheme Stage - File Naming - Appendices A1, B1 and C2.12 Fields 7 and 10
Defences (as-built) (polygon, polyline, point, level)	As-built	N/A	N/A	C2.13, C2.14, C2.15, C2.16	'As-built' to be denoted by Scheme Stage - File Naming - Appendices A1, B1 and C2.13, C2.14, C2.15 Field 6, and C2.16 Field 5).
Design River Feature Level	As-built	Current	SOP	C2.21	
River Enhancement Works Design Level	As-built	Current	SOP	C2.25	
As Built Defence Level	As-built	N/A	SOP	C2.17	
Channel Maintenance Extent	As-built	N/A	N/A	C2.18	
Channel Maintenance Chainage	As-built	N/A	N/A	C2.19	
Line of River Feature	As-built	N/A	N/A	C2.20	
As Built River Feature Level	As-built	N/A	N/A	C2.22	
Dredging Area	As-built	N/A	N/A	C2.23	
River Enhancement Works	As-built	N/A	N/A	C2.24	
River Enhancement Works As Built Level	As-built	N/A	N/A	C2.26	

The Scheme Completion Report and its accompanying datasets are subject to the requirements of [SECTION 4.11 REPORTING STANDARDS & QUALITY ASSURANCE](#), in relation to reporting standards, the examination process, digital data requirements, Quality Assurance and version control.

APPENDICES

Appendix A: PLANNING AND CPO REQUIREMENTS

Appendix B: LIST OF POTENTIAL HAZARDS AND RISKS FOR FIELD INSPECTIONS

Appendix C: Guide to Procedures and Offices for Title Research

Appendix D: SPATIAL DATA

Appendix E: Policy – Fixed Mechanical Installations and Equipment on OPW-funded Flood Relief Schemes

Appendix F: Standard Abbreviations for works / defence assets for Flood Relief Schemes

Appendix G: Operation & Maintenance Protocol Document

APPENDIX A: PLANNING AND CPO REQUIREMENTS

A.1 Planning Documents Requirements

A.2 Compulsory Purchase Order (CPO) Requirements

A.3 An Coimisiún Pleanála Oral Hearing

A.1 Planning Documents Requirements

The Planning route required, under either the 2000 or 2024 Acts (as amended and associated Regulations), will depend on the extent of environmental assessment to be undertaken, as determined by EIA and AA Screening of the preferred option for each Scheme in Stage 1. It is the duty of the Consultant to make a recommendation on Planning Route for consideration and approval by the Project Steering Group (refer to [SECTION 7.4.12 PLANNING ROUTE REPORT](#) of Project Brief).

For this Project it is assumed that Part 10 and/or Section 177AE of the Planning and Development Act 2000 (as amended, and associated Regulations) apply. However, if enacted prior to submission of the application, Chapter 6 of Part 4 of the Planning and Development 2024 Act shall apply. The Planning submission will therefore be made to An Coimisiún Pleanála for approval.

The Consultant shall prepare the Planning Documentation required for Public Consultation and submission via. these planning routes as follows:

- 1) **Project Description** outlining in detail the nature and extent of the works proposed to be carried out under the scheme;
- 2) **Maps** outlining the waters and watercourses to be dealt with; the lands protected by the scheme;
- 3) **Drawings / Plans / Sections / Photos** outlining details of the designed works proposed to be carried out under the scheme.
- 4) **Environmental Assessments Screening Reports** for the proposed scheme (EIA and NIS Screening).
- 5) **Preparation, erection and removal of Site Notice(s)** pursuant to Article 81, Part 8 of the Planning and Development Regulations, 2001-2019 relating to a proposed development by a Local Authority
- 6) **Newspaper Notice –** preparation of wording for newspaper notices
- 7) **Consideration of any submissions** received from public consultation periods and preparation of a report to assist the Client in preparing the Manager's Report in accordance with Part 8
- 8) **Preparation of a briefing note** for the Manager
- 9) Environmental Impact Assessment Report
- 10) Natura Impact Statement

A.1.1.1 *Project Description*

- detailing the general objectives of the scheme
- outlines in general detail the nature and extent of works proposed to be carried out under the scheme
- Outlines in specific detail the nature and extent of works proposed to be carried out under the scheme

A.1.1.2 Maps

Since the main objective of the scheme documentation is to inform the public as to the type and extent of the works to be carried out, maps (usually A1 size) of the area are required, viz.

- a general Site Location map of the area (usually O.S. Map 1:2500 scale) on which the channels/watercourses/ lands on which works are proposed, together with the area to benefit under the scheme are marked; chainage distances along watercourses are marked for reference;
- a more detailed map(s) of the area on which the channels/watercourse/land on which works are proposed, access and future maintenance routes to be identified together with the area to benefit under the scheme are marked.

A.1.1.3 Drawings / Plans / Sections

- These comprise of drawings of existing cross and longitudinal sections of the channel / watercourses on which works are proposed together with the corresponding design sections. They also include drawings/plans of structures, etc. proposed to be constructed under the scheme. (Maximum A1 size)
- Drawings of A1 size shall be bound in an indexed drawing wallet.
- Drawings of A1 size shall also be included as A3 half scale in the bound reports
- Reports shall be printed double sided on good quality white A4 paper with a minimum of 100g/m²
- Reports and drawings shall utilise colour where this will provide for better presentation of the information portrayed

The environmental impacts of the scheme proposals are assessed as the design is progressed through Stages I, and II. A series of environmental documents will form part of the statutory planning documentation i.e. EIAR if an EIA is required, NIS if an AA is required, Stage I CEMP, other environmental documents and assessments to assess other specific sensitivities such as Wildlife Act Licence consents, Ecological Assessments, Invasive Species Management Plan, archaeological or built heritage impact assessments. Copies of all the information are to be made available to the public.

