

**METROLINK**

Integrated Transport. Integrated Life.

**A5.15**

**Waste  
Management**

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## 1. Introduction

Waste is an inevitable output of any construction project, no matter the scale. The materials and waste streams that will arise during the Construction Phase of the proposed Project will include:

- Excavated material from earthworks, excavations and tunnels;
- Demolition waste;
- Construction waste; and
- Waste generated by workers at site compound facilities.

This report sets out the principles for waste management during the Construction Phase of the proposed Project and the measures that can be employed to minimise waste and to limit impacts to the environment.

The report focuses primarily on demolition and construction wastes. The management of waste and excavated materials is assessed in detail in Chapter 24 of this EIAR (Resource & Waste Management) and its associated appendix, the Excavated Material Management Strategy (Appendix 24.1). The legal requirements for the management of wastes are set out in this chapter.

## 2. Waste Management

### 2.1 General Provisions

The principal objectives of sustainable resource and waste management are to use material resources more efficiently, reduce waste at source and reduce the quantity of waste that requires final disposal to landfill in accordance with the waste hierarchy. The waste hierarchy is illustrated in Diagram 2.1.



Diagram 2.1: Waste Hierarchy

Construction waste would be reduced by balancing the cut and fill of excavations and tunnel arisings, segregating construction and demolition materials on site, and by using suitable waste contractors to divert waste from landfill through reuse, recycling and recovery.

### 2.2 Prevention through Design

The primary objective in the construction of the proposed Project will be at the top of the waste hierarchy on zero avoidable waste i.e., preventing waste and reusing waste wherever possible. As such the aim will be not to focus on lower value recycling and other recovery, and in any case most construction and demolition waste is already 'recovered' in some form.

The waste hierarchy will require to be departed from for particular types of waste, where justified, in order to ensure minimal environmental impact. It is important to understand any potential wider implications and thus any unintended consequences of managing waste. For example, there will be instances where avoiding waste in the first instance would create greater environmental impact. Consideration therefore will be given by the contractor(s) to the relationship with other factors such as materials consumption, energy usage and the emission of carbon. The following general measures are examples of how wastes can be managed in accordance with the waste hierarchy:

- Prevention – using standard sizes for most items to avoid specials and cutting on-site. Materials ordered to size with minimum waste.
- Prevention – use of off-site construction, prefabricated products / modules and pre-cast units where possible.
- Prevention - take-back scheme arrangement with suppliers, whereby packaging, cable drums and pallets are collected by suppliers and not broken up.
- Prevention / Preparation for Reuse - materials reused on-site where possible.

- Prevention - main contractors work with sub-contractors to identify waste minimisation and encourage all sub-contractors to reuse or recycle their own waste materials, in particular packaging.
- Reduction and Recycling - packaging requirements in materials procurement reduced and recycled content specified.
- Prevention - hoarding posts reused and shuttering systems used where these are required.

## **2.3 Management of Construction Waste**

Construction waste includes surplus materials which can arise from over-ordering or mishandling of construction materials, packaging waste, as well as mixed municipal waste and food waste associated with construction staff working on the sites.

Effective site management and practice can not only prevent the mixing of the inert portion together with the non-inert portion of construction waste but can also facilitate and allow on-site sorting and separation at source of construction.

The Main Contractor(s) will develop a Construction and Demolition Waste Management Plan (C&D WMP). The C&D WMP will be written in accordance with the best practice guidance (DoEHLG 2006) and will include:

- Roles and responsibilities with regards to waste management;
- An analysis of the likely waste arisings;
- Methods to ensure maximum segregation at source;
- Methods for reuse/ recovery of waste;
- Material handling procedures;
- Procedures for keeping records of all waste and materials which are removed from site; and
- Proposals for training of the workforce in waste management procedures and requirements.

