



Voyage Property Limited

Greenpark Development

Construction Waste Management Plan

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1 Introduction

Gavin & Doherty Geosolutions Ltd. (GDG) was instructed to provide a Construction Waste Management Plan (CWMP) on behalf of Voyage Property Limited for a proposed Strategic Housing Development (SHD) at Greenpark, Dock Road, Limerick. The proposed development will consist of 371 residential units (houses, apartments and duplexes), crèche, with associated roads and amenity infrastructure, refer to Figure 1-1 below.

The CWMP will outline the management of waste during the construction phase of the proposed development, to allow compliance with current legal and industry standards as outlined in the *Waste Management Act 1996 – 2011*, and other related regulations, outlined later in this report.

This CWMP aims to:

- Show how the construction of the proposed development will ensure maximum recycling, reuse and recovery of waste and materials, with diversion from landfill wherever possible.
- Provide guidance on the appropriate collection and transport of waste, which aims to prevent issues associated with littering and environmental impact such as contamination of soil or water.
- Provide an estimate of the types and quantities of waste that will be generated during the construction of the proposed development and how best to manage the different waste streams.

This document has been prepared taking due cognisance of the principals of waste management to reduce, reuse and recycle materials wherever possible, with an aim to send minimal amounts of material to landfill.

The CWMP will include estimates of the type and quantity of waste to be generated during the construction period of the proposed development and makes recommendations on effective management of different waste streams.



Figure 1-1: Development Layout

2 Guidance and Legislation

A summary of the national, regional, and local planning policy relevant to the construction phase of the proposed development is outlined below.

2.1 National Level

In September 2020, the Irish government published *A Waste Action Plan for a Circular Economy*, which includes revision of the 2006 *Best Practice Guidelines for C&D Waste*. The 2020 guidance covers the period between 2020-2025.

The 2020 document states that improved Construction & Demolition (C&D) waste management practices can offer many opportunities in terms of reduced environmental and financial costs to the industry and to society. Based on their data, approximately 80% of C&D waste, which was noted to be 5 million tonnes in 2017, comprises excavated soil and stone, with the remaining 20% including concrete, brick, tiles, metal, glass, wood, plastic and metal. A large proportion of the materials disposed of to landfill may be redirected and reused, which would add value to the construction industry, and reducing environmental and financial implications to industry and society.

Best Practice Guidelines for C&D Waste (National Construction and Demolition Waste Council, 2006), although under revision, remains current. The document provides guidance on the preparation of project construction and demolition waste management plans for certain classes of projects, which includes the Greenpark development. According the guidelines, a CWMP should address the following aspects of the project:

- Analysis of the waste arisings/material surpluses;
- Specific waste management objectives for the project;

- Methods proposed for prevention, reuse and recycling of wastes;
- Material Handling procedures; and
- Proposals for education for workforce and plan dissemination programme

2.2 Regional Level

The proposed development is located in the Local Authority area of Limerick City and County Council (LCCC). The *Southern Region Waste Management Plan 2015 – 2021* is the regional waste management plan for the south of Ireland including the LCC area which was published in May 2015.

The regional plan sets out the following strategic targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan.
- Achieve a recycling rate of 50% of managed municipal waste by 2020.
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

2.3 Legislation

The primary legislation related to waste management in Ireland, as derived from relevant European Policy and Directives, are:

- Waste Management Act, 1996
- Environmental Protection Act, 1992
- Litter Pollution Act, 1997
- Planning and Development Act, 2020

As outlined in the *Duty of Care of the Waste Management Act (1996)*, the waste producer is considered to be responsible for waste from the time of generation through to its legal disposal. As it 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. Following on from this is the concept of “*Polluter Pays*” whereby the waste producer is liable to be prosecuted for pollution incidents, which may arise from the incorrect management of waste produced, including the actions of any contractors engaged e.g. for transportation and disposal/recovery/recycling of waste.

As control of the waste is removed from the producer at such an early stage, it is therefore extremely important that effective management of the waste occurs prior to transfer off site. This responsibility therefore falls to the contractor in this case. It is also their responsibility to employ suitably permitted/licenced contractors to transfer the waste off-site, in accordance with all legal requirements. This includes the requirement that the waste contractor should handle, transport and reuse/recover/recycle/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

Contractors transporting the waste should hold a collection permit, as issued by the National Waste Collection Permit Office.

