UISCE ÉIREANN : IRISH WATER

Comhairle Contae Fhine Gall
Fingal County Council

Leixlip Water Treatment Plant Upgrade

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

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Client	Irish Water
Project No.	4041
Project Title	Leixlip Water Treatment Plant Upgrade
Report Title	Construction Environmental Management Plan

Rev.	Status	Author(s)	Reviewed By	Approved By	Issue Date
1	Draft Report	M Grace	J Bourke	J Bourke	10/06/2021
2	Revised	M Grace	J Bourke	J Bourke	13/07/2021
3	Revised	M Grace	J Bourke	J Bourke	03/09/2021
4	Revised following comments	M Grace	J Bourke	J Bourke	13/09/2021
5	Revised following update of dosing lines	M Grace	J Bourke	J Bourke	20/09/2021
6	Revised Red Line	M Grace	J Bourke	J Bourke	30/09/2021

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Contents

1 Introduction

1.1 Overview

This Construction Environmental Management Plan (CEMP) has been produced by Ryan Hanley on behalf of Irish Water as part of the planning application for upgrades to Leixlip Water Treatment Plant (WTP), Co. Dublin. This CEMP details the overall environmental management strategy to be adopted and implemented during the construction phase of the upgrades to Leixlip WTP in order to mitigate, avoid, prevent, or reduce environmental impacts which may arise during the construction phase of this development.

The final CEMP will be produced, pending the granting of planning permission, and will be updated to include more site-specific information once the Construction Management Team is appointed. A CEMP is an integral part of the site health, safety, environmental and quality management system. The CEMP is also subject to the requirements of the project quality management system with respect to documentation control, record control and other relevant measures.

1.2 Site Description

The Leixlip WTP is located within South Dublin County Council's functional area along the eastern bank of the River Liffey, and broadly enclosed by the N4 Motorway to the south, Cooldrinagh Lane to the east and the Leixlip Road (R148) to the north.
The site is also bounded by a number of properties within this area including residential, commercial and industrial premises, including The Walled Orchard housing development, Becketts Hotel, a Sludge Dewatering Facility, an ESB Hydro-Electric Station and the Salmon Leap Inn.

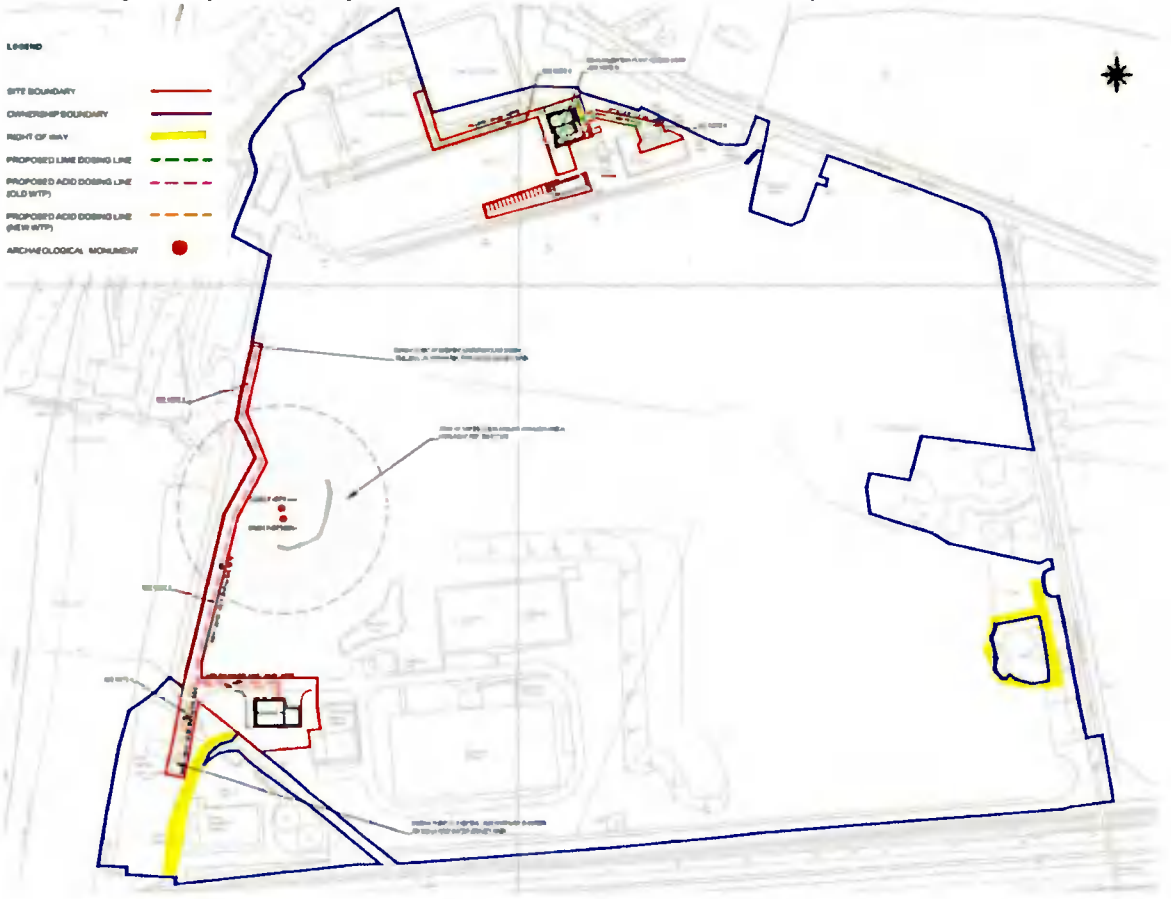

Figure 1.1 Overview of the existing site and proposed development (within red line boundaries)

The overall site measures in the order of 20 hectares, the majority of which is undeveloped lands, and will be unaffected by the proposed development, which is concentrated to specific areas of the site. Much of the site has been preserved from development due to topographical and archaeological constraints. The proposed development has been similarly designed to avoid constrained areas.
The site is accessed from the Leixlip Road to the north and via Cooldrinagh Lane to the east. The site is in proximity to Leixlip Town Centre, being located on the opposite bank of the River Liffey.

The old Treatment Plant is located to the north of the site and is arranged within a cluster of buildings / structures related to the water treatment process. The complex adjoins the ESB Hydro-Electric Station, residential property and the Salmon Leap Inn.
The new Treatment Plant is a modern addition to the treatment plant site, being constructed in recent years, to the south of the overall site, adjacent to the 'raw' water inlet infrastructure and the Sludge Dewatering Facility. This part of the complex is largely separate from surrounding uses and is bounded to the south by the M4, to the west by the River Liffey and to the north and east by undeveloped lands.

1.3 Purpose

The purpose of this document is to communicate key environmental obligations that apply to all contractor organisations, their sub-contractors and employees whilst conducting any form of construction activity on the Leixlip WTP Upgrade Project. The CEMP identifies the minimum requirements regarding mitigation, monitoring, inspection, and reporting mechanisms that need to be implemented throughout the construction phase.

1.4 Scope

The CEMP defines the approach to environmental management at the Leixlip WTP site during the construction phase. Compliance with the CEMP, the procedures, work practices and controls will be mandatory and must be adhered to by all personnel and contractors employed on the construction phase of the project. This CEMP seeks to:

- Provide a basis for achieving and implementing construction related mitigation measures;
- Describe the programme for environmental management during construction;
- Outline the principles and minimum standards required of the contractor during development;
- Comply with all relevant conditions attached to the Planning Permission (once obtained);
- Promote best environmental on-site practices for the duration of the construction phase.

Prior to the commencement of construction activities, this CEMP will be expanded and updated where necessary, as such this document is deemed a working or live document. Specific Method Statements will be required in line with a more detailed final CEMP which will be mindful of the proposed activities, equipment and plant usage and monitoring plans during construction. This CEMP details the range of potential impacts which may arise from construction activities of the proposed development and the control measures implemented to mitigate such, however is it the responsibility of the Contractor who will undertake the works to provide a detailed and final CEMP statement.

1.5 CEMP Structure

The structure of this CEMP is as follows:

- Section 1 provides an overview to the CEMP and the site description;
- Section 2 details the proposed development and associated works;
- Section 3 outlines the project roles and responsibilities and associated members involved;
- Section 4 outlines the Environmental Management Framework to be adopted during the construction phase to ensure environmental protection;
- Section 5 outlines the Construction Methodology;
- Section 6 describes the General Requirements and means to mitigate and address potential environmental impacts;
- Section 7 details the environmental management and mitigation measures;

- Section 8 outlines the Construction Environmental Emergency Plan to be adopted in the event of an environmental emergency and incident response;
- Section 9 contains an appendix to the CEMP:
    - Construction Waste Management Plan

1.6 Procurement & Detailed CEMP

The Contractor will be required to comply with all requirements including the statutory consent approvals which may be granted by the Planning Authority and other statutory stakeholders. Therefore, the Contractor is required to prepare a more detailed final CEMP for the works. The final CEMP will be specific, targeted, and a 'stand-alone' plan to support the detailed design and construction methodologies established during the next phase of the proposed development. The final CEMP will be submitted to the Planning Authority for consultation and approval in advance of any construction works on site.

The Contractor is required to develop a detailed final CEMP that:

- Is in accordance with the mitigation measures specified in this 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 AA Screening and ensures there is no material change in terms of significant effects on the environment;
- Where practicable the contractor should seek to identify opportunities for further reducing significant negative environmental effects and to implement best practice in as far as reasonably practicable, i.e., take every reasonable effort to reduce and prevent negative effects, while enhancing benefits; and
- Will have regard to the guidance contained in the handbook published by Construction Industry Research and Information Association (CIRIA).

1.7 Live Document

The CEMP is considered a 'live' document and as such will be reviewed on a regular basis. Updates to the CEMP may be necessary due to any changes in environmental management practices and/or contractors. As explained in more detail in the later sections, the procedures agreed in this CEMP will be audited regularly throughout the construction phase to ensure compliance.

