Appendix 5.1

Outline Construction Environmental Management Plan

Irish Water

Arklow Wastewater Treatment Plant Project

Outline Construction Environmental Management Plan

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ARUP

Contents

1 Introduction

1.1 Overview

This Outline Construction Environmental Management Plan (CEMP) has been prepared by Arup to support Irish Water's application for consent for the proposed Arklow Wastewater Treatment Plant Project (hereafter referred to as 'the proposed development'). The proposed development comprises the following:

- A new WwTP of 36,000 population equivalent (PE) and associated infrastructure including an inlet pumping station, a storm water storage tank, preliminary and secondary treatment facilities, sludge thickening and dewatering facilities, a pump sump and tank to discharge excess stormwater flows as well as site administration facilities and associated landscaping (all located at the site of the Old Wallboard factory at Ferrybank);
- Interceptor sewers along North Quay, South Quay and under the Avoca River (including associated manholes and vent stacks) that would tie in with the existing wastewater network and bring the untreated wastewater to the WwTP;
- A storm water outfall (SWO) and stormwater storage tank to the west of River Walk on a vacant site locally referred to as 'the Alps';
- A storm water overflow (SWO) pipeline (that terminates at the shoreline) to discharge excess stormwater flows to the Irish Sea;
- A long sea outfall pipe (approximately 900m in length) to discharge the treated wastewater effluent to the Irish Sea; and
- An upgrade to the existing revetment on the coastal side of the Old Wallboard site.

1.2 Purpose

The purpose of this Outline CEMP is to provide a framework that outlines how Irish Water and any contractor appointed will manage and where practicable minimise negative environmental effects during the construction of the proposed development. Construction is considered to include all site preparation, enabling works, demolition, materials delivery, materials and waste removal, construction activities and associated engineering works.

This Outline CEMP identifies the minimum requirements with regard to the appropriate mitigation, monitoring, inspection and reporting mechanisms that need to be implemented throughout construction. Compliance with this Outline CEMP does not absolve the contractor or its sub-contractors from compliance with all legislation and bylaws relating to their construction activities.

This Outline CEMP has been produced as part of the application for consent to ensure compliance with legislative requirements and the Environmental Impact Assessment Report (EIAR) that has been prepared for the proposed development.

1.3 Approach

This Outline CEMP provides a framework to:

- Describe the programme for environmental management during construction;
- Implement those monitoring and mitigation measures identified in the EIAR;
- Outline the principles and minimum standards required of the contractor during the development of the detailed CEMP (and associated Method Statements) and throughout construction;
- Identify the relevant roles and responsibilities for developing, implementing, maintaining and monitoring environmental management; and
- Outline the procedures for communicating and reporting on environmental aspects of the proposed development throughout construction.

It is intended that this Outline CEMP would be expanded and updated prior to the commencement of any construction activities on site. Irish Water, in line with its policy, is likely to procure this proposed development using a Design and Build contract.

Following appointment, the contractor will be required to develop more specific Method Statements and submit a more detailed (bespoke, contract-specific) CEMP that is cognisant of the proposed construction activities, equipment and plant usage and environmental monitoring plan for the proposed development. This Outline CEMP should not be considered a detailed Construction Method Statement as it would be the responsibility of the contractor, appointed to undertake the individual works, in association with Irish Water, to implement appropriate procedures and progress this documentation prior to commencement of construction.

This Outline CEMP outlines the range of potential types of construction methods, plant and equipment which may be used by any contractor appointed in order to enable their impacts to be assessed for the purposes of the Board's environmental impact assessment and appropriate assessment prior to determining whether to grant planning permission

1.4 Structure

This Outline CEMP has been structured as follows:

- Section 1 introduces the proposed development and outlines the purpose of the Outline CEMP;
- Section 2 describes in detail the proposed development;
- Section 3 sets outs the framework and mechanisms through which environmental requirements would be managed;
- Section 4 outlines the procedures to be employed during construction to manage environmental aspects;

- Sections 5 and 6 describe in detail the measures to be implemented to minimise likely significant negative effects, as far as practicable, during the construction of the proposed development.

1.5 Procurement and Detailed CEMP(s)

Irish Water intends to procure the detailed design and construction of the proposed development using a Design and Build contract. This form of contract has the benefit of encouraging innovation and value engineering, particularly for a project of this nature and scale, by giving the contractor ownership of both the detailed design and construction phases. Design and Build contracts traditionally also lead to shorter construction programmes. Under this form of contract the successful contractor will ultimately be responsible for the final detailed design of the proposed development, within the constraints as outlined in the EIAR.

The contractor would be required to comply with all of the performance requirements set out in the tender documentation including the statutory consent approvals which may be granted by An Bord Pleanála, Department of Housing Planning and Local Government, EPA and other statutory stakeholders.

The contractor is therefore required to prepare a more detailed CEMP for each specific package of works as required. The detailed CEMP(s) will be specific, targeted, and 'stand-alone' plan(s) developed to support the detailed design and construction methodologies established during the next phase of the proposed development. The detailed CEMP(s) will be provided to Wicklow County Council for consultation and approval in advance of any construction works on site.

The contractor is required to develop a detailed CEMP(s) that:

- Is in accordance with the mitigation measures specified in the EIAR and NIS and this Outline CEMP;
- Is in accordance with any conditions that may be prescribed as part of the consent(s) for the proposed development;
- Aligns with those design and construction details described in the EIAR and NIS ensures there is no material change in terms of significant effects on the environment; and
- Where practicable the contractor should seek to identify opportunities for further reducing significant negative environmental effects and to implement best practice in as far as reasonably practicable, i.e. take every reasonable effort to reduce and prevent negative effects, while enhancing benefits.
- Will have regard to the guidance contained in the handbook published by Construction Industry Research and Information Association (CIRIA)[1].

Further, the contractor is required to develop the following plans, and any others considered relevant, and incorporate accordingly into the detailed CEMP(s):

- Heritage Strategy;

[1] CIRIA (2015) Environmental Good Practice on Site Guide, 4th Edition

- Dredge Management Plan;
- Construction Compound Management Plan;
- Construction Traffic Management Plan;
- Noise and Vibration Management Plan;
- Water Quality Management Plan;
- Dust Management Plan;
- Construction and Demolition Waste Management Plan;
- Invasive Species Management Plan; and
- Emergency Incident Response Plan.

The detailed CEMP(s) are considered 'live' documents that will be reviewed and revised regularly as construction progresses. The process for update, review, and approval of the CEMP(s) must be documented in the detailed CEMP(s) to ensure that all revisions can be easily understood, applied and updated by Irish Water and the contractor throughout construction.

It is expected that amendments to the CEMP(s) may be necessary to reflect inter alia changes in the project scope, contract scheduling, contractor appointments, environmental management policies, practices or regulations, and developments on the site. These reviews and updates are necessary to ensure that environmental performance is subject to continual improvement and that best practice is implemented throughout construction.

2 The Proposed Development

2.1 Overview

The proposed development comprises the provision of a new Wastewater Treatment Plant (WwTP) and associated infrastructure including interceptor sewers, storm water overflow (SWO) and stormwater storage tank, long sea outfall and SWO at the WwTP and the upgrade to existing revetment. There are currently no waste water treatment facilities in Arklow town. As a result, untreated effluent is being discharged directly into the Avoca River. To rectify this problem, the proposed development is being advanced by Irish Water.

Wastewater treatment for Arklow is a requirement under both Council Directive 91/271/EEC (UWWT Directive) concerning urban waste water treatment and national legislation. The Urban Waste Water Treatment Regulations 2001-2010 requires relevant authorities to provide appropriate wastewater collection systems and treatment for agglomerations such as Arklow town. The proposed development would ensure compliance with these statutory requirements and obligations.

The primary objectives of the proposed development are as follows:

- To stop the current practice of discharging untreated wastewater to the Avoca River;
- To provide a wastewater treatment facility that will comply with all relevant legislative requirements and will service the population of Arklow into the future; and
- To improve water quality in the Avoca River.

2.2 Alps SWO and Storm Water Storage Tank

The existing SWO, located in the north-east corner of 'the Alps' development site, will be upgraded and associated site works undertaken to link with the existing network and provide storm water storage.

The scope of works for this section of the proposed development includes:

- Provision of a new online enclosed storage tank structure (approximately 26m x 7.5m x 4.5m) that would consist of reinforced concrete base, walls and roof including access covers in the roof and a non-powered static overflow screen inside the tank;
- Raising of existing ground profile by approximately 1m to accommodate the tank structure – with appropriate landscaping provided in the form of grassing above the tank and tarmac surfacing to provide vehicular access, an access gate and fencing (up to 2.4m in height);
- Provision of 40m gabion retaining wall (approximately 1.8m in height to the toe of existing embankment) in the area between the tank and access gate;

- Provision of new manholes, additional pipework and associated diversions;
- Provision of power and water supplies; and
- Abandonment of approximately 130m of sewer in this area of which approximately 80m would be left in situ and approximately 50m would be removed.

2.3 Interceptor Sewers and South Quay SWO

Interceptor sewers will be provided to the north and south of the river channel. A sewer will also be provided from the south quay to the north quay under the Avoca River (i.e. the 'river crossing'). The proposed sewers will intercept the existing network (which currently discharges untreated wastewater to the Avoca River). The interceptor sewers will join at Mill Road in order to convey untreated wastewater to the WwTP for appropriate treatment.

The scope of work for this section of the proposed development includes:

- Provision of approximately 1.1km of sewer on the southern side of the Avoca River between River Walk and South Quay (of which approximately 300m would be in the river channel);
- Provision of approximately 1km of sewer on the northern side of the Avoca River along North Quay;
- Provision of approximately 120m of tunnelled sewer under the Avoca River;
- Abandonment of approximately 590m of existing sewers; and
- Provision of SWO adjacent to South Quay (at TSS3).

2.4 WwTP

A WwTP will be provided on the site of the Old Wallboard factory on Mill Road in Ferrybank. Both preliminary and secondary treatment of the wastewater will be provided, in a bespoke, architecturally designed WwTP. The WwTP will have an ultimate capacity of 36,000PE with an initial treatment capacity of 24,000PE installed within the buildings in the first instance. The effects and impacts of the ultimate capacity of 36,000PE have been included in the EIAR and NIS.

There will be four buildings provided as part of the WwTP (illustrated in Figure 1) including:

- The Inlet Works building to the north;
- The Process building to the south-east;
- The Sludge tank enclosure to the east; and
- The Administration building to the south.

Figure 1: Proposed WwTP site layout

Incoming wastewater will enter the WwTP from the interceptor sewer network via an inlet works pumping station. From here, the wastewater will be pumped to the inlet works building where it will undergo preliminary treatment before gravitating to secondary treatment in the Process building. The treated effluent and excess storm flows will be discharged via a long sea outfall and SWO (respectively) to the Irish Sea. Excess sludge from the treatment processes will be thickened, dewatered and transported off site for further treatment and appropriate disposal.

2.5 Long Sea Outfall and SWO at WwTP

A long sea outfall and a storm water overflow will be provided at the WwTP, both discharging to the Irish Sea. The long sea outfall will discharge treated effluent and is located to the south. The SWO will discharge excess flows during significant rainfall events, which exceed the treatment and stormwater storage capacity and is located to the north. This SWO will also provide emergency relief for excess flows in the sewered catchment during extreme rainfall events and/or extended power outages.

Each of the outfalls will cross under the coastal revetment and discharge into the Irish Sea. The SWO will terminate at the shoreline and will likely comprise precast concrete, with an internal diameter of approximately 2m. A precast culvert concrete structure will be installed through the revetment to accommodate the last part of the SWO, which will terminate at the toe of the revetment, below the Mean Low Water Spring (MLWS) level. Appropriate non-return valves will be fitted to the SWO pipeline prior to the discharge point.

The long sea outfall (located to the south) will be approximately 955m in length (i.e. up to 900m from shoreline) and will likely comprise high density polyethylene (HDPE), with an internal diameter of approximately 555mm.

Six elastomeric variable orifice check valves will be provided as part of a subsurface diffuser located at the end of the long sea outfall. Appropriate aids to navigation will also be provided.

