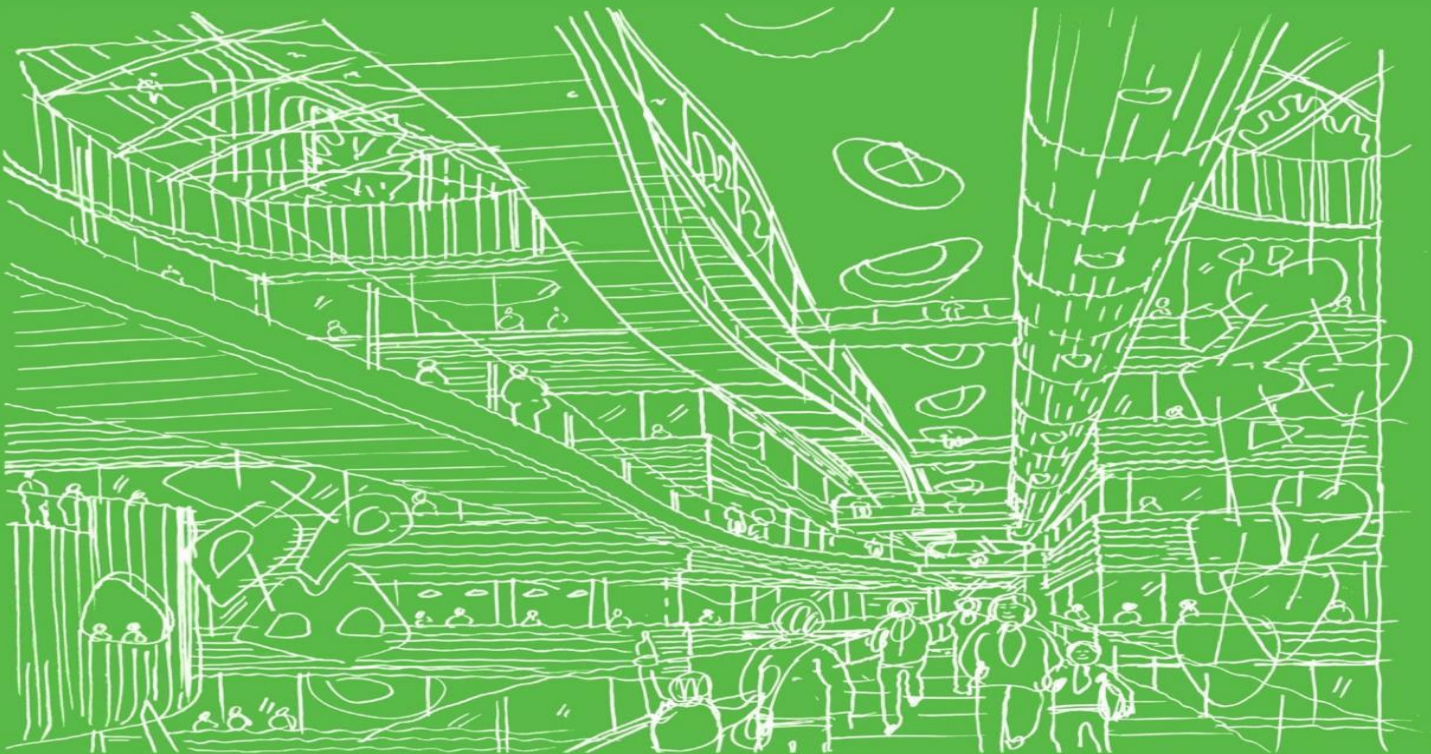


National Paediatric Hospital Project

Planning Application

Appendix 10.1 – Construction & Demolition Waste Management
Plan for the new children's hospital, Family Accommodation Unit
and Children's Research and Innovation Centre at St. James's
Hospital Campus, Dublin 8



August 2015

APPENDIX 10.1

**CONSTRUCTION &
DEMOLITION WASTE
MANAGEMENT PLAN
FOR THE
NEW CHILDREN'S
HOSPITAL, FAMILY
ACCOMMODATION UNIT
AND CHILDREN'S
RESEARCH AND
INNOVATION CENTRE AT
ST. JAMES'S HOSPITAL
CAMPUS, DUBLIN 8**

Report Prepared For

**National Paediatric Hospital
Development Board**

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Our Reference

RH/14/8182WMR01

Date of Issue

31 July 2015

Cork Office


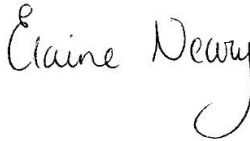
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Document History

Document Reference		Original Issue Date	
RH/14/8182W/MR01		31 July 2015	
Revision Level	Revision Date	Description	Sections Affected

Record of Approval

Details	Written by	Approved by
Signature		
Name	Robert Hunt	Elaine Neary
Title	Environmental Consultant	Principal Consultant
Date	31 July 2015	31 July 2015

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1.0 INTRODUCTION

As part of the National Paediatric Hospital Project, planning permission is being sought for the construction of a new children's hospital, a Family Accommodation Unit and a Children's Research and Innovation Centre (CRIC) at the St. James's Hospital campus, Dublin 8.

The new buildings will require the demolition of a number of existing structures on the campus and these will be included in a demolition plan produced by the contractor prior to commencement of the demolition works. In addition to having a number of active construction sites within St James's Hospital campus, an off-site construction compound is to be located on a brownfield site at Davitt Road.

AWN Consulting Ltd. (AWN) has prepared this Construction and Demolition (C&D) Waste Management Plan (WMP) for the proposed development. The purpose of the C&D WMP is to provide information necessary to ensure that the management of C&D waste at the site is undertaken in accordance with current legal and industry standards including the *Waste Management Act 1996 and 2008*¹, associated Regulations, *Litter Act 1997*² and the new '*Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021*'³. In particular, the C&D WMP aims to ensure maximum recycling, re-use and recovery of waste with diversion from landfill, wherever possible. It also seeks to provide guidance on the appropriate collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources).

This C&D WMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of waste to be generated by the proposed development and makes recommendations for management of different waste streams.

2.0 CONSTRUCTION & DEMOLITION WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Irish Government issued a policy statement in September 1998 known as '*Changing Our Ways*'⁴, which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this report was to recycle at least 50% of C&D waste within a five year period (by 2003), with a progressive increase to at least 85% over fifteen years (i.e. 2013).