Waste receiving facilities must also be appropriate licenced or permitted. The receiving facility must hold an appropriate Certificate of Registration (COR) or waste permit granted by LCCC under the *Waste Management (Facility Permit & Registration) Regulations 2007*, or a waste or Industrial Emissions Directive (IED) licence granted by the EPA.

3 Description of The Project

3.1 Location, Size and Scale of the Development

The proposed SHD will include the construction of residential units (houses, duplex apartments, apartment blocks), a creche, and public open space, with associated roads, parking, etc.

3.2 Details of the Wastes to be produced

3.2.1 Waste Streams

A review of the works has identified the following waste streams arising from construction operations. Table 3-1 outlines the waste streams arisings.

Table 3-1 Works Elements and waste streams arisings

Works Element	Waste Stream	Treatment
Site enabling works	Excavated soils	Reuse on site and export of surplus off site
Foundations	Concrete and steel reinforcement	Reinforcement – reused where possible or alternatively recycled. Concrete – exported to suitable facility for potential reuse
Foundations	Timber formwork	Reuse and recycled
Drainage	Plastic pipework	Recycled
Cladding	Damaged sheets	Recycled
Cladding	Insulation	Recycled
Mechanical Installation	Metal ductwork, MDPE/HDPE pipe	Recycled
Electrical Installation	Metal cable tray, cable off cuts	Recycled
Building fit out	Floor coverings	Recycled
Building fit out	Paint	Reused
Concrete footpaths	Concrete	Concrete – exported to suitable facility for potential reuse
Paved areas	Paving blocks/bricks	Reused recycled
Tarmac roads	Tarmacadam	Recycled

Works Element	Waste Stream	Treatment
		Reuse
Fencing	Concrete, Metal	Recycled Reuse
Suppliers	Pallets and packaging	Recycled
Glazing and Doors	Pallets and packaging	Recycled
Glazing and Doors	Glass	Recycled

3.2.2 Non-Hazardous Waste

During the construction phase there will be a surplus of building materials, such as timber off-cuts, broken concrete blocks, cladding, plastics, metals and tiles. There may also be excess concrete during construction which will need to be disposed of. 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 (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided onsite during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries will also be generated infrequently from site offices.

The highest proportion of non-hazardous material generated will be soil arising from the cut and fill of the site. There will be stripping of topsoil and earthworks to facilitate construction of the new building foundations, installation of services, roads and site levelling. Topsoil and subsoil is expected to be uncontaminated and therefore non-hazardous in nature, there is evidence of old concrete foundations from the racecourse infrastructure and locations with stone fill. As shown in Table 3-2, there is estimated to be a small surplus of subsoil, and a significant volume of surplus topsoil. However, these materials are to be reused within the development as part of soft landscaped areas and gardens, and thus no export of soils is expected.

Table 3-2 Estimated Volumes Cut/Fill -

Description	Area	Cut	Fill	Net
Earthworks (Not Including Topsoil)	71,256.3m ²	-47,389.7m ³	46,953.4m ³	-436.4m ³
Topsoil	71,358.5m ²	-21,407.6m ³	0m ³	-21,407.6m ³

3.2.3 Hazardous Waste

3.2.3.1 Contaminated Soil

A Materials Management Plan (MMP) will be developed by the contractor, which will provide details regarding how soils that have potentially been impacted by contamination are dealt with. The following provides a brief overview of the process.

All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed soil shall be segregated, and samples of impacted soil analysed for the presence of possible contaminants to determine if soils can be reused, or if necessary, allow a waste classification.

Analysis should allow the soil to be classified as either non-hazardous or hazardous in accordance with the EPA publication entitled '*Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous*' using the *HazWasteOnline* application (or similar approved classification method). The material will then need to be classified via Waste Acceptance Criteria testing as either inert, hazardous non-reactive or hazardous in accordance with the *EC Council Decision 2003/33/EC*, which establishes the criteria for the acceptance of waste at landfills.