2.6 Revetment

The existing rock armour revetment adjoining the Old Wallboard Site at Ferrybank will be upgraded as part of the proposed development. The existing rock armour will be removed and subsequently replaced over a distance of approximately 350m along the coastal side of this site boundary.

The alignment of the revetment will generally follow the existing shoreline, however the curve of the central part would be slightly softened to provide additional space between the Inlet Works building and the revetment.

The revetment will consist of a double layer of rock armour of approximately 6-10 tonnes (T) on an underlayer of approximately 0.3 to 1T. The revetment will have a crest level of approximately 7.5mOD (i.e. approximately 1 to 3m above the level of the existing revetment crest) with a crest width of approximately 9 – 10m. The total width of the upgraded revetment at its base would be approximately 50m (including the toe of the revetment that is to be buried under the seabed), however this will be subject to local minor variations due to changes in ground and seabed levels.

3 Environmental Management Framework

3.1 Overview

The contract(s) awarded for the proposed development will include a requirement for the contractor to comply with relevant documentation including the EIAR, planning (and other statutory consent) conditions received, this Outline CEMP and subsequent detailed CEMP(s).

As part of the environmental management framework contractors will need to comply with all relevant environmental legislation and take account of published standards, accepted industry practice, national guidelines and codes of practice appropriate to the proposed development. Due regard should be given to the guidance and advice given by ISO14001 standard[2] and Construction Industry Research and Information Association (CIRIA) guidance[3,4,5].

The contractor will be required to develop and implement an Environmental Management System (EMS) that follows the principles of ISO14001. Further, the contractor's EMS should include an environmental policy, operational, monitoring and auditing procedures to ensure compliance with all environmental requirements and to monitor compliance with environmental legislation and the environmental management provisions outlined in the relevant documentation.

3.2 Responsibilities

3.2.1 Employer

Irish Water will be the employer responsible for ensuring that competent parties are appointed to undertake construction and that sufficient resources are made available to facilitate the appropriate management of risks to the environment.

3.2.2 Employers Representative

Irish Water and/or the Employers Representative (ER) appointed by Irish Water will be responsible for monitoring compliance with the CEMP. The ER may be required to appoint temporary or permanent specialists with appropriate skills and experience as required to implement on site procedures and monitor construction on behalf of Irish Water, i.e. competent experts in biodiversity and architecture, archaeology and heritage, noise, vibration, dust, waste, land, soils, contamination and/or water.

[2] ISO (2015) ISO 14001:2015 Environmental management systems -- Requirements with guidance for use
[3] CIRIA (2015) Environmental Good Practice on Site C692 (fourth edition) (C762)
[4] CIRIA (2015) Coastal and marine environmental site guide (second edition) (C744)
[5] CIRIA (2002) Brownfield development sites: ground-related risks for buildings (X263)

3.2.3 The Contractor

The contractor(s) appointed will be responsible for the organisation, direction and execution of environmental related activities during the detailed design and construction of the proposed development. The contractor is required to undertake all activities in accordance with the relevant environmental requirements including the consent documentation and other regulatory and contractual requirements.

3.2.4 Site Manager

A Site Manager will be appointed by the contractor to oversee the day-to-day management of working areas within the site and ensure that effective, safe, planned construction activities are delivered on an ongoing basis to the highest standards. The Site Manager will be a suitably qualified, competent and experienced professional that will oversee site logistics, communicate regularly with construction staff, accommodate project-specific inductions for staff on site and ensure that all work is compliant with the relevant design standards and health and safety legislation.

3.2.5 Environmental Manager

An Environmental Manager will be appointed by the contractor to ensure that the CEMP(s) is effectively implemented. The Environmental Manager will be a suitably qualified, competent and experienced professional that would perform the necessary tasks, review environmental procedures and consult with the members of the construction team and stakeholders as requited. The Environmental Manager would be responsible for:

- Preparing, maintaining and implementing the CEMP;
- Establishing, implementing, and maintaining the EMS in line with ISO 14001;
- Conducting regular environmental inspections and audits as specified in the contract and checking adherence to the CEMP;
- Ensuring that construction occurs in accordance with the relevant environmental requirements and that such compliance is adequately recorded and documented;
- Completing a site inspection and compiling an environmental compliance report on a monthly basis;
- Attending site and stakeholder meetings as required;
- Keeping up-to-date with relevant environmental best practice and legislative changes;
- Liaising with the relevant staff to prepare Method Statements and relevant plans for all activities where there is a risk of environmental damage;
- Having a detailed level of knowledge on all aspects of environmental information associated with the proposed development;

- Ensuring all personnel have undertaken adequate environmental inductions, awareness briefings and training (including subcontractors);
- Dealing with environmental complaints; and
- Managing and responding to environmental incidents and ensuring that all incidents are recorded and reported in an appropriate manner.

3.2.6 Environmental Specialists engaged by the Contractor

To fulfil its obligations under the CEMP and to support its Environmental Manager, the contractor will be responsible for engaging suitably qualified and experienced professionals including where necessary the following (i.e. depending on the scope of the contract) competent experts:

- Project archaeologist;
- Project ecologist;
- Project aquatic ecologist;
- Noise and vibration specialist;
- Air quality and dust specialist;
- Land, soils and contamination specialist(s); and
- Water specialist.

3.3 Communication Procedures

3.3.1 Community and Stakeholder Engagement

The contractor will take all reasonable steps to engage with stakeholders in the local community, focusing on those who may be affected by the construction works including residents, businesses, community resources and specific vulnerable groups.

Communication with the local community, Wicklow County Council and other relevant stakeholders shall be undertaken at an appropriate level and frequency throughout construction. Irish Water will establish a Communications Management Plan that will specify obligations in relation to community and stakeholder engagement that the contractor must adhere to. Where communications are related to environmental issues the Environmental Manager will be informed and engaged with, as appropriate.

3.3.2 Regular Consultation and Public Communications

The Communications Management Plan will also specify obligations in relation to regular consultation and public communications activities required during the construction of the proposed development. The contractor will facilitate regular consultation in accordance with the specifications and cooperate with this plan.

Where communications are related to environmental issues the Environmental Manager would be informed and engaged with, as appropriate.

Details of the available communication channels/points of contact for members of the public to contact the project team during construction will be established in advance of the commencement of construction and displayed around working areas.

3.3.3 Advance Notice of Works

The contractor will ensure that local residents, businesses, occupiers, general users of the area and stakeholders are informed in advance of construction activities that may affect them. Relevant obligations and procedures in relation to advance notice of works will be identified in the detailed CEMP(s) and in the Communications Management Plan.

All notifications will detail the nature, estimated duration and working hours. All notifications will include a project-specific contact number to which any enquires can be directed. The contractor will be responsible for preparing and issuing the notifications subject to the relevant approval and consents.

Irish Water and the contractor in consultation with Wicklow County Council and statutory stakeholders will decide whether to arrange any further targeted consultation with the public or relevant stakeholders in advance of specific construction activities on a local basis.

3.3.4 Contacts

An emergency contact list will be established and made available to all construction staff employed. The contact list shall be displayed prominently on site as well as at suitable locations where construction activity is being carried out around working areas. The contact list will include key environmental representatives that may need to be contacted in the event of an incident.

3.3.5 Enquiries and Complaints

The contractor would establish a process for handling all enquires including complaints. All enquires will be recorded and a log would be maintained to include details of the response and action taken. This will be available upon request for inspection to Wicklow County Council. All enquiries, whether a query or a complaint, will be dealt with in a timely manner.

The Environmental Manager will be immediately informed of any environmental-related issues that have been raised. Where appropriate, the Environmental Manager would be responsible for informing Wicklow County Council, relevant stakeholders and statutory bodies.

4 Environmental Management Procedures

4.1 Training, Awareness and Competence

The contractor (and their subcontractors) would be selected with due consideration of relevant qualifications and experience. The contractor will be required to employ construction staff with appropriate skills, qualifications and experience appropriate to the needs of the works to be carried out during construction.

A site induction will be provided to all construction staff before they commence work on site. Where appropriate, the contractor will identify specific training needs for the construction workforce and will ensure that appropriate training requirements are fulfilled.

The contractor must establish an Environmental Training and Awareness Programme and ensure that all personnel receive adequate training prior to the commencement of construction activities. A baseline level of environmental awareness will be established through the site induction programme. Key environmental considerations and objectives will be incorporated into this induction. Specifically, site inductions will cover the following as a minimum:

- Introduction to the Environmental Manager;
- Description of the CEMP(s) and consequences of non-compliance;
- The requirements of due diligence and duty of care;
- Overview of conditions of consents, permits and licences;
- Requirements associated with community engagement and stakeholder consultation;
- Identification of environmental constraints and notable features within the site; and
- Procedures associated with incident notification and reporting including procedures for dealing with damage to the environment.

Nobody will work on site without first receiving environmental induction. Signed records of environmental training will be established, maintained and made available to the Employers Representative.

Site briefings and talks would be carried out on a regular basis to ensure that construction staff have an adequate level of knowledge on environmental topics and community relations, and can effectively follow environmental control procedures throughout construction.

4.2 Meetings

Irish Water and/or the Employer's Representative will arrange regular meetings (every three months) to discuss environmental matters and ensure effective coordination to be attended by:

- Irish Water;
- The Employer's Representative;
- Contractor;
- Environmental Manager; and
- Environmental Specialists – engaged by either Irish Water and/or the contractor.

The Environmental Manager will be responsible for arranging and holding monthly meetings and site walk overs with the Employer's Representative. The Environmental Manager would develop and distribute minutes of the monthly meetings and distribute them accordingly.

4.3 Monitoring, Inspections and Audits

For the duration of the contract(s), the environmental performance of the contractor will be monitored through site inspections and audits. The programme for monitoring, inspections and audits shall be specified in the contract and it is likely to be a combination of internal inspections and independent external audits that may be either random or routine.

Records of all inspections carried out should be recorded on standard forms and all actions should be closed out in a reasonable time. The detailed CEMP(s) would include further details of inspection procedures.

4.3.1 Monitoring

Mitigation and monitoring will be carried out in accordance with the requirements of the EIAR and NIS so that construction activities are undertaken in a manner that does not give rise to significant negative effects. Suitable monitoring programmes will need to be developed, implemented, documented, and assessed (with potential follow up) in accordance with the specification outlined in the detailed CEMP(s).

The results of all environmental monitoring activities would be reviewed by the Environmental Manager on an ongoing basis to enable trends or exceedance of criteria to be identified and corrective actions to be implemented as necessary. The contractor will be required to inform the Employer's Representative of any continuous exceedances of criteria.

4.3.2 Inspections

Routine inspections of construction activities will be carried out by the Environmental Manager on a daily basis to ensure all necessary environmental measures relevant to the construction activities are being effectively implemented by construction staff, ensuring legal and contractual conformity.

More detailed inspections would be undertaken by the Environmental Manager on a weekly basis.

The weekly inspections would be appropriately documented by the Environmental Manager and copies of these records and any action required to be undertaken should be made available to the Employers Representative.

Each month one of the weekly inspections will include a review of environmental documentation and records. The monthly inspection will be recorded on a standard form and reported to the Employers Representative within five days of the inspection taking place. This standard form will address the following as a minimum:

- Summary of compliance/non-compliance with the CEMP(s);
- Results and interpretation of the monitoring programme;
- Key issues noted in inspections and/or audits;
- Summary record of non-conformities, incidents and corrective actions;
- Summary of environmental complaints and queries received in relation to environmental matters; and
- Summary record of environmental training undertaken by staff.

4.3.3 Audits

Irish Water will arrange for independent environmental audits to be carried out by a third party during construction. External audits provide the opportunity for an independent auditor to advise on compliance with applicable environmental regulatory requirements, the efficacy of the environmental management approaches used, and recommendations for reducing identified environmental risks (if considered appropriate).

Further, regulatory and statutory bodies may undertake site visits to monitor compliance with legislative and regulatory requirements. These site visits may occur randomly throughout the construction period. The contractor will facilitate these visits and the Environmental Manager will be available to provide information as required and deal with any issues that may arise during, or as a result of, these visits.

Planned and documented audits aimed at evaluating the conformance of the EMS would also be carried out by the Environmental Manager. As part of the detailed CEMP(s), the Environmental Manager will establish a schedule for internal audits and this inspection calendar will be made available to the Employer's Representative. These environmental audits will be scheduled at least once every three months.