Note that on completion of Stage III, all conditions of Planning, environmental management systems and procedures, mitigating measures and monitoring requirements are compiled into a Stage III CEMP, to form part of the construction contract documents.

A.2 Compulsory Purchase Order (CPO) Requirements

CPO Requirements in accordance with the Planning and Development Acts.

The Consultant shall provide all Technical and Management Services required to assist the Client in securing a CPO of all lands necessary (both temporarily and permanently) for implementation of the approved works.

All lands required temporarily are to be reported separately for activities such as temporary diversions, service diversions, accommodation works and any short term construction operations. An assessment of impact in relation to these lands is also required.

The CPO process as outlined below will be implemented in parallel with the review and granting of Planning Permission by An Coimisiún Pleanála – in accordance with the Planning Act. However the Consultant shall note that the An Coimisiún Pleanála CPO process may extend beyond the Planning Process.

- Following completion of the EIAR and/or NIS and the determination of the final land take (to include where necessary, additional lands of environmental mitigation measures), the Consultant shall prepare the CPO deposit maps, orders, schedules and CPO notices.
- CPO deposit maps will be prepared at a scale of 1:2500.
- In addition to the deposit maps, the Consultant will prepare individual landowner maps showing the extent of the proposed CPO acquisition for every person with an interest in the lands in the CPO schedule. These maps will accompany the prescribed notice to landowners.
- Subject to Client approval, the Consultant shall prepare an Engineers Report certifying that the lands contained in the CPO Schedule are necessary and sufficient for constructing the Scheme and recommending that the CPO be published.
- The Client shall publish the CPO in accordance with Section 10 of the Local Government (No.2) Act, 1960, as substituted by Section 86 of the Housing Act, 1966, as amended by Section 6 of and the Second Schedule to the Roads Act, 1993 and as amended by the Planning and Development Acts, 2000-2024 and shall place the required CPO Documents, Drawings and supporting documentation on public display at the location(s) specified by the Client for a period not less than 6 weeks. The Consultant shall liaise with County Secretariat's office and arrange for advertisements to be placed in the nominated press (at the expense of the Client) on behalf of the Client in advance of the public display.
- The Client shall notify An Coimisiún Pleanála and consult with the prescribed statutory bodies by sending them copies of all reports and associated documents. The Consultant shall provide three hard copies and one electronic copy of the CPO documentation and associated documents for submission to An Coimisiún Pleanála for approval.
- Copies shall also be made available during the Stage II consultation period (refer also to [SECTION 4.2](#) of the Project Brief) and will be on display during the Oral Hearing (if required).

CPO Notices

Each reputed proprietor, owner and rated, other occupier, Utility companies, and/or the beneficiaries of a right of way, fishing right or other similar right of lands/property proposed to be impacted under the scheme shall be issued with a Notice detailing the type and extent of the works proposed to be carried out on their respective lands/property, access routes, along with any impact with rights associated with the property as a result of the scheme works on the particular property and any future restrictions. This Notice advises the individual mentioned therein not only of the availability for public inspection of scheme documents at certain specified locations and times in the affected area but also details the specific works to be

carried out on their lands/property. The notice shall outline in specific detail the works proposed to be carried out on individual landowners properties and includes all aspects of the works envisaged or likely to arise as a consequence of the scheme impacts.

The Notice also advises them of their entitlement to submit such observations, if any, they may wish to make concerning the scheme within one month of receipt of the Notice.

The Consultant will prepare these notices and they will then be sent to the reputed proprietor, owner, and rated or other occupier at least one week before the Stage II Public Information Session (refer to [SECTION 8 SCOPE OF SERVICES – STAGE II \(CONSENT PROCESSES & DETAILED DESIGN\)](#)). Notices shall include copies of relevant drawings, including plan layouts, Sections, property location map, benefit areas, flood extents, possible access routes for works/maintenance, works areas and property location drawings with works superimposed. Access for future maintenance work on infrastructure and/or channels along with a table of future restrictions shall be referenced in the Notices.

Post CPO Approval Requirements

Subsequent to CPO Approval being granted by An Coimisiún Pleanála, the Consultant shall prepare letters to each affected landowner on behalf of the Client as follows:

- 1) Notice to Treat
- 2) Notice to Enter

Details of the content of these letters shall be provided to the appointed Consultant.

A.3 An Coimisiún Pleanála Oral Hearing

Where required, this shall be instructed by the client as a change to the Services, and the Fee adjusted on a time and rates basis in accordance with clause 11.1-7 of the Conditions of Engagement

Refer to [SECTION 8.2.2](#) of Project Brief.

If an An Coimisiún Pleanála Oral Hearing is required for either the CPO process or Environmental Impact Assessment in accordance with the Planning and Development Regulations, the Consultant shall lead the presentation at the Oral Hearing for the Scheme.