In response to the *Changing Our Ways* report, a task force (Task Force B4) representing the waste sector of the already established Forum for the Construction Industry, released a report entitled '*Recycling of Construction and Demolition Waste*'⁵ concerning the development and implementation of a voluntary construction industry programme to meet the Government's objectives for the recovery of construction and demolition waste.

The most recent national policy document was published in July 2012, entitled '*A Resource Opportunity - Waste Management Policy in Ireland*'⁶. This document stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention. The document sets out a number of actions in relation to C&D waste and commits to undertake a review of specific producer responsibility requirements for C&D projects over a certain threshold.

The National Construction and Demolition Waste Council (NCDWC) was launched in June 2002, as one of the recommendations of the Forum for the Construction Industry,

in the Task Force B4 final report. The NCDWC subsequently produced *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects*⁷ in July 2006 in conjunction with the then Department of the Environment, Heritage and Local Government (DoEHLG). The guidelines outline the issues that need to be addressed at the pre-planning stage of a development all the way through to its completion. These guidelines have been followed in the preparation of this document and include the following elements:

- Predicted C&D wastes and procedures to prevent, minimise, recycle and reuse wastes;
- Waste disposal/recycling of C&D wastes at the site;
- Provision of training for waste manager and site crew;
- Details of proposed record keeping system;
- Details of waste audit procedures and plan; and
- Details of proposed consultation with relevant bodies i.e. waste recycling companies, Dublin City Council etc.

Section 3 of the Guidelines identifies thresholds above which there is a requirement for the preparation of a C&DWMP for developments. This development requires a C&DWMP under the following criterion:

- New developments including institutional, educational, health and other public facilities, with an aggregate floor area in excess of 1,250m².

Other guidelines followed in the preparation of this report include *'Construction and Demolition Waste Management – a handbook for Contractors and Site Managers'*⁸ published by FÁS and the Construction Industry Federation in 2002.

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

2.2 Regional Level

The proposed development is located in the Local Authority area of Dublin City Council (DCC).

The *EMR Waste Management Plan 2015 – 2021* is the new regional waste management plan for the DCC area published in May 2015. This plan replaces the previous Dublin region plan due to changing National policy as set out in *A Resource Opportunity: Waste Management Policy in Ireland* and changes being enacted by the *Waste Framework Directive (WFD) (2008/98/EC)*⁹. The new regional plan sets out the strategic targets for waste management in the region but does not set a specific target for C&D waste. However, the WFD sets Member States a target of '70% preparing for reuse, recycling and other recovery of construction and demolition waste' (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

The *Dublin City Development Plan 2011 – 2017*¹⁰ identifies facilitation of the development of recycling in order to minimise the use of landfill as the main objective of the City Council. The development plan also outlines a number of policies and objectives, the most relevant of which in the context in C&D waste are:

Policies:

- *SI30: To prevent and minimise waste.*
- *SI33: To minimise the amount of waste which cannot be prevented and ensure it is disposed of without causing environmental pollution.*

Objectives:

SIO61: To promote the reuse of building materials, recycling of demolition material and the use of materials from renewable sources. In all developments in excess of 10 housing units and commercial developments in excess of 1000 sqm, a materials source and management plan showing type of materials/proportion of reuse/recycled materials to be used shall be implemented by the developer.

2.3 Legislative Requirements

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

- Waste Management Act 1996 (S.I. No. 10 of 1996) as amended by the Waste Management (Amendment) Act 2001. Sub-ordinate legislation includes:
 - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended 2011 (S.I. No. 323 of 2011)
 - Waste Management (Collection Permit) Regulations S.I. No. 820 of 2007 as amended 2008 (S.I. No. 87 of 2008)
 - Waste Management (Facility Permit and Registration) Regulations, S.I. No. 821 of 2007 as amended 2008 (S.I. No. 86 of 2008)
 - Waste Management (Licensing) Regulations 2000 (S.I. No. 185 of 2000) as amended 2004 (S.I. No. 395 of 2004), 2010 and (S.I. No. 350 of 2010)
 - Waste Management (Packaging) Regulations 2003 (S.I. No. 61 of 2003) as amended 2004 (S.I. No. 871 of 2004), 2006 (S.I. No. 308 of 2006) and 2007 (S.I. No. 798 of 2007)
 - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
 - Waste Management (Landfill Levy) Regulations 2011 (S.I. No. 434 of 2011), as amended 2015 (S.I. No. 189 of 2015)
 - European Communities (Waste Electrical and Electronic Equipment) Regulations 2011
 - Waste Management (Registration of Brokers and Dealers) Regulations 2008 (S.I. 113 of 2008)
 - Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009), as amended 2015 (S.I. 190 of 2015) and European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 191 of 2015)
- Protection of the Environment Act 2003 (S.I. No. 413 of 2003)
- Litter Pollution Act 1997 (S.I. No. 12 of 1997)

These Acts and subordinate Regulations enable the transposition of relevant European Union Policy and Directives into Irish law.

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 - 2008* and subsequent Irish legislation, is the principle of “*Duty of Care*”. This implies that the waste producer is responsible for waste from the time it is generated through until its legal recycling, recovery or disposal (including its method of 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).

It is therefore imperative that the National Paediatric Hospital Development Board (NPHDB) ensures that the waste contractors engaged by construction contractors are legally compliant with respect to waste transportation, recycling, recovery and disposal. This includes the requirement that a contractor handle, transport and dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

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

3.0 DESCRIPTION OF THE PROJECT

3.1 Location, Size and Scale of the Development

The National Paediatric Hospital Project proposes a number of developments within the grounds of the existing St. James's Hospital campus in Dublin 8. These comprise the construction of:

- A new children's hospital;
- A Family Accommodation Unit; and
- A Children's Research and Innovation Centre (CRIC).

In addition, a site at Davitt Road is intended as a construction compound which will be made available to the contractor during the construction works. It will be used as a store for dry materials (steel, cladding, precast concrete etc.) and potentially as a staging area for the works.

3.2 Details of the Non-Hazardous Wastes to be produced

It is anticipated that there will be no waste generated at the Davitt Road site. There will be no requirement for demolition at the site as there are no existing buildings in the compound site so there will be no demolition waste. There are no groundworks required with the exception of some minor site clearance and local relocation of part of an existing mound to move it outside the proposed contractor compound area. It is not proposed to remove any soil or subsoil material from the site. There will be no construction required to prepare the site.