2 Proposed Development

The proposed development specifically relates to permission for development for the following elements:

1) Demolition of existing Workshop and (defunct) Activated Carbon Building adjacent the 'old' / northern Treatment Plant Building;

2) Construction of a Sulphuric Acid Storage and Dosing Facility Building (single storey up to approximately 8.7 metres in height) adjacent the 'new' / southern Treatment Plant Building;

3) Construction of a Lime Storage & Dosing Facility Building (single storey up to approximately 11 metres in height) adjoining the 'old' / northern Treatment Plant Building, associated external storage silos (2 no.) with external staircase (up to approximately 12.3 metres in height) partially enveloped with a perforated metal architectural screen, and ancillary plant and equipment;

4) Reconfiguration and repurposing for use as a De-Alkalisation Plant of existing (disused) High-Lift Pump Hall within the 'old' / northern Treatment Plant Building;

5) The construction of a new ancillary Workshop Building (single storey up to approximately 4.5 metres in height) to the rear / south of the 'old' / northern Treatment Plant Building;

6) Temporary and enabling works to facilitate construction and continued / uninterrupted operation of the Treatment Plant site;

7) Associated network of underground pipelines / connections, and redirection of existing where necessary, throughout the site; and,

8) Provision of additional car parking (to the rear / south of the 'old' / northern Treatment Plant Building), modification and extension of existing drainage, utility and services infrastructure and connections to serve and facilitate new and reconfigured buildings, and all other associated and ancillary development and works above and below ground level.

A number of temporary works may be necessary in terms of the construction of the proposed development, in the context of ensuring a continued operation of the site as a water treatment plant and otherwise to ensure an efficient and safe construction process. The following temporary works are envisaged in order to develop the outlined permanent works:

- Sheet piling and bracing at the Lime Building area may be required – the silos are to be placed in a depressed bund, approximately 1m below existing ground level, in order to minimise the height of the structures;
- Works Compound – there shall be 1 No. compound as detailed within the enclosed drawings;
- Temporary heras type security fencing shall be erected on all works zones and public interfaces;
- A Temporary Traffic Management Plan (TTMP) will be developed at construction stage to manage construction traffic access & egress from the site;
- Trench boxes may be required for ducting runs and pipelines. Localised dewatering of trenches may be required at construction stage. All dewatering arising from the excavations will be passed through siltation boxes and silt bags with the filtered water outlet discharging to the local sewer network;
- Spoil will be removed off-site as required by a licensed haulier to a licensed waste facility.

2.1 Project Environmental Policy

The Client, Irish Water recognises and seeks to minimise the impacts of its business on the environment. The Contractor will be committed to:

- Carrying out the Project in full compliance with all applicable environmental regulations and other requirements, including the planning conditions attaching to any planning obtained, mitigation measures and implementation of controls;
- Implementing good environmental practice as part of designs, e.g. carry out design reviews, risk assessments, etc;
- Preventing pollution from activities through a system of controls that include written instructions and staff training appropriate to the environmental requirements of their work;
- Continually improving environmental performance by setting objectives and targets and implementing them through an environmental programme;
- Informing all project employees about Environmental Policy and explaining what is needed in order to protect the environment;
- Implementing Environmental Policy through the successful operation of the CEMP;
- This policy will be reviewed periodically, taking into account current and potential future impacts.

3 Project Roles & Responsibilities

A Contractor has been appointed to undertake the construction works at the Leixlip site. The contract between Irish Water and the Contractor will allocate responsibility for compliance with the terms of the CEMP during construction.

A liaison group including but not limited to representatives of Irish Water, South Dublin County Council, Fingal County Council and the Contractor will be established.

3.1 Client

Irish Water were established in 2013 to bring water and wastewater services of the 31 local authorities together under one national service provider. Irish Water are responsible for the operation of all public water and wastewater services including: management of national water and wastewater assets; maintenance of the water and wastewater system; investment and planning; managing capital projects; customer care and billing. Irish Water are also responsible for all of the capital investment decisions and implementation of the capital programme delivery across the country.

Irish Water are 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 Engineer/Employer's Representative

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

3.3 Contractor

The Contractor 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.

3.4 Construction Director

The Construction Director will have an overall responsibility for the organisation and execution of all, related environmental activities as appropriate, in accordance with regulatory and project environmental requirements. The principal duties and responsibilities of this position will include:

- Overall responsibility for the development and implementation of the CEMP;
- Allocating resources to ensure the implementation of the CEMP;
- Participates in the management review of the CEMP for suitability, adequateness and effectiveness;
- Sets the focus of environmental policy, objectives and targets for the Contractor;
- To discharge his/her responsibilities as outlined in the CEMP; and
- To support and augment the Construction Management Team and the Environmental Officer through the provision of adequate resources and facilities in the implementation of the CEMP.

3.5 Site Manager

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

3.6 Construction 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 will perform the necessary tasks, review environmental procedures, and consult with the members of the construction team and stakeholders as required.

The Environmental Manager will be responsible for, but not limited to, the following activities:

- Preparation of the CEMP, environmental control plans, supporting procedures;
- Ensuring that the requirements of the CEMP are developed and environmental system elements (including procedures, method statements and work instructions) are implemented and adhered to with respect to environmental requirements;
- 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 site inspections and compiling an environmental compliance report on a monthly basis;
- Reviewing the Environmental responsibilities of other managed Contractors in scoping their work and during Contract execution;
- To ensure that advice, guidance and instruction on all CEMP matters are provided to all their managers, employees, construction contractors and visitors on site;
- Report to the Construction Manager on the environmental performance of Line Management, Supervisory Staff, Employees and Contractors;
- Advise site management (including, but not limited to, the site Construction/Commissioning Manager) on environmental matters;
- Ensuring all personnel have undertaken adequate environmental inductions, awareness briefings and training (including subcontractors);
- Respond to any concerns or complaints raised by the public in relation to the construction phase of the project;
- Ensure the Construction Director is informed of any complaints relating to the environment;
- Keep the public informed of project progress and any construction activities that may cause inconvenience to the local community;
- Investigate incidents of significant, potential, or actual environmental damage, ensure corrective actions are carried out and recommend means to prevent recurrence; and
- Be responsible for maintaining all environmental related documentation.

3.7 Project Archaeologist

The Project Archaeologist will report to the Environmental Officer and is responsible for advising on all archaeological monitoring activities, conducting watching briefs and distributing information relevant to monitoring. The responsibilities and duties of the Project Archaeologist will include the following;

- Monitor all ground disturbance works associated with the construction of the development;
- Ensure the appropriate course of action is taken in the event that archaeological material is discovered during the works;
- Liaison with the Construction Management Team (CMT) throughout the construction phase of the project; and
- Liaison with the Development Applications Unit, National Monuments Service, Department of Arts, Heritage and Gaeltacht and the Planning Authority Archaeologist as required.

3.8 Site Supervisors

The Construction Management Team Site Supervisors are required to:

- Read, understand and implement the CEMP;

- Know the broad requirements of the relevant law in environmental matters and take whatever action is necessary to achieve compliance. Where necessary seek the advice of the CMT Environmental Manager;
- Ensure that environmental matters are taken into account when considering Contractors' construction methods and materials at all stages;
- Be aware of any potential environmental risks relating to the site, plant or materials to be used on the premises and bring these to the notice of the appropriate management;
- Ensure plant suggested is environmentally suited to the task in hand;
- Co-ordinate environmental planning of CMT activities to comply with environmental authorities requirements and with minimum risk to the environment. Give Contractors precise instructions as to their responsibility to ensure correct working methods where risk of environmental damage exists;
- Where appropriate, ensure Contractors method statements include correct waste disposal methods;
- Be aware of any potential environmental risks relating to the Contractors and bring these to the notice of the appropriate management; and
- Ensure materials/waste register is completed.

3.9 Site Operatives

All Contractors, and other site personnel, on the project will adhere to the following principal duties and responsibilities:

- To co-operate fully with the CMT and the Environmental Manager in the implementation and development of the CEMP at the site;
- To conduct all their activities in a manner consistent with regulatory and best environmental practice;
- To participate fully in the environmental training programme and provide management with any necessary feedback to ensure effective environmental management at the site; and
- Adhere fully to the requirements of the site environmental rules.

4 Environmental Management Procedures

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

As part of the environmental management framework contractors will need to comply with all relevant environmental legislation and take account of published standards, accepted industry practice, national guidelines and codes of practice appropriate to the proposed development. Due regard should be given to the guidance and advice given by ISO14001[1] standard and Construction Industry Research and Information Association (CIRIA) guidance[2].

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.

4.1 Training, Awareness and Competence

The Contractor (and their subcontractors) have been 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. Site staff will receive relevant and appropriate training to ensure that they have the appropriate knowledge to successfully implement the CEMP.

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 Construction 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 including procedures for dealing with damage to the environment.

No persons shall work on site without first receiving environmental induction. Signed records of environmental training will be established, maintained, and made available to the Employers Representative.

Site briefings and talks should 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.

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[1] ISO (2015) ISO 14001:2015 Environmental management systems -- Requirements with guidance for use

[2] CIRIA (2015) Environmental Good Practice on Site C692 (fourth edition) (C762), CIRIA (2015) Coastal and marine environmental site guide (second edition) (C744), CIRIA (2002) Brownfield development sites: ground-related risks for buildings (X263)

4.2 Site Meetings

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

- Irish Water;
- Employer's Representative;
- Contractor, and
- Environmental Manager.

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

4.3 Monitoring, Inspections and Audits

Routine inspections and audits of construction activities will be conducted throughout the duration of the works by the Construction Environmental Manager and Construction Manager. The inspections will ensure compliance to the Environmental Management Plan and the agreed CEMP in place. 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 final CEMP will include further detail on inspection procedures.

4.3.1 Monitoring

Mitigation and monitoring will be carried out so that construction activities are undertaken in a means which does not give rise to significant negative effects. It is required that suitable monitoring programmes be developed, implemented, documented, and assessed in accordance with the specification outlined in the final CEMP. The results of all environmental monitoring activities will be reviewed by the Environmental Manager on an ongoing basis to enable trends or exceedance of criteria to be identified and corrective actions implemented where necessary.

4.3.2 Inspection

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

Review of the weekly inspections will be conducted monthly to revise environmental documentation and records. The monthly inspection will be recorded on a standard form and reported to the Employers Representative. This standard form will address the following as a minimum:

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

4.3.3 Audits

Independent environmental audits shall be carried out by a third-party during construction works. 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).

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.

As part of the final CEMP, the Construction Environmental Manager will establish a schedule for internal audits which will be scheduled at least once every three months.

The Contractor shall 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.