For each Scheme, the Consultant shall prepare the précis of evidence by each key member of the engineering and environmental team to include an assessment report on each objection to each scheme made prior to and during the Oral Hearing, preparation for and attendance at pre-Oral Hearing meetings with Client's legal team and advisors, attendance at the Oral Hearing and de-brief meeting post Oral Hearing.

The Consultant shall prepare all display drawings, as agreed with the Client during the Oral Hearing process / preparations and all drawings and documentation for submission at Oral

Hearing, including a range of photographs of significant locations along the proposed route i.e. sensitive environmental areas, buildings etc.

The Consultant shall prepare a booklet of objections, which shall include, but not be restricted to the following (per individual landowner / objectors):

- Landowner CPO map and schedule
- Individual landowner objection
- Tipperary County Council response to objection
- Accommodation works drawings and schedule
- Drawing of following combination: CPO drawings and overall land holding
- Drawing of following combination: CPO drawings, overall land holding and proposed scheme
- Infrastructure proposals in vicinity of objector
- Landscape proposals in vicinity of objector
- Environmental mitigation in vicinity of objector
- Photographs of existing land holding

The Consultant shall prepare the Schedule of Commitments for submission during Oral Hearing.

The Consultant (key personnel as requested by the Client) shall attend de-briefing meeting post hearing.

The Consultant shall allow for all necessary preparations, including the preparation of briefs, evidence and incorporating review by Senior Counsel and the Client.

The Consultant shall prepare an Errata if required.

The Consultant shall prepare Closeout Report on environmental aspects of the Statutory Process and the changes/amendments/agreements made during the process.

The Consultant shall provide any additional Oral Hearing services as deemed necessary during the Project, such as workshops, mock oral hearings, judicial review. These shall be instructed by the client as a change to the Services, and the Fee adjusted on a time and rates basis in accordance with clause 11.1-7 of the Conditions of Engagement.

APPENDIX B: LIST OF POTENTIAL HAZARDS AND RISKS FOR FIELD INSPECTIONS

Set out below is a ***preliminary, non-exhaustive*** list of the potential health, safety and welfare hazards and risks for site inspections, survey supervision and other on-site activities that may be encountered by the Consultant's staff in undertaking the Project.

Hazard	Risk(s)
Working in a changing environment:	Engulfment in swampland / mud / soft sand Drowning Hypothermia Vehicle impact Open / dislodged manhole / drain covers Sudden peak flow / water release / tidal Slips, trips and falls Personal injury
Driving for work:	Tiredness / fatigue Speeding, lack of awareness Use of mobile phones Failure to wear seatbelts Carrying equipment Influence of intoxicants Non roadworthy vehicles Weather conditions: Flooding / frost / heavy rain / glare from the sun / heavy winds Medically unfit to drive Road side break down Traffic collision Weather conditions: Flooding / frost / heavy rain / glare from the sun / heavy winds Medically unfit to drive Road side break down Traffic collision
Working on or near water	Drowning Hypothermia Entrapment Personal injury from debris / submerged objects.
Exposure to plants and insects	Hogweed burns Stings Allergic reactions Anaphylactic shock Cuts Personal injury
Biological hazards	Leptospirosis (Weils Disease) Tetanus Hepatitis A Lyme disease
Loneworking	Inability to raise the alarm in the event of an emergency Person injury
Weather conditions	Exposure to weather conditions. Poor visibility. Hypothermia.

	Sun burn. Slips, trips and falls
Aggressive animals.	Infection Bites Cuts Scrapes
Needle stick injuries	Blood borne pathogens Personal injury / illness Cuts and lacerations.
Over head / fallen power lines	Electrocution
Manual Handling.	Musculoskeletal injuries. Foot / hand injuries. Cuts / bruises / abrasions. Trips and falls
Confined spaces.	Serious or fatal injuries. Entrapment. Crush injuries.
Working from boats.	Drowning Hypothermia Impact injuries Cuts / bruises / scrapes Entanglement
Use of hand tools; portable equipment; survey equipment	Obstruction Injury to others Property damage
Trains, rail crossings.	Serious or fatal injury. Property damage.
Release of contaminants	Damage to aquatic environment and water quality Personal injury
Working at heights.	Falls from heights Slips, trips and falls Personal injury Property damage
Unstable structures.	Falling material. Loose or unstable ground.
Child protection.	Inadequate training / knowledge / vetting. Allegations by young / venerable persons.
Violence and aggression.	Physical violence / aggression Verbal violence / aggression Personal injury Property damage

APPENDIX C: GUIDE TO PROCEDURES AND OFFICES FOR TITLE RESEARCH

C.1 Land Registry

Ability to abstract relevant information from maps and folios, and in particular, from the primary folios. Maps on 6" are to be regarded as Primary maps since they were registered from the Estate Map. On-line maps are helpful but boundaries are not available for all counties yet, and on-line folios do not provide the history of the property. At public counter only.

C.2 Valuation Office

Invaluable for research into unregistered lands. Research back to Griffith's Valuation shall be completed for all lands, registered or unregistered. Maps and last occupier/ratepayer are on-line, but only commercial property gives most recent occupiers since rates are no longer paid by the general public so research shall then take place in the Registry of Deeds for sales, at public counter and self-search in archive room.

C.3 Land Commission

Contains original Estate Papers with maps, vesting orders, agreements, schedules of area and original title documents with history of estate. Information on Turbary rights. Public counter usually.

