

Shannon Technology and Energy Park (STEP) Power Plant

Appendix A16.1: Resource Waste Management Plan (RWMP)

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Shannon Technology and Energy Park (STEP) Power Plant

Environmental Impact Assessment Report (EIAR) - Volume 4
Appendix A16.1: Resource and Waste Management Plan

Shannon LNG Limited

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1. Introduction

Overview

- 1.1 This Resource and Waste Management Plan (RWMP) has been developed in accordance with the Environmental Protection Agency (EPA) *Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects*, 2021 (Environmental Protection Agency (EPA), 2021) (herein referred to as the 'RWMP Guidelines').
- 1.2 Full details on the background, Site history and the Proposed Development are provided in **Environmental Impact Assessment Report (EIAR) Volume 2 Chapter 2** (Description of the Proposed Development), and the Planning Statement submitted with this planning application. The Site of the Proposed Development (herein referred to as "the Site") is located in the townlands of Kilcolgan Lower and Ralappane, between Tarbert and Ballylongford, Co. Kerry.
- 1.3 The Proposed Development meets the threshold for a Tier 2 project: retrofit of commercial, industrial, infrastructural, institutional, educational, health and other developments with an aggregate floor area more than 2,000m². The thresholds are based on the principle of proportionality to ensure larger projects with larger potential resource footprints are required to more actively manage resources relative to smaller scale projects.
- 1.4 The RWMP Guidelines provide a recommended structure and content for Tier 1 and Tier 2 RWMPs. Some sections have been completed during this design phase as the information required is available at this point. Other sections are presented as a framework for the Contractor, where the commitment to responsibilities, auditing, training, reporting, tracking, supply chain, etc. will be set up and these sections will be further refined during the construction phase. These sections are included in this design phase for full transparency and commitment through the planning and procurement phases.
- 1.5 This RWMP will be updated by the appointed Contractor (the "Contractor") into a Contractor's Resource and Waste Management Plan prior to commencement of works and will be part of the Contractor's Construction Environmental Management Plan (CEMP).
- 1.6 This RWMP is structured as follows:
 1. Introduction;
 2. Project Description;
 3. Roles and Responsibilities;
 4. Design Approach;
 5. Key Materials and Quantities;
 6. Site Management;
 7. Site Infrastructure; and

8. Annex A – Resource and Waste Inventory Template.

Abbreviations and Acronyms

1.7 The abbreviations and acronyms included within this RWMP are listed in **Table 1**.

Table 1: Abbreviations and Acronyms

Abbreviations and Acronyms	Definition
ACM	Asbestos-Containing Material
BPM	Best Practice Measures
C&D	Construction & Demolition
CCS	Considerate Constructors Scheme
CEMP	Construction Environmental Management Plan
CIRIA	Construction Industry Research and Information Association
CoR	Certificate of Registration
DoW	Designing out Waste
EPA	Environmental Protection Agency
EU	European Union
FD	Framework Directive
JIT	Just in Time
LoW	List of Waste
RM	Resource Manager
RWMP	Resource and Waste Management Plan
WCP	Waste Collection Permit
WFP	Waste Facility Permit
WRAP	Waste & Resources Action Programme
WSA	Waste Storage Area

Purpose of the RWMP

1.8 RWMPs are used as a good practice measure on construction projects and to support planning and consenting applications.

1.9 This RWMP has been developed to act as a guide for site staff on how to manage construction materials and waste, in accordance with both legal and best practice requirements. The Contractor will use this RWMP as a framework for producing a detailed RWMP for use throughout the duration of the Proposed Development's construction phase.

Commitment

1.10 The Contractor will take all reasonable steps to ensure that:

- All waste from the Site is dealt with in accordance with the legal requirements.
- Materials are handled efficiently, and waste managed appropriately.

- Adherence to the RWMP Guidelines.

Legislation

- 1.11 The following information is reproduced from the RWMP Guidelines (EPA, 2021).
- 1.12 The EU Waste Framework Directive (Directive 2008/98/EC) (The European Parliament and The Council of the European Union, 2008), as amended by Directive (EU) 2018/851 (Waste FD) (European Union (EU), 2018) sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling, and recovery. It also includes definitions for when waste ceases to be waste and becomes a secondary raw material (end-of-waste criteria) and how to distinguish between waste and a by-product. The Waste FD is transposed into Irish law under European Communities (Waste Directive) Regulations 2011 (Government of Ireland (GOI), 2011).
- 1.13 Waste is defined by Article 3(1) of the Waste FD (The European Parliament and The Council of the European Union, 2008) as *“any substance or object which the holder discards or intends or is required to discard”*.
- 1.14 The legal definition of waste also covers substances or objects, which fall outside of the commercial cycle or out of the chain of utility. In particular, most items that are sold or taken off-site for recycling are wastes, as they require treatment before they can be resold or reused.
- 1.15 In practical terms, wastes include surplus earthworks materials and soil, scrap, unwanted surplus materials, packaging, recovered spills, office waste, and damaged, worn-out, contaminated or otherwise spoiled plant, equipment, and materials.
- 1.16 In Ireland, the primary waste legislation is the Waste Management Act 1996 (GOI, 1996), as amended, and Section 32 of the Act places a general obligation on the holder of waste to comply with legislation and ensure all wastes are managed within the requirements of the Act. In short, the obligation to manage waste legally lies with the holder of waste, which means the waste producer or the person who is in possession of the waste. At a construction site, the mandatory obligation to appropriately manage waste generated at a construction site lies with the Client and the Contractor. More detail on waste collection, waste shipment / movements and waste disposal / recovery is provided in Section 6 of this RWMP.
- 1.17 Under Section 3(1) of the Act (GOI, 1996), the requirements do not apply to the following materials, which hence are not considered ‘waste’:
- Land (in-situ) including unexcavated contaminated soil and buildings permanently connected with land – relates to land and buildings prior to any construction or demolition where material remains untouched. Once it has been excavated or otherwise removed, the material may enter into the control regime set down by the Waste Management Act.
 - Uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated.