Effective waste management practices will be implemented to reduce the risk of nuisance issues associated with construction waste:

- Debris netting will be erected to prevent materials being scattered by the wind;
- Food waste will be strictly controlled on all parts of the site in order to minimise the attraction of vermin and other pests;
- In the event of any litter or debris escaping the site, it will be collected immediately and removed to storage on site, and subsequently recovered / disposed of in the normal manner;
- Waste receptacles such as skips will be secured so as to minimise impact from fly-tipping;
- Waste will be collected in a timely fashion so as to prevent overly large volumes of waste accumulating; and
- A regular programme of housekeeping checks will be established to ensure a safe and orderly site.

## **2.4 Management of Demolition Waste**

Pre-demolition audits will be undertaken in order to facilitate selective demolition. Selective demolition will be undertaken to enable the removal and safe handling of hazardous substances and to facilitate reuse and recycling. The EU Construction and Demolition Waste Protocol and Guidelines (European Commission 2018) provides guidance on best practice for the assessment of C&D waste streams prior to demolition, called a 'waste audit'.

The aim of the guidance is to facilitate and maximise recovery of materials and components from demolition for beneficial reuse and recycling, without compromising the safety measures and practices outlined in the European Construction and Demolition Waste Protocol. This guidance will be used to inform the demolition audits.

Based on the findings of these audits, a Demolition Plan shall then be prepared for each building and structure to be demolished. The Demolition Plan will stipulate the procedure for the demolition of the building or structure; detailing sequence and method of demolition to be adopted including any restrictions. Where hazardous materials, e.g. asbestos containing materials (ACM) or petroleum, are present, they shall be removed and cleaned/disposed of according to the statutory requirements and industry guidance prior to demolition.

The Demolition Plan will also consider the proposed methods for handling and disposing of debris, including:

- Breaking down concrete and/or brick debris into smaller sizes and separating from reinforced steel for disposal;
- Crushing demolition arisings on-site using mobile concrete crushing equipment. This offers a range of environmental, logistical and financial benefits. Crushing reduces traffic movements to and from the site. The aggregate produced could be utilised as a piling mat or for backfilling basements/voids providing a substitute for virgin aggregates;
- Pulverising concrete debris into aggregate size for use as road base, temporary haul roads, fill materials or aggregates for concrete;
- Salvaging old bricks for reuse as architectural features, or other uses;
- Disposal of broken concrete at materials recycling facilities for processing into recycled products and aggregates for beneficial reuse;
- Methods of handling debris;
- Time and frequency of waste disposal off site; and
- Recording scheme for the movement of waste off site and site supervisory personnel.

Refer to Appendix A5.8 General Approach to Demolition for further details.

## **2.5 Management of Excavated Material**

Nearly 3 million m<sup>3</sup> of excavated material is forecast to be generated by the proposed Project during the Construction Phase. The predicted excavation material quantities are based on the reference design and the vertical alignment determined for both the tunnelling and surface works. Of that approximately 99,931m<sup>3</sup> (176,876 tonnes) is predicted to be used for backfilling and landscaping purposes, this leaves a remaining 210,386m<sup>3</sup> (378,695 tonnes) that would be managed as a waste.

In so far as is possible, options for beneficial reuse of the clean, suitable soil and stone material in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011 will be sought. This will prevent the need to classify all of the excavated material as a waste. Article 27 allows an operator to classify, under certain conditions, that material is a by-product and not a waste. Classification of material as a by-product means that the material is approved for a use that is not regulated by waste management legislation, and therefore is not required to be managed as per that legislation. For construction projects, excavated soil and stone can be categorised under this exemption provided the material adheres to the conditions stipulated under Article 27.

It is predicted that 89.6% of the 3 million m<sup>3</sup> would be classified as a by-product under Article 27 which is approximately 2.7 million m<sup>3</sup> (4,887,488 tonnes); and 10.4% would be classified as waste which is approximately 310,137m<sup>3</sup> (558,571 tonnes).

All remaining balance of surplus excavated material would be classified as 'waste'. All waste excavated material will be subject to laboratory testing in order to classify the material in accordance with soil recovery facility acceptance criteria or landfill acceptance criteria.