4.3.4 Corrective Actions

For any environmental nonconformities found, the auditor will prepare a Corrective Actions Report to describe and record the findings of the nonconformance. 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. The verification of previous Corrective Actions Reports should be also recorded. Upon completion of an audit, the auditor will review all Corrective Actions Reports and prepares an Audit Report to summarise:

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

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

The Construction 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 nonconformances identified and outline the proposed corrective action.

4.4 Incidents

4.4.1 Incident Response Plan

Whilst measures will be established to ensure the prevention of incidents arising in the first instance, an Incident Response Plan (IRP) will be prepared to ensure efficient and prompt corrective actions are implemented. Such corrective actions are applied to rectify any nonconformances (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 Construction 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.

The Construction Environmental Manager should identify the cause and implement remedial action and where necessary the associated third party or statutory body should also be contacted. Remedial measures should be implemented as soon as practically feasible to prevent further exceedances. Where new or amended measures are proposed, the relevant CEMP(s) will be updated accordingly by the Construction Environmental Manager and the Employer's Representative should be informed at the earliest opportunity.

An IRP will ensure adequate health and safety of all site members and minimise environmental impact. The plan should consider all possible emergency scenarios and establish a protocol and effective planning if such scenarios were to occur. Emergency incidents are deemed events which result in significant environmental effects and may include, but no limited to:

- Failure in any mitigation measures or environmental protection system;
- Any emission which does not comply with relevant licences and contract requirements;
- Any circumstance with the potential for environmental pollution; and
- Any emergency which may incur environmental effects.

The IRP will be developed and detailed by the assigned Contractor in the final CEMP, and as such is considered a working document and updated where applicable. Updated IRPs should be disseminated accordingly to construction staff.

The IRP should include emergency contact details and methods of notifying local authorities, statutory authorities, and stakeholders. Contact details of key personnel should also be included.

Emergency Contacts will include, but are not limited to:

- Environmental Protection Agency;
- Inland Fisheries Ireland;
- National Parks and Wildlife Service;
- Irish Water;
- Fingal and South Dublin County Councils (Environment Section);
- ESB Emergency;
- Health and Safety Authority;
- Leixlip Garda Station;
- Leixlip Fire Station;
- Connolly Hospital, Blanchardstown.

4.4.2 Environmental Incident Reporting

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);
- Suspected causes;
- Contributory causes;
- Weather;
- Scale and negative effects (short, medium, long term, temporary/permanent);
- Measures implemented to mitigate or compensate for adverse effects;
- Any recommendations to reduce the risk of similar incidents occurring.

The contractor shall 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 shall respond to all comments made by the ER on any incident.

4.5 Environmental Reporting

An Environmental Compliance Report will be required to be submitted on a monthly basis for review by the Employer's Representative. The report will detail at a minimum:

- Summary of compliance with the CEMP and the identification of any non-conformances;
- Monitoring results;
- Details of any issues and/or non-conformances identified during inspections and/or audits;

- Incidents and corrective actions reports;
- Overview of environmental complaints received / queries raised by stakeholders; and
- Records of environmental training undertaken where applicable.

The occurrence of any emergency incidents shall be immediately reported to the Employer's Representative with an initial report prepared within 24 hours detailing the specifics of the incident and cause, if known. An Environmental Incident Report will be required, and any other documentation as requested by the employer's representative, within 7 days of the incident occurring. The Environmental Incident Report will outline the details of the incident, the location, cause (known or suspected), the scale and effects (i.e. short/long-term, temporary/permanent), and the required corrective actions and mitigation or remediation measures to be established.

4.6 Environmental Records

Environmental documentation including monitoring, inspections, results, method statements and plans shall be maintained within an Environmental Management System by the Contractor. All records will be kept up to date and made available for audits, inspections, and reporting.

The Contractor shall maintain the following reports, at a minimum, which shall be available for inspection by the Employers Representative and other 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.

4.7 Communications

4.7.1 Communication Management Plan

A Communications Management Plan, including a procedure for internal and external communication in relation to the site development, shall be established by the contractor to promote awareness and information regarding the project. Engaging with stakeholders, and specifically the local community affected by the development, is important. 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.

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 shall facilitate regular consultation in accordance with the specifications and cooperate with this plan.

4.7.2 Regular Consultation & Public Relations

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.

Internal communication should also be established to ensure effective communication within the project team and should include:

- Weekly site safety meetings;
- Site management meetings;
- Reporting from the environmental manager on environmental issues.

4.7.3 Advance Notice of Works

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

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

Irish Water and the contractor in consultation with Fingal and South Dublin 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.

4.7.4 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 and emergency services that may need to be contacted in the event of an accident/incident.

4.7.5 Enquiries and Complaints

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

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

5 Construction Methodology

5.1 Overview

There are a number of elements of construction works required in order to complete the described facilities and infrastructure, including limited demolition, excavation, pipeline construction, installation of services on site at Leixlip WTP and construction of the proposed facilities. The construction is expected to take approximately 12 months and will be sequenced to ensure the following:

- Reduce disruption to neighbours to a minimum;
- Reduce disruption to the locality to a minimum;
- Reduce impact on the local environment to a minimum;
- Ensure safe working practices and sites.

All works will be conducted in accordance with the Safety, Health and Welfare at Work Act 2005, the Construction Regulations 2013 and all other relevant legislation and codes of practice as set out by the Health and Safety Authority. All sites, construction areas, public roadways, paths and any impacted private lands will be maintained in a safe condition for all. Noise, vibration and dust emissions will be fully controlled and mitigated to ensure they remain within permitted limits during the construction phase.

5.2 Construction Compounds

There is 1 No. site identified as the proposed site compound throughout the proposed development:

1. Leixlip Site Compound – see Planning Drawing 11118-RHL-LP2-XX-DR-PL-0005

The compound will initially be used by the site clearance and enabling works contractor, followed by drainage and networks contractors, and finally by contractors constructing each individual facility. The Main Site Compound will be located as per Planning Drawings, to the north-west of the site. The Compound will house the Contractor's staff welfare facilities, meeting rooms, etc. It will also act as a secure area for temporary storage of materials.

The Contractor shall install all necessary toilets and sewage collection infrastructure to cater for construction-related wastewater generation at each site. The Contractor shall arrange for frequent collection and licensed disposal of wastewater.

5.3 Demolition

There are two buildings on-site that will be demolished to make room for the proposed development. These are indicated on the Planning drawings. The main issues for the demolition phase will be as follows:

- Personnel safety;
- Noise;
- Control of Dust;
- Traffic, and;
- Working Hours.

A detailed Demolition Plan will be prepared by the Contractor and adequate mitigation measures to minimise dust, noise and potential run-off will be incorporated. An evaluation of the possible presence of asbestos will be carried out on site prior to construction commencement.

5.4 Excavation

Excavation works will commence on-site, beginning with site levelling activities in accordance with Planning Drawings. It is envisaged that most buildings, roadways, car-parking and paved areas will require shallow excavations.

5.5 *Site Clearance & Earthworks*

Prior to the commencement of construction activities, site clearance will be carried out which will include:

- Setup and installation of the proposed Site Work Compound, as per Planning Drawing 11118-RHL-LP2-XX-DR-PL-0005;
- Preparation of the working area;
- Stripping of top-soils and stockpiling of same.

5.6 *Demolition*

Demolition works comprise the demolition of existing Workshop and (defunct) Activated Carbon Building adjacent the 'old' / northern Treatment Plant Building, measuring 76.5 sqm and 71 sqm respectively as per 11118-RHL-LP2-XX-DR-PL-0006. The demolition methodologies will be provided by the Contractor upon commencement of works.

5.7 *Acid Building*

Construction of the acid dosing facility consists of Construction of a Sulphuric Acid Storage and Dosing Facility Building, measuring 335.9 sqm (single storey up to approximately 8.65 metres in height) adjacent to the 'new' / southern Treatment Plant Building as per Planning Drawings 11118-RHL-LP2-XX-DR-PL-0014 and 11118-RHL-LP2-XX-DR-PL-0015. The specific construction methodologies will be provided by the Contractor upon commencement of works.

5.8 *Lime Building*

Construction of the acid dosing facility consists of Construction of a Lime Storage & Dosing Facility Building, measuring 234 sqm (single storey up to approximately 11 metres in height) adjoining the 'old' / northern Treatment Plant Building and associated external storage silos (2 no.) with external staircase (up to c. 12.3 metres in height) and ancillary plant and equipment 11118-RHL-LP2-XX-DR-PL-0011, 11118-RHL-LP2-XX-DR-PL-0012 and 11118-RHL-LP2-XX-DR-PL-0013. The specific construction methodologies will be provided by the Contractor upon commencement of works.

6 General Requirements

6.1 Good Housekeeping & Site Practices

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

- 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, waste 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 and in the event that there is any surplus materials/soil, this shall be recovered or disposed of to a suitably authorised waste facility site, if applicable;
- Effective prevention of infestation from pests/vermin including the regular disposal of food and material attractive to pests will be implemented. If infestation occurs the contractor will take appropriate action to eliminate and prevent future occurrence;
- Maintenance of wheel washing facilities and other contaminant measures as required in each working area;
- The use of less intrusive noise alarms which meet the safety requirements, such as 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 public roads and only within the construction site boundary wherever this is practicable;
- Material handling and/or stockpiling of materials, where permitted, will be appropriately located to minimise exposure to wind and covered to reduce windblown material; and
- Frequent watering of exposed earthwork activities during dry weather.

6.2 Hours of Working

The timing of construction activities, core working hours and the rate of progress of construction works requires a balanced approach to ensure efficiency in the construction whilst minimising nuisance and significant adverse effects. Following the assignment of the Contractor and construction team, core construction working hours for the proposed development will be established.

It is proposed that the site construction hours will be as per standard site working hours:

- 07.30 a.m. –18.00 p.m. on weekdays
- 08.00 a.m. – 13.00 p.m. on Saturdays
- No works on Sundays or Bank Holidays.

Excluding core hours, 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.

Any additional working hours required to undertake certain activities outside of the construction core working hours will be agreed by the Contractor in advance with Fingal and South Dublin 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, Fingal and South Dublin County Council will be informed as soon as reasonably practicable of the reasons and likely duration and timing (outside of the core working hours).

