Appendix 4A: Outline Construction Environmental Management Plan

Client:

Uisce Éireann (formerly Irish Water)

Project:

Castletroy Wastewater Treatment Plant Upgrade Project

Report:

Outline Construction Environmental Management Plan

BARRY & PARTNERS

Document Control Sheet

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Document Title:	Outline Construction Environmental Management Plan
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	Suitability/ Status Code	**Definition**	**Revision Code**
Shared (Non-Contractual)	S2	Suitable for Information	Pnn (Major Revision) starting at P01
	S3	Suitable for Review and Comment	
	S4	Suitable for Stage Approval	
Published Documentation (Contractual)	An	Approved and accepted as stage complete (Stages of the project to be assigned Sequential status An starting at A1. e.g. A1 Planning, A2 Tender, A3 Construction, A4-O+M	Cnn (C=Contractual/Complete) starting at C01
Published for Asset Information Model (AIM) Acceptance	CR	As Constructed Record file	Cnn (C=Contractual/Complete) starting at C01

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SECTION 1: INTRODUCTION

1.1 Purpose

The purpose of this Outline CEMP is to provide a framework that outlines how Uisce Éireann (formerly Irish Water) and any contractor appointed will manage, and where practicable minimise, negative environmental effects during the construction of the Proposed Development. It should not be considered a detailed Construction Method Statement as it would be the responsibility of the appointed contractor, in association with Uisce Éireann, to implement appropriate procedures and progress this documentation prior to commencement of construction. 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. It identifies the range of potential types of construction methods, plant and equipment which may be used by any contractor appointed, and enables An Board Pleanála (ABP) to assess their impacts in conjunction with the environmental impact assessment and appropriate assessment prior to determining whether to grant planning permission.

In summary, 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.

1.2 Procurement and Detailed CEMP

Uisce Éireann 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 will be specific, targeted, and 'stand-alone' plans developed to support the detailed design and construction methodologies established during the next phase of the Proposed Development. The Detailed CEMP shall cross-reference the Outline CEMP and individual Employer's

Requirements as necessary. The Detailed CEMP will be provided to Limerick City and County Council, for consultation and approval in advance of any construction works on site.

The contractor is required to develop a Detailed CEMP 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;
- 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:

- Heritage Strategy;
- Construction Compound Management Plan;
- Construction Traffic Management Plan;
- Noise and Vibration Management Plan;
- Water Quality Management Plan;
- Dust Management Plan;
- Construction Waste Management Plan;
- Invasive Species Management Plan; and
- Emergency Incident Response Plan.
- Construction Logistics Plan.
- Travel Plan.

The Detailed CEMP is considered 'live' documents that will be reviewed and revised regularly as construction progresses. This will ensure that environmental performance is subject to continual improvement and that best practice is implemented. Amendments to the CEMP may include inter alia changes in the project scope, contract scheduling, contractor appointments, environmental management policies, practices or regulations, and developments on the site. The process for update, review, and approval of the CEMP must be documented to ensure that all revisions can be easily understood, applied and updated by Uisce Éireann and the contractor throughout construction.

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

SECTION 2: THE PROPOSED DEVELOPMENT

2.1 Overview

Castletroy is a Limerick suburb situated approximately 3km east of the City Centre. Castletroy WwTP is surrounded by the University of Limerick (UL) campus, between the university boat club and Dromroe student village. There is a walkway at the northern perimeter of the site along the banks of the Lower River Shannon. The site is predominantly enclosed as it is surrounded but by heavy vegetation, high trees and hedge rows. There The WwTP discharge point is in the main river channel, where Co. Limerick borders with Co. Clare. Figure 2.1 displays the site location with regard to the surrounding entities and the discharge point in the Lower River Shannon.

Figure 2.1: Castletroy WwTP and Discharge Point Locations

The Proposed Development shall cater for future population growth and industrial development in the area, in line with population projections for Limerick as set out in the National Planning Framework (NPF) Implementation Roadmap and the Southern Region Regional Economic Spatial Strategy (RSES). It will provide 20% Headroom allowance, in line with Irish Water guidelines for large urban settlements. It will also ensure the WwTP continues to comply with requirements of the EPA Wastewater Discharge License (WWDL), Urban Wastewater Treatment Regulations (UWWTR) and other relevant Irish Water Guidelines.

The initial upgrade works will cater for the 10-year growth projections up to 77,500 PE including a future IDA load of 5,500 PE. There will be provision made in the infrastructural development of the plant (tank sizing and pipework) for the 25-year growth projections of 81,100PE. However, a planning review will be required before any uplift above 77,500PE can be instated.

The upgrade design includes provision for 20% Headroom allowance, in line with Uisce Éireann guidelines for large urban settlements. It also includes installation of a new Stormwater storage tank that will significantly reduce the annual rate of spills to the Lower River Shannon and make the WwTP compliant with the criteria outlined in the DoEHLG "Procedures and Criteria for Storm Water Overflows, 1995“.

2.2 WwTP Upgrade

The proposed upgrade works are outlined in this section with regard to each phase of the wastewater treatment process. The proposed site layout plan is shown in Volume 4: Proposed Layout Plan.

Inlet works / Preliminary Treatment

- Replacement of the existing storm pumps in the inlet pumping station including the modification of pipework and fittings.
- Upgrade of the existing preliminary treatment screens to cater for higher flows.
- Construction of a new grit trap to provide redundancy to the preliminary treatment process.
- Installation of decking over the existing inlet works structure and installation of odour abatement equipment.
- A new forward feed pumping station which will transfer flows to primary treatment.
- Installation of closed decking over the existing inlet works structure to allow odours to be extracted and treated in a new odour abatement unit.

Stormwater and Flood Management

- Construction of a 4,500m^3 capacity stormwater tank with sufficient capacity for the projected 10-year and 25-year loadings.
- Construction of a stormwater return pumping station to return flows from the stormwater tank for primary and secondary treatment.
- Construction of a flood event pumping station to allow the plant to remain operational during high river levels. The walls of the existing final effluent inspection chamber will be increased to protect from flood water.
- Installation of a surface water attenuation system to collect additional surface water resulting from the Proposed Development.
- Provision of 28m^3 flood compensation area to account for positioning of new infrastructure on sections of the flood zone.

Primary Treatment

- Installation of 3 no. additional primary treatment mechanical filtration units.
- Construction of a proposed primary filter building. The structure will also be used for the installation of control panels, operational equipment and instrumentation.
- Construction of a new primary sludge holding tank which will store sludge removed from primary treatment. Sludge will be pumped to the upgraded dewatering plant within the site.
- Construction of a new elevated splitter chamber to allow flows gravitate through the primary treatment process with even distribution.
- An odour abatement unit will be installed external of the primary filter building to treat odours extracted from the building, sludge holding tank and splitter chamber.