1.18 In addition, there are two important provisions within the European Communities (Waste Directive) Regulations 2011 (GOI, 2011) that are of relevance to the construction sector and the prevention of waste, and these allow for the classification of resources out of the waste regime as follows:

- **Article 27** allows for the notification of a material as a by-product rather than a waste where certain criteria can be demonstrated by the legal person (i.e., further use is certain, no need for further processing, produced as part of a process and further use is lawful).
- **Article 28** sets out the grounds by which a material, which is recovered or recycled from waste, can be deemed to be no longer a waste and complies with a set of end-of-waste criteria (substance / object to be used for specific purposes, a market or demand exists, fulfils technical requirements and no overall adverse impact to human health or the environment).

Policy

1.19 A Waste Action Plan for a Circular Economy, Ireland's National Waste Policy 2022-2025 (GOI, 2020) sets out Ireland's approach to transitioning to a circular economy.

1.20 For construction and demolition (C&D) waste, the plan supports the provisions and targets of the European Communities (Waste Directive) Regulations 2011 (GOI, 2011) by undertaking to streamline the decision-making processes for by-product notifications and end-of-waste and updating best practice guidance in line with the Waste Hierarchy.

1.21 The Plan calls for the replacement of the existing Regional Waste Management Plans with a single National Waste Management Plan containing targets for reuse, repair, resource consumption and a reduction in contamination. The single Plan aims are to encourage sustainable consumption, prevent the generation of waste, improve the capture of materials to optimise circularity, and enable compliance to policy and legislation. Development of this National Waste Management Plan is currently ongoing with public consultation on the first draft closing in early July 2023.

1.22 For the purposes of waste management planning, Ireland is divided into three regions: Southern, Eastern Midlands and Connacht Ulster. Waste Management Plans for the three regions were published in May 2015. The Proposed Development is located within the Southern region and the Waste Management Plan for the Southern Region 2015 – 2021 (Southern Waste Region (SWR), 2015) provides the framework for the prevention and management of wastes in a safe and sustainable manner.

1.23 The Kerry County Development Plan (CDP) 2022-2028 sets out the overall planning and sustainable development strategy for the county (Kerry County Council, 2022).

Resource Targets

1.24 The environmental assessment of the Proposed Development is based on it achieving certain performance standards with respect to the recovery of C&D waste.

1.25 EU Member States such as Ireland must ensure that the preparation for reuse, recycling, and other material recovery of non-hazardous C&D waste (excluding naturally occurring material defined in List of Waste category 17 05 04) is a minimum of 70% by weight. The Waste FD specifies that this target should be achieved by preparing for reuse, recycling, and other material recovery, including backfilling operations using waste to substitute other material. However, as outlined in the RWMP Guidelines (EPA, 2021), the Waste FD C&D recovery target is designed for national statistics and is not an appropriate target for individual projects.

1.26 As outlined in the RWMP Guidelines (EPA, 2021), the responsibility for setting any project target lies with the Client who may dictate the appropriate performance specification for the project through imposing mandatory contractual obligations on the Contractor. Clients and Design Teams are recommended to reference the relevant industry practice, design standards and certification schemes in setting any project-specific target for the Contractor.

1.27 The following can be taken into consideration when setting waste targets:

- Standard, good, and best practice recovery rates by material are provided by the Waste and Resources Action Programme (WRAP) (Waste and Resources Action Programme (WRAP), 2007). Recovery rates for key construction materials and other C&D wastes relevant to the Project are provided in **Table 2**.
- The EPA's 'Progress to EU Targets' (EPA, 2022) reports Ireland's performance against targets set out in European Directives shows performance of 78% was reported for 2020, exceeding the 70% target.

Table 2: Standard, Good and Best Practice Recovery Rates by Material

Material	Standard Practice Recovery (%)	Good Practice recovery (%)	Best Practice Recovery (%)
Metals	95	100	100
Packaging	60	85	95
Concrete	75	95	100
Inert	75	95	100
Plastics	60	80	95
Miscellaneous	12	50	75
Electrical equipment	Limited information	70	95
Cement	Limited information	75	95
Liquids and oils	100	100	100
Hazardous	50	Limited information, cannot be 100% since some hazardous waste (e.g. asbestos) must be landfilled.	

Complementary Documents

1.28 This RWMP should be read in conjunction with the Construction Environmental Management Plan (CEMP) and Principal Contactor's CEMP. Additional relevant documents (e.g., health and safety plans) will be added to the RWMP by the Contractor in advance of commencement of work.