6.3 Traffic Management

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

- All trucks entering and exiting the site will be covered with tarpaulin;
- Adequate parking will be provided to avoid queuing at the site entrances and prevent disruption to neighbouring businesses. Construction vehicles will not be allowed to park on the public road either outside the site or on any of the approach roads leading to the site;
- All trucks entering the site will be restricted to suitable speed limits and will be directed to the relevant area by the Site Manager;
- Trucks required to wait on site will switch off engines to avoid unnecessary fuel usage and noise;
- All trucks exiting the site will be required to pass through a wheel wash. A lance will be provided to clean down the bodies and sides of the truck prior to leaving site;
- Roads outside the site will be visually inspected on a daily basis and power swept and washed as and when required;
- All site staff including truck drivers will be required to abide by the normal rules of the road;

A Temporary Traffic Management Plan (TTMP) will be created to detail the management of transportation of construction materials, equipment, and personnel along the public road network to facilitate the construction of the proposed project. This plan will be a key document during the construction phase to ensure effective and safe management of traffic and to reduce potential impacts which may arise on the public road network. As a whole the TTMP will outline minimum road safety measures to be undertaken at site access/egress locations and ensure adherence to relevant guidelines throughout the works.

The TTMP will include details on:

- Site Access & Egress;
- Traffic Management Signage;
- Routing of Construction Traffic/Road Closures;
- Timings of Material Deliveries to Site;
- Traffic Management Speed Limits;
- Road Cleaning;
- Road Condition;
- Road Closures;
- Implementation of Traffic Management Plan;
- Details of Working Hours and Days;
- Details of Emergency Plan;
- Communication;
- Construction Methodologies; and
- Particular Construction Impacts.

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

As part of the TTMP a Mobility Management Plan will be prepared to ensure access to the site by sustainable travel modes is encouraged. The following measures will need to be considered within the Mobility Management Plan:

- The provision of showers/ changing rooms for construction staff;
- The provision of cycle parking for staff;
- The promotion of car sharing among staff, including van pooling to travel between the different work sites;

The Construction Manager shall ensure implementation of the TTMP with all site personnel required to follow best practice and compliance of the TTMP. The TTMP will be finalised by the Contractor and will address any requirements within the planning conditions or any additional measures needed. It will remain a live document with updates where necessary applied throughout the construction phase. The TTMP will also require approval from Fingal and South Dublin County Council and An Garda Síochana.

6.4 Excavation Works

The Contractor is required to undertake the following in relation to the excavation works at Leixlip WTP:

- Prior to any excavation works all known existing underground services will be clearly marked on the ground. These will be located by personnel trained in the location of underground services;
- All overhead electrical lines to be clearly marked and delineated with goalposts, Crossing points, onsite in accordance with the ESB Networks Code of Practice. All exclusion zones to be clearly identified on site and appropriate plant and machinery selected for works within the exclusion zone with particular attention given to maximum reach of the machinery being used for lifting operations while constructing for excavation works;
- Appoint a competent & experienced excavator driver to operate within any exclusion zones in conjunction with a banksman as necessary;
- Sawcut Tarmac along the location of the new pipeline/ footprint of building;
- Excavate trench to required depth using appropriately sized machinery capable of safely handling and loading the excavated material;
- Dewatering & desilting of the excavation will be undertaken as necessary. In the event that large dewatering pumps and desilting units are required then they will be positioned in strategic locations along the excavation trench. Larger units will be lifted/moved using a suitable excavator as the works progress:
    - In the event of encountering groundwaters during excavation, it will be pumped from the excavation to temporary on-site drainage system prior to discharge via the site sewer system. This will ensure any suspended silt or sediment is captured through the use of a silt bag with an integral hydrocarbon filter on the pump outlet and a series of silt traps as required prior to discharge;
    - If discharge to land is not suitable than Dewatering will discharge into either Intermediate bulk containers / de-silting units or to a tanker for disposal at a licenced facility; and
    - The Contractor shall provide detailed design for surface water and ground water management systems before commencement of works.
- Ensure excavated materials such as tarmac and gravel are stored separately, a distance from the River Liffey to avoid contamination. Excavated material to be stored in designated location for removal to licensed tip location;
- Water Pollution Control Measures – Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows:
    - Minimal refuelling or maintenance of construction vehicles or plant will take place on site;
    - On-site refuelling will take place using a mobile double skinned fuel bowser. The fuel bowser will be parked on a level area when not in use. Only designated trained and

competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations;
    - Fuels volumes stored on site should be minimised. Any fuel storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction.
    - The plant used should be regularly inspected for leaks and fitness for purpose; and,
    - An emergency plan for the construction phase to deal with accidental spillages will be contained within the Emergency Response Plan. Spill kits will be available to deal with an accidental spillage.
- Trench support to be installed once the required depth is reached. Any existing services which have been exposed in the excavation are to be protected as required; and
- In relation to excavations there are no complex/ complicated or particularly deep digs proposed. They will be open cut excavations with sides battered to a safe angle of ripose.

6.5 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 on site. The following measures may be implemented to prevent unauthorised access:

- Install CCTV and alarm systems where required;
- CCTV and security systems will be sited and directed so that they do not intrude into occupied residential properties;
- Provide adequate security guards and patrols;
- When there is no site activity, close and lock site gates and set appropriate site security provisions in motion;
- Consult with neighbouring properties and local crime prevention officers including Fingal and South Dublin 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.

6.6 Hoarding and Fencing

A site boundary incorporating hoarding or fencing will be established around each of the working areas prior to the commencement of any significant construction activity. The hoarding/fencing shall be 2.4m high to provide a secure boundary to ensure unauthorised/unwanted access to what is deemed a dangerous environment for those that have not received the proper training and are unfamiliar with construction operations.

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

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

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

The following measures will be applied:

- Maintenance of adequate fencing and hoardings to an acceptable condition to prevent unwanted access to working areas and to 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.

6.7 Storage & Stockpiles

All excavated material will be removed off site as required by a licenced haulier to a licensed waste facility.

6.8 Fuel

The storage of fuels during the construction phase should occur in an impervious bunded area with suitable capacity for spillages. Spill containment kits and oil booms should be available throughout construction and form part of the emergency response plan that will be integrated into the final CEMP by the Contractor.

Refuelling of plant, machinery and vehicles will take place within the sites at suitable locations where potential spills would not be discharged into watercourses. A fuel management plan will be put in place for the duration of the works which will incorporate the following best practice guidelines for construction elements:

- Mobile bowsers, tanks and drums will be stored in secure, impermeable storage area, away from drains and open water;
- Fuel containers will be stored within a secondary containment system e.g. bund for static tanks or a drip tray for mobile stores;
- Ancillary equipment such as hoses, pipes will be contained within the bund;
- Taps, nozzles or valves will be fitted with a lock system;
- Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Only designated trained operators will be authorised to refuel plant on site;
- Emergency spill kits will be present at equipment for all refuelling events;
- Procedures and contingency plans will to be set up to deal with any emergency accidents or spills.

6.9 Wheel Wash

A wheel wash will be installed near each construction site entrance and exit to wash construction vehicle tyres. Water residue from the wheel wash will be settled and treated before discharge to any water course. The wheel wash area will be cleaned regularly so as to avoid the build-up of solids.

6.10 Services and Lighting

Site services shall be installed as part of the enabling works in conjunction 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.

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

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

6.11 Welfare Facilities

Welfare facilities will be provided, as appropriate, for construction staff and site personnel such as locker rooms, toilets, showers etc. which will be located within the main site compound, to the north-west of the site. The compound will also host offices and meeting rooms. Site preparation will involve the setup of required hard-standing areas, a water supply, and the establishment of the site offices and welfare facilities.

It is proposed that domestic sewage, generated from staff welfare facilities, toilets, sinks and canteens, will be collected on site and removed by a licensed transport to a licensed disposal facility.

6.12 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.

6.13 Road Cleanliness

Roads commonly utilised throughout the construction phase will be kept clean and clear of debris. The following measures will also be implemented to ensure road cleanliness:

- Water-assisted dust sweeper(s) will be utilised 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.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- 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 log-book
- 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 near each construction site entrance and exit (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.
- Daily on-site and off-site inspection will also be conducted to monitor dust soiling on surfaces with cleaning provided where necessary.

6.14 Plant & Equipment

The typical plant and equipment to be used during the construction of the proposed Leixlip WTP upgrade can be seen below:

Key Construction Plant	
Item of Construction Plant	**Purpose**
Hydraulic excavators – various	Excavation, substructures, drainage
Mobile cranes - various	Erection of buildings, movement of large materials and plant
Dumpers	Excavations, drainage, landscaping, movement of materials
Concrete saw cutting	Used for cutting concrete slabs in yard areas, building substructure and superstructures.
Large Dump Trucks	Removal of excavated materials off site
Ready-mix Concrete Trucks	Delivery of concrete to site for new structures, slabs, etc.
Ready-mix Concrete Pump Trucks	For placement of concrete.
Vibrating rollers	Used for compacting stone in roads, yard areas, substructures etc
HGV – 20 foot Trailers & Trucks	Delivery of materials, steel, cladding, concrete blocks,
HGV – 40 foot Trailers & Trucks	Delivery of structural steel, cladding, large elements of new plant and equipment
Telescopic Site Handlers	Handling and moving materials on site
Road Sweeping Equipment	Management of dust and excavation residues on site and off site on road approaches.
Welding Gear	Erection of structural steel and in mechanical installations
Mobile Elevated Work Platforms	Erection of steel, cladding and general construction at height.
Small tools – grinders, saws, drills, kango, hammers, power-floats, temporary lights, water, pumps, concrete vibrators	For use during all stages of construction

6.15 Concrete Works

Concrete structures will be required throughout the construction phase for various aspects of the development (i.e. concrete bases and foundations etc.). Concrete spills can kill aquatic life and or solidify river gravels in addition to changing water chemistry dramatically. To overcome the occurrence of such environmental incidents, pre-cast concrete and working in the dry will be implemented in order to reduce potential impacts. Drier mix concrete when working in the dry sets faster than wetter mixes. Concrete will be set over 1200-gauge plastic barriers to help reduce the risk of groundwater mixing with concrete. Concrete mixing should not occur near watercourse and no wash out of tanks should occur near any surface water pathways.

6.16 Weather Monitoring & Extreme Weather Response

Weather monitoring will be conducted to ensure construction work is completed safely and under suitable conditions. Weather monitoring will be conducted by the Environmental Manager.