Secondary Treatment

- Upgrade of the existing secondary treatment tanks with installation of an integrated fixed film activated sludge (IFAS) process.
- Upgrade to the existing tank aeration system (blowers and diffusers).
- Installation of tube settlers (or similar) within two of the existing clarifiers to increase flow through each tank.
- Construction of a new scum pumping station to collect and transfer scum removed from the clarifiers to the thickened sludge storage tank.
- The existing return activated sludge (RAS) pumps will be upgraded to a higher capacity.

- Two new bulk storage tanks will be installed to contain Ferric Sulphate (Fe_2SO_4) for phosphorous removal.

Sludge Dewatering

- The existing 7.1m diameter 'Picket Fence Thickener' (PFT) will be repurposed as a thickened sludge storage tank.
- A new larger diameter PFT will be constructed.
- The existing sludge dewatering equipment will be upgraded with new centrifuges.
- Sludge storage skips will be located on external concrete plinths. Sludge transfer pipework and valves will be installed to control sludge transfer from the dewatering units to the skips.
- An odour abatement unit will be installed external of the sludge treatment building.

SECTION 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.

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

Uisce Éireann 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 Employer's Representative

Uisce Éireann and/or the Employers Representative (ER) appointed by Uisce Éireann 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 Uisce Éireann, i.e., competent experts in biodiversity and architecture, archaeology and heritage, noise, vibration, dust, waste, land, soils, contamination and/or water.

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

[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)

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 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 during construction including where necessary the following 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, Limerick City and County Council, and other relevant stakeholders shall be undertaken at an appropriate level and frequency throughout construction. Uisce Éireann (formerly 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 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 enquiries can be directed. The contractor will be responsible for preparing and issuing the notifications subject to the relevant approval and consents.

Uisce Éireann and the contractor in consultation with Limerick City and 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 enquiries including complaints. All enquiries will be recorded, and a log will be maintained to include details of the response and action taken. This will be available upon request for inspection to Limerick City and 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 Limerick City and County Council, relevant stakeholders and statutory bodies.

SECTION 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 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 include procedures for dealing with damage to the environment.

Nobody will work on site without first receiving an 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

Uisce Éireann 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:

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

The Environmental Manager will be responsible for arranging and holding monthly meetings and site walkovers 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 CEMP 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 programs will need to be developed, implemented, documented, and assessed (with potential follow up) in accordance with the specification outlined in the CEMP.

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;
- 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

Uisce Éireann 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 CEMP, 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 prepare 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

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 will be updated accordingly by the Environmental Manager and the Employer's Representative should be informed at the earliest opportunity.

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 CEMP 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

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).

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 Limerick City and 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.

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 CEMP 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, Limerick City and 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 Limerick City and 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, Uisce Éireann (formerly Irish Water) and the Employer's Representative.

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 and Emergency Incident Response Plan.

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 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 Lower River Shannon.

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 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 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.

SECTION 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.

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 an 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.
- All chemicals will be stored appropriately in the COSHH stores. Oil, including diesel, would be stored in properly bunded tanks / bunded mobile bowsers/ drip trays. No fuels, chemicals or solvents will be stored outside of the confines of the WwTP buildings.

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; and
- 8am – 1pm: Saturday;

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 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 to by the contractor in advance with Limerick City and 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, Limerick City and 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, UL, and local crime prevention officers including Limerick City and 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 provided within the site to segregate construction works areas from plant operations that will remain in-situ for the duration of the construction works.

The erection of fencing/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/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/or 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.
- Erection of solid fencing will be erected at the south-eastern section of the site to minimise potential of disturbance to badger sett.

5.5.1 Construction Compound and Working Areas

The construction compound will be located within the planning site boundary of Castletroy WwTP and will provide site offices and welfare facilities for construction employees, as well as providing an area for material storage. Ground levels for the compound will be raised temporarily above the design flood level for the duration of the construction contract to prevent materials and equipment being carried away by flood water in the event of a flood.

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 for 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 and drying rooms, toilets, showers etc. The location of these will be agreed with Limerick City and County Council, and identified as part of the Detailed CEMP.

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 Limerick City and County Council, and Uisce Éireann.

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.

SECTION 6: ENVIRONMENTAL MITIGATION MEASURES

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

It should be noted that Sections 6.1 - 6.13 provide a summary of minimum requirements that should be built upon by the contractor when developing the Detailed CEMP. 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

Mitigation measures are listed in the sections below with regard to both general construction traffic management procedures and site-specific requirements during the construction period, particularly with regard to interactions with the UL Campus. The Traffic and Transport mitigation measures have been developed as a result of site visits, consultations with Limerick City and County Council and feedback received during communications with UL.

General Construction Mitigation Measures

- A Preliminary Traffic Management Plan will be drafted by the Project Supervisor Design Process (PSDP) for the works in full consultation with Limerick City and County Council, An Garda Síochána, the Fire Service and the Ambulance service prior to the issuing of tender documents. When the works are awarded to a contractor, the Preliminary Traffic Management Plan will be developed by the Project Supervisor Construction Phase into a Detailed Traffic Management Plan in full consultation with the same stakeholders. All traffic management plans, including working times, will be agreed with and approved by Limerick City and County Council Transportation Department in advance of implementation. Also, the contractor shall liaise and seek comments on the Detailed Traffic Management Plan from the University of Limerick.
- Tracked excavators will be moved to and from the site on low-loaders and will not be permitted to drive on the street pavements.
- The Contractor is to arrange for staff parking on-site. Contractor's, subcontractor's or supplier's vehicles or staff vehicles, or any vehicles associated with the works are not permitted to park, idle or queue on the public road network.
- Wheel washers/ judder bars will be placed at all site access points to minimise the migration of detritus onto the public roads, where appropriate. The roads will be inspected and cleaned on a regular basis.
- Haul vehicles will be covered after loading to ensure there is no risk of construction material falling or to any prevent any nuisance due to dust particles.
- Water bowsers will be deployed within the sites during periods of hot weather to damp down potential dust generation from unbound surfaces.
- An Application for an Abnormal Load Permit will be made to Limerick City and County Council in advance for any abnormal loads exceeding the thresholds laid out in the Road Traffic (Construction and Use of Vehicles) (S.I. No. 5/2003) Regulations 2003. Where possible abnormal load movements will be restricted to evening or night-time to minimize disruption to local traffic and traffic on strategic routes.