The contractor will be required to prepare standard forms for reporting and audit items shall include but not be limited to the following activities:

- Review of environmental documentation to establish if relevant requirements are being achieved and if continual improvement is occurring;
- Site inspection and interviews with onsite personnel; and
- Reporting with recommendations.

For any environmental nonconformities found, the auditor will prepare a Corrective Actions Report to describe and record the findings of the non-conformance (Refer to Section 4.4.1.2 for further detail). The verification of previous Corrective Actions Reports should be also recorded.

Upon completion of an audit, the auditor will review all Corrective Actions Reports and prepares an Audit Report to summarise:

- Corrective action requests raised;
- Previous corrective action requests closed; and
- Observations made during the audit.

The Environmental Manager will be entitled to participate in all audits. Notwithstanding this, the Employers Representative shall produce and provide the contractor with a copy of each audit report within five working days of the audit. Each audit report will detail the findings from the auditor, specify non-conformances identified and outline the proposed corrective action.

4.4 Incident Response

4.4.1 Corrective Actions

4.4.1.1 Overview

Corrective actions are measures to be implemented to rectify any non-conformances (i.e. exceedance of criteria or targets) identified during monitoring, inspections and/or audits.

In the first instance, an investigation should be undertaken by the Environmental Manager to identify the cause of any non-conformances. Appropriate remedial measures shall be identified and implemented as soon as practicable to prevent further exceedances. If necessary, the appropriate statutory authority and stakeholders will be notified.

Where new or amended measures are proposed, the relevant CEMP(s) will be updated accordingly by the Environmental Manager and the Employer's Representative should be informed at the earliest opportunity.

4.4.1.2 Corrective Action Reports

As outlined in Section 4.3.3, a Corrective Actions Report is prepared on foot of any non-conformances identified during environmental monitoring, inspections and/or audits on site. The Corrective Actions Report will describe in detail the cause and effect of a non-conformance on site and describe the recommended corrective action that is required to remedy it.

An appropriate timeline for closing out the corrective actions will be identified by the contractor in their detailed CEMP(s) as well as arrangements for the Environmental Manager verifying the Corrective Actions Report and informing appropriate authorities and stakeholders in a timely manner.

4.4.2 Emergency Incidents

4.4.2.1 Overview

Emergency incidents are those occurrences that give rise to significant negative environmental effects including but not limited to the following:

- Any malfunction of any mitigation measure and/or environmental protection system;
- Any emission that does not comply with the requirements of the contract and relevant licences;
- Any circumstance with the potential for environmental pollution; or
- Any emergency that may give rise to environmental effects (e.g. significant spillages or fire outbreak).

4.4.2.2 Spill Control Measures

Every effort will be made to prevent pollution incidents associated with spills during the construction of the proposed development. The risk of oil/fuel spillages will exist on the site and any such incidents will require an emergency response procedure. The following steps provide the procedure to be followed in the event of an oil/fuel spill occurring on site:

- Identify and stop the source of the spill and alert people working in the vicinity;
- Notify the Environmental Manager immediately giving information on the location, type and extent of the spill so that they can take appropriate action;
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident;
- Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill;
- If possible, cover or bund off any vulnerable areas where appropriate such as drains, watercourses and/or sensitive habitats;
- If possible, clean up as much as possible using the spill control materials;
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited;
- The Environmental Manager shall inspect the site as soon as practicable and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring; and
- The Environmental Manager will notify the appropriate stakeholders such as Wicklow County Council, National Parks and Wildlife Service, Department of Communications, Climate Action and Environment and Department of Housing, Planning and Local Government and/or the EPA.

Environmental incidents are not limited to just fuel spillages. Therefore, any environmental incident must be reported, recorded and investigated in accordance with the procedures described in Sections 4.4.1 and 4.4.2.

4.4.2.3 Emergency Incident Response Plan

A set of standardised emergency response procedures will govern the management of emergency incidents. The contractor will be required to detail emergency incident response procedures in the detailed CEMP(s) and to develop an Emergency Incident Response Plan.

The Emergency Incident Response Plan will contain emergency phone numbers and the method of notifying local authorities, statutory authorities and stakeholders. Contact numbers for key personnel will also be included therein. Contractors will be required to adhere to and implement these procedures and ensure that all staff and personnel on site are familiar with the emergency arrangements.

In the case of work required in an emergency, or which if not completed would be unsafe or harmful to workers, the public or local environment, Wicklow County Council will be informed as soon as reasonably practicable of the reasons and likely duration. Examples may include: where the ground needs stabilising if unexpected ground conditions are encountered, concrete pouring taking longer than anticipated due to delayed deliveries or equipment failure.

In the event of an emergency incident occurring, the contractor will be required to investigate and provide a report including the following, as a minimum:

- A description of the incident, including location, the type and quantity of contaminant and the likely receptor(s);
- Contributory causes;
- Negative effects;
- Measures implemented to mitigate adverse effects; and
- Any recommendations to reduce the risk of similar incidents occurring.

The contractor will consult with the relevant statutory authorities, stakeholders and relevant parties such as the Health and Safety Authority, the Fire Authority, the Ambulance Service, the EPA, utilities companies and Wicklow County Council when preparing and developing response measures. Further, if any sensitive receptor is impacted, the appropriate environmental specialists will be informed and consulted with accordingly.

Any response measures will be incorporated into an updated Emergency Incident Response Plan that should be disseminated accordingly to construction staff, Irish Water and the Employer's Representative.

4.4.2.4 Emergency Access

The contractor will be required to maintain emergency access routes throughout construction and identify site access points for each working area.

This should be developed in partnership with the emergency services and documented as part of the detailed CEMP(s) and Emergency Incident Response Plan.

4.4.3 Extreme Weather Events

The contractor will consider the impacts of extreme weather events and related conditions during construction. The contractor will use a short to medium range weather forecasting service from Met Eireann or other approved meteorological data and weather forecast provider to inform short to medium term programme management, environmental control and mitigation measures.

The detailed CEMP(s) should consider all measures deemed necessary and appropriate to manage extreme weather events and should specifically cover training of personnel and prevention and monitoring arrangements for staff. As appropriate, method statements should also consider extreme weather events where risks have been identified, e.g. construction works adjacent to the Irish Sea.

4.4.4 Unexpected Discoveries

The contractor is obliged to put in place appropriate procedures to be employed in the event of encountering unexpected archaeological or cultural heritage assets or subsurface contamination during intrusive ground works.

The contractor will be required to develop appropriate procedures as part of their detail CEMP(s) and the Environmental Manager will ensure that specialists (e.g. archaeologist) are facilitated to ensure management in accordance with industry best practice and effective compliance with the relevant legislation. All unexpected discoveries will be reported to the appropriate authorities and documented in an appropriate manner.

4.5 Reporting

4.5.1 Environmental Compliance Report

The contractor will be required to submit a monthly report to the Employer's Representative for review and approval. The report shall address the following as a minimum:

- Summary of compliance with the CEMP(s) including identification of any non-conformances;
- Interpretation of the results of ongoing monitoring;
- Detailed description of any issues and/or non-conformances identified during inspections and/or audits;
- Record of incidents and corrective actions (including Corrective Actions Reports as appropriate);
- Synopsis of environmental complaints received / queries raised by stakeholders; and

- Records of environmental training undertaken (as appropriate).

4.5.2 Incident Investigation Reports

The contractor will inform the Employer's Representative of all emergency incidents immediately and prepare an initial report within 24 hours setting out the details of the incident and cause(s) if known. The contractor will be required to complete the Environmental Incident Report and any further documentation requested by the Employer's Representative in relation to the incident within 7 days of the incident occurring. The Contractor will respond to all comments made by the ER on any incident.

The Environmental Incident Report will contain details of the incident including the location, known and suspected causes and weather conditions. It will define the scale and effects (short, medium, long term, temporary/permanent) as well as required corrective actions and mitigation/ remediation/compensation measures (as appropriate).

4.6 Environmental Records

The Contractor shall maintain records of all environmental documentation including monitoring, test results, method statements and plans. All records will be kept up to date and be made available for audits, inspections and periodical reporting. The Contractor will maintain the following environmental records (as a minimum) that will be made available for inspection to the Employer's Representative and the relevant authorities, if required:

- Management Plans;
- Records of environmental incidents;
- Monthly environmental reports;
- Records of environmental training;
- Register of environmental complaints;
- Corrective Action Reports;
- Environmental inspection and audit reports;
- All monitoring data;
- Waste and chemical inventories; and
- Health and Safety records.

5 General Requirements

5.1 Overview

It is anticipated, as discussed in detail in Section 1.5, that there will be a single contract to cover all the elements of the proposed development and that the contractor will be required to prepare more detailed CEMP(s).

The contractor (and any subcontractors) will be required to comply with all of the performance requirements set out in the tender documentation including the statutory consent approvals which may be granted by An Bord Pleanála, Department of Housing Planning and Local Government, EPA and other relevant statutory consent authorities.

It is the responsibility of the contractor to ensure compliance and to avoid and/or reduce significant adverse effects that have been identified where practicable. Where the contractor diverts from the methodologies and working areas outlined herein and/or defined in the granted planning consent and associated conditions that may be granted, it would be the responsibility of the contractor to obtain the relevant licenses, permits and consents for such changes.

5.2 Good Housekeeping

The Contractor will employ a "good housekeeping" policy at all times. This will include, but not necessarily be limited to, the following requirements:

- General maintenance of working areas and cleanliness of welfare facilities and storage areas;
- Provision of site layout map showing key areas such as first aid posts, material storage, spill kits, material and waste storage, welfare facilities etc;
- Maintain all plant, material and equipment required to complete the construction work in good order, clean, and tidy;
- Keep construction compounds, access routes and designated parking areas free and clear of excess dirt, rubbish piles, scrap wood, etc. at all times;
- Details of site managers, contact numbers (including out of hours) and public information signs (including warning signs) will be provided at the boundaries of the working areas;
- Provision of adequate welfare facilities for site personnel;
- Installation of appropriate security, lighting, fencing and hoarding at each working area;
- Effective prevention of oil, grease or other objectionable matter being discharged from any working area;
- Provision of appropriate waste management at each working area and regular collections to be arranged;

- Excavated material generated during construction will be reused on site as far as practicable and surplus materials/soil shall be recovered or disposed of to a suitably authorised waste facility site;
- Effective prevention of infestation from pests or vermin including arrangements for regular disposal of food and material attractive to pests will be implemented. If infestation occurs the contractor will take appropriate action to eliminate and prevent further occurrence;
- Maintenance of wheel washing facilities and other contaminant measures as required in each working area;
- No discharge of site runoff or water discharge without agreement of the relevant authorities;
- Open fires will be prohibited at all times;
- The use of less intrusive noise alarms which meet the safety requirements, such as broadband reversing warnings, or proximity sensors to reduce the requirement for traditional reversing alarms;
- Maintenance of public rights of way, diversions and entry/ exit areas around working areas for pedestrians and cyclists where practicable and to achieve inclusive access;
- All loading and unloading of vehicles will take place off the public highway wherever this is practicable; and
- Material handling and/or stockpiling of materials, where permitted, will be appropriately located to minimise exposure to wind. Water misting or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods.

5.3 Hours of Working

5.3.1 Core Working Hours

The timing of construction activities, core working hours and the rate of progress of construction works are a balance between efficiency of construction and minimising nuisance and significant effects. The core construction working hours for the proposed development will be:

- 7am – 7pm: Monday to Friday;
- 8am – 2pm: Saturday; and
- Tunnelling works will occur 24 hours a day, 7 days a week as required.

5.3.2 Start up and shut down

The contractor may require a period of up to one hour before and one hour after core working hours for start-up and shut down activities in working areas. Activities permitted may include deliveries and unloading of materials, movement of staff to their place of work, maintenance and general preparation works. The

use of plant or machinery likely to cause disturbance, other than for tunnelling, will not be permitted outside of the core working hours.

5.3.3 Additional Working Hours

It may be necessary in exceptional circumstances to undertake certain activities outside of the construction core working hours. Any construction outside of the construction core working hours will be agreed by the contractor in advance with Wicklow County Council and scheduling of such works shall have regard to nearby sensitive receptors.