There will be a significant volume of waste generated from demolition works at the development sites within the St James's Hospital campus and it is anticipated that this material will be more difficult to segregate than waste generated from the construction phase, as many of the building materials will be bonded together or integrated, i.e. steel reinforcement in concrete and metal or timber stud partition walls.

A small quantity of archaeological and architectural heritage material will also be salvaged for re-use elsewhere, especially from buildings such as the chapel, the old school building and Garden Hill house.

Waste asphalt and concrete will be generated from excavation of existing access routes and footpaths across the development areas. Additionally, shrubbery and green waste will be generated from removal / excavation of landscaped areas.

Based on earthworks data provided by the project engineers (O'Connor Sutton and Cronin (OCSC)), there will be a significant surplus of made ground and soil/stones generated from excavations and site clearance required to facilitate construction of foundations, basements, realignment of access routes and general landscaping. Where possible, excavated topsoil will be reused on site.

During the construction phase there will be a surplus of materials, such as off-cuts from timber, concrete blocks, tiles and bricks. Waste from packaging and oversupply of materials will also be generated. There may also be excess concrete delivered to site during construction which will need to be disposed of.

3.3 Anticipated Hazardous Wastes to be produced

3.3.1 Contaminated Soil

A site investigation and assessment was carried out at the Davitt Road site. The assessment report concludes that the contamination encountered does not pose a significant risk to site users and the environment and overall the site was found to be in good condition for a brownfield site with a history of industrial use. Further detail is provided in Chapter 7 (Soils and Geology). There will be no soil removed from the Davitt Road site.

A number of site investigations have been undertaken at the St. James's Hospital site since 2014. Site investigations have established that some localised contamination of the made ground/subsoils has occurred. Based on samples collected and the analysis results, OCSC have classified the soil as either non-hazardous or hazardous using the *HazWasteOnline* application and further classified the soil into five main categories for disposal purposes i.e. inert natural, inert, non-hazardous, stable non-reactive hazardous for disposal in non-hazardous landfill or hazardous, in accordance with *European Communities (EC) Council Decision 2003/33/EC*¹¹. Classification has been carried out on a horizontal 25m x 25m grid basis at 1m intervals vertically through the soil profile. The classification categories and the estimated volumes/quantum of each category as determined by OCSC are presented in Table 3.1.

Waste Category	Description	Estimated Volume (m ³)	Estimated Weight (Tonnes) ¹
Category A1	Inert Natural	332,500 . 343,500	665,000 . 687,000
Category A2	Inert	33,500 . 39,000	67,000 . 78,000
Category B	Non-Hazardous	36,000 . 40,500	72,000 . 81,000
Category C	Stable non-reactive hazardous for disposal in non-hazardous landfill	400 - 500	800 . 1,000
Category D	Hazardous		

Table 3.1 Soil classification at St James's Hospital campus (provided by OCSC)

Note: ¹ Typical density of 2 tonnes/m³ used based on Dublin boulder clay density range of 2.2 – 2.4 tonnes/m³ (Long, Brangan, Menkiti, Looby and Casey) Retaining Walls in Dublin Boulder Clay, Ireland – Geotechnical Engineering, Volume 165, Issue GE4 (2012). Total excavation volume will also include some made ground and non-boulder clay material.

The classification of a small quantity of material as Category C or Category D is based on the identification of two small contamination hotspots at the site. The first is in the location of a former pump house which operated at the site in the early 1900s and the second is an area where soil with a high pH was detected. Once the site work commences, further testing and soil analysis will be required to confirm if the material is hazardous and to establish the actual quantity of material.

The excavations should be carefully monitored by a suitably qualified person to ensure potentially contaminated soil is correctly identified and segregated, where encountered.

A small area of Japanese Knotweed (*Fallopia japonica*), an invasive weed species, was identified at the eastern end of the landscape corridor behind Donnellan Avenue / McDowell Avenue. The plant is an invasive alien species as listed on the Third Schedule (Part 1: Plants) of the *European Communities (Birds and Natural Habitats) Regulations*, 2011 (SI No 477 of 2011, also known as the *Habitats Regulations*). In particular, Regulations 49 and 50 prohibit the introduction, dispersal, trading and keeping of certain this non-native invasive species. The affected area has been fenced-off and is excluded from construction works associated with the proposed development. A programme of management and treatment towards the eradication of the plant is being put in place under the supervision of a qualified ecologist and in accordance with best practice. No plant materials, soils or other arising will be removed from the infected area. This affected area will be maintained as a construction exclusion zone during the proposed development. Further detail is provided in Chapter 9 (Flora and Fauna) of the EIS.

3.3.2 Fuel/Oils

As fuels and oils are classed as hazardous materials, any on-site storage of fuel/oil, all storage tanks and all draw-off points will be bunded and located in a dedicated, secure area of the site. Provided that these requirements are adhered to and the site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel/oil wastage at the site.

3.3.3 Asbestos

An asbestos survey will be carried out on existing buildings to be demolished at the St James's Hospital campus in advance of commencement of any soft strip or demolition works. The survey will be carried out on a staged basis in line with the proposed decant process as works to remove asbestos can only be carried out once the buildings have been vacated. Removal of asbestos or asbestos containing material (ACM) will be carried out by a suitably qualified contractor and ACM will only be removed from site by a suitably permitted/licenced waste contractor. The Health and Safety Authority (HSA) should be contacted in relation to the handling of asbestos and material should be dealt with in accordance with the *Safety, Health and Welfare at Work (Exposure to Asbestos) Regulations 2006*, as amended.

3.3.4 Other known Hazardous Substances

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.

3.4 **Main C&D Waste Categories**

The main non-hazardous and hazardous waste streams that could be generated by the construction and demolition activities at a typical site are shown in Table 3.2. The List of Waste (LoW) code (also referred to as the European Waste Code or EWC) for each waste stream is also shown.