Site-specific Construction Mitigation Measures

- Provision of banksmen or implementation or "Stop and Go" traffic control method / temporary traffic signal system, when required, will be put in place at the LCCC Access Road to prevent back up onto Plassy Park Road.
- Health and safety of pedestrians and cyclists along the LCCC Access Road and in the vicinity of the site entrance will be addressed with the use of signage and manning of the hazard spots during busy

periods. The contractor will be made aware of any existing health and safety issues and will be advised to liaise with the University of Limerick (UL) where necessary.

- All efforts will be made to schedule busy construction phases outside of college term months. If this is not possible, site access for HGVs will be restricted to outside of the peak hours 8-10am so as not to cause delays on the LCCC Access Road.
- It may be necessary, due to space confinement on the LCCC Access Road, for large plant and equipment to be delivered to site via the main campus route. The contractor will be required to agree this with UL ahead of scheduling the works. Such deliveries may include the contractor's compound, large construction plant (cranes, piling rigs, excavators, etc.), materials (prefabricated concrete units, sheet piles, etc.) and process equipment (centrifuges, IFAS system, etc.);
- UL are not opposed to construction traffic using the internal campus road during regular operational periods, however the following constraints will apply:
  - The LCCC Access Road will remain a one-way (in) route during term months between the hours 8-10am, as per the standing agreement between LCCC and UL;
  - Construction staff vehicles will use the LCCC Access Road as the primary travel route to minimise any potential for disruption in the main campus;
  - Construction vehicles such as tankers and HGVs that travel via the campus route must be clean and empty; and
  - There will be *zero* disruption during exam periods in traffic movements resulting from construction traffic.

6.2 Air Quality and Climate

In accordance with the IAQM Guidance, for proposed mitigation measures, the highest risk category should be applied. Therefore, the mitigation measures applicable to a Medium-Risk site have been outlined in the following sections. The contractor is required to implement these following measures in relation to air quality and climate during construction:

General Construction Mitigation Measures

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager / engineer or the site manager; and
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan (DMP), which will include measures to control other emissions, approved by the Local Authority. The DMP may include monitoring of dust deposition, dust flux, real-time PM10 continuous monitoring and/or visual inspections.
- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken;
- Make the complaints log available to the local authority when asked;
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the logbook; and
- Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are coordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport / deliveries which might be using the same strategic road network routes.
- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100m of the site boundary, with cleaning to be provided if necessary;
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked;

- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions; and
- Agree dust deposition, dust flux, or real-time PM10 continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.
- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site;
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- Avoid site runoff of water or mud;
- Keep site fencing, barriers and scaffolding clean using wet methods;
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below; and
- Cover, seed or fence stockpiles to prevent wind whipping.
- Ensure all vehicles switch off engines when stationary - no idling vehicles;
- Avoid, where possible, the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable;
- Impose and signpost a maximum-speed-limit of 15 miles per hour (mph) on surfaced and 10 mph on unsurfaced haul roads and work areas;
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials; and
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
- Ensure an adequate water supply on the site for effective dust / particulate matter suppression / mitigation, using non-potable water where possible and appropriate;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate; and
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
- No bonfires or burning of waste materials.

Works-Specific Construction Mitigation Measures

- Re-vegetate earthworks and exposed areas / soil stockpiles to stabilise surfaces as soon as practicable;
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable; and
- Only remove the cover in small areas during work and not all at once.
- Avoid scabbling (roughening of concrete surfaces) if possible;
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery; and
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport;
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable;
- Record all inspections of haul routes and any subsequent action in a site logbook;
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits; and
- Access gates to be located at least 10m from receptors where possible.

6.3 Odour

There are no odour mitigation measures applicable to the construction phase of the Proposed Development.

6.4 Noise and Vibration

General Construction Mitigation Measures

The appointed Contractor(s) will prepare detailed method statements addressing the likely ground borne 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.

Works-Specific Construction Mitigation Measures

- To protect residential amenity, construction activities will be restricted to daytime hours as outlined:
  Monday to Friday: 0700 hours – 1900 hours;
  Saturday: 0800 hours – 1300 hours.
- An on-site speed limit will be enforced for all traffic;
- Heras fencing will go in around stormwater storm tank construction area.
- Best practicable means will be employed to minimise noise emissions and will comply with the general recommendations of BS 5228;
- All plant will be maintained in good working order. Where practicable, machines will be operated at low speeds and will be shut down when not in use;
- Mechanical plant used on site will be fitted with effective exhaust silencers. Vehicle reverse alarms will be silenced appropriately to minimise noise breakout from the site while still maintaining their effectiveness;
- If required, compressors will be of the “noise reduced” variety and fitted with properly lined and sealed acoustic covers;
- In all cases, engine and/or machinery covers should be closed whenever the machines or engines are in use;
- All pneumatic percussive tools will be fitted with mufflers or silencers as recommended by the equipment manufactures. Where practicable all mechanical static plant will be enclosed by acoustic sheds or screens;
- Employees working on the site will be informed about the requirement to minimise noise and undergo training on the following aspects:

- The proper use and maintenance of tools and equipment;
- The positioning of machinery on-site to reduce the emission of noise to the noise sensitive receptors;
- Avoidance of unnecessary noise when carrying out manual operations and when operating plant and equipment; and
- The use and maintenance of sound reduction equipment fitted to power pressure tools and machines.
- It is recommended that if complaints are received from nearby residential properties, periodic noise monitoring will be undertaken during construction works to determine noise levels at noise sensitive receptors. Based on the findings of such noise monitoring, appropriate noise mitigation measures will be implemented to reduce noise impacts. Where excessive noise levels are recorded, further mitigation measures will be employed which may include temporary screening of the nearest receptor to on-site activities;
- Responsible Person - It is recommended that the Contractor will appoint a responsible and trained person who will be present on site and who will be willing to answer and act upon complaints and queries from the local public; and
- To protect residential amenity, the cumulative noise level from construction activities on the development site (including plant and equipment) shall not exceed 65 dB $L_{Aeq(12\ hour)}$ at residential dwellings outside the nearest window of the occupied room closest to the site boundary (SR 11).

6.4.1 Vibration

Construction Vibration Impact Prediction

No blasting is proposed as part of the Construction Phase of the Proposed Development. The nearest residential properties are located relatively remote from the Castletroy WwTP boundary with the nearest sensitive receptor location located 130m to the east. Therefore, there will be no potential for a vibration impact at the nearest residential properties.