Weather monitoring should take account of rainfall levels which may increase the risk of flooding, and wind speeds, with gusts and gale force winds resulting in high sea swells and the unsafe use of some plant and machinery such as cranes. Excessive rainfall or fog may also limit visibility deeming work unsafe. Furthermore, high temperatures in the summer season may be dangerous to workers, reducing their ability to complete some components of work.

Weather monitoring is essential for:

- Groundworks as large excavations and movements of overburden or large-scale overburden or soil stripping will be suspended or scaled back if heavy rain is forecast;
- The pouring of concrete as this will be completed in the dry to reduce environmental impacts;
- Dry periods will be monitored for the creation of dust as suppression may be required through the watering of roads, stockpiles etc. Furthermore, dust dispersion is also influenced by as wind speed and direction;
- Ground and drainage conditions in order for ground works to proceed.

While core hours will be implemented (Section 6.2) to ensure that optimal use is made of good weather periods or at critical periods within the development, it could occasionally be necessary to work outside of these hours

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

The final 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.

6.17 Health and Safety

All works will be conducted in accordance with the Safety, Health and Welfare at Work Act 2005, the Construction Regulations 2013 and all other relevant legislation and codes of practice as set out by the Health and Safety Authority. The Contractor will 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.

Furthermore, the Contractor will also have to ensure that all aspects of their works comply with good industry practice and all necessary consents, licences and authorisations that have been put in place for the proposed development.

6.18 Major Accidents and Natural Disasters

The Contractor is required to consider all major accidents and natural disasters which may arise during the construction phase of the Leixlip WTP upgrade to ensure potential risks are identified, avoided, and mitigated, as necessary. Such information will be detailed within the final CEMP.

A major accident, in the context of the proposed development, is defined as an event that threatens immediate or delayed serious damage to human health, welfare and/or the environment and requires the use of resources beyond those of its contractors. Serious damage includes the loss of life or permanent injury and/or permanent or long-lasting damage to an environmental receptor that cannot

be restored through minor clean-up and restoration efforts. The significance of this effect considers the extent, severity and duration of harm and the sensitivity of the receptor.

A natural disaster, is a naturally occurring phenomenon such as an extreme weather event (e.g. storm, flood, temperature) or ground-related hazard events (e.g. subsidence, landslide, earthquake) with the potential to cause an event or situation that meets the definition of a major accident as defined above.

Ensuring that the proposed development is designed safely and will thus operate safely, has been to the forefront of the design process. Furthermore, the design process was conducted to ensure the proposed development is capable of being constructed safely and without risk to health, can be maintained safely, and complies with all relevant health and safety legislation. This approach has allowed all identified risks to be managed such that, where possible, the hazards that result in risks are mitigated (manage hazard source, manage pathway between source and receptor, manage receptor) or eliminated (eliminate source, remove pathway between source and receptor, remove receptor).

The Contractor will be required to:

- Consider the vulnerability (exposure and resilience) of the proposed upgrade to risks of major accidents/and or disasters;
- Identify the types of major accidents and/or disasters that are relevant to the proposed development and the likelihood of their occurrence;
- Describe the expected significant adverse effects of the proposed development on the environment (environmental factors) arising from the vulnerability of the proposed development to risks of major accidents and/or disasters.

It is anticipated that weather events are the principal hazards to be encountered with respect to the development and construction phase i.e. rainfall, wind, icy conditions, and their potential contribution to natural disasters (i.e. flooding) and major accidents.

Low likelihood events, such as minor spills, silt control, and dust emissions which may occur during construction, have been considered during the design and environmental evaluation process, to eliminate, isolate and mitigate such risks. Due to their limited area, volume and temporary nature such risks/impacts do not meet the definition of a major accident and/or disaster and have been considered and mitigated for as part of the environmental assessment of the proposed development.

7 CEMRP – Construction Environmental Emergency Response Plan

7.1 Scope

Whilst every means will be implemented to ensure the prevention of incidents arising in the first instance, a Construction Environmental Emergency Response Plan (EERP) will be prepared to ensure efficient and prompt corrective actions are implemented.

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

The Contractor shall be required to adhere to and implement these procedures and ensure that all staff and personnel on site are familiar with the emergency arrangements.

The EERP provides details of the procedures and steps to be adopted in the event of an emergency in terms of site health and safety and environmental protection and details the response required and the responsibilities of all personnel on site. The EERP will be developed prior to the commencement of construction and implemented by the CMT.

The EERP will require updating and submissions from the Contractor and Construction Manager and suppliers as the proposed project progresses. It will be required that sub-contractors that are contracted on site and are governed by their own emergency response plan, that such plan be included into the final EERP as produced by the Contractor.

The EERP ensures that emergencies such as fires, explosions, accidents and/or leaks, occur as little as possible; if they do, however, occur, the EERP ensures that measures are in place and can be quickly implemented in a controlled manner to ensure greater damages are avoided and the possible effects upon persons, the environment and property are avoided or limited. The general required emergency response actions will be posted at strategic locations, such as the site entrance, canteen and near the entrances to buildings.

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 South Dublin 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.

Potential emergencies or hazards are required to be identified by the Contractor with a response plan set out for each in the event of such occurrence. Emergency incidents are deemed events which result in significant environmental effects and may include, but not limited to:

- Failure in any mitigation measures or environmental protection system;
- Any emission which does not comply with relevant licences and contract requirements;
- Any circumstance with the potential for environmental pollution;
- Any emergency which may incur environmental effects.

Management procedures should be in place to minimise the event of such environmental incidents occurring. It is important for the Contractor and Construction Environmental Manager to:

- Identify the type and quantity of harmful substances to be used on site, and thus the appropriate quantity and type of spill containment materials required for their containment and clean up;
- Provide Personal Protective Equipment (PPE) required to safely handle contaminated materials. As a minimum, gloves must be worn, however, further equipment may be required, including respiratory equipment;
- Ensure the Safety Data Sheets (SDS) which contain essential information, including ecological impacts, recommended containment and clean up methods, PPE and disposal requirements are kept on site and referred when creating the EERP;

- Ensure that any booms for rivers or exposed shorelines are long enough and have suitable anchorage points;
- Absorbent granules and fibres generally absorb much more than their own weight. Check the manufacturer's guidelines for application rates and do not apply too much of the material, which will be classified as hazardous waste once used and will require specialist disposal;
- Ensure that appropriate waste disposal containers are available to place contaminated material following the clean-up.

Every effort will be made to prevent an environmental incident during the construction and operational phase of the proposed project. Spillages of fuels or oils or other harmful substances on construction sites can result in significant contamination of soil, surface waters and groundwater beneath and around the site. The release of fuel, oil or chemicals into waterways can lead to detrimental impacts on the aquatic environment.

7.2 Responsibilities

The Contractor shall appoint an Emergency Coordinator for the site that will be responsible for activating and coordinating the emergency response procedure. The Environmental Manager and Construction Manager will also be delegated responsibility. If the Emergency Coordinator is unavailable or incapable of coordinating the emergency response, the responsibility will be transferred to the next person in the chain of command. This will be updated throughout the various stages of the project to include appointed personnel and included within the final CEMP.

Emergency Contact details will be provided within the final CEMP and EERP and will be easily accessible and located on site. Such emergency contacts will include, but are not limited to:

- Environmental Protection Agency;
- Inland Fisheries Ireland;
- National Parks and Wildlife Service;
- Irish Water;
- Fingal and South Dublin County Councils (Environment Section);
- ESB Emergency;
- Health and Safety Authority;
- Leixlip Garda Station;
- Leixlip Fire Station;
- Connolly Hospital, Blanchardstown.

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.

7.3 Emergency Access

The contractor will be required to maintain emergency access routes throughout construction and identify site access points for each working area. This will be developed in partnership with the emergency services and documented as part of the detailed CEMP(s) and EERP.

7.4 Outline Procedures

7.4.1 Oil/Fuel Spillage

In order to resolve such environmental incidents, prompt and effective responsive actions are key. The following steps should be adopted in the event of an oil/fuel spillage occurring:

- If safe, and using PPE, stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers;
- If applicable and safe, eliminate any sources of ignition in the immediate vicinity of the incident;
- If safe and wearing PPE, 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 or sensitive habitats;
- If possible, clean up as much as possible using the spill control materials;
- Do not hose the spillage down or use any detergents;
- Contain any used spill control material and dispose of appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is prevented;
- Notify the Environmental Manager immediately providing information on the location, type and extent of the spill;
- The Environmental Manager will inspect the site and conduct an accident investigation and ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage occurring;
- The Environmental Manager will notify the appropriate regulatory body such as South Dublin County Council, The Department of Environment, Climate and Communications (DECC) and the Department of Housing, Local Government and Heritage (DHLGH), if deemed necessary.

At the Leixlip WTP, there will be bunded storage of fuels or chemicals on site. Refuelling of machinery will be undertaken at the dedicated bunded refuelling depots located adjacent to the existing local roads.

7.4.2 Concrete Spillage

The occurrence of concrete spillages also follow a similar response approach:

- Site staff will report the concrete spillage immediately to the Emergency Coordinator/Environmental Manager or Construction Manager;
- If there is a risk of concrete spreading into the drainage system, drains will be blocked using absorbent booms, which will prevent concrete flowing into the existing drains;
- Do not wash the spillage into the drainage system. Washing will extend the pollution to other water bodies/drainage systems;
- If the spill has already reached drains, acid may be added to the drains by the Environmental Manager to neutralise the alkalinity of the concrete;
- Remove the contaminated concrete granules for removal for adequate waste treatment;
- Where relevant, the Environmental Manager will report the spillage to IFI and South Dublin County Council;

In the instance of the Leixlip WTP upgrade, concrete works will be completed using pre-cast concrete and working in the dry to reduce potential impacts. When working with concrete, it will be set over 1200-gauge plastic barriers helps reduce risk of groundwater mixing with concrete. Furthermore, concrete mixing shall not occur near watercourses and no wash out of tanks shall occur near any surface water pathways.