Waste Material	LoW Code
Non-Hazardous:	
Concrete, bricks, tiles, ceramics	17 01
Wood, glass and plastic	17 02
Bituminous mixtures	17 03 02
Metals (including their alloys)	17 04
Soil and stones	17 05
Gypsum-based construction material	17 08
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Hazardous:	
Electrical and electronic components	20 01 35
Batteries and accumulators	20 01 33-34
Wood preservatives	03 02
Liquid fuels	13 07
Waste construction material containing asbestos	17 06 05
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13/1927-28/29-30
Soil and stones containing dangerous substances (if encountered)	17 05 03
Other construction and demolition wastes containing dangerous substances	17 09 03

Table 3.2 Typical waste types generated and LoW codes

4.0 WASTE MANAGEMENT

4.1 Demolition Waste Generation

The total gross area of existing buildings within the St James's Hospital campus to be demolished has been estimated by the project architects as approximately 20,539m². It is understood that the majority of buildings to be demolished at the site are constructed with brick and concrete. However, there are also some portacabin type buildings to be demolished. Waste figures from similar projects have been used to estimate the approximate breakdown of waste to be generated from the demolition works. The waste is segregated by type and estimates have also been made for indicative reuse (offsite), recycling and disposal targets. This breakdown is shown in Table 4.1.

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	862	0	0	85	733	15	129
Concrete, brick, tiles and ceramics	7,024	30	2,107	60	4,215	10	702
Plasterboard	494	5	25	75	370	20	99
Metals	1,725	5	86	80	1,380	15	259
Timber	1,848	10	185	40	739	50	924
Others	370	0	0	0	0	100	370
Total	12,323		2,403		7,437		2,483

Table 4.1 Predicted off-site reuse, recycle and disposal rates for demolition waste

It should be noted that until a detailed survey of the buildings to be demolished is carried out, it is difficult to predict with a high level of accuracy the demolition waste that will be generated from the proposed works. A demolition plan will be prepared by the contractor prior to commencement of the demolition phase which will refine the demolition waste figures detailed in Table 4.1.

4.2 Construction Waste Generation

Table 4.2 shows the breakdown of C&D waste types produced on a typical site based on data from the EPA *National Waste Reports*¹².

Waste Types	%
Soil & Stones	83
Concrete, Bricks, Tiles, Ceramics, Plasterboard	11
Asphalt, Tar and Tar Products	1
Metals	1
Other	4
Total	100

Table 4.2 Waste materials generated on a typical Irish construction site

Notwithstanding the information in Table 4.2, there will be soil/stones and made ground excavated to facilitate the construction of the new building foundations, basements, installation of underground services and realignment of access routes. The volume of soil/stones and made ground to be excavated has been estimated by the project engineers (OCSC) as approximately 413,000m³ (equivalent to approximately 826,000 tonnes). OCSC have advised that it is unlikely that any of this material will be suitable for reuse onsite so it will require removal offsite for reuse, recovery and/or disposal, as appropriate. However, suitable topsoil will be stockpiled on-site and reused in landscaping works, where appropriate. It may also be feasible to reuse a small amount of suitable excavated material as backfill around drainage and service excavations.

Table 4.3 shows the predicted construction waste generation for the proposed development based on the information available to date along with the targets for management of the waste streams. The predicted waste amounts are based on an average large scale development waste generation rate per m², using the waste breakdown rates shown in Table 4.2.

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Concrete, bricks, tiles, ceramics and plasterboard	435	40	174	40	174	20	87
Asphalt, tar and tar Products	159	0	0	25	40	75	119
Metals	40	5	2	90	36	5	2
Other	158	10	16	40	63	50	79
Total	792		192		313		287

Table 4.3 Predicted on and off-site reuse, recycle and disposal rates for construction waste

It should be noted that until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with complete accuracy the construction waste that will be generated from the proposed works as the exact materials and

quantities may be subject to some degree of change and variation during the construction process.

4.3 Proposed Waste Management Options

4.3.1 Waste Management Options for Excavated Materials

The total estimated volume of material required to be excavated at the St. James's Hospital campus has been classified by OCSC into the five main categories for disposal purposes, in accordance with *EC Council Decision 2003/33/EC*, as per Table 3.1. The five categories are inert (Category A1), inert (suitable for Murphy Environmental Landfill, Category A2), non-hazardous (Category B), stable non-reactive hazardous for disposal in non-hazardous landfill (Category C) or hazardous (Category D).

The Waste Management Hierarchy states that the most preferred option for waste management is prevention and minimisation of waste, followed by re-use and recycling/recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The excavations are required to facilitate construction so the preferred option (prevention and minimisation) cannot be accommodated for the bulk excavation phase.

The next option (beneficial re-use) may be possible for some and potentially all of the inert natural material (Category A1). This material could be used as fill material in other construction projects or engineering fill for waste licensed sites. Beneficial re-use of surplus excavation material as engineering fill may be subject to further testing to determine if materials meet the specific engineering standards for their proposed end-use (e.g. in respect of sulphate content, pyrites etc.).

Any nearby sites requiring clean fill/capping material will be contacted to investigate reuse opportunities for clean and inert material. If any of the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27 of the *European Communities (Waste Directive) Regulations 2011*. Article 27 requires that certain conditions are met and that by-product decisions are made to the EPA, via their online notification form.

If the material is deemed to be a waste, removal and reuse/recycling/ recovery/disposal of the material will be carried out in accordance with the *Waste Management Acts 1996 - 2008*, the *Waste Management (Collection Permit) Regulations 2007 and Amendments* and the *Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments*. The volume of waste removed will dictate whether a Certificate of Registration (COR), permit or licence is required by the receiving facility.

Similarly, if any soils/stones are imported onto the site from another construction site as a by-product, this will also be done in accordance with Article 27.

Once all available beneficial re-use options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered. Recycling and recovery options for inert natural material include, but are not limited to:

- the reinstatement of quarries; and
- raising land for site improvement or development.

The option of disposal of inert natural material to landfill will only be considered once all available re-use options have been explored and where void capacity cannot be secured at appropriately permitted/licensed facilities for recycling or recovery purposes. Landfill disposal options for inert natural soil include Murphy Concrete Manufacturing Limited at Sarsfieldtown, Gormanstown, Co. Meath. It should be noted

however that acceptance of the material to any landfill will be subject to the landfills approval. Landfill details are discussed below.