In the case of work required in an emergency or which if not completed would be unsafe or harmful to workers, the public or local environment, Wicklow County Council will be informed as soon as reasonably practicable of the reasons and likely duration and timing (outside of the core working hours).

5.4 Security

Security will be the responsibility of the contractor who will provide adequate security to prevent unauthorised entry to or exit from any working areas. The following measures may be used to prevent unauthorised access:

- Install CCTV and alarm systems where required;
- CCTV and security systems will be sited and directed so that they do not intrude into occupied residential properties;
- Provide adequate security guards and patrols;
- When there is no site activity, close and lock site gates and set appropriate site security provisions in motion;
- Consult with neighbouring properties and local crime prevention officers including Wicklow County Council and An Garda Síochána on site security matters as required; and
- Prevent access to restricted areas and neighbouring properties by securing equipment on site such as scaffolding and ladders.

5.5 Hoarding and Fencing

A site boundary in the form of hoarding or fencing will be established around each of the working areas before any significant construction activity commences in that working area. The hoarding/fencing shall be 2.4m high to provide a secure boundary to what can be a dangerous environment for those that have not received the proper training and are unfamiliar with construction operations.

Site hoarding also performs an important function in relation to minimising nuisance and effects including:

- Noise emissions (by providing a buffer);
- Visual impact (by screening the working areas, plant and equipment); and

- Dust minimisation (by providing a buffer).

The erection of hoarding would be of a similar nature to what is carried out on most construction sites. Mounting posts would be erected by using a mini-digger and the posts would be set in concrete. The size and nature of the posts and hoarding would depend on the requirements for any acoustic mitigation as well as preferences that the contractor may have. Where practicable, hoarding and fencing would be retained and re-configured and re-used between working areas as the construction activities progress.

The following measures will be applied in relation to hoarding and fencing:

- Maintenance of adequate fencing and hoardings to an acceptable condition to prevent unwanted access to working areas and provide noise attenuation, screening, and site security where required;
- Appropriate sight lines/visibility splays will be maintained around working areas to ensure safety of both vehicles and pedestrians is preserved;
- Use of different types of fencing and hoarding (e.g. mesh fence of solid hoarding including hoardings used for noise control);
- Temporary fences may be used in certain areas, such as for short term occupation of working areas;
- Display information boards with out of hours contact details, telephone helpline number (for comments/complaints) and information on the works;
- Erect notices on site boundaries to warn of hazards on site such as deep excavations, construction access, etc.;
- Ensure suitable measures for tree protection are implemented as required;
- Keep hoarding and fencing free of graffiti or posters;
- Retain existing walls, fences, hedges and earth banks as far as reasonably practicable; and
- Appropriate positioning of the fencing or hoarding to minimise the noise transmitted to nearby receptors or from plant, equipment and vehicles entering or leaving the working area.

5.6 Services and Lighting

5.6.1 Services and Utilities

Site services shall be installed as part of the enabling works in parallel with the rearrangement and diversion of existing utilities. Working areas will be powered by mains supplies or diesel generators where an electrical supply is not available.

The contractor will be responsible for undertaking their own surveys to establish full extent of underground services prior to the commencement of construction to support any surveys already undertaken as part of early design work and statutory consent applications.

5.6.2 Lighting

Site lighting would typically be provided by tower mounted 1000W metal halide floodlights. The floodlights would be cowled and angled downwards to minimise spillage to surrounding properties. The following measures will be applied in relation to site lighting:

- Lighting will be provided with the minimum luminosity sufficient for safety and security purposes. Where practicable, precautions will be taken to avoid shadows cast by the site hoarding on surrounding footpaths, roads and amenity areas;
- Motion sensor lighting and low energy consumption fittings will be installed to reduce usage and energy consumption; and
- Lighting will be positioned and directed as not to unnecessarily intrude on adjacent buildings and land uses, ecological receptors and structures used by protected species, nor to cause distraction or confusion to passing motorists, river users or navigation lights for air or water traffic.

5.7 Welfare Facilities

Welfare facilities will be provided, as appropriate, for construction staff and site personnel such as locker rooms, toilets, showers etc. The location of these will be agreed with Wicklow County Council and identified as part of the detailed CEMP(s).

5.8 Reinstatement of Working Areas on Completion

The contractor will reinstate all working areas and access routes as work proceeds during construction. All plant, equipment, materials, temporary infrastructure and vehicles will be removed at the earliest opportunity and the surface of the ground restored as near as practicable to its original condition.

5.9 Health and Safety

The contractor would be required to ensure all relevant health and safety, fire safety and security requirements are in place prior to the commencement of construction and in accordance with relevant legislative requirements in addition to the specifications of Wicklow County Council and Irish Water.

Relevant Irish and EU health and safety legislation would be complied with at all times by all construction staff and personnel during construction. Further, contractors would also have to ensure that all aspects of their works comply with good industry practice and all necessary consents, licences and authorisations that have been put in place for the proposed development.

6 Environmental Management

This section describes the specific environmental requirements identified as part of the specimen design and EIAR and NIS that will need to be adhered to by the contractor.

It should be noted that Sections 6.1 - 6.13 provides a summary of minimum requirements that should be built upon by the contractor when developing the detailed CEMP(s). It is intended that the measures set out herein will be discussed in more detail with relevant stakeholders as required in order to support the identification of any additional measures to be taken account of during construction.

6.1 Traffic and Transportation

The contractor is required to implement the following measures in relation to traffic and transportation during construction:

- All trucks entering and exiting the site will be covered with tarpaulin;
- Adequate parking will be provided to avoid queuing at the site entrances and prevent disruption to neighbouring businesses. Construction vehicles will not be allowed to park on the public road either outside the site or on any of the approach roads leading to the site;
- All trucks entering the site will be restricted to suitable speed limits and will be directed to the relevant area by the Site Manager;
- Trucks required to wait on site will switch off engines to avoid unnecessary fuel usage and noise;
- All trucks exiting the site will be required to pass through a wheel wash. A lance will be provided to clean down the bodies and sides of the truck prior to leaving site;
- Roads outside the site will be visually inspected on a daily basis and power swept and washed as and when required;
- All site staff including truck drivers will be required to abide by the normal rules of the road;
- The contractor shall prepare a Detailed Construction Traffic Management Plan (CTMP) covering all construction stages that takes into account other potential construction works in the area including the proposed Arklow Flood Relief Scheme. The CTMP will demonstrate how pedestrians, cyclists and motorised vehicles can pass through the works areas safely and that measures are in place which ensure traffic operates in as an efficient manner as possible;
- The CTMP will include a detailed consultation plan to deal with third party queries from both residents and retail/ commercial operators. The CTMP will require agreement with both Wicklow County Council and An Garda Síochána.

The contractor will appoint a single point of contact to facilitate the communication of the various traffic management plans and the preparation of a project specific website to aid communications would also be beneficial.

- As part of the CTMP a Mobility Management Plan will be prepared to ensure access to the site by sustainable travel modes is encouraged. The following measures will need to be considered within the Mobility Management Plan:
  - The provision of showers/ changing rooms for construction staff;
  - The provision of cycle parking for staff;
  - The promotion of car sharing among staff, including van pooling to travel between the different work sites;
- For works at North Quay, the following individual traffic management measures will be considered:
  - The works will be carried out during a quiet period of the year, possibly late summer however impacts on tourist traffic will also need to be considered.
  - The works will be carried out utilising a longer working day (16-24 hour basis), however the impact on adjacent residents would need to be considered to reduce the time North Quay needs to remain closed.
  - The junction would need to be manned during busy periods to ensure the junction operates efficiently and safely.
  - Parking in and around the junction of Ferrybank and Seaview Avenue needs to be managed and controlled by appropriately trained personnel.
- For any works to Arklow Bridge that require lane closures the following measures are suggested:
  - No scheduled lane closures will commence before 21:00 and all lane closures will be lifted by 07:00 in the morning.
  - The length of lane closure and the required working area needs to be made as small as possible to reduce the length of the shuttle system.

6.2 Air Quality and Climate

The contractor is required to implement the following measures in relation to air quality and climate during construction:

- Implementation of ‘standard mitigation’, as stated in the TII guidance[6], including the following measures:
  - Spraying of exposed earthwork activities and site haul roads during dry weather;

[6] Transport Infrastructure Ireland (TII), (formerly the National Roads Authority (NRA)) (2011). Guidelines for the Treatment of Air Quality during the Planning and Construction of National Roads Schemes. TII, Dublin, Ireland

  - Provision of wheel washes at exit points;
  - Covering of stockpiles;
  - Control of vehicle speeds, speed restrictions and vehicle access; and
  - Sweeping of hard surface roads.
- Erection of a c. 2.4m hoarding will be provided around the working areas to minimise the dispersion of dust from the working areas;
- Generators will be located away from sensitive receptors in so far as practicable;
- Stockpiles will be located as far as possible from sensitive receptors and covered and/or dampened during dry weather;
- Employee awareness is also an important way that dust may be controlled on any site. Staff training and the management of operations will ensure that all dust suppression methods are implemented and continuously inspected.
- Where asbestos is uncovered on site during construction, the ACM will be double-bagged and removed from the site by a competent contractor and disposed of in accordance with the relevant procedures and legislation.

6.3 Odour

No mitigation measures are required during the construction of the proposed development with regards to odour.

6.4 Noise and Vibration

The Noise and Vibration Management Plan (NVMP) will outline how the appointed Contractor(s) will comply with the noise criteria set out in this section and will deal specifically with construction activities in a strategic manner to remove or reduce significant noise and vibration impacts associated with the construction of the proposed development. The NVMP will detail the provision and installation of localised acoustic screens, the best practice noise measures that the appointed Contractor(s) will be required to adhere to for construction activities and the noise and vibration monitoring programme that the appointed Contractor(s) will be required to undertake during the construction works.

In addition, the appointed Contractor(s) will prepare detailed method statements addressing the likely groundborne noise and vibration levels that will be generated as a result of the construction activities once the specific details of the proposed plant items and construction methodologies are known.

Where considered necessary, structural surveys will be undertaken at sensitive receptors in close proximity to the works to establish their condition and tolerance for vibration impacts.

The contractor is required to implement the following measures in relation to noise and vibration during construction:

- The contractor will take specific noise abatement measures and comply with the recommendations of the standard[7] and the European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001 and 2016 so as to acknowledge the EC (Noise Emission by Equipment for Use Outdoors) (Amendment) Regulations 2006;
- A site representative shall be appointed to be responsible for matters relating to noise and vibration;
- Construction of temporary infrastructure (e.g. haul roads) will be with materials that minimise noise and vibration and design of haul roads will minimise reversing;
- Internal haul roads shall be well maintained;
- Unnecessary revving of engines should be avoided and equipment should be switched off when not required;
- Rubber linings shall be used in chutes and dumpers etc. to reduce noise;
- Drop heights of materials shall be minimised;
- Generators will be located away from sensitive receivers and will be enclosed;
- Careful selection of equipment, construction methods and programming with the objective of reducing noise and vibration where possible. Only equipment, including road vehicles, conforming to relevant national or international standards, directives and recommendations on noise and vibration emissions, will be used;
- Plant and vehicles shall be started sequentially rather than all together;
- Selecting electrically powered plant that is quieter than diesel or petrol-driven plant, if interchangeable;
- Fitting suitable anti-vibration mountings where practicable, to rotating and/or impacting equipment;
- Avoiding percussive piling, except where there is an overriding justification;
- Using noise-control equipment such as jackets, shrouds, hoods, and doors, and ensuring they are closed;
- Locating plant, as far as is reasonably practicable, away from receptors or as close as possible to noise barriers or hoardings where these are located between the source and receptor;
- Regular and effective maintenance by trained personnel shall be carried out to reduce noise and/or vibration from plant and machinery;
- Ensuring that all plant is maintained regularly to comply with relevant national or international standards and operation of plant and equipment that minimises noise emissions;
- Ensuring that plant is shut down when not in use;

[7] British Standards Institution (BSI) (2014) 5228-1 and 2:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites. Noise and Vibration.