Environmental incidents are not limited to just fuel or concrete spillages. Therefore, any environmental incident must be investigated in accordance with the following steps:

- The Environmental Manager and Emergency Coordinator must be immediately notified;
- If necessary, the Environmental Manager will inform the appropriate regulatory authority. The appropriate regulatory authority will depend on the nature of the incident;
- The details of the incident will be recorded including information such as the cause, extent, actions and remedial measures used to follow the incident. The form will also include any recommendations made to avoid reoccurrence of the incident;
- If the incident has impacted on a sensitive receptor such as an archaeological feature the Environmental Manager will liaise with a Project Archaeologist;

- A record of all environmental incidents will be recorded as part of the environmental management system by the Environmental Manager. The records will be made available to the relevant authorities such as South Dublin County Council if required;

Training may be required for all personnel responsible for responding to spills, or environmental incidents, who should:

- Know the location of spill kits and/or materials and how to apply them;
- Understand the principles of spill containment and be aware of the site drainage and locations of receiving environments;
- Know the appropriate PPE requirements to deal with oils, fuels and other harmful substances used on the site;
- Know how to dispose of contaminated materials;
- Know the appropriate authorities to notify, if required, and emergency services to contact if the spill is beyond the capacity of the site resources to contain.

The necessary equipment required to respond to and eliminate environmental incidents, such as spill kits, must be inspected regularly by the Emergency Coordinator/Environmental Manager to ensure equipment is adequately stocked and in good working order. Following its use, equipment must be restocked as soon as practical to ensure it is adequate to deal with any subsequent event. An inventory of the equipment contents must be provided within kit itself or in the site office as a minimum.

8 Appendices

8.1 *Appendix 1 - Construction Waste Management Plan*

8.1.1 Introduction

8.1.1.1 Overview

The Construction Waste Management Plan presented within this report is provided as an outline as the exact quantities and volumes of waste material have not yet been determined. Therefore, upon granting of planning permission, this C&D WMP will require updating to produce a site-specific waste management plan that will include particulates of waste streams envisaged on the site.

The purpose of this construction and demolition waste management plan (C&D WMP) is to provide the necessary information and requirements to ensure the effective, efficient and safe management of C&D waste at the Leixlip WTP site which will be undertaken in accordance with current legal and industry standards including the Waste Management Acts 1996 - 2011 and associated Regulations, Protection of the Environment Act 2003 as amended, Litter Pollution Act 1997 and East Midlands Regional Waste Management Plan 2015-2021. This document has also been prepared in reference to Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects published by the Department of the Environment, Heritage and Local Government.

Construction and demolition waste is defined as waste which arises from construction, renovation and demolition activities, together with all waste categories mentioned in Chapter 17 of the European Waste Catalogue (EWC). Also included within this are surplus and damaged products and materials arising during the course of construction work or used temporarily during the course of on-site activities.

Section 3 of the Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition identifies thresholds above which there is a requirement for the preparation of a C&D Waste Management Plan for developments:

- New residential development of 10 houses or more;
- Demolition/renovation/refurbishment projects generating in excess of 100m^3 in volume, of waste;
- New developments, including institutional, educational, health and other public facilities, with an aggregate floor area in excess of 1,250m^2;
- Civil Engineering projects producing in excess of 500 m^3 of waste, excluding waste materials used for development works on the site.

In line with sustainability practices and the waste management hierarchy, this C&D WMP aims to ensure maximum recycling, reuse, and recovery of waste with diversion from landfill, wherever possible. The WMP aims to promote sustainable development, environmental protection, and the optimum use of resources.

The following publications have also been referenced in determining the structure and content of the document:

- Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects, Department of the Environment, Heritage and Local Government (DoEHLG), 2006;
- Construction and Demolition Waste Management – a handbook for Contractors and Site Managers, FÁS and the Construction Industry Federation, 2002.

These guidance documents are considered to define best practice for C&D projects in Ireland and describe how C&D projects are to be undertaken such that environmental impacts and risks are minimised and maximum levels of waste recycling are achieved.

8.1.2 Objective

The objectives of the C&D WMP are as follows:

- Promote an integrated approach to waste management throughout the project construction stage and to set out appropriate responsibilities;
- Promote sustainable waste management in line with waste management hierarchy;
- Provide an outline for the management of wastes arising from construction works for the project in accordance with the relevant Irish and EU waste management legislation; and

- Provide a framework for the Contractor to appropriately manage waste generated during the construction phase of the development. The Contractor will be responsible for implementing the findings and recommendations of the C&D WMP in their Site Waste Management Plan.

The C&D WMP outlines methods to achieve waste prevention, maximum recycling and recovery of waste and provides recommendations for the management of the various anticipated waste streams. The plan also provides guidance on collection and transport of waste to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources). The C&D WMP describes the applicable legal and policy framework for C&D waste management in Ireland.

8.1.3 Regulatory & Policy Requirements

8.1.3.1 National & European Level

The EU Waste Framework Directive (2008/98/EC), enacted in Ireland under the Waste Directive Regulations 2011 requires Member States to take the necessary measures to achieve the minimum recycling/recovery target of 70% by weight for non-hazardous C&D waste, excluding naturally occurring materials, by 2020. The Directive specifies that such a target should be achieved by preparing for reuse, recycling, and other material recovery, including backfilling operations using waste to substitute other material.

The primary legislative instruments that govern waste management in Ireland and are applicable to this project include:

- Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate legislation includes
  - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended;
  - Waste Management (Collection Permit) Regulations (S.I No. 820 of 2007) as amended;
  - Waste Management (Facility Permit and Registration) Regulations 2007, (S.I No. 821 of 2007) as amended;
  - Waste Management (Licensing) Regulations 2004 (S.I. No. 395 of 2004) as amended;
  - Waste Management (Packaging) Regulations 2014 (S.I. 282 of 2014) as amended;
  - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) o Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015);
  - European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014);
  - European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended;
  - Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009), as amended o European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 191 of 2015);
  - Waste Management (Hazardous Waste) Regulations, 1998 (S.I. No. 163 of 1998) as amended;
  - Waste Management (Shipments of Waste) Regulations, 2007 (S.I. No. 419 of 2007) as amended;
  - Waste Management (Movement of Hazardous Waste) Regulations, 1998 (S.I. No. 147 of 1998);
  - European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994);
  - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015)
- Environmental Protection Act 1992 (No. 7 of 1992) as amended;
- Litter Pollution Act 1997 (No. 12 of 1997) as amended.
- Planning and Development Act 2000 (No. 30 of 2000) as amended.

A principle of the European waste legislation, which is incorporated into the Waste Management Act 1996 - 2001 and subsequent Irish legislation, is the principle of "Duty of Care". This implies that the waste producer is responsible for the waste from the time it is generated until its legal recycling, recovery, or disposal (including its method of disposal). As this is not practical in most cases for the

waste producer to physically transfer all waste from where it is produced to the final destination, waste contractors will be employed to physically transport waste to the final destination.

It is therefore imperative that the Contractor ensures waste contractors are legally compliant with respect to waste transportation, recycling, recovery and disposal. This includes the requirement that a waste contractor handle, transport and recycle/recover/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments or a waste or IE licence granted by the Environmental Protection Agency (EPA). The COR/permit/licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site. The assigned C&D waste coordinator and/or Environmental Manager will ensure that each waste facility and contractor is appropriately licenced.

8.1.4 Waste Management

8.1.4.1 Background

It should be noted that pending the application for Planning it is not possible to provide information on the specific volume, quantity and destinations of each waste stream as final materials and detailed construction methodologies have yet to be confirmed. It is therefore difficult to predict with a high level of accuracy the volume of construction waste that will be generated from the proposed works at the Leixlip WTP site as the exact materials and quantities may be subject to change and variation during the construction process. Table 8.2 outlines the key waste streams and LoW codes as applicable to Leixlip WTP. Prior to commencement of the upgrade and removal of any demolition and construction waste offsite, details of the proposed destination of each waste stream will be provided by the Contractor.

8.1.4.2 Roles and Responsibilities

In line with the Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition, a C&D Waste Co-ordinator/Manager will be appointed who will be responsibility for all aspects of waste management at the different stages of the development. The C&D Waste Manager may well be a number of different individuals over the life-cycle of the Project, but in general is intended to be a reliable person chosen from within the Planning/ Design/Contracting Team, who is technically competent and appropriately trained, who takes the responsibility to ensure that the objectives and measures within the Project Waste Management Plan are delivered and who is assigned the requisite authority to secure achievement of this purpose. Specifically, the function of the C&D Waste Manager will be to communicate effectively with colleagues in relation to the aims and objectives for waste management on the Project. The primary responsibility for delivery of the objectives of the Waste Management Plan will fall upon the C&D Waste Manager designated at the demolition/construction stage.

8.1.4.3 Waste Permitting, Licences & Documentation

Under the Waste Management (Collection Permit) Regulations 2007, as amended, a collection permit to transport waste, which is issued by the National Waste Collection Permit Office (NWCPO), must be held by each waste collection contractor utilised for the development. Waste may only be treated or disposed of at facilities that are licensed or permitted to carry out that specific activity (e.g. chemical treatment, landfill, incineration, etc.) for a specific waste type. Operators of such facilities cannot receive any waste, unless they are in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments or a waste licence granted by the EPA. The COR/permit/licence held will specify the type and quantity of waste permitted to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site. Records of all waste movements and associated documentation should be held at the site. Records management and maintenance will be the responsibility of the Contractor.

According to the EPA Document 'Waste Classification, List of Waste & Determining if Waste is Hazardous or Non-Hazardous", "correct classification is the foundation for ensuring that the collection, transportation, storage and treatment of waste is carried out in a manner that provides protection for the environment and human health and in compliance with legal requirements" (EPA, 2019).

Soils requiring offsite disposal should be appropriately characterised, prior to transport and disposal, as follows;

- Representative chemical analytical results are input into a waste classification tool (to determine the relevant List of Waste (LoW) Code) and if the waste soils are hazardous or non-hazardous;
- Representative Waste Acceptance Criteria (WAC) analytical results are then separately screen against the relevant screening values (as established under the European Communities Council Decision ((EC) 92003/33/EC) 'COUNCIL DECISION of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II to Directive 1999/31/EC); and,
- All waste soils removed from site must be transported by appropriately permitted hauliers and must be disposed of to an appropriately authorised disposal / recovery facility (via. valid Certificate of Registration, Waste Facility Permit, or Waste Facility Licence).

8.1.4.4 Waste Hierarchy

The on-site handling of waste should be carried out in accordance with the Waste Management Hierarchy, as set out in Article 4 of the Waste Framework Directive (2008/98/EC) and transposed into Irish law via Section 21A of the Waste Management Act. The Waste Management Hierarchy outlines that waste prevention and minimisation are the first priority in managing wastes, followed by waste reuse and recycling with disposal being considered as a last resort. The EU Waste Directive (2008/98/EC) also mandates that hazardous waste generation should be avoided or at least minimised.