The Category A2 inert material is made ground and gravelly fill with minor waste elements (red brick, concrete, hardcore fill, cinders and other mixed C&D). This material would be unsuitable for disposal at the Murphy Gormanstown landfill but would be suitable for disposal at Murphy Environmental Hollywood Limited (MEHL) which is suitable to accept inert material with Total PAH concentrations of less than 100mg/kg. As previously noted, acceptance of the material to any landfill will be subject to the landfills approval procedures. If any waste timber, plastic, metals and organic material are encountered in this material during excavations, it would need to be screened prior to disposal at MEHL. It is understood that very little, and in most cases none of the Category A2 soil was found to contain these wastes during the site investigation works.

Category B non-hazardous material exceeded the Category A criteria but was less than the non-hazardous waste criteria set out in *EC Council Decision 2003/33/EC*. It is understood that some of this material is natural material and the remaining is made ground. The natural material may be suitable for recovery as capping material at non-hazardous landfills. The made ground material classed as non-hazardous may be suitable for recovery or disposal at a non-hazardous landfill subject to the landfills approval.

A small portion of the excavated material has been classed as Categories C and D i.e. stable non-reactive hazardous for disposal in a non-hazardous landfill and hazardous. This material will require disposal abroad via Transfrontier Shipment of Wastes (TFS). There a number of suitable receiving facilities available in Europe. The following sites would be suitable and would have sufficient capacity to accept the material:

- **ATM, Vlasweg 12, 4782 PW Moerdijk, Netherlands**
ATM is a soil thermal treatment facility which is suitable for waste with high hydrocarbon contamination including PAHs, it is generally not suitable for soil with high levels of metal contamination.
- **Terracon GmbH, Hovestraße 74, 20539 Hamburg, Germany**
Terracon is a soil treatment and transfer facility which allows access to the wide range of waste treatment facilities available in Germany.

Landfill Options Currently Available

AWN undertook research to determine if permitted/licensed capacity is likely to exist at authorised and regulated facilities for acceptance of surplus material generated from the construction of the National Paediatric Hospital Project. The case studies presented identify a number of named facilities in the Greater Dublin Area. These case studies are provided on a demonstrative basis only. It will be the responsibility of the appointed contractor to secure agreements for acceptance of the surplus material in similar authorised and regulated facilities, in accordance with the acceptance criteria the facilities.

Lists of local authority permitted waste facilities were reviewed as possible destinations for surplus material from the developments. However, these were discounted as they did not have sufficient facility capacity remaining to accept the amount of surplus material estimated.

A list of licensed and operating facilities in Counties Dublin, Meath, Kildare, and Wicklow was obtained from *Eastern Midlands Region Waste Management Plan 2015-2021* (Figure 4.1). Five suitable facilities were identified following a review of licensed

available recovery and disposal capacity and the viability of their use as a destination for surplus excavation material from the project.



Figure 4.1 Map showing the active landfill sites in the Eastern Midlands Region – taken from the EMR Waste Management Plan 2015-2021

The following information was obtained from the EPA website and through contacting facility operators directly:

- Waste types accepted;
- Available capacities; and
- Access routes.

Murphy Concrete Manufacturing Limited holds a waste licence (W0151-01) from the EPA for their site at Sarsfieldtown, Gormanstown, Co. Meath. The licence allows for operation of an inert landfill in a sand and gravel quarry which is approximately 33 ha in size. This site is operated in conjunction with the Murphy Environmental Hollywood Ltd (MEHL) site. C&D waste for recovery or disposal is brought to the Hollywood facility initially for testing. Here it is decided if the material is clean enough to be sent to the Gormanstown site for recovery as this site only accepts clean soil and stone and clean concrete.

The facility is licensed to intake a maximum of 750,000 tonnes per annum for recovery either for use at the landfill itself or for use as aggregate material and disposal of inert waste to landfill. Therefore, this facility would provide a viable destination for the estimated volumes of the inert natural (Category A) material which is expected to be generated during the construction of the project.

This facility can be accessed by road from Dublin via the M50, M1 and the R132. The application process for the waste licence involved the submittal of an environmental impact statement to the EPA. Thus, the environmental impacts of delivering surplus material to this site have previously been addressed.

Murphy Environmental Hollywood Limited (MEHL) holds a waste licence (W0129-02) from the EPA for a site at Hollywood, The Naul, Co. Dublin. The licence is for

restoration of a former quarry which is approximately 39.2 ha in size. The maximum amount of construction and demolition waste the facility is licensed to accept per annum is 500,000 tonnes.

This licence allows for disposal of inert waste arising from construction and demolition projects, including soil and stones. The facility is also licensed to accept Category A2 soil and stones in accordance with Schedule A.2 of the waste licence which includes a derogation of a maximum PAH value of 100mg/kg. Therefore, the Category A2 inert soil could be brought to this facility.

The site is located in the North County Dublin townland of Hollywood Great at Nags Head. Access to the site is gained via the R108 off the R132 Balbriggan exit from the M1. The environmental impacts of traffic from operation of the facility have been taken into consideration in the EIS which was submitted to the EPA as part of the application for the waste licence. Therefore, the impacts of delivering surplus material have previously been addressed during the licensing process.

Bord na Móna (BnM) PLC holds a waste licence (W0201-03) from the EPA for a site at Drehid Waste Management Facility at Cadbury, Co. Kildare.

The facility is approximately 179 ha in size. This facility is licensed to accept non-hazardous, solid, residual waste for disposal in accordance with Schedule A.2 of the waste licence. From 2016 onwards, the facility will be licensed to accept a maximum of 120,000 tonnes of waste per annum and an unlimited amount of inert waste accepted to be used in landfill engineering activities. Category B material could be brought to this facility for recovery and/or disposal subject to the landfills approval. All waste being delivered for recovery as inert and inert non-natural material must be screening to remove timber, plastic, metals and organic material if any is encountered during the excavations.

This site can be accessed via a network of regional routes which in turn link with the national motorway network. An EIS accompanied the waste licence application on submission to the EPA. The EIS considered the environmental impacts of traffic from operation of the facility and so impacts of delivering surplus material from the project have been addressed during the licensing process.

Knockharley Landfill Ltd. holds a waste licence (W146-02) for the operation of a non-hazardous landfill site in Navan, Co. Meath.