Operational Vibration Impact Prediction

The operation of the existing Castletroy WwTP and the Proposed Development do not contain any aspect which have the potential to give rise to a perceptible vibration impact at any of the nearest residential noise sensitive receptors.

6.5 Biodiversity

Mitigations for habitat loss

The proposed development will result in the loss of 3290 sqm of amenity grassland and dry meadow/grassy verge, and 25 ornamental trees, most of which are young.

A landscaping plan has been prepared for the proposed development and is provided in Appendix 12B of EIAR.

Mitigations for loss of faunal habitat

The loss of potential faunal habitat as a result of the loss of trees will be mitigated through replanting as part of the landscaping plan. In addition, it is proposed to create faunal habitat through the following measures:

- At least 4 bat boxes will be placed on suitable trees along the eastern and western boundaries of the site, in agreement with a qualified ecologist. It is proposed to use bottom-less bat boxes in order that bat droppings will fall out, reducing the need for cleaning. However, these will be checked by site operators to ensure they do not become clogged. If the boxes require cleaning, this will be carried out by a qualified Ecologist with a roost disturbance licence, outside of bat maternity season (May to August).

- It is proposed to place a swift box on the external façade of the northern building within the site, underneath an overhang, approximately 5m from the ground, under supervision of a suitably qualified ecologist.
- Dead wood piles will be created in suitable areas of the site from the trees being felled.

Mitigation Measures for Disturbance/Displacement of Fauna During Construction

- All plant and equipment for use will comply with Statutory Instrument No 359 of 1996 "European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1996". Plant will be chosen to avoid significant low-frequency noise emissions which increase nuisance potential.
- Operating machinery will be restricted to the Proposed Development site boundary.
- The methodology of British Standard WS 5228-1:2009+A1:2014 "Code of Practice for Noise and Vibration Control on Construction and Open Sites" Part I, will be employed during works, where required, to minimise emission of any noise.
- Work will be completed during daylight hours. However, if lighting is needed for construction during certain periods over winter months, this lighting will be limited and will face downwards, with no lighting focussed onto surrounding woodland.
- A pre-commencement survey for Otter will be carried out prior to any works commencing. Should Otter holts be recorded within 150m of the proposed works, a derogation license will be obtained from NPWS and works carried out in accordance with NRA (2006) *Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes*.
- Regular maintenance of plant will be carried out in order to minimise noise emissions. Particular attention will be paid to the lubrication of bearings and the integrity of silencers.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the works.
- Compressors will be of the "sound reduced" models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.
- Machines, which are used intermittently, will be shut down during those periods when they are not in use.
- Noisier plant will be positioned to optimise screening by other plant.
- Any requirement for removal of vegetation will be carried out in line with the provisions of the Wildlife Act. Therefore, the necessary removal of trees within the site will not be carried out between 1st of March and 31st of August inclusive, unless a breeding bird survey is carried out by a qualified ecologist 2 weeks before scheduled felling and a second survey no more than 48 hours before the felling.

Mitigation Measures for Badgers During Construction

In relation to the badger sett, as described in the attached Badger Survey Report, all construction works will be carried out in line with *NRA (2006) Guidelines for the Treatment of Badger Prior to the Construction of National Road Schemes. National Roads Authority, Dublin, Ireland.*

Consultation was carried out with the NPWS with regard to the badger sett within the sett and the prescribed mitigation below. The extents of the badger buffer zones can be seen in the proposed layout drawing in Appendix 11A of the EIAR. The following measures will be in place to prevent disturbance or infringement on the sett:

- A pre-construction badger survey should be carried out no more than 10-12 months in advance of construction in order to ascertain if there are any additional sett entrances.
- No construction works will take place within 30 meters of the badger sett unless in consultation with the NPWS.

- No heavy machinery will be used within 30m of badger setts (unless carried out in consultation with NPWS); lighter machinery (generally wheeled vehicles) will not be used within 20m of a sett entrance; light work, such as digging by hand or scrub clearance will not take place within 10m of sett entrances.
- Any works within the badger breeding season (December to June inclusive) will require an exclusion zone of 50m around the setts.
- During the breeding season, no blasting or pile driving will be carried out within 150m of active setts. This will apply to works related to the construction of the storm tank.
- Therefore, piling for construction of the storm tank will be carried out between July and November, outside of badger breeding season.
- As the proposed works are located in proximity to the badger sett, they will be carried out in consultation with the NPWS. It is proposed to erect fencing along the south of the paved area adjacent to the sett in order screen off the works from the sett and prevent any entry of machinery to the south of the paved area, as depicted in Appendix 11A of the EIAR.
- The fence will be constructed in consultation with a qualified ecologist. It will not obstruct badger movement along existing commuting routes.
- Construction works will be carried out during normal working hours and all construction lighting and machinery will be switched off outside of these hours.

Mitigation Measures for Water Quality During Construction

- Prior to the outset of works, a double silt fence will be erected along the drains present to the west and north of the WwTP boundary. This will comprise wooden posts and geotextile membrane buried in an 'L' shape to a minimum depth of 250mm. The silt fence will filter any potential surface water run-off from the site generated during the proposed works. All surface water will thus be intercepted in this way before potentially entering any of the perimeter drainage ditches. An indicative layout drawing in Volume 3 Appendix 11A- Fig 11-21.
- An indicative area for a raised and bunded site compound is shown Volume 3 Appendix 11A- Fig 11-21. The compound area will be raised above potential flood levels.
- Access routes will be clearly marked / identified. Access during construction to any working areas will be restricted to land within the outlined works area.
- Plant will travel slowly across bare ground at a maximum of 5 kilometres per hour (km/hr).
- An Ecological Clerk of Works will visit the site at the outset of works to supervise installation of mitigation measures and will visit the site periodically during construction. The site will be continuously monitored by the Site Manager, Environmental Manager and ECoW for signs of run-off such as silt in surrounding vegetation, and measures will be put in place to prevent this where necessary.
- Excavations will be carried out using a suitably sized excavator and, in all circumstances, excavation depths and volumes will be minimised.
- Stockpiling of excavated material will be temporary and located in a clearly defined and demarcated area, away from any watercourse. Stockpiles will be removed on a regular basis to avoid potential sediment-laden run-off escaping the site or will be surrounded with silt fencing to prevent pathways to sensitive receptors.
- Earthworks will not take place during periods of high rainfall to reduce run-off and potential siltation of watercourses. Details on rain levels provided in 'Environmental Monitoring' section below.
- Good construction practices such as dust suppression on site roads, and regular plant maintenance will ensure minimal risk.
- Works may be required to be carried out within the water-table. Any ingress of groundwater into excavations will be pumped out to ground via a silt bag which will filter remaining sediment from the pumped water. The entire discharge area from silt bags will be enclosed by a perimeter of silt fencing. Alternatively, it will be pumped to a sealed clean tanker and removed from the site for appropriate treatment and discharge. An indicative area for the discharge, surrounded by silt fencing, is shown in Volume 3 Appendix 11A- Fig 11-21. In addition, silt traps or straw bales will be provided within the

drain closest to this area to provide another level of interception. Water monitoring will be carried out while this measure is being used. This will include monitoring two points as indicated in the drawing in Volume 3 Appendix 11A- Fig 11-21, one upstream and one downstream of the site, for turbidity. If downstream NTU levels are 10% higher than those upstream, works will pause until the issue has been addressed or further silt prevention measures are implemented.