- Ensuring that air lines are maintained and checked regularly to prevent leaks;
- Designing all audible warning systems and alarms to minimise noise. Non-audible warning systems can be used in preference, i.e. cab-mounted CCTV or the use of banksmen. If required, ensure that audible warning systems are switched to the minimum setting required by the Health and Safety Authority and where practicable use 'white noise' reversing alarms in place of the usual 'siren' style reversing alert
- A c. 2.4m hoarding shall be provided around construction works, including around the TBM launch site;
- Rotary drills and bursters actuated by hydraulic or electrical power will be used for excavating hard material. In some instances, chemical bursting can be used where nearby sensitive structures are particularly vulnerable to vibration from pneumatic breakers etc.;
- Handling all materials, particularly steelwork, in a manner that minimises noise. For example, storing materials as far as possible away from sensitive receptors and using resilient mats around steel handling areas;
- During construction, regular inspections will be undertaken to ensure that the noise and vibration minimising methods, plant and mitigation identified in the specimen design stage are adopted on site and are working effectively. If applicable, it is proposed that construction method inspections be integrated into any health and safety or quality surveillance regime;
- Typically, site activities shall be limited to 7am – 7pm, Monday to Friday; and 8am – 2pm, Saturday. However, during the interceptor sewer construction works, the TBM equipment (including generator) will operate on a 24-hour basis. No works are anticipated on Sundays and Bank Holidays (with the exception of tunnelling). Aside from the 24-hour use of the TBM equipment, it is anticipated that there will be times due to exceptional circumstances that construction work will be necessary outside of normal construction core working hours. Any such working hours outside the normal construction core working hours will be agreed with Wicklow County Council. The planning of such works will have regard to nearby sensitive receptors;
- A Communications Management Plan shall be prepared to provide for effective community liaison to help ensure the smooth running of construction activities and to address any issues that may arise;
- Noise monitoring should be undertaken at the start of each new activity to determine the compliance with limit values. This may involve monitoring on a daily basis initially (for the first three weeks), but subject to satisfactory results, this could be relaxed to once a week/twice-weekly depending upon the site activities. The frequency will be increased again if particularly noisy activities (such as driven piling) are undertaken;
- Continuous noise and vibration monitoring will take place at three of the nearest sensitive receptors (including Arklow Bridge). Environmental noise monitoring will be undertaken only by suitably-trained and experienced staff;

- BS 5228-1 provides an example of noise insulation and temporary rehousing policy and defines the threshold value of eligibility, this recommends a minimum number of days before a resident may be eligible. Where minimum durations of *a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive months*, are predicted, the standard[7] recommends re-housing. The contractor will outline the specific construction methodologies and agree a schedule that minimises effects on receptors. Any requirement for temporary re-housing will be confirmed by the contractor in consultation with Irish Water and the affected stakeholder. The determination for such mitigation will be made after detailed construction methodologies, phasing and detailed equipment are known. This information will be presented in the Noise and Vibration Management Plan.
- During tunnelling, the most effective pre-emptive measure that to reduce impacts is soil probing prior to tunnelling works. Probing prior to tunnelling will allow hard obstacles or rock to be identified. If encountered pre- auguring will be undertaken at these locations where hard obstacles have been identified prior to tunnelling to minimise noise and vibration impacts. Where ground conditions may be unknown, this measure will be carried out prior to tunnelling.

During the construction of the marine outfall, there is the potential for noise impacts on marine mammals. The Department of Arts, Heritage and the Gaeltacht have published guidance[8] on best practice construction mitigation measures that should be followed for construction in Irish waters.

The following summarised measures will be implemented during the construction of the marine outfall in Arklow Bay.

Pre- Drilling

- A qualified and experienced marine mammal observer (MMO) shall be appointed to monitor for marine mammals and to log all relevant events using standardised data forms.
- Drilling activity shall not commence if marine mammals are detected within a 500m radial distance of the drilling sound source, i.e., within the Monitored Zone.

Pre- Start Monitoring

Drilling activities shall only commence in daylight hours where effective visual monitoring, as performed and determined by the MMO, has been achieved. Where effective visual monitoring, as determined by the MMO, is not possible the sound-producing activities shall be postponed until effective visual monitoring is possible.

An agreed and clear on-site communication signal must be used between the MMO and the Works Superintendent as to whether the relevant activity may or

[8] Department of Arts, Heritage and the Gaeltacht (2014) *Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters* https://www.npws.ie/sites/default/files/general/Underwater%20sound%20guidance_Jan%202014.pdf.

may not proceed, or resume following a break (see below). It shall only proceed on positive confirmation with the MMO.

In waters up to 200m deep, the MMO shall conduct pre-start-up constant effort monitoring at least 30 minutes before the sound-producing activity is due to commence. Sound-producing activity shall not commence until at least 30 minutes have elapsed with no marine mammals detected within the Monitored Zone by the MMO.

This prescribed Pre-Start Monitoring shall subsequently be followed immediately by normal drilling operations. The delay between the end of Pre-Start Monitoring and the necessary full drilling output must be minimised.

Drilling

Once normal drilling operations commence, there is no requirement to halt or discontinue the activity at night-time, nor if weather or visibility conditions deteriorate nor if marine mammals occur within a 500m radial distance of the sound source, i.e., within the Monitored Zone.

Breaks in Sound Output

If there is a break in drilling sound output for a period greater than 30 minutes (e.g., due to equipment failure, shut-down or location change) then all Pre-Start Monitoring must be undertaken in accordance with the above conditions prior to the recommencement of drilling activity.

6.5 Biodiversity

The contractor is required to implement the following measures outlined in relation to biodiversity during construction:

Terrestrial biodiversity, habitats, and flora

The mitigation measures for habitats and flora aim to implement Objective NH12 of Wicklow County Development Plan 2016-2022, in the context of the ecological baseline conditions recorded within the planning boundary of the proposed development. It is noted that a Public Realm Plan will be developed as part of the proposed Arklow FRS, and that this will include tree planting along River Walk, along the South and North quays in Arklow, and at South Green. Because of this cumulative development issue, tree planting cannot be specified at these locations in respect of the proposed WwTP development. There may therefore be a short term delay in tree planting, until the FRS works are complete.

Chapter 5 of this EIAR provides for top-soiling and seeding of existing areas of Amenity grassland **GA2** within the planning boundary of the proposed development, where these are removed or damaged during the construction phase. The species listed in Table 1 are suitable for seeding in these areas, and managed as short meadow.

Table 1: Native grasses and wild flowers to be included in short and long meadow habitat

Common name	Scientific name	Habitat / management notes
Grasses		
Red Fescue	*Festuca rubra*	Dominant grass species on existing site. Common widespread species, also salt tolerant. Suitable for use in in short and long meadow habitat
Common Bent/Brown Top	*Agrostis capillaris*	Component species of wild flower seed mix
Flowering herbaceous plants for inclusion in wild flower mix. All these native species occur on site or in the Arklow coastal area, are pollinated by insects and will enhance biodiversity and habitat for bats and birds		
	Apiaceae	
Wild Carrot	*Daucus carota*	Biennial. Tolerates coastal conditions, calcareous substrate, suitable for use in long meadow habitat
	Asteraceae	
Common knapweed	*Centaurea nigra*	Perennial. Suitable for use in long meadow habitat
Hawkbit	*Leontodon spp.*	Suitable for use in short and long meadow habitat
Sea Mayweed	*Tripleurospermum maritimum*	Biennial or perennial of coastal rock, shingle and waste ground. Suitable for use in small gravel or reinforced surface with light use, or in meadow
Yarrow	*Achillea millefolium*	Perennial, suitable for use in short and long meadow habitat
Legumes; Clovers and Vetches	**Fabaceae**	
Bird's foot trefoil	*Lotus corniculatus*	Perennial. Suitable for use in short meadow habitat
Common vetch	*Vicia cracca*	Perennial. Suitable for use in long meadow habitat
Hare's-foot Clover	*Trifolium arvense*	Annual of coastal habitats. Suitable for use in small gravel or reinforced surface and in meadow
Kidney vetch	*Anthyllis vulneraria*	Perennial, coastal habitats. Suitable for use in short and long meadow habitat
Meadow vetchling	*Lathyrus pratensis*	Suitable for use in long meadow habitat
White clover	*Trifolium repens*	Suitable for use in reinforced grass surface and in short meadow habitat

Red clover	*Trifolium pratense*	Suitable for use in reinforced grass surface and in short and long meadow
Black medick	*Medicago lupulina*	Suitable for use in short and long meadow
	Lamiaceae	
Selfheal	*Prunella vulgaris*	Perennial, suitable for use in short and long meadow
	Rubiaceae	
Lady's bedstraw	*Galium verum*	Perennial of dry sandy and coastal areas, suitable for use in short and long meadow

Wildflower grassland management

Initially, sown areas will need to be monitored for germination and establishment, and any unwanted species removed manually. Subject to monitoring, mowing may not be required during the first year after seeding. After the meadow is established, the following regime is recommended:

Short meadow would generally be mown 5 times per year, with cut material removed:

- First cut after the 15 April
- Second cut at end of May
- Third cut in mid-late July (maximises growth of Clovers and other wildflowers)
- Fourth cut at the end August
- Fifth cut after mid-October.

Long meadow would be mown once a year, in late September or October, with cut material removed.

For both short and long meadow, a high cut setting of >8-10cm is recommended during mowing or strimming.

At the Alps SWO and storm water storage tank site, Honeysuckle will be planted at 2m centres along the western and eastern sides of the perimeter fence. This measure will provide shelter and habitat for insects and feeding habitat for bats at a small site where tree and shrub planting would be inappropriate. The grass and wildflower seed mix listed in Table 1 will be seeded within and adjoining the temporary construction site as part of completion works and managed initially as short meadow, to implement measures to control Buddleia are required in this area.

Landscaping around the four buildings at the WwTP site will follow a basic grid, derived from the primary geometries of the site. This grid will include hard landscaping between the buildings in addition to soft landscaping that will be planted around the site perimeter. This landscaping will be provided as part of the completion works. Planting of trees, shrubs and climbers, and seeding with the

bespoke mix of native grasses and wild flowers listed in Table 1, to to be managed as short and long meadow, will be carried out in areas agreed with the project architect Clancy Moore within the WwTP site, and also along the site road frontage where a 5m setback to be provided will allow space for planting of groups of trees and short meadow, with Honeysuckle provided at intervals along the WwTP site boundary fence. Irish native species are proposed throughout, as specified in Table 1 and Table 2 with the exception of Scot's pine for which a cultivar is likely to be more suitable for this coastal location.

Table 2: Trees, shrubs and climbers to be included in planting at the WwTP site

Common name	Scientific name	Habitat / management notes
Colonising / established trees and shrubs recommended for planting		
Silver Birch	*Betula pendula*	Requires some shelter. Birch provides light shade, suitable for under-planting with Bluebell *Hyacinthoides non-scripta*. Bluebell leaves will emerge in autumn, flowers in April and May, leaves will die back in June. Wildflower meadow species from adjoining planting will colonise. Any maintenance of herbaceous ground flora required in areas planted with Silver birch should be carried out in July and August.
Autumn Gorse	*Ulex gallii*	Tolerates exposure. Mature plants up to 0.8m tall, little management required. Not suitable for under-planting with grasses or wild flowers
Honeysuckle	*Lonicera periclymenum*	Climber, suitable for planting at intervals along the site boundary fence, may need some support until established. Little management required
Scot's pine	*Pinus sylvestris*	A cultivar, Pinus sylvestris Glauca Nana that appears to do well in coastal windy locations is recommended, it will grow to 12m in height after 20-50 years

Birds

Tree felling, removal of scrub and other tall vegetation will be carried out between 1 September and 28 February, to avoid any risk to breeding birds and their habitats.

At the WwTP site, depending on the schedule of demolition of existing buildings, the sequence of demolition works may require to be modified to take account of a small number of breeding birds that may be present within structures, in the event of works occurring from 1 March to 31 August.

Nesting boxes for the Red-listed species Grey Wagtail, and for Pied Wagtail will be provided in alternate arches of Arklow Bridge, on ledges above high water level in the existing concrete structure on the upstream side of the bridge, because existing ledges are not secure from predation, in order to provide nesting habitat for these species that feed extensively along the river channel.

Bats

A Derogation Licence No. DER/BAT 2018 – 73 has been issued.