2. Description of the Proposed Development

Project Details

2.1 The Contractor will complete **Table 3** prior to commencement of construction.

Table 3: Project Details

Project Title	Shannon Technology and Energy Park (STEP) Power Plant		
Client	Name		
	Address		
	Contact	Email	
	Phone	Mobile	
Contractor	Name		
	Address		
	Contact	Email	
	Phone	Mobile	
Sub-Contractor	Name		
	Address		
	Contact	Email	
	Phone	Mobile	
Site Manager	Name		
	Address		
	Contact	Email	
	Phone	Mobile	
Address of development	Address		
	Town		
	Postcode		
Planning Reference	Register		
Person responsible for implementation of this plan (Resource Manager)	Name		
	Address		
	Contact	Email	
	Phone	Mobile	
RWMP Drafter	Name		
	Address		
	Contact	Email	
	Phone	Mobile	
Construction cost (estimated)			
Site area (gross area)			

Project Title Shannon Technology and Energy Park (STEP) Power Plant

Construction programme:

Start date Day Month Year

Completion date Day Month Year

Document Controller / Secretary

Location of RWMP (electronic and hard copy)

Project Description

2.2 The Contractor will complete **Table 4** prior to commencement of construction.

Table 4: Project Description

Project Title Shannon Technology and Energy Park (STEP) Power Plant

Site location

Site description to include details of the existing site layout

Details of any proposed site clearance and/or demolition

Description of the development (at a minimum this should include the description included in the planning permission)

Description of the main construction elements including all new structures, roads, drainage or other infrastructure

Any designing out waste initiatives adopted

Identification of waste prevention mechanisms implemented

2.3 The following Tier 2 project RWMP contents will include the following details. The current details are provided in **Chapter 2** and **Chapter 16** of the Environmental Impact Assessment Report, Volume 2.

- Site description to include site area, topography, description of existing structures, site access, adjoining land uses, sensitivity of the environment, etc.
- Site history including any details of previous land uses – in particular, potential for residual ground contamination from previous uses such as fuel / material storage, industrial operations (gas works, foundries, collieries, etc.).
- Details of any proposed demolition including descriptions of scale and building fabric.
- Details of any site clearance including vegetation removal, topsoil stripping or other excavations to enable works, including estimations of potential volumes.

- Description of construction elements including all new structures, roads, drainage, or other infrastructure.
- Material balance for the site indicating the cut / fill requirements for development and estimates for all other material imports.
- Details of project programme and phasing.
- In the event that Asbestos-Containing Material (ACM) is present on-site, details of the volume, nature and condition of all material. Confirm if an ACM inventory for the site is available.
- If there is known or suspected ground contamination on the site or adjoining lands, provide details of the nature and scale of contamination. This should include a gridded map of the site highlighting areas of contamination.
- For any brownfield development or development where there is known or suspected ground contamination, a remediation plan should be prepared to present the scale and nature of the contamination and the proposed approach to remediation, i.e., full excavation and off-site treatment, in-situ treatment, etc.
- Details of any other hazardous materials known on-site.

3. Roles and Responsibilities

3.1 The main RWMP roles and responsibilities as outlined in the RWMP Guidelines (EPA, 2021) are shown in **Table 5**. The Principal Contractor will complete and add any additional roles to **Table 5** prior to the commencement of the construction phase.

Table 5: Roles and Responsibilities

Position	Name	Contact Details	RWMP Responsibility
Client Advisory Team (e.g., Engineers, architects, consultants etc.) Project Manager			<ul style="list-style-type: none"> Revising and maintaining the RWMP through the design, planning, and procurement phases of the project, in accordance with this RWMP. Appointing a Resource Manager (RM) to track and document the design process, inform the Design Team, and prepare the RWMP. Include details and estimated quantities of all projected waste streams. This should also include data on waste types (e.g., waste characterisation data, contaminated land assessments, site investigation information) and prevention mechanisms (such as by-products) to illustrate the positive circular economy principles applied by the Design Team. Incorporate relevant conditions imposed in the planning permission into the RWMP. Handover of the RWMP to the Contractor at commencement of construction for the development of the RWMP in a similar fashion to how the safety file is handed over to the Contractor. Work with the Contractor as required to meet the performance targets for the Proposed Development.
Client Project Manager			<ul style="list-style-type: none"> Establishing the ambition and the performance targets for the Proposed Development. Set out these commitments and targets in relation to prevention and minimisation in the project brief, tendering documentation including pre-qualification requirements, invitation to tender, etc. Require the preparation and submission of an RWMP as part of the design and planning submission, even if not requested by the planning authority for planning. Require the preparation and submission of an updated RWMP as part of the construction tendering process. Ensure that the RWMP is agreed and submitted to the local authority prior to commencement of works on-site. Request the end-of-project RWMP from the Contractor.
Principal Contractor Project Manager			<ul style="list-style-type: none"> Implementing and reviewing the RWMP through construction (including the management of all suppliers and sub-contractors) as per the requirements of these guidelines. Identifying a designated and suitably qualified RM who will be responsible for implementing the RWMP. Identifying all hauliers to be engaged to transport each of the resources / wastes off-site. Note that any resource that is legally a 'waste' must only be transported by a haulier with a valid Waste Collection Permit.

Position	Name	Contact Details	RWMP Responsibility
			<ul style="list-style-type: none"> Identifying all destinations for resources taken off-site. End-of-waste and by-product notifications addressed with EPA where required. Clarification of any other statutory waste management obligations, which could include on-site processing. Full records of all resources (both wastes and other resources) should be maintained for the duration of the project. Preparing a RWMP Implementation Review Report at project handover.
Local Authority			<p>The Local Authority (or An Bord Pleanála) as the planning regulator is responsible for the following tasks:</p> <ul style="list-style-type: none"> Ensure that the requirement for an RWMP for C&D Projects (as specified in the RWMP Guidelines (EPA, 2021) is required for all planning applications (through setting this requirement as an objective of the County Development Plan or local planning policy) for development where construction or demolition is proposed. Ensuring that any RWMP submitted with planning complies with the requirements of the RWMP Guidelines (EPA, 2021). Setting appropriate planning conditions as required in line with the requirements of Section 34(4)(l) of the Planning and Development Acts (GOI, 2000), as amended. <p>Ongoing enforcement of these conditions through the construction phase.</p>