The licence allows the facility to accept 200,000 tonnes of waste per annum including a maximum of 25,000 tonnes of construction and demolition waste per annum. The facility is currently operational and is likely to remain open during the execution of the project. Thus the facility will provide a viable destination for disposal of non-hazardous surplus excavation material arising from the development.

The Knockharley Landfill site is accessed via a 1.5km dedicated access road off the N2 in Co. Meath. The application for the waste licence was accompanied by an EIS on submission to the EPA. This considered the environmental impacts of traffic from operation of the facility and so the impacts of delivering surplus material have been addressed during the licensing process.

Ballynagran Landfill Ltd. holds a waste licence (W165-02) for the operation and development of a landfill at Ballynagran, Coolbeg and Kilcandra, Co. Wicklow.

The facility is licensed to accept 175,000 tonnes of waste per annum for disposal and a maximum of 28,000 tonnes of C&D waste for recovery, restoration and site development works per annum. The site is currently operational and is expected to remain operational during the timespan of the proposed project. This site provides a

viable destination for disposal of non-hazardous surplus material excavated from the development.

An EIS accompanied the submission of the application for the waste licence to the EPA in 2001. The environmental impacts of traffic from operation of the facility were considered in this EIS. Thus, the impacts of delivering surplus material from the project have, in accordance with the conditions of waste licence W165-02, been addressed during the licensing process.

Conclusion

The facilities presented are viable destinations for excavation waste arising from the construction works for the National Paediatric Hospital Project. In summary, the preferred option for waste material generated from the project is offsite re-use. When re-use options have been exhausted for inert and non-hazardous material, recovery options will be availed of with disposal to landfill only used as a last resort. Based on the facilities outlined herein, there will be sufficient capacity available at authorised waste facilities in Ireland in 2016 for recovery and disposal of the inert and non-hazardous material. Hazardous waste material will require disposal abroad via TFS. There are numerous suitable facilities available in Europe with sufficient capacity to accept this waste.

4.3.2 Wastes Management Options for other C&D Wastes

Waste materials generated will be segregated on site, where it is practical. Where the on-site segregation of certain wastes types is not practical, off-site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at source. All waste receptacles leaving site will be covered or enclosed. The appointed waste contractor will collect and transfer the wastes as receptacles are filled. There are numerous waste contractors in the Dublin Region that provide this service.

All waste arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste arisings requiring disposal off-site will be disposed of at a facility holding the appropriate COR, licence or permit, as required.

Mixed C&D waste (classified under EWC code 17 09 04) can be accepted at a number of facilities in the region including Murphy Environmental Hollywood Ltd., Knockharley Landfill Ltd. and Ballynagran Landfill Ltd.

Other segregated C&D waste will consist of concrete blocks, bricks, tiles, ceramics, hard plastic, metal and glass. A number of waste transfer stations have been identified close to the development which will accept these waste streams for recycling:

- W0079-01: Starus Eco Holding Ltd. (Greenstar Ltd.) . Tallaght;
- W183-01: Starus Eco Holding Ltd. (Greenstar Ltd.) . Ballycoolin;
- W0044-02: Thornton Recycling Ltd. . Ballyfermot;
- W0152-03: Oxigen Environmental Ltd. . Ballymount; and
- W0227-01: Lawlor Brothers Waste Disposal Ltd. (Access Skip Hire) . Dublin 12.

Plasterboard will be accepted at some of these transfer stations or can be brought to Allied Recycling (Allied) in Naas (WFP-KE-08-0347-01). Allied is one of the three facilities in Ireland that currently recycle plasterboard. The others are McNabb Waste in Downpatrick, NI (LN/09/111/M) and Evirogrind in Co. Donegal (WFP-DL-11-004-01).

Written records will be maintained by the contractor(s) detailing the waste arising throughout the demolition, excavation and construction phases, the classification of

each waste type, the contact details and waste collection permit number of all waste contactors who collect waste from the site and the end destination details for all waste removed and disposed off-site.

Dedicated bunded storage containers will be provided for hazardous wastes which may arise such as batteries, paints, oils, chemicals etc., if required.

The management of the main waste streams are detailed as follows:

Bedrock

Excavation of a small volumes of bedrock in some isolated areas in the south of the site will be required to facilitate basement construction. Excavation of rock will be a maximum of c.2m deep into rock and will likely constitute the upper weathered zone only. Further details of the extent of bedrock are presented in Chapter 7 (Soils and Geology) of this EIS. Excavated bedrock will be reused or disposed of off-site. If it is to be reused on another site as by-product (and not as a waste), this will need to be done in accordance with Article 27 of the EC (Waste Directive) Regulations, 2011.

Concrete Blocks, Bricks, Tiles & Ceramics

The majority of concrete blocks, bricks, tiles and ceramics generated as part of the construction works are expected to be clean, inert material and should be recycled, where possible.

Hard Plastic

As hard plastic is a highly recyclable material, much of the plastic generated will be primarily from material off-cuts. All recyclable plastic will be segregated and recycled, where possible.

Timber

Timber that is uncontaminated, i.e. free from paints, preservatives, glues etc., will be disposed of in a separate skip and recycled off-site.

Metal

Metals will be segregated into mixed ferrous, aluminium cladding, high grade stainless steel, low grade stainless steel etc., where practical and stored in skips. Metal is highly recyclable and there are numerous companies that will accept these materials.

Plasterboard

There are currently a number of recycling services for plasterboard in Ireland as detailed above. Plasterboard from the construction phase will be stored in a separate skip, pending collection for recycling. The site manager and project engineers will ensure that oversupply of new plasterboard is carefully monitored to minimise waste.

Glass

Glass materials will be segregated for recycling, where possible.

Waste Electrical and Electronic Equipment (WEEE)

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

Other Recyclables

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

Non-Recyclable Waste

Construction waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate skips or other

receptacles. Prior to removal from site, the non-recyclable waste skip/receptacle will be examined by a member of the waste team (see Section 6.0) to determine if recyclable materials have been placed in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle.

Hazardous Wastes

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

Any asbestos or ACMs discovered on site will be removed by a suitably qualified contractor and collected from site by a waste contractor that is appropriately permitted to transport asbestos or ACMs and brought to a suitably licenced facility. There are currently two facilities in the country licensed to accept asbestos waste, which are Veolia, Fermoy, Co. Cork (W0050-2) and Rilta, Rathcoole, Co. Dublin (W0192-03).