C.4 Registry of Deeds

Register deeds by two methods. By Baronies and Townlands in Location Books from 1708 to 1949 and by Grantors Surname from 1708 to 1960 in Grantor's Books. From the 1960's the information is available on-line with the exception of a couple of years in the early 1970's. Grantors names can usually be got from the Valuation Office archives. Titled grantors shall also be checked under Family name, i.e.: Earl of Portarlington/Dawson. Transfers and Sales of property may be registered here but no maps are available. Public counter and self-search.

C.5 National Archives

Contains information on Crown Grants, Lodge's Record of the Rolls, Books of Survey and Distribution, Quit Rents, Lec. Conveyances, Calendar of Wills and Testamentary Indices. Many of these are available on Micro-Fiche. Registration of Wills is available in book form up to 1983 in Archives. Those that did not survive the 1922 fire are indexed by name. Self-search usually but help is available from staff.

C.6 Probate Office

Registers of Wills from 1983 onwards on-line. Approximate date of death and address is needed. Public Counter.

C.7 Companies Office

Gives names of Directors, company Secretaries and Articles of Association. Files available but most information are now on-line. Public counter.

C.8 National Library

Useful for Death notices of Family Histories in newspapers. Thom's Directory and Burke's Peerage and Burke's Irish Landed Gentry are also available here. Micro-fiche and self-search.

Copies of most of the above research can be ordered from the relevant office.

C.9 FIELD INVESTIGATIONS

Field investigations shall be carried out to:

- 1) Confirm that the boundaries as shown on the drawings correspond with that on the ground. This shall consist of a visual survey only – no instruments shall be used. Photographs shall be taken where deemed necessary.
- 2) Confirm that ownership / occupancy details sourced through searched are correct and up to date or where searches did not yield any result to seek assistance in tracing title to the property.
- 3) Agree a suitable address for service of Statutory Notices.

The Consultant shall issue advance notification of field investigations by letter (Letter of Authority) where possible. A record of all field investigations along with all correspondence relating to each property holding shall be kept on file and be made available to the Client in due course. Individual files shall be kept for each property holding.

APPENDIX D: SPATIAL DATA

D.1 Tailte Éireann Datasets

Data Name	Data Type	Data Storage Type	Projection	Date of Capture
Discovery Series 1:50,000	raster	GeoTIFF	ITM	Current Tailte Éireann versions, updated annually
1:5,000 Series	raster	GeoTIFF	ITM	Current Tailte Éireann versions, updated annually
1:5,000 Vector Mapping	vector	DXF	ITM	Current Tailte Éireann versions, updated annually
1:2,500 Vector Mapping	vector	DXF	ITM	Current Tailte Éireann versions, updated annually
1:1,000 Vector Mapping	vector	DXF	ITM	Current Tailte Éireann versions, updated annually
PRIME2				Tipperary County Council holds a copy of the Tailte Éireann PRIME-2 dataset, which is updated on an annual basis by the Local Authority, as Tailte Éireann is constantly updating and evolving the dataset. Hence, it shall not be viewed as a substitute for the preparation of maps.

D.2 Aerial Photography

Data Name	Data Type	Data Storage Type	Spatial Horizontal Resolution	Projection	Date of Capture

D.3 InterMap Dataset

Data Name	Data Source	Data Storage Type	Spatial Horizontal Resolution	Vertical Accuracy (raw data)	Projection	Geoid	Date of Capture
Intermap 5m Digital Terrain Model*	SAR	ESRI GRID	5m	± 0.7m	ING and ITM	OSGM 02	2007

* Indicates a dataset with national coverage

D.4 Digital Terrain Model Data – National CFRAM (excl. Pilots)

Data Name	Data Source	Data Storage Type	Spatial Horizontal Resolution	Vertical Accuracy (raw data)	Projection	Geoid	Date of Capture
2m Digital Surface Model	LiDAR	ESRI ASCII, TXT, ERDAS IMG, MapInfo GRD	2m	± 0.2m	ING and ITM	OSGM 02	2011 - 2012
2m Digital Terrain Model	LiDAR	ESRI ASCII, TXT, ERDAS IMG, MapInfo GRD	2m	± 0.2m	ING and ITM	OSGM 02	2011 - 2012
5m Digital Terrain Model	LiDAR	ESRI ASCII, TXT, ERDAS IMG, MapInfo GRD	5m	± 0.2m	ING and ITM	OSGM 02	2011 - 2012
10m Digital Terrain Model	LiDAR	ESRI ASCII, TXT, ERDAS IMG, MapInfo GRD	10m	± 0.2m	ING and ITM	OSGM 02	2011 - 2012

APPENDIX E: POLICY – FIXED MECHANICAL INSTALLATIONS AND EQUIPMENT ON OPW- FUNDED FLOOD RELIEF SCHEMES

This policy is with regard to Pumps, Penstocks, Sluices and any other Mechanical Installation with a moving part including all vehicles and equipment required for the operation of Flood Relief Schemes. Particularly it is with respect to Pumps and Penstocks, but in order to cover all areas the word equipment or facility is used in the Policy. It is expected that the Policy shall be implemented at design stage by the PSDP and at Construction Stage by the PSCS in Consultation with OPW Mechanical Engineering Field Services (MEFS).