Figure 8.1 EU Waste Management Hierarchy.

The key terms as outlined in Figure 8.1 are, in order of priority:

- Prevention includes measures taken before a substance, material or product has become waste, that reduce (a) the quantity of waste, including through the reuse of products or the extension of the lifespan of products, (b) the adverse impacts of the generated waste on the environment and human health or (c) the content of harmful substances in materials and products.
- Re-Use is defined as any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.
- Recycling is any recovery operation by which waste materials are processed into products, materials, or substances whether for the original or other purposes. It includes the reprocessing

of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

- Recovery is defined as any operation, the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.

8.1.4.5 *Waste Prevention*

The prevention of waste is the most desirable approach to waste management, since the elimination of waste removes the need for subsequent handling, transportation, and treatment of discarded materials. During the construction phase, the Contractor can prevent waste by tight estimating to ensure that large surpluses of construction materials are not delivered to site; supplier co-ordination (requiring the supplier to take back/buy back surplus and sub-standard/rejected materials) operate a "just in time" delivery system (co-ordinating material delivery with its use). On-site waste can be minimised by careful storage and handling of materials and by centralising cutting operations. Waste prevention principles can be further reinforced by specifying that the individuals working on-site conform to the requirements of the C&D WMP for all operations.

8.1.4.6 *Waste Minimisation*

The minimisation of waste can be achieved through recycling of C&D waste which will reduce the dependency on finite natural resources such as geological and energy reserves. The recycling of such material has the added benefit of controlling the extent of waste disposal and reducing overall transportation costs.

The following waste minimisation measures will be implemented during the course of the construction works:

- Facilitate recycling and appropriate disposal by on site segregation of all waste materials generated during construction into appropriate categories, including:
    - Top-soil, subsoil, gravel hard-core
    - Concrete, bricks, tile, ceramics, plasterboard
    - Asphalt, tar and tar products
    - Metals
    - Dry Recyclables e.g. cardboard, plastic, timber
- All waste assessed by the Waste Manager as 'not suitable for reuse' will be stored in skips or other suitable receptacles in a designated area of the site, to prevent cross contamination between waste streams;
- Wherever possible, leftover materials (e.g. timber off cuts) and any suitable demolition materials will be reused on-site. Re-use of materials will be recorded by the Waste Manager;
- Uncontaminated excavated material (top-soil, sub soil, etc. – following waste acceptance criteria testing) will be segregated, stockpiled and re-used on site in preference to importation of clean fill, where possible; and
- Where possible, the Waste Manager will ensure that all waste leaving site will be recycled or recovered.

8.1.4.7 *Cost of Waste Management*

An outline of the costs associated with different aspects of waste management is provided below. Upon assignment of the Contractor and establishment of construction methodologies, the total cost of implementation of the C&D WMP will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs. Estimating cost components associated with waste production is effective in enhancing internal cost control procedures for the contractor and helping to ensure that unproductive and readily avoidable costs of C&D waste management are eliminated.

8.1.4.8 *Reuse/ Recovery*

Through the reuse of materials on site, there will be a reduction in the transport and disposal costs associated with the requirement for a waste contractor to take the material away to landfill. Clean and inert soils, gravel, stones etc. which cannot be reused on site may be classified as a by-product (under

Article 27 of the 2011 Waste Directive Regulations), used as capping material for landfill sites, or for the reinstatement of quarries etc. subject to approvals by EPA. This material is often taken free of charge for such purposes, or when used as capping in landfills will not attract the landfill tax levy, thereby reducing final waste disposal costs.

8.1.4.9 Recycling

Salvageable metals will earn a rebate which can be offset against the cost of collection and transportation of the skips. Clean, uncontaminated cardboard and certain hard plastics can be recycled. Timber can be recycled as chipboard. Waste contractors will charge considerably less to take segregated wastes such as recyclable waste from a site than mixed waste.

8.1.4.10 Disposal

Landfill charges includes a €75 per tonne landfill levy which was introduced under the Waste Management (Landfill Levy) (Amendment) Regulations 2012 for non-hazardous waste and €25/tonne for inert waste. In addition to disposal costs, waste contractors will also charge a collection fee for skips. Collection of segregated C&D waste usually costs less than municipal waste. Specific C&D waste contractors take the waste off-site to a licensed or permitted facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill. Clean soil, rubble, etc. is also used as fill/capping material wherever possible.

8.1.5 On-Site Construction Waste Management

8.1.5.1 Waste Handling

Waste materials generated on site will be segregated and temporarily stored on site (pending collection or for re-use on site) in accordance with a pre-determined segregation and storage strategy as developed by the Contractor and Waste Manager.

The following minimum segregation and storage strategy requirements will be required:

- Waste streams will be individually segregated, with all segregation, storage and stockpiling locations clearly delineated on site drawings;
- Waste storage, fuel storage and stockpiling and movement are to be undertaken with a view to protecting any essential services (electricity, water etc.) and the surrounding environment;
- Roles and responsibilities of those managing the segregation and storage areas will be identified;
- The waste storage area should contain suitably sized containers for each waste stream and will be agreed with the waste contractors in advance of the commencement of the project;
- All segregation and waste storage areas will be inspected regularly by the appointed Waste Manager;
- Waste to be stored on-site will be conducted in such a manner as to:
    - Prevent environmental pollution (bunded and/or covered storage, minimise noise generation and implement dust/odour control measures, as may be required);
    - Maximise waste segregation to minimise potential cross contamination of waste streams and facilitate subsequent re-use, recycling and recovery; and
    - Prevent hazards to site workers and the general public during construction phase (largely noise, vibration and dust).

Where the on-site segregation of certain wastes types is not feasible, off-site segregation will be conducted. There will be skips and receptacles provided to facilitate segregation at source. The appointed waste contractor will collect and transfer the wastes as receptacles and skips are filled. There are numerous waste contractors in the Kildare/Dublin Region that could provide this service. All waste arising's will be handled by an approved waste contractor holding a current waste collection permit. All waste requiring disposal off-site will be reused, recycled, recovered, or disposed of at a facility holding the appropriate registration, permit or licence, as required.

The site may produce waste streams of both hazardous and non-hazardous wastes, which are classified in Table 8.1 below.

Table 8.1 Classification of hazardous and non-hazardous waste.

Hazardous Waste	Non-Hazardous Waste
Liquid Fuels	Metals (stainless steel, mild steel, copper, aluminium)
Concrete (contaminated with dangerous substances)	Concrete (not contaminated with dangerous substances)
Excavated Soil (contaminated with dangerous substances)	Excavated soil/fill (not contaminated with dangerous substances)
Excess Electrical & Electronic Components	Wood (Clean), glass, plastic, paper, and cardboard
Batteries	Asphalt
Other construction and demolition wastes containing dangerous substances	Municipal waste

Appropriate environmental testing of soils will be carried out in accordance with standard waste acceptance criteria testing. It is anticipated that samples will be obtained at 1m depth intervals and 5 linear metres where waste soil is encountered.

8.1.5.2 Main C&D Waste

The main non-hazardous and hazardous waste streams that could be generated by the construction and demolition activities at Leixlip WTP are shown in Table 8.2 The List of Waste (LoW) code (as effected from 1 June 2015) (also referred to as the European Waste Code or EWC) for each waste stream is also shown (non-exhaustive list).

***Table 8.2** Typical waste types generated and EWCs (individual waste types may contain hazardous substances)*

Waste Material	LoW Code
Concrete, bricks, tiles, ceramics	17 01 01 - 03 & 07
Wood, glass and plastic	17 02 01 - 03
Bituminous mixtures, coal tar and tarred products	17 03 02
Metals (including their alloys)	1704 01 - 07
Soil and stones	17 05 04
Gypsum-based construction material	17 08 02
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Green waste	20 02 01
Electrical and electronic components	20 01 35 & 36
Batteries and accumulators	20 01 33 & 34
Liquid fuels	13 07 01 - 03
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13, 19, 27-30
Insulation materials and asbestos-containing construction materials	17 06 04

In addition, the EPA have produced a breakdown of figures regarding the quantity of construction and demolition waste generated by various developments in Ireland which can be seen in Table 8.3 below.

Table 8.3 Breakdown of construction waste on a typical site.

Waste Type	Percentage
Soil and Stone	51
Concrete, Bricks, Tiles, Ceramics, Plasterboard	39
Asphalt, Tar and Tar Products	2
Metals	2
Others	6
Total Waste	100

8.1.5.2.1 Non-Hazardous Waste

During the construction phase there may be a surplus of building materials, such as timber off-cuts, broken concrete blocks, plastics and metals generated. There may also be excess concrete during construction which will need to be disposed of appropriately. Plastic and cardboard waste from packaging and oversupply of materials will also be generated. Waste will also be generated from construction workers e.g. organic/food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins, and Tetra Pak cartons) and mixed non-recyclables. Waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

The transportation of non-hazardous waste by persons who are not directly involved with the waste business, at weights less than or equal to 2 tonnes, and in vehicles not designed for the carriage of waste, are exempt from the requirement to have a waste collection permit (Ref. Article 30 (1) (b) of the Waste Collection Permit Regulations 2007 as amended). Any sub-contractors engaged that do not generate more than 2 tonnes of waste at any one time can transport this waste offsite in their work vehicles (which are not design for the carriage of waste). However, they are required to ensure that the receiving facility has the appropriate COR / permit / licence.

8.1.5.2.2 Potentially Hazardous Waste

As fuels and oils are classed as hazardous materials, any on-site storage of fuel/oil will occur in secure, bunded area in a dedicated, secure section of the site prior to collection by a licenced and authorised waste collector. Provided that these requirements are adhered to and construction workers are appropriately trained in refuelling techniques, it is not expected that there will be any fuel/oil wastage at the site. The occurrence of fuel/oil spills on surrounding soils will thus lead to the production of contaminated soil which will need to be disposed of by a licenced waste facility.

Additional hazardous substances may include paints, glues, adhesives, and other substances which will be stored in designated areas. Such substances will be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

8 1.5.2.3 Hazardous Waste

Where hazardous waste is generated, the Contractor will undertake the following:

- Immediate notification of the nature of the hazardous waste to the design team in writing;
- Submission of a revised waste management plan for the site detailing the nature and management of the hazardous waste prior to off-site waste disposal.