As all bat species recorded within the planning boundary of the proposed development are protected under Annex IV of the Habitats Directive, the works to be carried out to the two southernmost arches of Arklow Bridge and their associated piers require a derogation from the National Parks and Wildlife Service of the Department of Culture, Heritage and the Gaeltacht to allow works that would create a risk to bats and would remove existing roosting options. The measures proposed will meet the requirements for protecting the bats availing of Arklow Bridge.

The measures proposed specifically for the two southernmost arches of Arklow Bridge derogation include:

- Examination of the bridge prior to works by the licensed bat specialist for evidence of bats.
- Exclusion of bats if necessary with one-way valves devised by the bat specialist.
- Capture of any bats that are still present prior to works and retention until the risk of injury or re-entry to the bridge has been removed.
- Provision of 4 x 2FR Schwegler woodcrete bat tubes for each modified arch (i.e. 12 x 2FR bat tubes). These bat boxes must be attached to the bridge in an unlit area above high-water mark.

  The boxes should be attached upright unless there is insufficient clearance above the river and the lower section would be immersed. Two boxes should be attached together to form a large cavity suitable for a large population of bats.

<u>Examination of all mature trees, and bat boxes along River Walk with roost potential prior to removal</u>

All mature trees at the Alps, along River Walk, and along the south and North quays in Arklow shall be examined for bats prior to felling. This may be achieved through a bat detector assessment if undertaken in the active season (prior to November and after March) or alternatively may require supervision at the time of felling. Any mature trees will require survey prior to felling.

All buildings within the WwTP site shall be examined for bats prior to removal. This may be achieved through a bat detector assessment if undertaken in the active season (prior to November and after March) or alternatively may require supervision at the time of removal.

<u>Lighting at the WwTP site</u>

External lighting will be installed around the WwTP for the safety and security of staff on the site. The lighting will be kept close to the buildings and only operate when there is movement. The lighting will be designed in consultation with the licenced bat expert, using emerging lighting technologies and having regard to best practice.

Mitigation for bats includes the following additional lighting considerations:

- Floodlighting is required for two of the external yards, and will be located within the building facade, and screened from broader light spillage by the louvered elements of the facade. Floodlights will be LED, as these have glass lenses which can be used to direct the light to the working area and reduce light spillage;
- Floodlights for working areas will make use of multiple lights to produce a more uniform light output and to lower the individual output from a single source – these will however still be quite high output;
- The site lighting incorporates the use of street lights to light the roadway around the building. The street lights will be selected to minimize upward lighting spill, hoods, louvres, shields or cowls would be fitted on the lights to reduce light spillage, and will incorporate the use of presence detection;
- Perimeter fence lighting will also incorporate presence detection, and will be off by default until motion is detected;
- low level (~ 1m high) bollard lighting is being used in selected areas (refer to architect's landscape plans);
- lights should be of low intensity. It is better to use several low intensity lights than one strong light spilling light across the entire area. The source of light should be Light Emitting Diodes (LEDs) as this is a narrow beam highly directional highly energy efficient light source. The lighting should allow for a light level of 3 lux at ground level. This low lighting is thus easier to control both the direction but also the actual light level because it is so close to the target area (if using bollard lighting);
- narrow spectrum lighting should be used with a low UV component. Glass also helps reduce the UV component emitted by lights.

In the event of security lighting being required, it is recommended that infra-red lighting and infra-red cameras are employed to record anti-social activity to assist in crime solving and prevention. This would not raise the visible light levels that would affect mammals and birds to a much greater extent.

Additional habitat creation measures for bats

It is envisaged that the façade of the new buildings at the WwTP will provide roosting opportunities for bats. As part of the proposed development, the appointed bat specialist shall review the buildings and advise on an appropriate location for of a purpose-built bat box such as the Improved Roost-Maternity Bat Box; likely to be located on the southern facade of both Process and Inlet works Buildings at about 4.5m off the ground. These locations will not be directly illuminated.

Marine mammals

The Contractor's Standard Management Conditions will include a requirement to consider alternative construction methodologies during the Contractor Detailed

Design Phase, including confirmation of the sound generation characteristics (in air and in water) of all methodologies and all the equipment intended to be used in coastal and marine environments (i.e. in all areas east of Arklow Harbour at South Quay), and to apply the appropriate risk minimisation measures to manage the risk to marine mammals from man-made sound sources in Irish waters. These risk minimisation measures include the following list of measures (listed on page 18 of the Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters[9]):

- A6.1. Minimise the duration over which the sound-producing activity is intended to take place;
- A6.2. Minimise the individual and cumulative sound pressure and exposure levels delivered into the environment by the activity. If necessary the use of alternative, lower impact equipment and methods could be explored (e.g., vibratory hammer, gravity base piles).
- A6.3. Incorporate the use of clear "ramp-up" (i.e., "soft-start") procedures, whereby sound energy input to the marine environment is gradually or incrementally increased from levels unlikely to cause significant behavioural impact on marine mammals to the full output necessary for completion of the activity.
- A6.4. Incorporate the use of fully enclosing or confined bubble curtains, encircling absorptive barriers (e.g., isolation casings, cofferdams) or other demonstrably effective noise reduction methods at the immediate works site, in order to reduce underwater sound propagation from on-site operations. Studies have shown that such methods can provide a significant reduction in sound input to the wider aquatic environment in the order of 10-30 dB.
- A6.5. Use trained and experienced marine mammal observers (MMOs) to provide effective means of detecting marine mammals in the vicinity of coastal and marine plans or projects. Associated operational considerations must also be taken into account (see section 4.2 of the Guidance to Manage the Risk to Marine Mammals from Man-made Sound Sources in Irish Waters).

Implementation of these measures during construction will ensure that no risks of injury to, or of a disturbance/behavioural response by marine mammals from man-made sound will arise during construction.

Aquatic ecology

It shall be a requirement of the Contract that the outline CEMP will provide the minimum requirements that the Contractor will be required to implement.

The Contractor shall submit a detailed programme of work to the client and to Inland Fisheries Ireland showing the order of procedure and the method by which

[9] Issued by the Minister for Arts, Heritage and the Gaeltacht as official guidelines and codes of practice under Regulation 71 of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011).

it is proposed to carry out the authorised works, together with a timetable for completion of such work. These works shall comply with the IFI guidance[10].

The seasonal restriction contained in the guidance has been modified in consultation with Inland Fisheries Ireland, in respect of the proposed development, to take account of the presence and seasonal passage on migration of Habitats Directive Annex II listed fish species Atlantic Salmon, River Lamprey, and potentially also Sea Lamprey in the Avoca River and Estuary. All instream works including the installation and removal of sheet piling or geotextile wrapped gabions required to provide barriers between works areas /temporary haul roads and aquatic habitats will be carried out during the three months of July to September inclusive.

The following mitigation measures will apply:

- Four weeks' notice shall be given in writing to the Employer's Representative and Inland Fisheries Ireland before the authorised works commence;
- A suitably qualified Environmental Clerk of Works shall be appointed to oversee and monitor all measures taken to protect the aquatic environment;
- The Contractor shall pay all statutory fees associated with the works;
- The Contractor shall be responsible for maintaining flows in the river at all times. The Contractor will be permitted to construct temporary haul roads in the river beside the proposed pipeline however the flow must be maintained throughout this period to enable free passage of fish. The details of the all temporary works in and immediately adjoining the Avoca River shall be subject to approval by the Employer's Representative and by Inland Fisheries Ireland;
- The Contractor shall take all practicable measures to prevent the deposition of silt or other material in, and the pollution or damage to the Avoca River;
- Any construction equipment and vehicle which in the opinion of the Employer's Representative presents a risk of affecting the Avoca River shall be removed from Site;
- Instream machine works shall be minimised, and any machines working in the watercourse must be protected against leakage or spillage of fuels, oils, greases and hydraulic fuels;
- Instream earthworks must be executed so as to minimise the suspension of solids. Construction works, especially ones involving the pouring of concrete, must be conducted in the dry;
- De-watering of any in-stream or marine sheet piled areas will be via a screened water intake pipe, to avoid injury or mortality to any fish that may be present;
- Search for and safe removal to safe waters of any fish trapped in enclosed works areas in the aquatic environment will be carried out by suitably

[10] IFI (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters

qualified and licenced personnel, using methodologies to be agreed with Inland Fisheries Ireland;

- Discharge from the dewatering process would be passed to a suitably sized settlement pond or a propriety silt removal system, before discharge to the Avoca River or the local sewer network. Back-up equipment will be required to be maintained ready for use at all works sites. Any discharge to either sewer or watercourse would be subject to a discharge licence. It is noted that the existing sewer network currently discharges untreated waters to the Avoca River;
- In order to minimise the volumes of water required to be removed from contained works areas in which in-situ cement works and/or excavation are required, works areas will be covered overnight and other periods when works are not in progress, in order to minimise infiltration of rainfall into works areas;
- To minimise the risk of spills and/or leaks, standard good practice will be followed with regard to pollution prevention as part of the appointed Contractor's detailed CEMP(s);
- All in-situ cement works will be monitored by the appointed contractor's Environmental Manager to ensure that spill prevention and remediation measures are in place, to minimise the risk and extent of spills and to rapidly deploy clean up equipment;
- Machinery maintenance work, re-fuelling of construction equipment and the addition of hydraulic oil or lubricants to vehicles / equipment will take place in designated bunded areas within the temporary construction compounds. All waste oil, empty oil containers and other hazardous wastes will be disposed of in compliance with the requirements of the Waste Management Acts 1996, as amended. All of the construction machinery operating near any watercourse will be systematically checked in order to avoid leaks of oils, hydraulic fluids and fuels; and
- Spill-kits and hydrocarbon absorbent packs will be stored in the cabin of each vehicle and operators will be fully trained in the use of this equipment.

Coastal processes

Construction of the long sea outfall will generally be restricted to the period May – September, with the period between November-February generally avoided. In this manner, the months with likely worst wave and wind conditions, which lead to higher levels of sediment suspension and transport, are avoided.

Following the precautionary principle, the installation of the diffuser, required for all methods of construction of the long sea outfall, will be scheduled to be carried out by the contractor during a period of calm weather. The contractor will have regard to weather forecasting, wave and tidal conditions.

6.6 Archaeology, Architectural and Cultural Heritage

The contractor is required to implement the following measures in relation to archaeology, architectural and cultural heritage during construction:

- All ground excavations associated with the proposed development will be monitored by a suitably qualified archaeologist. This will enable the identification of any previously unrecorded features/ deposits of archaeological significance. Full provision will be made to ensure the preservation by record of any such features, should that be deemed the most appropriate manner in which to proceed, following consultation with the DCHG;
- All archaeological works will be carried out under the supervision of a project archaeologist, appointed on behalf of Irish Water, to ensure all mitigation measures are implemented;
- All excavations associated with the outfalls and revetment upgrade, will be monitored by a suitably qualified underwater archaeologist. Works will be carried out under licence to the DCHG and full provision will be made to ensure the preservation by record of any features that may be identified, should that be deemed the most appropriate manner in which to proceed, following consultation with the DCHG;
- All excavations associated with the interceptor sewer within the river channel (and any associated underpinning works) will be monitored by a suitably qualified underwater archaeologist. Works will be carried out under licence to the DCHG and full provision will be made available to ensure the preservation by record of any features that may be identified, should that be deemed the most appropriate manner in which to proceed, following consultation with the DCHG;
- All archaeological works will be carried out under the supervision of a project archaeologist, appointed on behalf of Irish Water, to ensure all mitigation measures are implemented; and
- All works to Arklow Bridge will be carried out under the supervision of a conservation engineer. A full assessment of potential effects will be undertaken once the preferred methodology has been selected for the underpinning works. This will lead to the production of a construction method statement that will ensure the historic fabric of Arklow Bridge is maintained throughout construction.

6.7 Landscape and Visual

The contractor is required to implement the following measures in relation to landscape and visual during construction:

- The nature of the construction activities in the townscape environment is such that there will always be disruption. Mitigation during construction relates to phasing of construction activity to different working areas sequentially to

minimise the duration of significant effects arising from construction activities at any one location, and/or effective pedestrian and traffic management to minimise inconvenience and ensure access is maintained as appropriate.