E.1 Accessibility

The core issue with respect to this is that ergonomic access to the equipment is most important with regard to safe access and egress for persons inspecting and maintaining the facility. This shall mean that consideration shall be taken as to the location of the facility from the point of view of entry and exit (preferably where traffic and persons are easily excluded). Depending on the use of equipment and the requirements for maintenance and inspection of the equipment an ergonomic assessment shall be made at design stage.

E.2 Redundancy

This is where back up is required. Risk analysis shall be completed on all critical equipment to determine the likelihood of failure occurrence and the need for back-up. This shall be completed at design stage and mitigation put in place accordingly. Examples are extra pumps for the facility, space for the mobile equipment to be brought in and the electricity back up available in the event of failure.

E.3 Interoperability

Consideration must be taken of schemes where operations interact with other systems. For example sewage pumping, fresh water pumping, normal storm water systems etc.

E.4 Connectivity

Where telemetry is required with equipment the connection with the OPW Telemetry systems must be considered and planned accordingly at design stage.

E.5 Electrical Capacity

The correct design for the input capacity of transformers must fit the installation, This may require soft starts being fitted or upgrading of transformers.

E.6 Generators / Tariffs

The use of Electricity is a significant cost to the operation of equipment and design considerations need to take account of the future methods of supply. The CO2 usage of the facility also needs to be assessed and reduced if possible.

E.7 Maintainability

Whether the equipment is maintained in-house or externally by an SLA there is a huge need for this to be considered at design stage. In particular, any information provided by the manufacturer must be kept both on site and in electronic format for future reference and to design the maintenance plan for the facility. This electronic information needs to be sent to the OPW's Mechanical Engineering Field Services (MEFS) for retaining on record.

E.8 Life Cycle

Like any properly designed engineering project a life cycle cost needs to be put on all equipment. In particular, the life cycle needs to include an expected life along with disposal, recycling and replacement cycle of the equipment and facility being designed.

MEFS Contact:

East: keith.mcloughlin@opw.ie

West: johnj.kelly@opw.ie

South West: johnj.kelly@opw.ie

APPENDIX F: STANDARD ABBREVIATIONS FOR WORKS / DEFENCE ASSETS FOR FLOOD RELIEF SCHEMES

F.1 Naming Convention

The following naming convention shall be used for all works / defence assets to be used as part of Flood Relief Schemes:

CXX_FMMYYY_RB

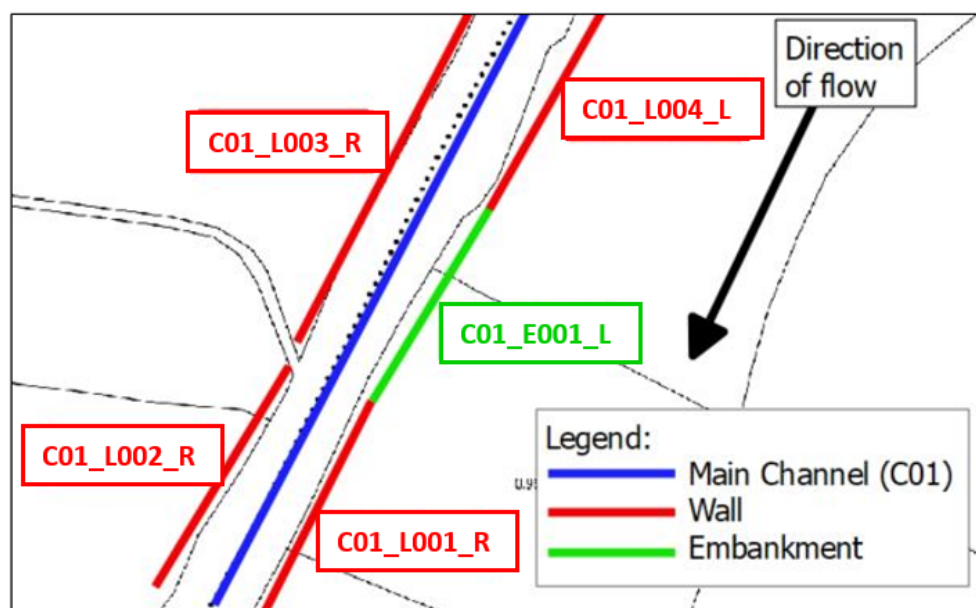
Where:

- C = Channel
- XX = The number of the channel in the scheme e.g. C01 = the main channel in the scheme
- FMM = The flood management measure which will be chosen from the Table 1
- YYY = The number of the flood management measure on the channel. The numbering goes from the downstream end ascending in the upstream direction i.e. the numbering starts at "001" for the measure furthest downstream, please see *Figure* which shows an example.
- RB = The riverbank it is on – either left or right. Therefore, either 'L' or 'R' will be used. This element is not required in the naming convention for the following: culverts, weirs, fish passes and dredging (See example 3).