Should asbestos containing materials be encountered in fill and soil during excavation works, the Contractor shall establish a specific procedure for the management of asbestos wastes (identified during asbestos survey) that may arise during excavation works. The management of such wastes shall be coordinated with the client and design team in accordance with the Safety and Health Plan for the overall works, in order to ensure that personnel within the construction site and the local residents are protected against exposure to asbestos. Prior to commencement of any asbestos removal works, the Principal Contractor shall identify a suitable Waste Collection Contractor with a Waste Collection Permit for the transfer of asbestos wastes from the site.

8.1.5.2.4 Temporary Site Toilets

Sewage from temporary site toilets and construction staff welfare facilities will be collected in appropriate containers on-site and emptied on a regular basis by appropriately-licensed waste contractors at licensed waste facilities nearby

8.1.5.2.5 Soil, Stone & Made Ground

Excavations are required on site to facilitate construction works; thus, the preferred option, under the Waste Management Hierarchy, of prevention and minimisation, cannot be accommodated for in the excavation phase. It is anticipated that all the of excavated material will be taken off site.

However, if the Contractor proposes to reuse excavated soil/material within the works e.g. as backfill, and where reuse is permitted in accordance with the relevant legislation and provided that the reuse

meets the engineering requirements for material used within the works, the Contractor shall set out their proposal for its management, documentation and reuse. This shall include:

- Delineation of areas where excavated soil is intended for disposal off-site as waste, and where it is intended for re-use on site;
- Identification and recording of the location from where the soil will be excavated and its proposed re-use location and function;
- Engineering assessment to confirm its suitability for re-use;
- Environmental soil testing to ensure the soils being reused are not contaminated;
- Any proposed treatment or processing required enabling its reuse, as well as any associated treatment permits or licences.

However, if the material is not re-used on site and thus removed it could be reused as a by-product rather than a waste. If the material is re-used as a by-produced it will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011. Article 27 requires that certain conditions be met and that by-product notifications are made to the EPA. Excavated material should not be removed from site until approval from the EPA has been received.

Clean inert material may be used as fill material in other construction projects or engineering fill for waste licensed sites, once it is not deemed as hazardous. Testing to determine the suitability of the soil/material will be carried out in accordance with the Specification and related documents for ground investigation in Ireland. Beneficial reuse of surplus excavation material as engineering fill may be subject to further testing to determine if materials meet the specific engineering standards for their proposed end-use. Any nearby sites requiring clean fill/capping material will be contacted to investigate reuse opportunities for clean and inert material. If any of the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27.

However, if a material is deemed to be a waste, then removal and reuse/recovery/disposal of the material will be carried out in accordance with the Waste Management Acts 1996 – 2011 as amended, the Waste Management (Collection Permit) Regulations 2007 as amended and the Waste Management (Facility Permit & Registration) Regulations 2007 as amended. Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered. In the event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately to any non-hazardous material. It will require off-site treatment at a suitable facility or disposal abroad via Transfrontier Shipment of Wastes (TFS).

Where appropriate, excavated soil and material intended for recovery or disposal off-site will require Waste Assessment Criteria (WAC) testing and subsequent waste classification in order to select an appropriate receiving facility for the waste. It is noted that natural soil showing no visual or olfactory signs of impact may, in certain circumstances, be classified without testing, once this has been agreed with the waste receiving facility.

Assessment of the excavated material shall be carried out with regard to the following guidance and legislation:

- EU Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 and Annex II of Directive 1999/31/EC (2002);
- Regulation (EC) No. 1272/2008: the classification, labelling and packaging of substances and mixtures (CLP);
- Environmental Protection Agency document entitled Waste Classification; List of waste and determining if waste is Hazardous or Non-Hazardous; and
- UK Environment Agency Technical Guidance WM3: Waste Classification - Guidance on the classification and assessment of waste.

Waste soil and material intended for off-site disposal, recycling or recovery shall not be removed from site prior to appropriate waste classification and receiving written confirmation of acceptance from the

selected waste receiving facility. While waste classification and acceptance at a waste facility is pending, excavated soil for disposal shall be stockpiled in an appropriate manner, as follows:

- A suitable temporary storage area shall be identified and designated;
- All stockpiles shall be assigned a stockpile number;
- Non-hazardous and hazardous soil shall be stockpiled only on hard-standing or high-grade polythene sheeting to prevent cross-contamination of the soil below;
- Soil stockpiles shall be covered with high-grade polythene sheeting to prevent run-off of rainwater and leaching of potential contaminants from the stockpiled material generation and/or the generation of dust; and
- When a stockpile has been sampled for classification purposes, it shall be considered to be complete and no more soil shall be added to that stockpile prior to disposal.

An excavation/stockpile register shall be maintained on site showing at least the following information:

- Stockpile number;
- Origin (i.e. location and depth of excavation);
- Approximate volume of stockpile;
- Date of creation;
- Description and Classification of material;
- Date sampled;
- Date removed from site;
- Disposal/recovery destination; and
- Photograph.

8.1.5.2.6 Silt & Sludge

During the construction phase, silt and petrochemical interception should be carried out on runoff and pumped water from site works, where required. Sludge and silt will then be collected by a suitably licensed contractor and removed offsite.

8.1.5.2.7 Hard Plastic

Plastics will be generated primarily from material cut-offs. As hard plastic is a highly recyclable material, the material will be segregated and recycled, where possible.

8.1.5.2.8 Timber

Timber that is uncontaminated, i.e. free from paints, preservatives, glues etc., will be separated from other materials and recycled off-site.

8.1.5.2.9 Metal

Metals will be segregated and stored in skips. Metal is highly recyclable and there are numerous companies that will accept these materials within County Dublin.

8.1.5.2.10 Glass

Glass materials will be segregated for recycling, where possible.

8.1.5.2.11 Waste Electrical and Electronic Equipment (WEEE)

Any WEEE will be stored in dedicated covered cages/receptacles/pallets pending collection for recycling.

8.1.5.2.12 Other Recyclables

Where any other recyclable wastes such as cardboard and soft plastic are generated, these will be segregated at source into dedicated skips and removed off-site.

8.1.5.2.13 Non-Recyclable Waste

C&D waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate skips or other receptacles. Prior to removal from site, the non-recyclable waste skip/receptacle will be examined by the Waste Coordinator or Environmental Manager.

8.1.5.2.14 Other Hazardous Wastes

On-site storage of any hazardous wastes produced (i.e. hazardous contaminated soil if encountered and/or waste fuels) will be kept to a minimum and removed off-site on a regular basis. Storage of all hazardous wastes on-site will be undertaken so as to minimise exposure to on-site personnel and the public and to also minimise potential for environmental impacts. Hazardous wastes will be recovered, wherever possible, and failing this, disposed of appropriately.

8.1.5.2.15 Demolition Waste

A small number of old, disused buildings and roadways will need to be demolished to make way for the development. Information on the exact quantity and type of materials arising from demolition works are at the time of writing not available. Subsequently, no exact quantities of demolition waste can be detailed. At contract initiation a pre-demolition survey would be required to ascertain accurately the likely waste arisings from demolition. It is expected that only small amounts of largely inert material will be produced from the works.

8.1.6 Waste Management System

8.1.6.1 Documentation

A Waste Documentation System will be prepared by the Waste Manager and included within the site specific WMP. The Waste Manager will be responsible for the implementation and auditing of the Waste Documentation System on a regular basis. All movement of waste and the use of waste contractors will be undertaken in accordance with the Waste Management Acts 1996 - 2011, Waste Management (Collection Permit) Regulations 2007 as amended and Waste Management (Facility Permit & Registration) Regulations 2007 and amended.

The documentation to be maintained, as a minimum, shall be the following:

- The names of the agent(s) and transporter(s) of the wastes;
- The name(s) of the person(s) responsible for the ultimate recycling, recovery or disposal of the wastes;
- The ultimate destination(s) of the wastes;
- Written confirmation of the acceptance and recovery, recycling or disposal of any waste consignments;
- The tonnages and LoW code for all waste materials;
- Details of any rejected waste consignments;
- Waste Transfer Forms (WTF) for hazardous wastes transferred from site and associated appendices;
- Completed Transfrontier Shipment Forms (TFS) for hazardous wastes transferred abroad
- Written documentation of waste classifications, including any related analyses; and
- Certificates of Recycling, Recovery, Re-Use or Disposal for all wastes transferred from the site.

All waste records will be maintained for a minimum period of 3 years and must be subject to verification and validation. All waste documentation will be maintained by the Waste Manager in a safe place, preferably on site, during the project implementation phase.

8.1.6.2 Waste Audits

A Waste Audit represents a systematic study of the waste management practices applied in the project. The purpose of waste auditing is to highlight the problems that waste can cause and the benefits of prevention and minimisation.

Details of the inputs of materials to the project site and the outputs of wastage arising from the development will be investigated and recorded in the waste audit undertaken by the Waste Manager. Audits will identify the quantity, nature and composition of the waste generated on the site and transported off-site. If waste movements are not accounted for, the reasons for this should be established and corrective actions implemented.

The Waste Audit will examine the manner in which waste is produced on-site and the quantity of waste being recovered, reused or recycled and compare this to the initial targets set out for the site. Each material type will be examined, to assess the largest percentage of waste generation. The waste management methods for each material type will then be reviewed in order to highlight how the targets can be achieved.

8.1 6.3 Awareness & Training

Copies of the C&D WMP and the site specific WMP will be made available to all personnel on site. All site personnel and sub-contractors will be instructed about the objectives of these plans and informed of the responsibilities which fall upon them as a consequence of its provisions. Where source segregation and selective material reuse techniques apply, each member of staff will be given instructions on how to comply with the C&D WMP. Posters will be designed to reinforce the key messages within the WMP and will be displayed prominently for the benefit of site staff. Specialist training as may be required (e.g., asbestos containing materials handling) and will be assessed or provided as required. An asbestos survey will be completed, and any identified asbestos waste removed in accordance with HSA Guidance Documentation before any demolition works commence. Asbestos removal and disposal works will be subject to certification by a third party asbestos specialist.

All on-site staff must be in a position to:

- Distinguish reusable materials from material suitable for recycling;
- Ensure maximum segregation of waste and recyclables at source;
- Co-operate with site manager on best locations for stockpiling reusable material;
- Separate material for recovery;
- Identify and liaise with operators of recovery outlets as appropriate.