4. Design Approach

- 4.1 Decisions made at the detailed design stage of the Proposed Development will impact on the quantity and types of materials used, the quantity and types of waste arising and the management of materials and waste.
- 4.2 The Proposed Development's design development has and will continue to apply the principles of Designing out Waste (DoW), which include:
- Design for reuse and recycling;
 - Design for green procurement;
 - Design for off-site construction;
 - Design for materials optimisation; and
 - Design for deconstruction and flexibility.
- 4.3 The RWMP Guidelines (EPA, 2021) provides a further guide to DoW.
- 4.4 In general, the following measures will be implemented during the design and construction phases of the Proposed Development, where technically, economically, and environmentally practicable:
- Manage waste in accordance with the Waste Hierarchy;
 - Design-out and prevent waste arising;
 - Reuse excavated earthworks materials within the Proposed Development;
 - Divert waste from landfill through off-site recycling and recovery; and
 - Use recycled and secondary aggregates (alternative materials) in the construction of the Proposed Development.
- 4.5 Prior to construction, the Contractor must record, in the RWMP, all actions to be implemented to reduce waste or material use on the Proposed Development, and the resulting benefits.
- 4.6 **Table 6** will be populated by the Contractor during the detailed design of the Proposed Development.

Table 6: Designing out Waste Actions

Material / Waste	Estimated Reduction in Waste Arising		Approach by Which Reduction Achieved	Will Additional Planning Permissions / Authorisations be Required?	Estimated cost Saving (€)	Persons Responsible for Completing Action
	Tonnes	m³				

5. Key Materials and Quantities

5.1 The precise types and quantities of material use, and waste arisings are not yet known, therefore a high-level construction waste estimate is provided at this stage. The Contractor will populate the inventory provided in **Annex A** for inclusion in the Contractor RWMP.

5.2 This section of the RWMP will be updated by the Contractor to provide specific detail on:

- The estimated cost of resource management;
- The nominated authorised haulier who will be employed for each stream must be named along with the relevant permissions; and
- The nominated destination site for all streams must be provided along with the relevant permissions.

Identification of Each Waste Stream

5.3 **Table 7** summarises the main types of materials that will be used and the wastes that are likely to arise during the construction of the Proposed Development.

Table 7: Estimated Types of Material Use and Waste Arising from the Construction of the Proposed Development

Activity	Material Use	Waste Arising
Site remediation, preparation, and earthworks, including excavation	<ul style="list-style-type: none"> • Fill material for construction purposes. • Primary / secondary / recycled aggregates for ground stabilisation. 	<ul style="list-style-type: none"> • Surplus excavated materials (limited excavation anticipated) • Surplus subsoil. • Unsuitable and contaminated soils and excavated materials. • Vegetation from site clearance (small quantities). • Clearance of hardstanding.
Demolition	<ul style="list-style-type: none"> • Installation of temporary supports and careful isolation of building structures from any adjacent structures. 	<ul style="list-style-type: none"> • Hard inert waste such as concrete, brick and stone (small quantities from the demolition of a small farm complex, a former dwelling, a gun emplacement structure, a well and a field boundary).
Construction	<p>Main construction materials including:</p> <ul style="list-style-type: none"> • Aggregates (including well graded materials, granular fill, backfill, pipe bedding and drainage media). • Asphalt and bituminous materials. • In-situ cast concrete. • Steel reinforcing bar (for reinforced concrete). • Precast concrete products (components, kerbs, drainage pipes, chambers and channels). • Composite PVC / Plastisol. 	<ul style="list-style-type: none"> • Excess, offcuts, and broken / damaged construction materials. • Packaging from materials delivered to site. • Construction worker wastes from offices and rest areas / canteens. • Waste oils from construction plant.

Predicted Quantities

- 5.4 Estimation of waste arisings for the demolition, excavation and construction activities are limited to those resulting from the buildings, structures and works detailed in Volume 2 of the EIAR: **Chapter 2** (Description of the Proposed Development), **Section 2.3**. The WRAP construction, demolition, and excavation waste volume to mass conversion factors (WRAP, 2014) and National Highways Material Density Factors (National Highways, 2021) have been used to convert the material quantities / volumes provided to tonnes so that they can be assessed against C&D waste collected in Ireland in 2021.
- 5.5 The quantities of waste are anticipated to be small compared to the overall C&D waste arisings. All materials will be segregated, classified, and disposed of off-site in accordance with the Waste Management Act 1996 (as amended). It is assumed that this waste will have a high recovery rate and is likely be recovered rather than sent to landfill.
- 5.6 The precise composition and volume of this waste is dependent on several factors and will be further informed by the appointed Contractor, based on their experience of similar developments. It is assumed that all construction waste will require off-site management.
- 5.7 All effects are deemed to be **temporary** due to the length of the construction programme.

Demolition

- 5.8 Planned demolition activities are restricted to the removal of derelict buildings and structures, including a small farm complex, dwelling, a gun emplacement structure, a disused well, and a field boundary wall. Waste generated from demolition of these buildings and structures are expected to be **Slight / Not Significant** in the context of national waste arisings and significantly less than those arising from the construction of the Proposed Development.
- 5.9 Demolition quantities from the Proposed Development are not yet available so a quantitative assessment has not been conducted at this stage of the assessment however a qualitative assessment has been undertaken.