Consultations have been undertaken with a number of bodies and organisations in order to identify potential locations for by-product material from the proposed Project. Huntstown Quarry in County Dublin has been identified as the preferred location due to its ability to take all by-product material as forecasted to be produced by the proposed Project. Huntstown Quarry is operated by Roadstone and is located just outside the M50 Motorway near Junction 5, approximately 5.5km from the Northwood Portal location.

The management of excavated materials is described in detail in Chapter 24 of this EIA (Resource & Waste Management) and its associated appendix, the Excavated Material Management Strategy (Appendix 24.1).

## **2.6 Tunnel Boring Spoil**

Drilling material and waste during the Construction Phase of the proposed Project will be managed by the Main Contractor(s). Where the Variable Density Tunnel Boring Machine (TBM) is used in Slurry mode, waste bentonite will be created. During operation of the TBM, the bentonite slurry would be reused within the system. The spoil would be filtered and separated from the water and bentonite slurry, with the slurry then being recirculated and reused within the system. Liquid sludge from this process would be placed under a soil separator and dewatered with a centrifuge or filter press. Bentonite slurry can be reused repeatedly provided its properties are carefully monitored and controlled. Once it is no longer required, the spoil and residual slurry from the tunnel boring will be disposed of off-site to a suitable authorised waste facility through an appropriate waste contractor.

Material arising from the TBM in Earth Pressure Balance (EPB) mode will not require separation treatment as with the Slurry TBM mode, as the conditioning additives which are mixed within the spoil are highly biodegradable with 95% destroyed within 28 days. Spoil conditioning additives are used to make the cut ground more consistent and easier to handle. Spoil which arises from the TBM during operation in EPB mode will need to be stored in a banded area for 28 days in order to allow for the degradation of the additives before transportation to a secondary storage area or to an off-site destination. As with all the waste, the materials arising from the TBM will be managed in accordance with the waste hierarchy with consideration for re-use, recycling, recovery and as a last resort disposal.

Please refer to Appendix A5.13 of this EIA for a detailed description of the proposed tunnelling construction methodology, use of spoil additives and spoil handling arrangements.

## **2.7 Hazardous Waste**

The quantities of hazardous waste anticipated to arise as a result of the construction of the proposed Project will be managed as per the Waste Management (Hazardous Waste) Regulations (S.I. No. 163 of 1998), as amended, and other applicable legislation. Any hazardous waste will be stored separately to non-hazardous waste, with individual hazardous waste streams segregated from each other. Appropriate signage will be put in place to denote any hazardous waste storage locations.

Paints, glues, adhesives and other known hazardous substances will be stored in designated areas. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum.

Small volumes of waste electric and electronic equipment (WEEE) containing hazardous components, printer toner/cartridges, batteries (Lead, Nickel-Cadmium or Mercury) and/or fluorescent tubes and other mercury containing waste will be generated during C&D activities or temporary site offices. These wastes will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor for recycling or disposal if recycling is not possible.

Any waste oil storage tanks and draw-off points will be bunded and located in a dedicated, secure area of the site.

All hazardous waste, including asbestos, will be stored in appropriate receptacles pending collection by a suitably permitted waste contractor for disposal or processing at a suitably licensed/permitted/ registered facility which can accept the type of hazardous waste being managed. As per legislative requirements, records of all hazardous waste generated and removed from site will be retained for a minimum period of three years by the Main Contractor(s). This includes documentation such as waste transfer forms (WTF), any applicable transfrontier shipment records in the event that waste has to be exported, and any records on the treatment and ultimate disposal of the hazardous waste.

Export of hazardous waste from outside of Ireland is subject to a Europe-wide control system founded on Regulation (EC) No. 1013/2006 of the European Parliament and of the Council of 14 June 2006 on Shipments of Waste (referred to as the Transfrontier Shipment Regulations). This legislation is supplemented by S.I. No. 419/2007 - Waste Management (Shipments of Waste) Regulations 2007, as amended, which makes Dublin City Council responsible for the enforcement of this regulatory system throughout Ireland. Export of hazardous waste from the site outside of Ireland will comply with the procedures set out in this legislation.