It should be noted that until a construction contractor is appointed it is not possible to provide information on the specific destinations of each waste stream. Prior to commencement of development and removal of any waste offsite, details of the proposed destination of each waste stream will be provided to DCC.

4.4 Tracking and Documentation Procedures for Off-Site Waste

All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the project contractor.

All movement of waste and the use of waste contractors will be undertaken in accordance with the *Waste Management Acts 1996 - 2008*, *Waste Management (Collection Permit) Regulations 2007 and Amendments* and *Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments*. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project Waste Manager (see Section 6.0) will maintain a copy of all waste collection permits on-site.

If the waste is being transported to another site, a copy of the Local Authority COR, waste permit or EPA Waste Licence for that site will be provided to the nominated project Waste Manager. If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) document will be obtained from Dublin City Council (as the relevant authority on behalf of all local authorities in Ireland) and kept on-site along with details of the final destination (permits, licences etc.). A receipt from the final destination of the material will be kept as part of the on-site waste management records.

If any surplus soils/stones is being removed from the site for reuse on another construction site as a by-product, this will need to be done in accordance with *Article 27 of the EC (Waste Directive) Regulations, 2011 (S.I. No. 126 of 2011)*. Similarly, if any soils/stones are imported onto the site from another construction site as a by-product, this will be also be done in accordance with Article 27.

All information will be entered in a waste management recording system to be maintained on site.

5.0 ESTIMATED COST OF WASTE MANAGEMENT

An outline of the costs associated with different aspects of waste management is provided below.

The total cost of C&D waste management will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

5.1 Reuse

By reusing materials on site, there will be a reduction in the transport and disposal costs associated with the requirement for a waste contractor to take the material away to landfill.

Clean and inert soils, gravel, stones etc. which cannot be reused on site may be used as capping material for landfill sites, or for the reinstatement of quarries etc. This material is often taken free of charge for such purposes, reducing final waste disposal costs.

5.2 Recycling

Salvageable metals will earn a rebate which can be offset against the costs of collection and transportation of the skips.

Clean uncontaminated cardboard and certain hard plastics can also be recycled. Waste contractors will charge considerably less to take segregated wastes, such as recyclable waste, from a site than mixed waste.

Timber can be recycled as chipboard. Again, waste contractors will charge considerably less to take segregated wastes such as timber from a site than mixed waste.

A small quality of archaeological and architectural heritage material will also be salvaged for re-use off-site and, as such, this material may also have some additional value.

5.3 Disposal

Landfill charges in the Leinster region are currently at around " 160/tonne (which includes a " 75 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2012*. In addition to disposal costs, waste contractors will also charge a collection fee for skips.

Collection of segregated C&D waste usually costs less than municipal waste. Specific C&D waste contractors take the waste off-site to a licensed or permitted facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill. Clean soil, rubble, etc. is also used as fill/capping material, wherever possible.

6.0 TRAINING PROVISIONS

A member of the construction team will be appointed as the waste manager to ensure commitment, operational efficiency and accountability during the construction and demolition phases of the project.

6.1 Waste Manager Training and Responsibilities

The nominated waste manager will be given responsibility and authority to select a waste team if required, i.e. members of the site crew that will aid him/her in the organisation, operation and recording of the waste management system implemented on site. The waste manager will have overall responsibility to oversee, record and provide feedback to the client on everyday waste management at the site. Authority will be given to the waste manager to delegate responsibility to sub-contractors, where necessary, and to coordinate with suppliers, service providers and sub-contractors to prioritise waste prevention and material salvage.

The waste manager will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on site. The waste manager will also be trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and be knowledgeable in how to implement this C&D WMP.

6.2 Site Crew Training

Training of site crew is the responsibility of the waste manager and, as such, a waste training program should be organised. A basic awareness course will be held for all site crew to outline the C&D WMP and to detail the segregation of waste materials at source. This may be incorporated with other site training needs such as general site induction, health and safety awareness and manual handling.

This basic course will describe the materials to be segregated, the storage methods and the location of the Waste Storage Areas (WSAs). A sub-section on hazardous wastes will be incorporated into the training program and the particular dangers of each hazardous waste will be explained.

7.0 RECORD KEEPING

Records will be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the construction waste arisings on site. A copy of the Waste Collection Permits, Certificates of Registration, Waste Facility Permits and Waste Licences will be maintained on site at all times.

The waste manager or delegate will record the following;

1. Waste taken for reuse off-site;
2. Waste taken for recycling;
3. Waste taken for disposal; and
4. Reclaimed waste materials brought on-site for reuse.

For each movement of waste on or off-site, a signed docket will be obtained by the Waste Manager from the contractor, detailing the weight and type of the material and the source and destination of the material. This will be carried out for each material type. This system will also be linked with the delivery records. In this way, the percentage of construction waste generated for each material can be determined.

The system will allow the comparison of these figures with the targets established for the recovery, reuse and recycling of construction waste presented earlier and to highlight the successes or failures against these targets.

8.0 OUTLINE WASTE AUDIT PROCEDURE

8.1 Responsibility for Waste Audit

The appointed Waste Manager will be responsible for conducting a waste audit at the site during the construction phase of the development.

8.2 Review of Records and Identification of Corrective Actions

A review of all the records for the waste generated and transported on or off-site should be undertaken mid-way through the project. If waste movements are not accounted for, the reasons for this should be established in order to see if and why the record keeping system has not been maintained. The waste records will be compared with the established recovery/reuse/recycling targets for the site.

Each material type will be examined, in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Waste management costs will also be reviewed.

Upon completion of the construction phase, a final report will be prepared, summarising the outcomes of waste management processes adopted and the total recycling/reuse/recovery figures for the development.

9.0 CONSULTATION WITH RELEVANT BODIES

9.1 Local Authority

Once a construction contractor has been appointed and prior to removal of any waste materials offsite, details of the proposed destination of each waste stream will be provided to DCC for their approval.

DCC will also be consulted, as required, throughout the demolition, excavation and construction phases in order to ensure that all available waste reduction, reuse and recycling opportunities are identified and utilised and that compliant waste management practices are carried out.