Excavation

- 5.10 All excavated material will be reused onsite, within the development area, and no import of soil is required so a balanced cut and fill is proposed so the impact is considered to be **No Change / Imperceptible**.

Construction

- 5.11 The estimated quantities of construction waste are estimated to be 4,088 tonnes (includes hazardous waste). Compared to the quantity of C&D waste collected in Ireland in 2021 (excluding soil, stones and dredging spoil) and assuming all waste requires off-site management, this would account for 0.30% of total national C&D waste arisings (1,347,462 tonnes). Since this is <1% of total C&D waste arisings, the impact is considered to be **Slight / Not Significant**.

Municipal Waste and Hazardous Waste

- 5.12 Small quantities of municipal waste will likely be generated during construction this may include canteen and ad hoc waste from the construction workforce. Hazardous waste (e.g. oily waste and batteries from the construction plant and maintenance, waste paints and chemicals etc.) are also expected to be generated in minimal quantities. The quantities are anticipated to be small in the context of national waste arisings (3.17 million tonnes of municipal waste (EPA, 2021c) and 466,941 tonnes of hazardous waste (EPA, 2023a)) therefore as municipal and hazardous waste will be $\leq 1\%$ of national waste arisings, a **Negligible / Not Significant** impact. Procedures for the storage and management of these wastes are set out in this RWMP and will be further detailed in the Contractor RWMP.
- 5.13 Removal of all hazardous materials is to be carried prior to demolition works commencing. Any asbestos identified in the Demolition and Refurbishment Asbestos Survey will be removed, managed and disposed of in accordance with the Health and Safety Authority (HSA) Guidelines on Management and Abatement of Asbestos-Containing Materials (Health and Safety Authority (HSA), 2013).

List of Waste (LoW) Codes

- 5.14 It is not possible to estimate the exact composition of construction waste at this time, however it is anticipated that the majority of waste will sit within Chapter 17 of the List of Waste (LoW) Codes within the EPA Waste Classification List of Waste and Determining if Waste is Hazardous or Non-hazardous (EPA, 2018).

Resource Management Routes

- 5.15 The Waste Hierarchy sets out the priority order that should be considered when managing wastes. A basic representation is provided in **Plate 5-1**. The Contractor will use the Waste Hierarchy as a guide to encourage the prevention of waste and to define waste management options.
- 5.16 When considering waste management options for the Proposed Development, the Contractor will take account of the site's location, natural environment, and available infrastructure. The Contractor will consider the following options when determining the preferred waste management option for each waste stream.

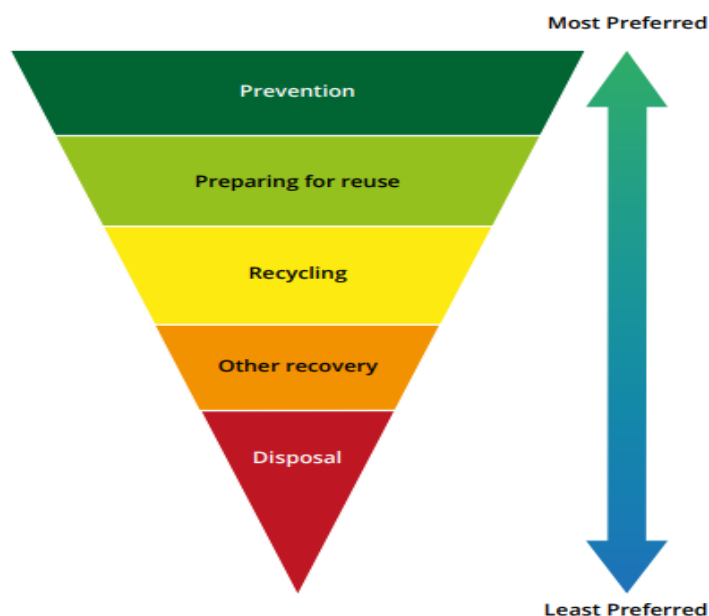


Plate 5-1: Waste Hierarchy

Source: EPA 2021. *Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects*

Prevention and Preparing for Reuse

5.17 To reduce the potential impacts from materials and waste, and to achieve high levels of sustainability in the Proposed Development as a whole, the Contractor will apply the principles of the Waste Hierarchy and adopt best practice measures (BPM) which go beyond statutory compliance.

5.18 This may include BPMs set out in construction industry guidance for example, guidance from the Considerate Constructors Scheme (CCS), Waste & Resources Action Programme (WRAP) and Construction Industry Research and Information Association (CIRIA).

5.19 As outlined in the RWMP Guidelines (EPA, 2021), the RM will engage with team or individuals tasked with procurement of materials and services to ensure best practice procedures are employed to prevent residual resources at the site. A range of good practice measures may include the following:

- Select procurement routes to minimise unnecessary packaging – for example applying 'Just-in-Time' (JIT) delivery processes to minimise material spoilage.
- Use of 'consolidation centres' to support JIT delivery – these are strategically-located storage and distribution facilities where materials can be stored prior to JIT delivery to sites.
- Implement ordering procedures and supply chain systems that avoid waste, i.e., no over-ordering, use of take-back schemes for packaging, material surplus and offcuts.
- Select procurement routes that minimise unnecessary packaging.
- Plan the work sequence to reduce the potential for on-site residual resource generation.