- **Emergency Response Procedure**
- 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).
- 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 requires 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 Limerick City and 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 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 impacts;
    - Measures implemented to mitigate impacts; and
    - Any recommendations to reduce the risk of similar incidents occurring.

Mitigation Measures for Invasives Species

A site-specific Invasive Species Management Plan has been provided in respect of the proposed works and the presence of Giant Hogweed and Himalayan Balsam at the site. The Invasive Species Management Plan is attached as an Appendix 11B of the EIAR. Mitigation measures are also provided below.

Himalayan Balsam (Impatiens glandulifera)

Due to the nature of the proposed works, it will be necessary to achieve immediate eradication of the plant within proposed works areas in order to reduce the extent of infestation in advance of construction works. Hand-pulling the plant from proposed works areas is identified as the most appropriate control option for Himalayan Balsam at the site. The material will be kept within the site and left to dry out and die. Uprooted plants will be stockpiled and covered with jute material in order to block out light and degrade, since uprooted plants can potentially re-root form nodes in moist conditions. Infested areas within the site will be fenced off with a buffer of 7 meters and avoided where possible during construction works.

The following sections outline the steps that will be followed in order to achieve removal of the plant within the works areas and prevent any potentially contaminated material being removed off site.

Hand-pulling the plant from infested areas within the site in advance of construction phase is identified as the most appropriate control option for this species at the site.

- Himalayan Balsam hand-pulling will be supervised by a qualified ecologist and will be undertaken annually between the end of April to May, when plants are visible but before seed pods have developed.
- To manually remove, stems will be gripped about 0.5m above the ground and carefully pulled.
- The uprooted material will be stockpiled within the site and covered with jute material in order to block out light and degrade. The stockpile will be located within an area of the site where it will be undisturbed.
- Post control monitoring will be carried out four weeks after the control operations to assess the need for further control in advance of construction.
- Any hand-pulling which needs to take place from June onwards will be carried out by a qualified ecologist using a plastic bag to carefully cover the seed heads.

The following measures will be implemented in relation to the construction phase of the Proposed Development:

- A pre-commencement invasive species survey will be undertaken in advance of construction.
- Any persistent plants within works areas will first be removed by hand under supervision of the ecologist prior to works commencing and/or machinery and personnel accessing the area. This will avoid unnecessary disturbance to seed pods and potential dispersal of seed. Balsam plants will be removed by placing a plastic bag over the head of the plant to create a seal and pulling. Pulled plants will be stockpiled under jute material within the site in an area unlikely to be disturbed.
- A Toolbox Talk will be given by the ecologist in relation to the management of Himalayan Balsam within the site.
- Any current or previously mapped infested areas which can be avoided by the works will be fenced off to a 7-meter buffer.
- Throughout much of the site, it will not be possible to avoid areas that are contaminated with Himalayan Balsam. All works within 7m of Himalayan Balsam will be supervised by a suitably qualified ecologist.
- The entire site will be treated as a contaminated zone. A bio-secure zone will be set up at the entrance to the site. The bio-secure zone will comprise heras panels and/or posts and geotextile membrane in order to form a contained area for brush down of personnel and machinery to take place. Warning signage will be erected to direct personnel through the bio-secure zone prior to leaving the contaminated construction site. Clothes and shoes will be brushed down within the bio-secure area to prevent any seed being carried off site. Any material gathered here will be collected and kept within the site.
- As well as personnel, any machinery will be fully brushed down prior to moving away from the works. Power washing may also be carried out, however, all washings generated during clean down will need to be fully contained and discarded within the site away from any watercourse. It is

recommended that power washing be avoided due to proximity to watercourses and potential for contaminated material to escape.

- On completion of the works biosecurity measures will be removed under the supervision of the Ecologist.
- The Contractor will produce a detailed Method Statement prior to the commencement of works incorporating all measures detailed in the Invasive Species Management Plan.
- Contaminated areas where pipework is to be laid can be excavated and back-filled using the original excavated soil, resulting in this soil being left in-situ.
- Any other excavated soil to be isolated and contained within the site (outside the flood risk zone) and re-used in landscaping and infilling.
- It is envisaged that no soil is to be removed from the site but is to be reinstated within the site, thus negating the need for transport off-site, further risk of spread, and licencing requirements. Should potentially contaminated spoil be required to be removed from the site, it will be transported to a suitably licenced waste facility and will require a licence from the NPWS prior to its transportation.
- A detailed Method Statement will be prepared by the contractor showing the bio-secure zone and proposed stockpile location prior to works commencing.
- Post control monitoring will be carried out four weeks after the control operations to assess the need for further control and additionally on at least an annual basis, since seeds can persist in soil for up to 3 years, and since the infestation extends beyond the boundary of the WwTP.
- Uprooted areas and areas of bare soil post-construction will be re-seeded with native seed or replanted with extirpated native species, for habitat enhancement and in order to increase native competition and reduce the potential for re-establishment of Himalayan Balsam in these areas.

Giant Hogweed (Heracleum mantegazzianum)

Due to the nature of the proposed works, it will be necessary to achieve immediate eradication of the plant within proposed works areas via spraying in order to reduce above-ground plant biomass in advance of construction works.

Soil within 4m of plants which have flowered and set seed is likely to contain vast quantities of seed and disturbance to these areas will be avoided unless required as part of a treatment/control measure. Seeds are typically concentrated in the top 50cm of soil. Infested areas within the site which can be avoided by the construction works will be fenced off with a buffer of 4 meters.