- While the establishment of working areas, tunnelling shafts and traffic diversion will require felling of many existing quayside trees, the detailed design has identified opportunities to protect and retain most of the more valuable Willow trees along the riverside walkway upstream of Arklow Bridge that contribute to the setting of the Avoca River and provide a high degree of visual amenity in this locality.
- Where trees are required to be removed along South Quay and North Quay for construction, such trees are of lower value and will be re-planted post construction so as to reinstate the existing visual environment along the quayside.
- All tree protection works will be implemented strictly in accordance with BS5837:2012
- Requirement for detailed construction management plans that set out robust tree protection methodologies in accordance with BS5837: 2012, where trees are to be retained, including in particular the Willow trees upstream of Arklow Bridge, and ensuring that tree protection is implemented and maintained throughout construction.
- Careful dismantling, storage and ultimate reinstatement of the Seafarers Memorial Garden has been identified as important to the locality and contemporary culture of the area, and a detailed method statement will be required from the appointed contractor to ensure the feature is satisfactorily reinstated following construction.
- For the most part, (excluding the land reclamation areas downstream of Arklow Bridge along South Quay), the existing finishes will be reinstated post construction. Where land is reclaimed downstream of Arklow Bridge, the widened quayside will incorporate a simple grass verge between the existing low wall concrete kerb upstand and the new quay wall. This will provide a quayside finish that is consistent with the existing quayside, and will facilitate potential further public realm plans anticipated as part of the proposed Arklow Flood Relief Scheme); and
- Reinstated vegetation is undertaken by a suitably qualified landscape contractor, and their contract will include 2 year aftercare.

6.8 Land and Soils

The contractor is required to implement the following measures in relation to land and soils during construction:

- The adopted construction techniques will comply with the requirements of statutory bodies (Building Control Amendment Regulations, Health Service Executive inspections, Irish Water inspections and compliance with Employers Requirements).

- Precautionary measures will be taken to contain any areas within the planning boundary at risk of contaminated run-off.
- Potential pollutants shall be adequately secured against vandalism and will be provided with proper containment according to the relevant codes of practice. Any spillages will be immediately contained and contaminated soil shall be removed from the proposed development and properly disposed of in an appropriately licensed facility.
- Dust generation shall be kept to a minimum through the wetting down of haul roads as required and other dust suppression measures.
- Any stockpiles of earthworks and site clearance material shall be stored on impermeable surfaces and covered with appropriate materials.
- Silt traps shall be placed in gullies to capture any excess silt in the run-off from working areas.
- Soil and water pollution will be minimised by the implementation of good housekeeping (daily site clean-ups, use of disposal bins, etc.) and the proper use, storage and disposal of these substances and their containers as well as good construction practices in accordance with the CIRIA guidance[11].
- A contingency plan for pollution emergencies will also be developed by the contractor prior to the commencement of the works and regularly updated during construction. This contingency plan will identify the actions to be taken in the event of a pollution incident in accordance with the CIRIA guidance11 which requires the following to be addressed:
    - Containment measures;
    - Emergency discharge routes;
    - List of appropriate equipment and clean-up materials;
    - Maintenance schedule for equipment;
    - Details of trained staff, location and provision for 24-hour cover;
    - Details of staff responsibilities;
    - Notification procedures to inform the EPA or Environmental Department of the Wicklow County Council;
    - Audit and review schedule;
    - Telephone numbers of statutory water consultees; and
    - List of specialist pollution clean-up companies and their telephone numbers.

Alps SWO and Stormwater Tank

- Excavations shall be kept to a minimum, using shoring or trench boxes where appropriate. For more extensive excavations, a temporary works designer shall

[11] Masters – Williams et al (2001) Control and management of water pollution from construction sites in their publication Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors

be appointed to design excavation support measures in accordance with all relevant guidelines and standards.

- All excavated material will, where possible, be reused as construction fill. The appointed contractor will ensure acceptability of the material for reuse for the proposed development with appropriate handling, processing and segregation of the material. This material would have to be shown to be suitable for such use and subject to appropriate control and testing according to the Earthworks Specification(s). These excavated soil materials will be stockpiled using an appropriate method to minimise the impacts of weathering. Care will be taken in reworking this material to minimise dust generation, groundwater infiltration and generation of runoff. Any surplus suitable material excavated that is not required elsewhere for the proposed development, shall be used for other projects where possible, subject to appropriate approvals/notifications.
- Earthworks haulage will be along agreed predetermined routes along existing national, regional and local routes. Where compaction occurs due to truck movements and other construction activities on unfinished surfaces, remediation works will be undertaken to reinstate the ground to its original condition. Where practicable, compaction of any soil or subsoil which is to remain in situ along the sites will be avoided.
- Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe runoff and prevent ponding and flooding. Runoff will be controlled through erosion and sediment control structures appropriate to minimise the water impacts in outfall areas. Care will be taken to ensure that the bank surfaces are stable to minimise erosion.
- Ground settlement, horizontal movement and vibration monitoring will be implemented during construction activities to ensure that the construction does not exceed the design limitations.
- Ground settlements will be controlled through the selection of a foundation type and method of construction which are suitable for the particular ground conditions.
- To reduce the amount of dewatering required at any given time, it is likely that the contractor would construct the sewer in sections. Discharge from the dewatering process would be passed to a suitably sized settlement pond or a proprietary silt removal system located within the working area where possible, before discharge to the Avoca River or the local sewer network. Any discharge to either sewer or watercourse would be subject to a wastewater discharge licence (WwDL).

South Interceptor Sewer, North Interceptor Sewer and Central Interceptor sewer including river crossing

- All excavated material will, where possible, be reused as construction fill. The appointed contractor will ensure acceptability of the material for reuse for the proposed development with appropriate handling, processing and segregation of the material. This material would have to be shown to be suitable for such use and subject to appropriate control and testing according to the Earthworks Specification(s). These excavated soil materials will be stockpiled located

within the working area where possible, using an appropriate method to minimise the impacts of weathering. Care will be taken in reworking this material to minimise dust generation, groundwater infiltration and generation of runoff. Any surplus suitable material excavated that is not required elsewhere for the proposed development shall be used for other projects where possible, subject to appropriate approvals/notifications.

- Earthworks haulage will be along agreed predetermined routes along existing national, regional and local routes. Where compaction occurs due to truck movements and other construction activities on unfinished surfaces, remediation works will be undertaken to reinstate the ground to its original condition. Where practicable, compaction of any soil or subsoil which is to remain in situ along the sites will be avoided.
- Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe runoff and prevent ponding and flooding. Runoff will be controlled through erosion and sediment control structures appropriate to minimise the water impacts in outfall areas. Care will be taken to ensure that the bank surfaces are stable to minimise erosion.
- Ground settlement, horizontal movement and vibration monitoring will be implemented during construction activities to ensure that the construction does not exceed the design limitations. Monitoring will be more rigorous at Arklow bridge as it is a protected structure. This will include more frequent monitoring and more monitoring points. Monitoring points will be located on the face of the bridge piers and centred every 1m or at least one monitoring point for each phase in the underpinning procedure. Horizontal, vertical and rotational displacement in all directions will be monitored.
- Ground settlements will be controlled through the selection of a foundation type and method of construction which are suitable for the particular ground conditions
- To reduce the amount of dewatering required at any given time, it is likely that the contractor would construct the sewer in sections. Discharge from the dewatering process would be passed to a suitably sized settlement pond or a proprietary silt removal system located within the working area, before discharge to the Avoca River or the local sewer network. Any discharge to either sewer or watercourse would be subject to a WwDL Infilling of river channel and installing sheet piles:
- The causeway would be contained on the river side to mitigate against siltation migration into the Avoca River. The two most likely methods to achieve this containment would either be an additional row of sheet piles on the river side of the causeway or alternatively a row of stone gabions wrapped in a geotextile membrane. Either method would require that the containing material (i.e. the sheet piles or the gabion walls) are extended (i.e. to a height above the surface of the causeway) to be effective. The infilling will produce a favourable lateral force on the existing quay wall but an unfavourable lateral force on the sheet piles. Horizontal movement monitoring of the sheet piles

will be implemented during construction activities to ensure that the movement does not exceed the design limitations

WwTP and Revetment

- Excavations and therefore the transport of soils across the site shall be kept to a minimum, using shoring or trench boxes where appropriate. For more extensive excavations, a temporary works designer shall be appointed to design excavation support measures in accordance with all relevant guidelines and standards.
- It should be noted that both the excavation and import of materials will be required for construction of the revetment.
- Excavations in made ground for the WwTP and the revetment will be monitored by an appropriately qualified person to ensure that any spots of contamination (such as nitrocellulose or asbestos) encountered are identified, segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure no cross-contamination with clean soils elsewhere throughout the site.
- Excavated contaminated soils will be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure no cross-contamination with clean soils elsewhere throughout the site.
- Dewatering will be required for the construction of the WwTP. Discharge volumes could be up to 250m^3/day and would be passed to a suitably sized settlement pond or a propriety silt removal system, along with any other treatment as required by WCC before discharge to the Avoca River or the local sewer network. This will most likely include treatment to remove elevated heavy metals which were noted during the ground investigation. Any discharge to either sewer or watercourse would be subject to a WwDL.
- Ground settlement, horizontal movement and vibration monitoring will be implemented during construction activities to ensure that the construction does not exceed the design limitations.
- Ground settlements will be controlled through the selection of a foundation type and construction methods which are suitable for the particular ground conditions. See Section 5.6.4 for the WwTP and Section 5.6.6 for the revetment of Chapter 5 Construction Strategy for details.
- All excavated material will, where possible, be reused as construction fill. The appointed contractor will ensure acceptability of the material for reuse for the proposed development with appropriate handling, processing and segregation of the material. This material would have to be shown to be suitable for such use and subject to appropriate control and testing according to the Earthworks Specification(s). These excavated soil materials will be stockpiled using an appropriate method to minimise the impacts of weathering. Care will be taken in reworking this material to minimise dust generation, groundwater infiltration and generation of runoff. Any surplus suitable material excavated

that is not required elsewhere for the proposed development shall be used for other projects where possible, subject to appropriate approvals/notifications.

- Where compaction occurs due to truck movements and other construction activities on unfinished surfaces, remediation works will be undertaken to reinstate the ground to its original condition. Where practicable, compaction of any soil or subsoil which is to remain in situ along the sites will be avoided.
- Earthworks operations shall be carried out such that surfaces shall be designed with adequate falls, profiling and drainage to promote safe runoff and prevent ponding and flooding. Runoff will be controlled through erosion and sediment control structures appropriate to minimise the water impacts in outfall areas. Care will be taken to ensure that the bank surfaces are stable to minimise erosion.

Outfalls

- Ground settlement, horizontal movement and vibration monitoring will be implemented during construction activities to ensure that the construction does not exceed the design limitations.
- Ground settlements will be controlled through the selection of methods of construction as outlined in Section 5.6.5 of Chapter 5 Construction Strategy which are suitable for the particular ground conditions.
- Based on ground conditions and construction methods, there should be limited mobilisation of those sediments.
- Best practice guidelines[12] will be adhered to as a minimum for any dredging exercises to be carried out. Measures to minimise disruption to the seabed and mobilisation of sediments will be applied and seabed conditions will be taken into account when selecting construction methods.

6.9 Water

The contractor is required to implement the following measures in relation to water during construction:

Hydrology and Water Quality

- During construction, surface water runoff would be collected by the temporary drainage system installed by the contractor and then treated or desilted on-site before discharge into the Avoca River;
- Earthworks operations shall be carried out such that the surfaces are designed with adequate slope to promote safe runoff and prevent flooding;
- Good housekeeping such as site clean ups, use of disposal bins, etc will be adopted in construction areas;
- In order to prevent accidental release of hazardous materials such as fuels, cleaning agents etc into surface water during construction, all hazardous

[12] British Standards (2016) BS6349-5 - Maritime works – Part 5: Code of practice for dredging and land reclamation

materials will be stored within appropriately bunded containment areas designed to retain spillages;

- Temporary bunds will be used for storage of oil/diesel; and
- The temporary causeway and the surface water runoff from this area would be entirely contained to prevent any pollution entering the Avoca River. This would be contained through the implementation of best practice measures.
- As outlined in Chapter 5 Construction Strategy, it is necessary to construct launch and reception chambers to facilitate tunnelling works. As these shafts will extend beneath the ground water level, it will be necessary to "plug" these shafts to prevent water ingress.