5.20 The following approaches will be implemented, where practicable, to further minimise the quantity of waste arising and requiring disposal:

- Reuse of materials on-site wherever feasible, e.g., reuse of excavated soil for landscaping, recycling of demolition materials into aggregates.
- Off-site prefabrication, where practical, including the use of prefabricated elements.
- Segregation of waste at source, where practical, to facilitate a high proportion and high-quality recycling.
- Off-site reuse, recycling and recovery of materials and waste where reuse on-site is not practical, e.g., through use of an off-site waste segregation or treatment facility or for direct reuse or reprocessing off-site.

Recycling

5.21 The aim is to reuse materials won on-site by recycling them into an alternative form that can be used for construction purposes (for example crushing concrete, brick, or other inert wastes to produce aggregate material). By recycling on-site, as far as practicable, the quantity of waste requiring off-site management is reduced and carbon emissions associated with transportation are eliminated.

5.22 Recycling may also be achieved by utilising materials with a recycled content, such as recycled aggregates produced off-site.

Recovery

5.23 This generally aims to recover energy from waste which cannot otherwise be reused or recycled. This may include waste materials such as hazardous liquids or solids that can be sent to energy from waste facilities.

5.24 Recovery may also include the beneficial use of materials on land for restoration (backfilling operations).

Disposal

5.25 The least preferred option in the Waste Hierarchy is a final disposal route such as landfill. Some waste streams will inevitably end up with such a solution.

5.26 When placing waste disposal contracts, the Contractor will consider the implications of long-distance travel in terms of health and safety risk, commercial terms, and increased emissions from vehicles.

6. Site Management

6.1 As outlined in the RWMP Guidelines (EPA, 2021), the Contractor will manage the resources required for the Proposed Development in accordance with this RWMP and the construction of the Proposed Development and the following tasks will be implemented by the contractor:

- Agree and revise as necessary any commitments or targets included in the RWMP developed at design / planning with the Client for acceptance and adoption in the RWMP for construction.
- Allocate responsibility for resource management to one or more individuals of sufficient seniority to put the relevant procedures into practice. Nominate a suitably qualified RM with expertise in waste and resource management to implement the RWMP.
- The RM will be required to update the plan as required to reflect new resource streams, work practices, suppliers or resource management options as required.
- The RM will carry out for delivery of all training and induction in relation to resource management.
- The RM will ensure site infrastructure is supplied and maintained as fit for purpose.
- The RM will conduct all internal site audits including audits of sub-contractor operations.
- The RM will be available as required for any Local Authority or other audits undertaken. The RM will be responsible for maintaining site records for waste and resources exported off-site and ensuring these are undertaken by suitably authorised operators to suitably authorised sites.
- The RM will be engaged with relevant individuals who have access to ordering and stock-control records to ensure supply chain initiatives have been adopted.

6.2 This section of the RWMP will be updated by the Contractor to provide specific detail on the:

- Requirements to include the RWMP in site induction training;
- Requirements for toolbox talks and all other training on the RWMP;
- Procedures for identifying suitably authorised waste collection operators and waste destination sites;
- Requirements for resource-efficient supply chains;
- Procedures for record keeping and reporting of all off-site export of resources;
- Procedures for record keeping and reporting of all on-site resource uses;
- Requirements for communications with the local authority and other stakeholders;
- Procedures for audits and inspections of resource management practices; and

- Requirements for a final report summarising the outcomes of resource management processes adopted and the final inventory and cost for the project.

Training

- 6.3 Training of site personnel will be the responsibility of the Contractor's RM and, as such, waste management training is recommended as outline in the RWMP Guidelines (EPA, 2021). This can be incorporated with other site training needs such as general site induction, health and safety awareness and manual handling.
- 6.4 All construction workers (including sub-contractors and other parties working on-site) are to receive an environmental induction before commencing work on the construction of the Proposed Development will include a module on resource management and the RWMP.
- 6.5 As a minimum the following will be included in the induction:
- Scope and content of the RWMP.
 - Project commitments and targets.
 - List of anticipated resources and wastes and volumes to be generated.
 - Procedures for the proper identification and segregation of resources and wastes.
 - Temporary storage and the location of the Waste Storage Areas (WSAs).
 - Clear instruction on hazardous wastes will be incorporated into the training programme and the particular dangers of each hazardous waste.
- 6.6 The environmental induction shall be provided and delivered by the Contractor and be tailored to suit the tasks and responsibilities of site personnel from management and supervisory level through to site operatives. Toolbox talks on resource management will be provided on a continuous basis. Regular toolbox talks shall ensure site staff are aware of the resource management practices associated with their work and the appropriate control measures that are required to carry out their work in compliance with the RWMP.

Waste Collection

- 6.7 Section 32 of the Waste Management Act 1996, as amended, places the responsibility on the original waste producer, or waste holder, to transfer waste only to an appropriate person, an appropriate person in this instance being a Local Authority and/or a person with a valid Waste Collection Permit. It is an offence under Section 32 (1) of the Waste Management Act 1996 to cause or facilitate the abandonment, dumping or unauthorised management of waste, or to hold, transport, recover or dispose of waste, or treat waste, in a manner that causes or is likely to cause environmental pollution. Please note it is also an offence under Section 32 (2) of the Waste Management Act 1996 to transfer the control of your waste to any person other than an appropriate person.

6.8 All residual resources legally classified as a 'waste' moved off-site, including soil and stone must be collected by authorised waste collectors (as authorised by the National Waste Collection Permit Office). A list of currently authorised waste collectors is available on the following website: <https://www.nwcpo.ie/permitsearch.aspx>.

6.9 For further details are also available from the National Waste Collection Permit Office Áras an Chontae, Charleville Road, Tullamore, Co. Offaly R35 F893, and <http://www.nwcpo.ie/>.