For example:

- 1) The first flood wall on the right bank of the main channel of a scheme would be labelled as: **C01_L001_R**
- 2) The first flap valve on the left bank of the main channel of a scheme would be labelled as: **C01_FV001_L**
- 3) The first inline weir on the main channel of a scheme would be labelled as: **C01_W001**

Figure F.1.10 Example of flood management measure naming convention and numbering



Note:

- 000 – denotes a storage depot
- For mobile generators stored in the storage depot and transported to site, 'CXX' should be replaced with '000' i.e. a mobile generator stored offsite or in a storage depot would be: 000_GEN001

Table F.1.10 Flood Management Measures abbreviations

Flood Management Measures	Abbreviation
Bridge	B
Combined sewer	CS
Culvert	CU
Dredging	D
Demountable Barrier	DB
Duckbill Valve	DBV
Embankment	E
Fish Pass	F
Flood Gate	FG
Flap Valve	FV
Foul water sewer	FW
General Interferences	G
Generator	GEN
Glass Wall	GW
Headwall	HW
In-line valve	ILV
Kiosk	K
Walls & Buildings	L
Flood Wall with Demountable Barrier on top	LDB

Mills, Mill Weirs & Mill Races	M
Manhole	MH
Pump installations / station	P
Pump Sump Location	PL
Penstocks	PS
Rainfall Gauge	RFG
Roads / Regrading	R
Road Gullies	RG
Rising Main	RM
Security Screen	SS
Specific Maintenance Requirements*	SMR
Stormwater sewer / Surface water drainage	SW
Trash Screen	T
Water Level Gauge	WLG
Weirs	W
Fences	Z
* To be used where the performance of the scheme is dependent on specific regular maintenance e.g. removal of gravel / debris along a dredged section of channel.	

If a flood management measures is not specified above, please contact the OPW and an abbreviation will be provided.

APPENDIX G: OPERATION & MAINTENANCE PROTOCOL DOCUMENT

G.1 General

The Operation & Maintenance (O&M) protocol document for the Scheme shall be a clear and concise document that will outline the duties and responsibilities for the OPW or Local Authority or an agent (on behalf of either OPW or the Local Authority) on the scheme.

This document shall be written in clear manner, which upon reading will enable a person(s) not familiar with the design and/or construction to understand the scheme elements, along with the actions and tasks involved.

It is essential that the design of the Nenagh FRS takes account of all aspects in relation to O&M of the scheme.

The Consultant's Brief outlines the evolution of the O&M document, in the various stages;

Stage I	DESIGN O&M PROTOCOL DOCUMENT
Stage II	DETAILED DESIGN O&M PROTOCOL DOCUMENT
Stage IV	DRAFT FINAL O&M PROTOCOL DOCUMENT & DELIVER TRAINING TO RELEVANT PERSONNEL
Stage V	FINAL O&M PROTOCOL DOCUMENT

The following is an outline of what is expected for an O&M Document for a Flood Defence Scheme in County Tipperary. The Consultant shall tailor this document for the specific requirement of the Nenagh Flood Relief Scheme (FRS), i.e. not all sections in this document may be relevant or additional content may be required. An agreement on O&M Protocol document layout shall be discussed, developed and agreed with the Client and Steering Group at each relevant stage.

It is noted that the Client and the OPW have significant experience on other schemes and will assist with knowledge gained to streamline the layout of the document during its evolution.

As stated in 4.11.7 and [APPENDIX F: STANDARD ABBREVIATIONS FOR WORKS / DEFENCE ASSETS FOR FLOOD RELIEF SCHEMES](#) of the brief, the Consultant shall adhere to the OPW's naming convention for all works / defence assets to be used as part of Flood Relief Schemes. The Consultant shall also complete the OPW's standard format Flood Defence Assets Register. This naming convention and flood asset defence register shall be embedded into the O&M documentation for the scheme.

G.2 O&M Protocol Document Content

The following headings must be considered & covered as appropriate in the scheme development and the preparation of the O&M Protocol document for the Nenagh FRS. The following are initial suggested items to be covered, the document shall not be limited to the items below and shall cover the scheme in as much details as required.

G.2.1 Introduction

An executive summary of the scheme, including a short background to the scheme.

A short summary of the design criteria, design life, principles, standards and design assumptions which have been applied, with particular mention of those relevant to the O&M phase.

Overview/list of the Flood Defence elements and a summary outline of what interventions are needed.

Additional flood areas not covered by Scheme (If applicable)

The structure of the protocol document shall be discussed with the Client, OPW and Steering Group.

G.2.2 Safety and Training

The consultant shall prepare a preliminary health & safety plan for the O&M phase. A summary of this shall be included in the main body of the O&M protocol document and the full plan attached as an appendix.

Required statutory Health and Safety training shall be outlined, e.g. Manual handling, Safepass, TM, etc. Also include all elements that require specific Training, i.e. Flood gates, penstocks and other equipment.

G.2.3 Environmental Requirements

This section shall detail all environmental requirements with regard to the ongoing operation and maintenance of the scheme.

This document shall schedule the frequency and timing of the maintenance, considering all ecological sensitivities and will not prescribe maintenance that will adversely impact on protected species and habitats.

Relevant competent authority will determine if prescribed maintenance is compliant with relevant environmental legislation prior to scheduled maintenance is executed and that any required AA Screening, NIS, EclA, WFD assessment, etc. is in place.

All ongoing ecological mitigations and enhancements shall be maintained as required to maintain continued compliance requirements are being met. This document will also detail ongoing environmental monitoring requirements arising from the scheme EIAR, CEMP or other relevant environmental report.

All prescribed maintenance shall refer to “OPW Drainage Maintenance and Construction Guidance 2019” and agents of the OPW shall also refer to this guidance, and maintenance shall aim to meet this target standard or other applicable equivalent standard.