If hazardous soil, or historically deposited hazardous waste is encountered during the work, the contractor must notify LCCC, Environmental Enforcement Section, and provide a Hazardous/Contaminated Soil Management Plan, to include estimated tonnages, description of location, any relevant mitigation, destination for authorised disposal/treatment, in addition to information on the authorised waste collectors.

3.2.3.2 Fuel/Oils

Fuels and oils are classed as hazardous materials. Where present on site, fuels and oils should be stored in accordance with the Safety Data Sheet (SDS), in their own designated areas where the risk of being damaged is minimal, in containers designed to the specific standard for the relevant fuel/oil type. Drip trays and bunding should be utilised to minimise impact to the environment in the case of a spill.

The volume of fuel/oil waste is expected to be minimal to negligible.

3.2.4 Other known Hazardous Substances

Other hazardous substances that may be generated as waste during construction include:

- Paint
- Glue / adhesives
- Waste Electrical and Electronic Equipment (WEEE) containing hazardous components
- Printer/toner cartridges
- Batteries
- Fluorescent tubes / light bulbs
- Other mercury containing waste

As with the fuels the volume of these other hazardous substances is anticipated to be very low.

3.3 European Waste Codes

The main non-hazardous and hazardous waste streams that could be generated by the during construction have been selected based on those within Chapter 17 of the List of Waste, EPA document *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2015). The waste streams associated with C&D are provided in Table 3-3.

Table 3-3 Construction and Demolition Waste (including excavated soil from contaminated sites)

Waste Material	LoW Code
Concrete	17 01 01 or 17 01 06*
Bricks	17 01 02 or 17 01 06*
Tiles and ceramics	17 01 03 or 17 01 06*
Wood	17 02 01 or 17 02 04*
Glass	17 02 02 or 17 02 04*
Plastic	17 02 03 or 17 02 04*
Bituminous mixtures, coal tar and tarred products	17 03 02 or 17 03 01*
Copper, Bronze, Brass	17 04 01 or 17 04 09*
Aluminium	17 04 02 or 17 04 09*
Iron & steel	17 04 05 or 17 04 09*
Tin	17 04 06 or 17 04 09*
Mixed metals	17 04 07 or 17 04 09*
Cables	17 04 11 or 17 04 10*
Soil and Stones	17 05 04 or 17 05 03*
Gypsum-based construction material	17 08 02 or 17 08 01*
Mixed C&D waste	17 09 04 or 17 09 01*

Denotes hazardous mirror entry. An assessment is required to determine which code would be appropriate and therefore whether the waste is hazardous or non-hazardous. Where materials are considered to be contaminated with a hazardous substance, the mirror entry should be used for classification purposes.

3.4 Construction Waste Generation

In the course of the project, it is estimated that the quantities of C&D waste/material surpluses will arise are as indicated in Table 3-4.

Table 3-4 Estimated tonnages of waste at the Proposed Development (to be completed by contractor)

Waste Types	Tonnes
Soil and stones	123,830 (reuse on site)
Concrete, brick, tiles and similar	To be completed by contractor
Mixed C&D waste	To be completed by contractor

Waste Types	Tonnes
Metals	To be completed by contractor
Bituminous mixtures	To be completed by contractor
Segregated wood, glass, and plastic	To be completed by contractor

4 Proposals for Minimisation, Reuse and Recycling of C&D Waste

Construction waste will arise on the project mainly from excavation and unavoidable construction waste. Damaged and surplus material will undoubtedly be generated but to a lesser extent. The contractor shall ensure that materials are ordered so that the quantity delivered, the timing of the delivery and the storage is not conducive to the creation of unnecessary waste.

Excavated subsoil and topsoil will be carefully stored in segregated piles on site for subsequent reuse, or treatment/disposal, although the latter is considered unlikely to be required.

Concrete waste will be segregated and stockpiled prior to being crushed ready for reuse. Surplus will be collected in receptacles with mixed C&D waste materials for subsequent separation and recovery at a remote facility.

Surplus masonry and wood arisings will be source segregated and recovered at a remote facility.

Packaging will be segregated and returned to the supplier for reuse if possible. Otherwise, segregated packaging shall be stored ready for transfer to a recycling facility.