Waste Shipments/Movements of Hazardous Waste Within Ireland

6.10 Dublin City Council is designated as the National Competent Authority for the export, import and transit of waste shipments. More information is available at: <https://www.dublincity.ie/residential/environment/national-tfs-office/about-national-tfs-office>.

6.11 All waste that requires off-site movement will need to be transported in accordance with these requirements.

Waste Disposal / Recovery

6.12 All residual resources legally classified as a 'waste' taken from Site must be sent to suitably authorised waste facilities for disposal or recovery as outline in the RWMP Guidelines (EPA, 2021). The following authorisations are applicable:

- Certificate of Registration (CoR) from the Local Authority (issued to private sector).
- CoR from the EPA (issued to Local Authority).
- Waste Facility Permit (WFP) from the Local Authority.
- Waste or Industrial Emissions Licence from the EPA.

6.13 A list of currently authorised (CoR or WFP) waste sites in each Local Authority is available on the following website: <http://facilityregister.nwcpo.ie>.

6.14 A list of sites currently licensed by the EPA (Industrial Emissions or Waste Licence) is available on the following websites:

- <https://epawebapp.epa.ie/terminalfour/waste/index.jsp?disclaimer=yes&Submit=Continue> (for Waste Licensed sites); and
- <https://epawebapp.epa.ie/terminalfour/ippc/index.jsp?disclaimer=yes&Submit=Continue> (for Industrial Emission Licensed waste facilities).

Auditing

6.15 The appointed RM will conduct ongoing resource audits at the site during the construction phase as outline in the RWMP Guidelines (EPA, 2021). These audits will cover work practices, record keeping, and off-site tracking as follows:

- The RM will undertake periodic audits and inspections of work practices to assess compliance with the RWMP. The audit protocol will be risk based and focus on key issues of concern but will include as a minimum:
 - Adequacy of site signage and need for any repairs or upgrades.
 - Adequacy of storage infrastructure and need for any repairs or upgrades.
 - Compliance with resource segregation protocols and observed contamination in any resource streams.
 - Assessment of observed Contractor and sub-contractor work practices for compliance with the RWMP.
- The RM will undertake a review of all records of wastes and resources generated on-site and transported off-site periodically through the project. If waste movements are not accounted for, the reasons for this are to be established to understand why the record keeping system has not been maintained and implement corrective actions if needed.
- The resource records will be compared with established targets for the site (e.g., reuse of resource target or recycling of waste target).
- Examining material management on-site to determine where the largest percentage residual waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how project contract targets can be achieved.
- Issue corrective actions (training, penalties, etc.) as required to site operatives where deviations of the RWMP are observed.

Tracking and Tracing

6.16 The RM is required to maintain records for all resource material which is used on-site and leaves the site, either for reuse, recycling, energy recovery, backfilling or other recovery or disposal on third party sites as outlined in the RWMP Guidelines (EPA, 2021). A recording system will be put in place to record residual waste and resources generated on-site and a sample recording table is provided in **Annex A - Resource and Waste Inventory Template**. This table will be employed as a daily log to update resource movements off-site on a given day and compiled into a database as part of the RWMP files. The type of information that will be recorded in the site tracking system is described in the following section.

- For each movement of resource off-site, a signed docket / invoice will be obtained by the RM from the haulier / contractor detailing the following:
 - A description of the resource stream.
 - List of Waste (LoW) Code for each stream (where applicable).
 - Validated quantity of material moved off-site by the haulier / contractor (typically reported in tonnes).

- The name and authorisation of the haulier to transport the material – in the case of a ‘waste’ this requires a valid Waste Collection Permit (WCP). In the case of by-product or other materials that are not a waste, no WCP is required. In both cases the vehicle registration number should also be recorded for each load of material removed from site.
- The name and authorisation of the destination site for the resource – again for a ‘waste’ this requires a valid CoR, Waste Permit or Waste Licence and in the case of by-product the relevant by-product determination.
- The waste contractors will be required to provide details of end-use or waste treatment in waste reports.
- This recording will be carried out for each resource type and the system will also be linked with the delivery records. In this way, the percentage of residual resource generated for each material can be determined.
- The system will allow the comparison of these figures with the targets established for the prevention, reuse, and recovery of resources to highlight successes or failures against these targets.

6.17 It is the obligation of the RM to ensure that all resources taken off-site are in line with the relevant legislation and the key area relates to ensuring that hauliers and recovery / disposal sites have the appropriate authorisations. Some key measures that the RM will implement:

- Checking the expiry date of the authorisation relative to the duration of the works and whether any review of the permit is required over that period (e.g., WCPs have a maximum life of five years and review applications need to be lodged before expiry).
- Checking that the waste consent i.e., permit / licence has the authorisation ‘COR holders, Waste Facility Permit holders and Waste Licence holders’ for the resource stream proposed (e.g., Waste Permits and Waste Licences only permit an operator to accept specific waste streams).
- Authorisation for the resource management operation proposed (e.g., Waste Permits and Waste Licences only permit an operator specific recovery or disposal codes).
- Check that any waste acceptance limits expressed in the permit / licence for material acceptance are known and that on-site sampling has indicated that the residual resource complies with these limits (for example a licensed soil recovery facility can only accept uncontaminated material which meets the limits set out in the EPA Guidance on *Waste Acceptance Criteria at Authorised Soil Recovery Facilities* (EPA, 2020) and cannot accept contaminated soils).