G.2.4 Details of Permanent Elements of Flood Defence Scheme

This section shall outline the permanent defence, including but not limited to:

- Walls
- Embankments
- Storm pumping stations
- Foul pumping stations
- Penstocks
- Trash Screens
- Surcharged or pressurised culvert systems
- Sump Manholes for temporary pumping
- Drainage
- Non-Return Valves
- Any alterations to 3rd party assets
- Etc.

Please note that if defence element types vary, this shall also be detailed, e.g. RC Wall, Sheet Piled Wall, Earthen embankment with sheet pile core, earthen embankment without sheet pile core, etc.

If there is any element that are a partial or secondary defence (e.g. existing wall or high ground that acts as a defence).

Any Sealed Utility/Services Chambers/Ducts and any Surcharged/Pressurised Culvert Systems within the scheme.

Trigger levels for actions shall be presented (suggested in tabular form) with timings/sequence if appropriate.

Locations of all utility provider meters (ESB meters, water meters, etc) shall be listed, along with coordinates, location drawing and photographs. Access arrangements shall also be detailed, e.g. where keys are stored &/or if the meter is behind a gate what is the access route.

G.2.5 Details of the Non-Permanent Elements of Flood Defence Scheme

This section shall outline the non-permanent elements of the scheme which are required for its successful operation. These shall include, but not limited to, where appropriate;

- Flood Forecasting System
- Demountable Defences
- Foul pumping stations and penstocks
- Tributary penstocks
- Temporary Submersible/Suction Surface Water Pumps
- Emergency generators for pumping stations

- Traffic diversions and warning signs
- etc.

If elements are required during an event such as demountable sections, mobile pumps and emergency generators, the storage and transportation of these shall also be outlined. If elements are time dependant a schedule of tasks with times of transport, erection/completion shall be included. If refuelling of items such as pumps &/or generators is required then this process shall be considered in detail e.g. frequency, filling mechanism, etc.

Access to non-permanent element storage locations shall also be considered, including distance from scheme particularly if elements of O&M are time dependent. The layout of storage facility shall be detailed.

Communicating with the public during a flood event shall also be considered and outlined, including any appropriate warning signs. If there is disruption to public access by way of pedestrian access or traffic diversions, traffic diversions and signage shall be outlined.

If mobile pumps or generators require signage or barriers in public areas (or area where the public have access) during operation these shall also be detailed and space available on the transport trailer where appropriate.

Mobile pumps or generators shall be tagged clearly to indicate the location at which they are required.

The Consultant shall make preliminary suggestions with regard to signage and barriers in advance of OPW, or their agents, carrying out their own risk assessments of the works.

All hand tools and machinery required, where appropriate, to undertake the operation and maintenance elements of the scheme shall be indicated.

G.2.6 Details of Non Flood Defence Elements

These are elements constructed and/or included as part of the scheme which may require maintenance/monitoring but do not directly affect flood defences. E.g. Bridges, fish Passes, settlement markers.

G.2.7 Ongoing Maintenance Requirements

A detailed description of all maintenance required on the scheme for both permanent and non-permanent elements. The Consultant shall describe the maintenance requirement for each element, together with each of the tasks associated with that requirement:

- Maintenance task
- Responsible authority (if agreed at the time of drafting)
- Frequency of maintenance task
- Access route and hardstanding areas for maintenance task

- Method statement for maintenance task
- Residual risks to staff while carrying out maintenance task,
- Management of materials generated as part of maintenance task,

Maintenance task tick sheets shall be provided by the Consultant in the appendices for each scheme element prompting the user for each item of checking. Required tools and machinery tick sheet shall also be provided.

The Handover Condition Survey carried out by the consultant shall be referenced in this section and it shall be inserted into the appendices.

G.2.8 Replacement and Upgrade Requirements

The Consultant shall provide a summary of the typical lifespan of individual flood management measures and scheme dependent equipment. The Consultant shall describe provisions in place to facilitate the replacement and each element as appropriate. The Consultant shall also describe provisions in place to facilitate the upgrade of elements for climate change adaptation.

G.2.9 Operational Protocols – prior to, during and after a Flood Event

This section shall clearly set out the key parties involved in the O&M of the scheme and where appropriate their statutory obligations.

This section shall clearly detail how the defences shall be operated and in which order.

These tasks to be carried out for a flood event shall be clearly detailed into the following sub-sections;

- Prior to
- During
- After

Operational task check- sheets shall be provided by the Consultant in the appendices for each scheme element prompting the user for each item of checking. Required tools and machinery tick sheet shall also be provided.

A list of critical elements to check prior to a flood event shall be noted, such as specific non-return valves that may cause flooding if not functioning correctly.

The consultant shall also provide details of the manpower and equipment requirements necessary during a flood event, and the travel and completion times, etc. for the operational and maintenance elements of the scheme. (All resources are covered in [SECTION G.2.10 ACCESS](#) below)

It is acknowledged that this section is a live document and shall be reviewed by all key parties at regular intervals (consultant to suggest interval for discussion) and after a training run, or actual flood event. This section and the operational matrices shall be updated as necessary to achieve the smooth operation of the defences as required.

G.2.10 Access

This section sets out the access arrangements for Operation and Maintenance and any restrictions that may apply.

G.2.11 Resource Requirement

This section sets out the resources both equipment and manpower required to operate and maintain the flood scheme.