Everyone operating in areas infested with Giant Hogweed will be made aware of the health risks associated with this plant. Infestations will be fenced off including a 4m buffer zone and a warning notice erected. All parts of the plant must be avoided. Any person involved in control or treatment is at risk from direct contact or contact with small fragments of plant or sap released into the works area. Workers must wear protective synthetic water-resistant clothing. Gloves with long sleeves and protective goggles must also be worn. Care must be taken not to touch any exposed skin with gloves covered in sap. If skin is accidentally exposed then the affected area should be carefully washed with soap and water, then covered to prevent UV light reaching the area and medical advice sought.

A professional specialist contractor must be employed for treating any Giant Hogweed infestations and must carry out a detailed risk assessment prior to undertaking any survey/treatment/control measures.

The following sections outline the steps that will be followed in order to achieve removal of the plant within the works areas and prevent any potentially contaminated material being removed off site.

Immediate commencement of in-situ spraying of Giant Hogweed is identified as the most appropriate control option for this species at the site. Due to the proximity of watercourses around the site and the SAC, a suitable herbicide which is approved for use near watercourses will be required.

- An invasive species specialist with experience in Giant Hogweed and the appropriate PPE will be employed for eradication of the plant from within the WwTP.
- Herbicide treatment will only be carried out by suitably qualified personnel/contractors with strict reference to the product label, local land use, health and safety considerations, compliance with relevant legislation and adherence to Uisce Éireann (formerly Irish Water) 's Biocide Strategy and Policy.
- A Risk Assessment with regard to the hazards of working with and in proximity to the plant will be provided by contractors.
- Treatment commenced in 2022 and follow-up treatment will be carried out in May 2023 in order to treat any seedlings which may have germinated after first treatment.

The following measures will be implemented in relation to the construction phase of the Proposed Development:

- A pre-commencement invasive species survey will be undertaken in advance of construction.
- Do not allow vehicle/machinery/personnel access to the infested area until the infestation has been treated by a Giant Hogweed Specialist and deemed not to present a health risk.
- A Toolbox Talk will be given by the ecologist in relation to the management of Giant Hogweed within the site.
- Any current or previously mapped infested areas which can be avoided by the works will be fenced off to a 4-meter buffer.
- Where works within 4m of Giant Hogweed are unavoidable - these will be supervised by a suitably qualified ecologist.
- The entire site will be treated as a contaminated zone. A bio-secure zone will be set up at the entrance to the site. The bio-secure zone will comprise heras panels and/or posts and geotextile membrane in order to form a contained area for brush down of personnel and machinery to take place. Warning signage will be erected to direct personnel through the bio-secure zone prior to leaving the contaminated construction site. Clothes and shoes will be brushed down within the bio-secure area to prevent any seed being carried off site. Any material gathered here will be collected and kept within the site.
- As well as personnel, any machinery will be fully brushed down prior to moving away from the works. Power washing may also be carried out, however, all washings generated during clean down will need to be fully contained and discarded within the site away from any watercourse. Power washing will be avoided due to proximity to watercourses and potential for contaminated material to escape.
- On completion of the works, biosecurity measures will be removed under the supervision of the Ecologist.
- The Contractor will produce a detailed Method Statement prior to the commencement of works incorporating all measures detailed in the Invasive Species Management Plan.
- Contaminated areas where pipework is to be laid to be excavated and back-filled using the original excavated soil, resulting in this soil being left in-situ.
- Any other excavated soil to be isolated and contained within the site (outside the flood risk zone) and re-used in landscaping and infilling.
- It is envisaged that no soil is to be removed from the site but is to be reinstated within the site, thus negating the need for transport off-site, further risk of spread, and licencing requirements. Should potentially contaminated spoil be required to be removed from the site, it will be transported to a suitably licenced waste facility and will require a licence from the NPWS prior to its transportation.
- A detailed Method Statement will be prepared by the contractor showing the bio-secure zone and proposed stockpile locations prior to works commencing.
- Ongoing monitoring for Giant Hogweed with follow-up spraying will be necessary in order to control Giant Hogweed within the site, particularly as it is pervasive in areas outside of the site.
- Uprooted areas and areas of bare soil post-construction will be re-seeded with native seed or replanted with extirpated native species, for habitat enhancement and in order to increase native competition and reduce the potential for re-establishment of Giant Hogweed in these areas.

Excavation Measures for Biosecurity:

- Contaminated areas where pipework is to be laid to be excavated and back-filled using the original excavated soil, resulting in this soil being left in-situ.
- Any other excavated soil to be isolated and contained within the site, within the compound or within bunded stockpiles, and re-used in landscaping and infilling. Stockpile locations and associated bunding are shown in the ISMP.
- It is envisaged that no soil is to be removed from the site but is to be reinstated within the site, thus negating the need for transport off-site, further risk of spread, and licencing requirements. Should potentially contaminated spoil be required to be removed from the site, it will be transported to a suitably licenced waste facility and will require a licence from the NPWS prior to its transportation.

Post-Construction Measures for Biosecurity:

Post control monitoring will be carried out four weeks after the control operations to assess the need for further control and additionally on at least an annual basis, since seeds can persist in soil for up to 3 years, and since the infestation extends beyond the boundary of the WwTP.

Lighting

The proposed external lighting design for the proposed development has been provided by Thorlux Lighting (shown in Section 11.5 of EIAR Part B). The site is already subject to external lighting on surfaced areas and infrastructure. The existing lights are on constantly throughout the night and are resulting in large amounts of light spillage.

Consideration was given to ecological sensitivities on the site in the design of the lighting layout, including the badger sett on the site and peripheral woodland areas with suitability for bat roosting and foraging. Therefore, the proposed new lighting layout, which will replace the existing lights, has been designed with the following mitigations in place, in line with Bat Conservation Trust - Guidance Note 08/18 *Bats and artificial lighting in the UK* and 2022 NPWS guidance (Marnell et al. 2022)*:*

- All lights will be of warm colour temperature 3000K.
- External lights will contain motion sensor systems, therefore, there will be the option for all lights to be off, or dimmed, when not needed.
- Lighting levels around the perimeter of the site/wooded areas will be kept to 1lux or lower.
- Lighting will be directional and will be focused onto roads and infrastructure and away from adjacent habitats.

General good practice measures:

- During the construction, low-level vibration technology will be used,
- Works resulting in vibration will be sequenced so that such activities do not occur simultaneously,
- Vibration levels will be monitored at both the source and the sensitive receptor location (i.e adjacent to the badger sett).

6.6 Archaeology, Architectural and Cultural Heritage

The following mitigation measures are recommended during the construction phase:

- Archaeological monitoring of all groundworks associated with the development will be carried out by a suitably qualified archaeologist in line with a method statement, and under licence from the Department of Housing, Local Government and Heritage in consultation with the National Museum of Ireland. Should significant archaeological material be identified during works, preservation in situ, where possible, or preservation by record is recommended and shall be undertaken following consultation with the National Monument Services.
- The mature trees and hedging bounding and screening the site will be retained.