Communications

6.18 The following communication tasks will be implemented by the RM in the RWMP Guidelines (EPA, 2021) through the construction phase:

- Internal reporting of resource statistics to the Client and the Contractor management. This includes performance relative to agreed targets and objectives which should be included as an agenda item at site meetings.
- Engaging with relevant local authority on any site inspection or enforcement audits undertaken at the site. All follow-up actions and corrective actions should be logged and reported to the local authority.
- Engaging with other stakeholders (EPA, public, etc.) as appropriate in relation to the resource management on-site.
- Upon completion of construction, the RM will prepare a final report summarising the outcomes of resource management processes adopted, the total reuse and recovery figures and the final destinations of all resources taken off-site. This report will be issued to the Client, Contractor management and the local authority. The local authority may make such a requirement a condition of planning and require the formal sign-off of same by the local authority for full planning compliance.

7. Site Infrastructure

7.1 This section of the RWMP will be updated by the Contractor to provide specific detail on the:

- Minimum requirements for site signage on resource management.
- Minimum requirements for resource storage (dedicated skips, hazardous materials storage, stockpile management, etc.).
- Specific requirements on stockpiling more than 50kg of certain persistent organic pollutants (from a construction perspective these may include some chlorinated hydrocarbon contaminants in ground contamination, Expanded Polystyrene / Extruded Polystyrene insulation building material containing brominated flame retardant (Hexabromocyclododecane) or polychlorinated biphenyls from removal of electrical equipment) under Article 5 of EU Regulation (EU) 2019/1021 (The European Parliament and The Council of the European Union, 2019).
- Handling and export of resources.

7.2 The Contractor will engage with the team or individuals tasked with procurement of materials and services to ensure best practice procedures are employed to prevent residual resources at the site. A range of measures may include the following:

- Select procurement routes to minimise unnecessary packaging – for example applying ‘Just-in-Time’ (JIT) delivery processes to minimise material spoilage.
- Use of ‘consolidation centres’ to support JIT delivery – these are strategically-located storage and distribution facilities where materials can be stored prior to JIT delivery to sites.
- Implement ordering procedures and supply chain systems that avoid waste, *i.e.*, no over-ordering, use of take-back schemes for packaging, material surplus and offcuts.
- Plan the work sequence to reduce the potential for on-site residual resource generation.

7.3 Prior to construction, the site layout will be reviewed to ensure that the proposed Waste Storage Areas (WSAs) have adequate space for storage and handling.

7.4 WSAs may include stockpiles (for soil and stone, aggregates, etc.), skips (for metals, wood, glass, etc.) or secure containers for hazardous materials. All WSAs will be assessed as fit for purpose and should be suitably contained, banded or defined as required.

7.5 The WSA will be set out to reduce any potential for impact on sensitive human (e.g., residential) or natural (water courses, ecological sites, etc.) and a suitable buffer, e.g., receptor will be applied to mitigate any impact.

7.6 Labelling and signage shall be used on-site to inform personnel of key WSA requirements and restrictions, with clear signage provided on all WSAs. An example is shown in **Table 8**.

Table 8: Waste Container Colour Codes

Grey: Inert		Green: Wood	
Black: Mixed		Brown: Packaging	
Blue: Metal		Orange: Hazardous	
White: Gypsum			

7.7 In relation to resource storage, the Waste Management Act 1996 (GOI, 1996), as amended, allows for the temporary storage of resources defined as 'waste' at the site where it was produced. The Act defines the phrase *'the temporary storage of waste'* limiting it to having a six-month duration. Appropriate measures to prevent environmental impact, e.g., run-off, should be implemented as needed.

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Annex A: Resource and Waste Inventory Template (EPA, 2021)

LoW Code	Description	Volume Generated (tonnes)	Prevention (tonnes) (non-waste)	Reused (tonnes) (non-waste)	Recycled (tonnes) (waste)	Recovered (tonnes) (waste) ¹	Disposed (tonnes) (waste)	Unit Cost Rate (€/tonne)	Total Cost (€)
17 01 01	Concrete								
17 01 02	Bricks								
17 01 03	Tiles and Ceramics								
17 02 01	Wood								
17 02 02	Glass								
17 02 03	Plastic								
17 03 02	Bituminous Mixtures								
17 04 01	Copper, Bronze, Brass								
17 04 02	Aluminium								
17 04 03	Lead								
17 04 04	Zinc								
17 04 05	Iron and Steel								
17 04 06	Tin								
17 04 07	Mixed Metals								
17 04 11	Cables								
17 05 04	Soil and Stone								
17 06 04	Insulation Material								
17 08 02	Gypsum								
17 09 04	Mixed C&D Waste								

¹ Recovered here includes energy recovery, backfilling and other recovery.

LoW Code	Description	Volume Generated (tonnes)	Prevention (tonnes) (non-waste)	Reused (tonnes) (non-waste)	Recycled (tonnes) (waste)	Recovered (tonnes) (waste) ¹	Disposed (tonnes) (waste)	Unit Cost Rate (€/tonne)	Total Cost (€)
17 01 06*	Mixtures of, or separate fractions of concrete, bricks, tiles and ceramic containing hazardous substances								
17 02 04*	Glass, plastic and wood containing or contaminated with hazardous substances								
17 03 01*	Bituminous mixtures containing coal tar								
17 04 09*	Metal waste contaminated with hazardous substances								
17 05 03*	Soil and stones containing hazardous substances								
17 06 05*	Construction materials containing asbestos								
	Other resources (non-waste materials) (specify as needed)								
	Other wastes (specify as needed)								