## **2.8 Identification and Classification of Waste**

The Main Contractor(s) will develop a Construction and Demolition Waste Management Plan (C&D WMP). This will identify the specific types and quantities of waste arising during construction.

Wastes will be classified in accordance with the European Waste Catalogue (EWC) waste classification code, also referred to as LoW (List of Waste).

All waste excavated material will be subject to laboratory testing to classify the material in accordance with soil recovery facility acceptance criteria or landfill acceptance criteria.

All necessary action will be taken to ensure that the production, collection and transportation of hazardous waste, as well as its storage and treatment, are carried out in a way that protects the environment and human health and meets the legal requirements.

A pre-demolition asbestos and hazardous materials survey would be undertaken on all buildings and structures to be demolished, as detailed in Section 3.3, to ensure the removal and safe handling of such hazardous substances.

## **2.9 Segregation and Storage of Waste**

The following measures would be implemented to ensure the segregation and safe storage of waste:

- Skips and other storage receptacles used to contain construction, demolition and excavation waste to be colour-coded in line with the local best practice;
- Skips to have appropriate signage to facilitate separation of waste for re-use, recycling or disposal and the separation of inert, hazardous and non-hazardous wastes;
- Plastic sheeting to be used to prevent leaching from waste soils and aggregates where these are not contained within skips or other storage receptacles;
- Skips and storage receptacles to be sheeted, or otherwise remain lidded or closed, when waste is not being deposited into them. They would also be covered to prevent the escape of waste while in transit;
- Skips and storage receptacles to be inspected on arrival to ensure they are fit for purpose;
- Mixing inert, hazardous and non-hazardous wastes, either while stored on site or upon collection, would not be permitted;



- All necessary measures to be taken to ensure that hazardous waste is not mixed, either with other categories of hazardous waste or with other waste, substances or materials;
- All necessary measures to be taken to ensure that, in the course of collection, transport and temporary storage, hazardous waste is packaged and labelled in accordance with the international and community standards in force;
- Liquid wastes to be stored on hard-surfaced areas with secondary containment systems to prevent spillages;
- Waste would not be stored within 10m of any controlled watercourse, borehole, well, spring, surface water drainage system or foul water drainage system; and
- The storage and segregation of waste would comply with any air quality mitigation measures to minimise nuisance impacts such as dust, odour or pests.

### 3. Duty of Care

All contractors will maintain their duty of care to protect the interests and safety of others from the potential effects related to waste and ensure that waste generated during the Construction Phase is handled in accordance with the relevant legislation governing its storage, transfer, treatment and disposal. All contractors have a legal obligation to ensure compliance with all relevant waste legislation.

All necessary measures will be taken to ensure that waste management is carried out without endangering human health and without harming the environment, and in particular:

- Without risk to water, air, soil, plants or animals;
- Without causing a nuisance through noise or odours; and
- Without adversely affecting the countryside or places of special interest.

All relevant documents and required authorisations will be put in place before removing any waste from site, and a register of this information will be maintained. This will be in relation to the transfer of waste (waste carriers), any off-site waste management facilities (permitted or exempt sites) to which waste is taken.

Any waste leaving the site will be accompanied by appropriate duty of care documentation in line with the relevant statutory requirements for waste transfer and hazardous wastes (as appropriate). Duty of care documentation will be retained by the contractors in line with statutory requirements.

A register of all waste loads leaving the site and/or a tracking system for excavated material destined for re-use would be maintained to provide a suitable audit trail and to facilitate monitoring and reporting of waste and material types, quantities and management methods.

## 4. Monitoring

Regular audits and inspections of waste management activities would be undertaken to ensure compliance with the legal requirements, statutory controls and other policies and procedures relevant to the management of waste and surplus excavated material.

The types, quantities and fate of waste generated during construction will be identified, measured and recorded. This information would be reported on a periodic basis to facilitate monitoring of any key performance indicators and to measure progress against any waste management performance targets that may apply.

A register of all waste loads leaving each construction site would be maintained to provide a suitable audit trail for compliance purposes and to facilitate monitoring and reporting of waste types, quantities and management methods.