If these recommendations are implemented, the potential impact on archaeological and built heritage material will be sufficiently mitigated.

6.7 Landscape and Visual

The existing WwTP has mature vegetation on the boundaries which filter the site from the surrounding area. No vegetation is expected to be removed for the Proposed Development. No additional screening planting has been proposed.

The existing vegetation surrounding the WwTP is critically screening views towards the Proposed Development. Its protection and enhancement should be adequate to further enhance visual screening to the inside of the site. This is expected to reduce further the visual impacts to the assessed visual receptors. It is also expected to have a positive impact to the landscape character along the Lower River Shannon by improving the quality of the vegetation and provided amenity.

6.8 Land and Soils

6.8.1 General

The proposed construction techniques shall comply with the requirements of statutory bodies (Building Control Amendment Regulations, Health Service Executive inspections, Uisce Éireann (formerly 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 in addition to the following:

- 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.

6.8.2 Works- Specific Mitigation Measures

Removal of Potentially Contaminated Soils

Excavations in made ground will be monitored by an appropriately qualified person to ensure that any evidence of contamination (e.g. asbestos, hydrocarbons, etc) encountered are identified, segregated and appropriately stored in an area where there is no possibility of run-off 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.

The contractor will be required to carry out a waste characterisation of the material that will be taken off site for disposal. A waste acceptance criteria (WAC) analysis and asbestos levels should be determined on any material that will be taken off site for disposal. All wastes in the European Waste Catalogue are classified by a unique 6-digit code. In this case (waste soil/stones), two List of Wastes (LoW) Codes are applicable to material that may be taken off site for disposal during the construction phase:

- 17 05 03 - Soil and stones containing hazardous substances;
- 17 05 04 - Soils and stones other than those mentioned in 17 05 03.

Any soil samples that contain asbestos should be subjected to full quantification analysis. Uncontaminated soil materials can be brought to a soil recovery facility. Soil recovery facilities are licensed to accept only uncontaminated natural soil and stone. Any materials exceeding soil trigger levels determined by *Table 3.3 - Summary of Maximum Concentrations and/or Trigger Levels in Soil & Stone for Soil Recovery Facilities* (EPA, 2020), or containing invasive species, will be disposed of at an appropriately licenced landfill facility.

The Site Manager will ensure that a Waste Management Plan is in place to ensure that these criteria are followed. The acceptance of this material at a licenced soil recovery facility will be subject to the approval of the facility operator.

Loss of Overburden

Excavated material will, where possible, be retained and reused on site as construction fill. It is anticipated that all of the excavated topsoil may be reused in landscaping throughout the site. Based on the ground investigation data, the majority of the overburden material within the storm tank footprint is unlikely to be suitable for re-use as an engineered fill without additional mechanical working (drying out) or chemical amelioration (lime or cement stabilisation).

If this is feasible, the appointed contractor will need to ensure acceptability of the material for reuse and oversee the appropriate handling, processing and segregation of the material. This material would have to be shown to be suitable for re-use and subject to appropriate control and testing according to the Earthworks Specification(s). These excavated soil materials will need to 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.

Sealing of Overburden

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.

Groundwater Quality

Excavated 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. Should contaminated materials be encountered, care will be taken to ensure no cross-contamination with clean soils elsewhere throughout the site.

Groundwater Flow

Dewatering will be required for the construction below the groundwater table. Extracted groundwater would be passed to a suitably sized settlement pond or a propriety fines removal system, along with any other treatment as required by Limerick County and City Council before discharge to the Lower River Shannon, or local drainage network. Any discharge to either sewer or watercourse would be subject to a WWDA.

6.8.3 Monitoring During Construction

Excavations in made ground will be monitored by an appropriately qualified person to ensure that any contaminated material is identified, segregated and disposed of appropriately. Any identified hotspots shall be segregated and stored in a bunded area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the hotspot does not cross-contaminate clean soils elsewhere.

Any excavation shall be monitored during earthworks to ensure the stability of side slopes and to ensure that the soils excavated for disposal are consistent with the descriptions and classifications according to the waste acceptance criteria testing.

Ground settlement, horizontal movement and vibration monitoring will be implemented during the works to ensure that construction activities do not exceed the design limitations of nearby existing WwTP infrastructure.

Water quality monitoring will be carried out at all discharge points as per the requirements of the issued Wastewater discharge authorisations (WWDA).

6.9 Water

6.9.1 Construction Mitigation Measures

Surface Water Run-Off

- 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 Lower River Shannon;
- Best practice measures will be implemented during excavation works to avoid the release of bentonite and prevent sediment running into the drainage network and/or to surface waters during construction;
- Earthworks operations shall be carried out such that the surfaces are designed with adequate slope to promote safe runoff.
- Any excavated vegetation, soil and subsoil will be temporarily stockpiled away at least 20 m from surface water or drainage features;
- Earthworks will aim to be carried out in periods of dry weather (from April to September inclusive) to avoid potential for suspended sediment runoff;
- All concrete works will be carried out in dry conditions;
- Good housekeeping such as site clean ups, use of disposal bins, etc will be adopted in construction areas;
- Working areas will be dewatered at the end of each working day and vehicle washdown will be carried out in an appropriate area where wash water can be captured and treated accordingly.
- In order to prevent accidental release of hazardous materials such as fuels, cleaning agents etc into surface water during construction, all hazardous 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 Lower River Shannon. This would be contained through the implementation of best practice measures.

Accidental Spills and Leaks

With regards to accidental spills and leaks, the Main Contractor and sub-contractors shall be responsible for ensuring the following measures are implemented:

- An Emergency Plan for accidental spills will be established by the Main Contractor prior to work commencing at the site. As a minimum the Emergency Plan should contain contact details for statutory bodies such as the NPWS and IFI. All site workers should be made aware of the plan and its location in the site offices;
- There will be no refuelling of machinery within or near the river channel. Refuelling will take place at designated locations at distances of greater than 30 meters from any surface water or drainage features;
- No vehicles will be left unattended when refuelling and a spill kit including an oil containment boom and absorbent pads will be on site at all times;

- Any fuel that is stored on the site will stored appropriately and at a location that is set back from the river. All other construction materials will be stored in this compound. The compound will also house the site offices and portable toilets. This compound will either be located on ground that is not prone to flooding or will be surrounded by a protective earth bund to prevent inundation;
- All vehicles will be regularly maintained and checked for fuel and oil leaks;
- If a spillage does occur, it will be contained with adsorbent pig bags. These will be placed in a hazardous waste bin for ultimate disposal;
- All oils and fuels will be stored in bunded tanks with the provision of a storage/retention capacity of 110% of tank storage. Care and attention will be taken during refuelling and maintenance operations. Particular attention shall be paid to gradient and ground conditions which could increase the risk of discharge to waters.