Mitigation during construction will include implementing best practice during excavation and tunnelling works to avoid the release of bentonite and prevent sediment running into the drainage network and/or hydrological environment during construction of the proposed development.

Coastal processes

The following mitigation measure has been proposed with respect to effects on coastal processes from construction of the proposed development:

- Construction of the long sea outfall will generally be restricted to the period May – September, with the period between November-February generally avoided. In this manner, the months with likely worst wave and wind conditions, which lead to higher levels of sediment suspension and transport, are avoided.

Flood risk

Site of the proposed WwTP

During the construction period, there is a risk of coastal erosion and a risk of wave overtopping. Similarly to the construction of the long sea outfall, works between November and February should be avoided. It is also recommended that the contractor considers tidal and wind forecasts and monitors these closely to minimise the risk of coastal erosion and wave overtopping.

Given the absence of a significant risk of flooding at the site of the proposed WwTP, no further mitigation measures to address flood risk during construction are required.

Interceptor sewers

In order to mitigate and minimise the potential flood impact caused by the construction of the temporary causeway and the interceptor sewers in the Avoca river channel, the following sequence of works is proposed prior to construction of the c. 270m long causeway downstream of the bridge:

- Proposed underpinning of the first 2 arches and lowering of the 2nd Arch by c. 1m at the bridge is completed.

- Proposed in-stream works at and upstream of the bridge is fully completed (i.e. the upstream interceptor sewer manhole and the laying of the interceptor sewer beneath the bed of Bridge Arch 1).
- The temporary works should proceed from downstream to upstream (i.e. from east to west direction).
- Following completion of construction of the interceptor sewer in the Avoca River (i.e. when the causeway is no longer required), the causeway would be removed in a similar sequential manner.
- Timely removal of sections of the causeway should be a priority once works have been completed

6.10 Resource and Waste Management

The contractor is required to implement the following in relation to resource and waste management during construction:

- The contractor is required to prepare, implement and maintain a Construction and Demolition Waste Management Plan throughout construction that addresses the following as a minimum:
    - Description of the proposed development;
    - Wastes arising including procedures for minimisation/reuse/recycling;
    - Estimated cost of waste management;
    - Roles including training and responsibilities for construction and demolition waste;
    - Procedures for education of workforce and plan dissemination programme;
    - Record keeping procedures;
    - Waste collectors, recycling and disposal sites including copies of relavant permits or licences; and
    - Waste auditing protocols.
- The Contractor will minimise waste disposal so far as is reasonably practicable;
- Waste from the proposed development will be transported by authorised waste collectors in accordance with the Waste Management (Collection Permit) Regulations 2007 to 2016 to take into account the Waste Management (Collection Permit) (Amendment) Regulations 2016.
- Waste from the proposed development will be delivered to authorised waste facilities in accordance with the Waste Management Acts 1996-2011 and the Waste Management (Collection Permit) (Amendment) Regulations 2016;
- Source segregation: Where possible metal, timber, glass and other recyclable material will be segregated during construction works and removed off site to a permitted/licensed facility for recycling. Waste stream colour coding, and photographs of wastes to be placed in each container as required, will be used

to facilitate segregation. Where waste generation cannot be avoided this will maximise the quantity and quality of waste delivered for recycling and facilitate its movement up the waste hierarchy away from landfill disposal and reduce its environmental impact;

- Material management: 'Just-in-time' delivery will be used so far as is reasonably practicable to minimise material wastage;
- Supply chain partners: The contractor will engage with the supply chain to supply products and materials that use minimal packaging, and segregate packaging for reuse;
- Waste Auditing: The contractor will record the quantity in tonnes and types of waste and materials leaving site during the construction phase;
- Waste fuels/oils may be generated from equipment used on-site during construction and may be classified as hazardous waste. Such wastes will be stored in a secure, bunded area on-site prior to collection by a contractor who holds the appropriate waste collection permit;
- Possibilities for re-use of clean non-hazardous excavation material as fill on the site or in landscaping works will be considered following appropriate testing to ensure material is suitable for its proposed end use. Where excavation material may not be re-used within the proposed works the contractor will endeavour to send material for recovery or recycling so far as is reasonably practicable;
- The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material which is recovered and which is disposed of; and
- The contractor(s) will ensure that any off site interim storage or waste management facilities for excavated material have the appropriate waste licences or waste facility permits in place.

6.11 Population and Human Health

The contractor is required to implement the following measures in relation to population and human health during construction:

- Provide for safe pedestrian access at points of entry and exit of construction vehicles accessing River Walk and Châteaudune Promenade from Main Street;
- Ensure provision of a safe surface for the existing eastern footpath (currently gravel) from Vale Road for use of the walk by more vulnerable older age groups as an alternative to the temporary closure of surfaced section from River Walk;
- Provide continued access to boat moorings on North Quay during open cut works;

- Where practicable, use short sections of transparent hoarding or include viewing windows in the hoarding at locations popular for amenity such as in front of the cafes on River Walk and at the Bridgewater Shopping Centre;
- Stagger works wherever possible and remove hoarding as soon as it is no longer needed to mitigate against severance;
- Avoid works that could involve high noise or visual intrusion during major social events around the Avoca River, notably any sites used by the annual Arklow Maritime Festival or other public events.
- Provide temporary signalling or manning of junction between Ferrybank and Seaview Avenue while diversion to Bridgewater Shopping Centre is in effect;
- Maintain regular proactive consultation with local residents and businesses, particularly along River Walk, South Green, Harbour Road, Bridgewater Shopping Centre, Aldi and Marine Village, but also with all living or working along South Quay, North Quay and Ferrybank.

Other than the mitigation outlined in the respective Chapters 7 - 10, no further mitigation has been proposed with respect to human health effects during construction of the proposed development. This is because, in accordance with the best scientific evidence no significant health effects are predicted with the mitigation already proposed.

6.12 Material Assets

The contractor is required to implement the following measures in relation to material assets during construction:

- Landowners will be compensated as appropriate for permanent and temporary land acquisition, in accordance with the relevant legislation. The details of any individual agreements will be private and confidential and therefore mitigation measures in the form of compensation are not specific or detailed herein.
- A Property Protection Scheme will be put in place by Irish Water prior to works commencing on site. This will involve advance condition surveys prior to construction for all properties within the zone of influence of the proposed development. If it is determined that any reported minor cosmetic damage has been caused by construction of the proposed development, suitable remedial works will be undertaken to repair the damage to the properties with the use of the appropriate conservation technique.
- Mitigation measures for all areas of temporary land acquisition will involve reinstatement to their original condition so far as is reasonably practicable.
- Access to all existing properties will be maintained at all times during the construction of the proposed development. This may require temporary alternate access arrangements at some locations. All access will be reinstated upon completion of construction.

- The contractor will be obliged to put measures in place to ensure that there are no interruptions to existing utilities and services unless this has been agreed in advance with the relevant service provider. All utilities and services diversions will be agreed and undertaken as part of the enabling works and in advance of the commencement of construction activities. All construction activities in the vicinity of existing services and utilities will be carried out in ongoing consultation with the relevant service provide and undertaken in compliance with any requirements or guidelines they may have.
- Sewer diversions will be undertaken as part of the enabling works prior to the commencement of construction activities. Upon commissioning, the older pipelines being abandoned will be sealed off and/or removed.
- Surface water management measures will be adopted along the entire site.

6.13 Major Accidents and Natural Disasters

The contractor is required to implement the following measures in relation to major accidents and natural disasters during construction:

- The construction methodology for the revetment employed by the contractor, that would involve replacement of the revetment in sections, will work to mitigate the risk of flooding in that it would enable the section under construction to be quickly protected during storm events; and
- A detailed CEMP would be prepared prior to the commencement of any works and implemented during the works. The CEMP will be a live document maintained by the contractor that would work to ensure that potential risks of major accident and/or disaster are identified, avoided and mitigated, as necessary.

Appendix A

Outline Noise and Vibration Management Plan

Irish Water

Arklow Wastewater Treatment Plant Report

Outline Noise and Vibration Management Plan

Issue | 31 August 2018

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ARUP

Contents

1 Introduction

This management plan defines the measures to control and limit noise emissions and vibration levels, at residential properties and other sensitive receptors in the vicinity of the proposed development.

2 Works Description

2.1 Summary of Scheduling and Activities

A brief description of;

- the stage/activity,
- anticipated progress rate of works,
- the plant equipment and size to be used,
- start and end date, and
- duration.

3 Noise and Vibration Limit Values

3.1 Overview of Limits

Description of the project wide noise and vibration limits for the proposed development, including limits that will apply for triggering of certain mitigation measures e.g. possible acoustic treatment / alternative accommodation if deemed appropriate.

3.2 Airborne Noise Limits

Relevant air borne noise limits for the NVMP, as set out in Chapter 10 Noise and Vibration, Section 10.3.1.2.

3.3 Ground-borne Noise and Vibration Related Limits

Relevant ground borne noise and vibration limits for the NVMP as set out in Chapter 10 Noise and Vibration, Section 10.3.1.2.

4 Baseline Environment

4.1 Existing Noise Environment

Description of the existing noise environment around the study area.

4.2 Baseline Monitoring

Data on baseline noise surveys undertaken prior to the commencement of works including locations, durations and appropriate noise levels (L_{Aeq}, L_{A90})

4.3 Sensitive Receptors

Description of the sensitive receptors in the vicinity of the works.

5 Noise and Vibration Level Predictions

An assessment of the noise and vibration impacts of the proposed development is set out in Chapter 10 of the EIAR. Based on the actual equipment to be used during the construction phase and a detailed construction program, the Contractor may wish to refine the implementation of mitigation measures proposed. In that event, the following methodology for assessing impacts should be applied.

5.1 Introduction

Noise levels will be predicted at the nearest noise sensitive receivers in accordance with ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation (ISO 9613-2). Modelling inputs will include topography, nearby buildings, noise sources (including their anticipated hours of operation) and noise sensitive receivers. Modelling assumptions, including ground hardness, operation times, simultaneous operation etc.

5.1.1 Source Sound Power Levels

Full details on the sound power levels and the octave band frequency of the plant equipment to be used and reference to origin of the sound power level. If reference data is available for tunnelling equipment, including monitoring data from previous works, include.

5.2 Ground-borne Noise and Vibration

Methodology for predicting ground borne noise and vibration levels at sensitive receptors for vibration to structures, human comfort and ground-borne noise.

6 Management and Mitigation

6.1 Management Controls

Noise management controls to be outlined in detail, including those outlined in Chapter 10 of the EIAR and the CEMP. Actions will include, working hours, respite periods, public consultation, inductions, behavioural practices, monitoring, communication plans, etc.

6.2 Source Controls

Noise source controls to be outlined in detail, including those outlined in Chapter 10 of the EIAR and the CEMP. Actions may include, equipment selection, plant rental, siting of plant, site compound layouts, reversing alarms, site deliveries, hand tool use etc.

6.3 Path Controls

Noise source controls to be outlined in detail, including those outlined in Chapter 10 of the EIAR and the CEMP. Actions may include, site hoarding, exhaust silencers, etc.

6.4 Site Specific

Any site or receptor specific controls.

6.5 Noise and Vibration Monitoring

6.5.1 Unattended Monitoring

Details where unattended monitoring will take place, duration periods, trigger levels for reassessment of works and parameters measured. Details on any other monitoring that relates to Arklow Bridge, including settlement.

6.5.2 Attended Monitoring

Details where attended monitoring will take place, duration periods, trigger levels for reassessment of works and parameters measured. Details on any other monitoring that relates to Arklow Bridge, including settlement.

Details on when attended monitoring will take place e.g. at the start of certain construction events, during out of hours works, in the event of complaints etc.

7 Findings

7.1 Airborne Noise

Predicted airborne noise levels.

7.2 Ground-borne Noise and Vibration

Predicted ground borne noise and vibration levels.

7.3 Compliance with Noise and Vibration limits

Statement of compliance with any mitigation actions recommended.

8 Conclusion

Conclusion of NVMP.