Hazardous wastes will be identified, removed and kept separate from other C&D waste materials in order to avoid further contamination. Materials will be stored in such a way that they shall not impact their surrounding environment, prior to disposal to suitably licenced recycling or disposal facilities.

Other C&D waste materials will be segregated where possible and disposed of appropriately, or mixed with mixed C&D waste materials, for subsequent separation and recovery or disposal at a remote facility.

Table 4-1 Estimated tonnages of waste at the Proposed Development (to be completed by contractor)

Waste Types	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Soil and stones	123,830	100	123,830	-	-	-	-
Concrete, brick, tiles and similar	To be completed by contractor						
Mixed C&D waste	To be completed by contractor						

Waste Types	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Metals	To be completed by contractor						
Bituminous mixtures	To be completed by contractor						
Segregated wood, glass, and plastic	To be completed by contractor						

Excavation of subsoil and topsoil and C&D waste-derived aggregates are considered suitable for certain on-site construction applications. It is proposed, as stated previously, that arisings will be reused within the project, for example topsoil will be utilised in gardens and landscaped areas.

It is anticipated that where reuse on site is not possible, that waste materials will have to be moved off site. It is the intention to engage specialist waste service contractors, who possess the requisite authorisations, for the collection and movement of waste off-site, and to bring material to a facility which currently holds a Waste Licence/Waste Permit/Certificate of Registration.

5 Assignment of Responsibilities

The contractor shall designate a suitably experienced employee as the C&D Waste Manager who will hold overall responsibility for the implementation of the Project C&D Waste Management Plan. The C&D Waste Manager will be assigned the authority to instruct all site personnel to comply with the specific provisions of the Plan. At the operational level, a foreman from the main contractor and appropriate personnel from each sub-contractor on the site shall be assigned the direct responsibility to ensure that the discrete operations stated in the project CWMP are performed on an on-going basis.

6 Training

Copies of the project CWMP will be made available to all relevant personnel on site. All site personnel and sub-contractors will be instructed about the objectives of the project CWMP and informed of the responsibilities which fall upon them as a consequence of its provisions. Where source segregation, selective demolition and material reuse techniques apply, each member of staff will be given instructions on how to comply with the project CWMP. Posters shall be designed to reinforce the key messages within the project CWMP and will be displayed prominently for the benefit of site staff.

7 Waste Auditing

The C&D Waste Manager shall arrange for full details of all arisings, movements and treatment of construction and demolition waste discards to be recorded during the construction stage of the project. Each consignment of C&D waste taken from the site will be subject to documentation, which will conform with Table 7-1 and ensure full traceability of the material to its final destination.

Table 7-1 Details to be included within Transportation Dockets

Detail	Particulars
Name of project origin	
Material being transported	
Quantity of material	
Date of material movement	
Name of carrier	
Destination of material	
Proposed use	

Details of the inputs of materials to the construction site and the outputs of wastage arising from the Project will be investigated and recorded in a Waste Audit, which will identify the amount, nature and composition of the waste generated on the site. The Waste Audit will examine the manner in which the waste is produced and will provide a commentary highlighting how management policies and practices may inherently contribute to the production of construction and demolition waste. The measured waste quantities will be used to quantify the costs of management and disposal in a Waste Audit Report, which will also record lessons learned from these experiences which can be applied to future projects. The total cost of C&D waste management will be measured and will take account of the purchase cost of materials (including imported soil), handling costs, storage costs, transportation costs, revenue from sales, disposal costs etc. Costs will be calculated for the management of a range of C&D waste materials, using the format shown in Table 7-2.

Table 7-2 Standard Record Form for Costs of C&D Waste Management (Sample relates to soil – separate record forms should be compiled in respect of each waste material)

Material	Estimated Quantities & Costs (tonnes & Euro)
<u>SOIL</u>	
Quantity of Waste Soil (tonnes)	
Purchase Cost i.e. import costs (€)	
Material Handling Costs (€)	
Material Transportation Costs (€)	
Revenue from Material Sales (€)	
Material Disposal Costs (€)	
Material Treatment Costs (€)	
Total Waste Soil Management Costs (€)	
Unit Waste Soil Management Costs (€)	

Final details of quantities and types of C&D Waste arising from the project will be forwarded to the Environmental Protection Agency, Limerick City and County Council and NCDWC.

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