- No fuel storage will be allowed in areas prone to temporary flooding.

Flood Risk

There is a possibility that a flood will occur during the construction phase. The contractor will be required to monitor storm and high tide conditions that may cause inundation. The contractor will devise an appropriate construction-phase flood defence around works areas, such as a defined area bunded with sandbags.

All works undertaken near the riverbanks will be fully consolidated to prevent scour and run-off of silt. Consolidation may include use of protective and biodegradable matting or geotextiles. Earth works will be aimed to take place during the driest season to ensure that any flooding during the wet season does not result in mobilisation of significant quantities of unconsolidated material.

Ground levels for the compound will be raised temporarily above the design flood level for the duration of the construction contract to prevent materials and equipment being carried away by flood water in the event of a flood.

6.9.2 Construction Monitoring

The site-specific Detailed CEMP will set out the monitoring requirements for the scheme during the construction stages. Visual inspections will be undertaken as part of the regular site audits during construction to ensure surface water drainage discharge is not impacting the Lower River Shannon. The contractor will also be required to monitor weather conditions in the case of potential flood risk so that mitigation measures, as previously discussed, may be undertaken.

6.10 Resource and Waste Management

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

- The contractor will minimise waste disposal so far as is reasonably practicable. Opportunities for reuse of materials, by products and wastes will be sought throughout the construction stage of the Proposed Development.
- 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 excavated 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.
- Waste from the Proposed Development will be transported by authorised waste collectors in accordance with the Waste Management (Collection Permit) Regulations, 2007 as amended.
- Waste from the Proposed Development will be delivered to authorised waste facilities in accordance with the Waste Management Acts 1996-2022 as amended.
- 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.
- 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 disposed of.
- 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

- Early consultation has been established with local residents and water-based recreational users of the University of Limerick Boat House in the form of a public consultation event on the 13th June 2022. In addition, the college was informed of proposals and a social media drive and poster, and paper campaign carried out in the area. This is required to minimise any impacts on the Proposed Development on these stakeholders. While it is noted that as all works are confined within the site boundary and envisaged direct impacts on these stakeholders are considered to be minimal, the timeframe of the proposed works in general and specific works impacting indirectly on recreational uses will be communicated to ensure that any impacts from these works are minimised.
- A Traffic Management Plan will be prepared as described in Section 6.1. This will co-ordinate the management of vehicular, pedestrian and cyclist traffic adjacent to the site including road closures and diversions, to mitigate any traffic congestion or road safety impacts which may arise for road and pavement users. It will propose signage and manning the hazard spots during busy periods with close liaison proposed with UL throughout the construction phase.
- All construction traffic shall use Harvard Close via Junction 1 – Plassey Park Road/ Harvard Close travelling to/from the site, to minimise any potential for temporary disruptions to the operation of University of Limerick and businesses in the vicinity. Passing bays or banksmen will be provided on Harvard Close to ensure smooth traffic movement. Where possible abnormal load movements, on receipt of a permit from the council, will be restricted to off peak times.
- Construction staff parking will not be permitted on the public road network. Restrictions to the movement of tracked vehicles and haul loads shall apply, in conjunction with the use of wheel washers and water bowsers to prevent migration of detritus and dust built-up on public roads.
- Section 6.4 includes a comprehensive suite of construction noise mitigation measures with best practice being adopted to monitor and limit the hours when high noise levels are permitted; restrict construction traffic speeds, establish channels of communication with stakeholders; train construction staff in noise minimisation, select and locate plant to minimise noise levels.
- Section 6.7 notes that existing mature vegetation critically screens views towards the Proposed Development, this will be protected and enhanced. Temporary hoardings will be put in place should this be deemed necessary to screen glimpses of the construction zone.
- In terms of flood risk Section 6.9 notes that all new infrastructure will be constructed within Flood Zone B and C, in the small area where this is not possible, commensurate compensatory storage will be provided for Flood Zone A. Essential infrastructure will be constructed at an elevation above the 1% Annual Exceedance Probability with the inclusion of freeboard.

- In terms of water quality, during the construction phase best practice will be adopted, to ensure contaminated runoff and stormwater or any resuspended silt particles do not pose a risk to the Lower River Shannon.
- 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:

- Wherever possible, mitigation by avoidance of negative effects on property was a priority during the design of the Proposed Development. Liaison with the University of Limerick and Limerick City and County Council will be undertaken to minimise disruption on the road network.
- 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 proposed works will be located within the existing Castletroy WwTP site boundary and should not impact services outside of the site.
- Any shutdowns required to connect into existing water and waste water infrastructure will be agreed in advance with Uisce Éireann (formerly Irish Water) and the Local Authority. This will minimise the disruption to the operation of the existing plant and network.
- Surface water management measures will be adopted throughout the site. The contractor will be required to prepare and maintain a Detailed CEMP during the construction phase of the Proposed Development. The appointed contractor will be required to comply with the Outline CEMP Effective implementation of the CEMP will ensure that disruption and nuisance are kept to a minimum throughout the construction of the Proposed Development. The Detailed CEMP will be required to have regard to the guidance and industry best practice. The CEMP will be effective throughout construction and the contractor will be required to review and update the CEMP as construction progresses.
- In addition to the CEMP, it is anticipated that the contractor will prepare relevant management plans and Works Method Statements in advance of any works commencing on site. Every effort will be made to ensure that any significant effects on material assets will be avoided, prevented or reduced during the construction of the Proposed Development.

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:

- To mitigate the risk of flooding, all chemicals will be stored appropriately in the COSHH stores. Oil, including diesel, would be stored in properly bunded tanks / bunded mobile bowsers/ drip trays. No fuels, chemicals or solvents will be stored outside of the confines of the WwTP buildings.
- Earthworks operations will be designed with adequate drainage to promote safe runoff and prevent ponding and flooding.
- It is recommended that compensatory storage is provided for floodplain lost during the 1% AEP flood so as not to increase flood risk elsewhere. The FRM Guidelines states that to provide compensatory storage, a volume of flood plain equal to that lost to the Proposed Development should be created and to ensure that flood flow routes are protected.
  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.