It will include the list of equipment needed, in particular any specialist equipment. This equipment may be kept in a specified location or storage Depot.

If specially trained personnel are required to carry out certain tasks this shall be detailed, for example electrician, M&E contractor, etc.

G.2.12 Residual Risk

This section shall discuss the significant residual risk that remains once the scheme is put in place and any plans that shall be put in place to mitigate this risk.

Items to be considered, but not limited to;

- Potential Failure of Permanent Elements/ and or Mechanical/Electrical Parts
- Malfunction of Flood Warning System
- Failure to implement non-permanent aspects of Flood Defences
- Flood Event in excess of Design Flood Event (Overtopping of Defences)
- Future Development in the town

G.2.13 Conclusion

This section shall give a brief summary and any recommendations to keep in mind going forward.

G.2.14 Appendices

The following list of appendices has been collated from flood relief schemes that are operational at the time of writing. These schemes include various elements and not all may be applicable to all schemes.

The appendices shall include, but not limited to;

- Scheme drawings
- OPW Flood Defence Assets Register
- Operational protocol matrix
- Operational protocol – supervisor ticksheet
- Prioritisation of Post Flood Deconstruction of Elements
- Detailed Ongoing Maintenance Regime
- Flood Warning System Operational Manual
- Storage facility layout
- Handtools and other ancillary items required to operate and maintain - Supervisor ticksheet
- Outline Flood Inundation Maps for Exceedance of Design Flood Event
- Scheme Design Report
- Handover completion survey
- Historical Flood Events and Lessons Learned Log
- Invasive Species Management Plan
- Environmental reports & monitoring of relevance to the scheme
- Pumping Stations Operating and Maintenance Manual
- Glass Flood Walls Data Sheets
- Non-Return Valve Data Sheets
- Flood Gate and Flood Barriers Operating and Maintenance Manual
- Safety File Contents (NOTE: this table shall navigate the reader to the appropriate section of the safety file to access the detailed information on the constructed scheme)
- Preliminary health & safety plan for the O&M phase

G.3 O&M Protocol Document Sample Content Page

The following is a sample contents page for an O&M Protocol Document. As above, the O&M of the Nenagh FRS must be considered & covered as appropriate in the scheme development, design and construction. The following are initial suggested titles to be covered, however the document shall not be limited to the items below and shall cover the scheme in as much details as required.

INTRODUCTION

- The Scheme
- Flood Defence Elements
- What Interventions are needed
- Structure of this Document

SAFETY AND TRAINING

- Include all elements that require specific training ie flood gates, penstocks etc

- Other safety training as necessary ie manual handling, T.M. etc

ENVIRONMENTAL REQUIREMENTS

- May include environmental restrictions on the site
- Environmental monitoring requirements
- Environmental obligations

DETAILS OF THE PERMANENT ELEMENTS OF FLOOD DEFENCE SCHEME

- Introduction
- Reinforced Concrete Flood Walls
- Sheet Piled Flood Walls
- Blockwork Flood Walls
- Flood Embankments
- Glass Flood Walls
- Stormwater Pumping Stations
- Culverts and Concrete U Channel
- Non-Return Valves
- Trash Screens
- Dry and Wet Side Drainage
- Sump Manholes
- Storage Depot

DETAILS OF THE NON-PERMANENT ELEMENTS OF FLOOD DEFENCE SCHEME

- Introduction
- Floodgates
- Flood Barriers
- Temporary Surface Water Pumps
- Emergency Generators

DETAILS OF NON-FLOOD DEFENCE ELEMENTS

- E.g. Bridges, Fish Passes, which may require maintenance but not directly affect flood defences

ONGOING MAINTENANCE REQUIREMENTS

- E.g. Table of Inspection/Maintenance and timing of inspections – Monthly, Yearly, After flood event

OPERATIONAL PROCEDURES

- Introduction
- Flood Warning Trigger Levels
- Operational Protocol for Before a Flood Event

- Operational Protocol for Response to a Flood Event
- Operational Protocol after a Flood Event
- Summary of Plant and Labour Resources Required
- Maintenance Phase
- Flood Event Response

ACCESS

- Where Access is achieved for maintenance & restrictions if any.

RESOURCE REQUIREMENT

- Introduction
- Storage Depot
- Equipment
- Personnel

RESIDUAL RISK

- Introduction
- Potential Failure of Permanent Elements
- Potential Failure of Mechanical/Electrical Parts
- Failure to Implement Non-Permanent Aspects of Flood Defences
- Flood Event in Excess of Design Flood Event (Overtopping of Defences)
- Future Development within Catchment Area

TABLES

- Table 3-1: Floodgates Installed on Scheme
- Table 3-2: Flood Barriers Installed on Scheme
- Table 3-3: Additional Temporary Flood Barrier to be Constructed on Scheme
- Table 3-4: Scheme Temporary Pumping Requirements
- Table 4-1: Routine Maintenance Requirements

FIGURES

- Figure 1-1: Flood Risk Extents prior to Completion of the Flood Relief Scheme

APPENDICES

- Scheme drawings
- OPW Flood Defence Assets Register
- Operational protocol matrix
- Operational protocol – supervisor ticksheet
- Prioritisation of Post Flood Deconstruction of Elements
- Detailed Ongoing Maintenance Regime

- Flood Warning System Operational Manual
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