9.2 Recycling/Salvage Companies

Companies that specialise in C&D waste management will be contacted to determine their suitability for engagement. Where a waste contractor is engaged, each company will be audited in order to ensure that relevant and up-to-date waste collection permits and facility COR/permits/licences are held. In addition, information regarding individual construction materials will be obtained, including the feasibility of recycling each material, the costs of recycling/reclamation and the means by which the wastes will be collected and transported off-site, and the recycling/reclamation process each material will undergo off site.

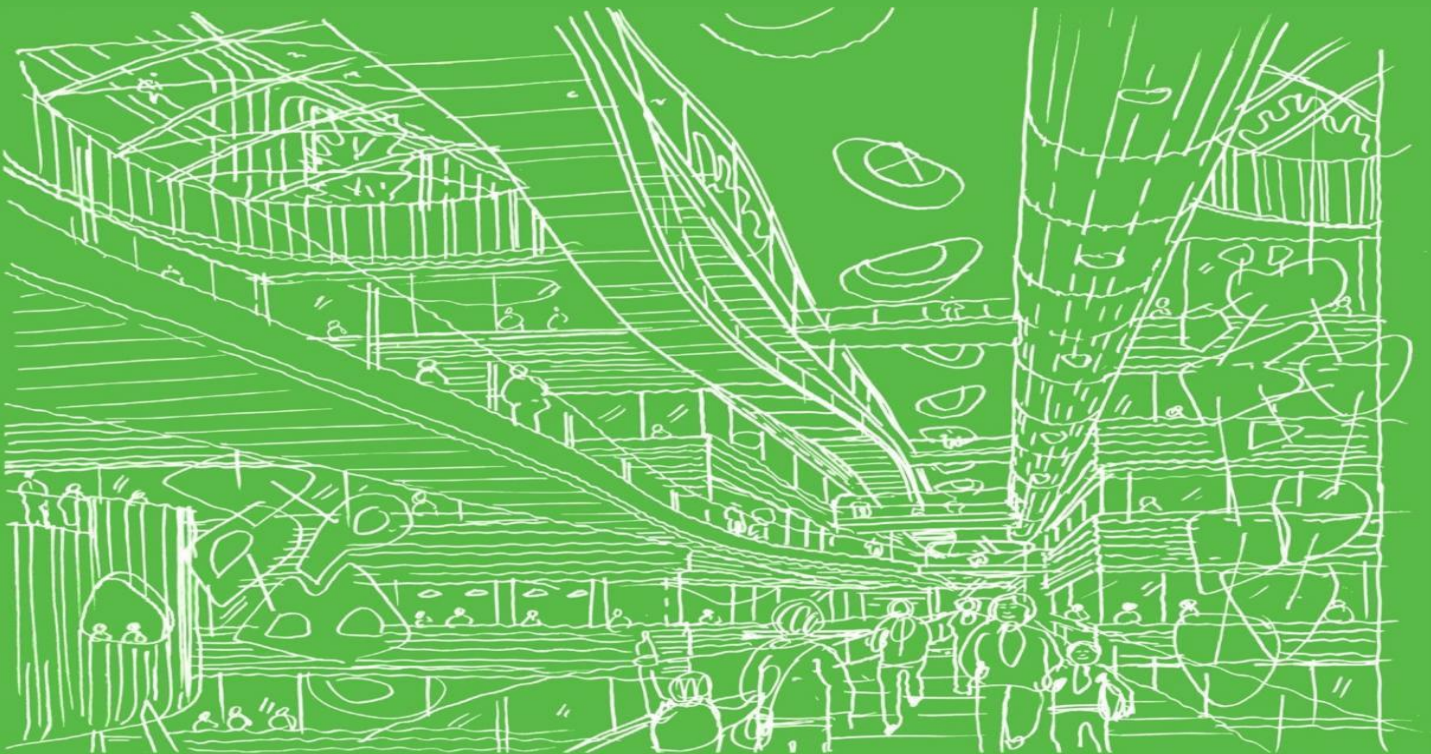
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 - Waste Management (Facility Permit and Registration) Regulations, S.I No. 821 of 2007 as amended 2008 (S.I No. 86 of 2008);
 - Waste Management (Licensing) Regulations 2000 (S.I. No. 185 of 2000) as amended 2004 (S.I. No. 395 of 2004), 2010 and (S.I. No. 350 of 2010);
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 - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997);
 - Waste Management (Landfill Levy) (Amendment) Regulations 2013 (S.I. No. 194 of 2013), as amended 2015 (S.I. No. 189 of 2015);
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12. Environmental Protection Agency (EPA), *National Waste Database Reports 1998 – 2012*.

National Paediatric Hospital Project

Planning Application

Appendix 10.2 – Operational Waste Management Plan for the new children's hospital, Family Accommodation Unit and Children's Research and Innovation Centre at St. James's Hospital Campus, Dublin 8



August 2015

APPENDIX 10.2

**OPERATIONAL WASTE
MANAGEMENT PLAN
FOR THE
NEW CHILDREN'S
HOSPITAL, FAMILY
ACCOMMODATION UNIT
AND CHILDREN'S
RESEARCH AND
INNOVATION CENTRE AT
ST. JAMES'S HOSPITAL
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Report Prepared For

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RH/14/8182WMR02

Date of Issue

31 July 2015

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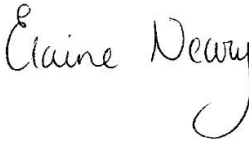
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Document History

Document Reference		Original Issue Date	
RH/14/8182W/MR02		31 July 2015	
Revision Level	Revision Date	Description	Sections Affected

Record of Approval

Details	Written by	Approved by
Signature		
Name	Robert Hunt	Elaine Neary
Title	Environmental Consultant	Principal Consultant
Date	31 July 2015	31 July 2015

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1.0 INTRODUCTION

As part of the National Paediatric Hospital Project, planning permission is being sought for the following developments at the St. James's Hospital Campus in Dublin 8:

- A 473 no. bed children's hospital;
- A 53 no. bed Family Accommodation Unit adjacent to the children's hospital; and
- A Children's Research and Innovation Centre (CRIC).

AWN Consulting Ltd. (AWN) has prepared this Operational Waste Management Plan (OWMP) to provide an integrated strategy for managing the wastes generated during the operational phase of the new children's hospital, Family Accommodation Unit, CRIC and waste generated at the St. James's (Adult) Hospital and potential future maternity hospital.

This OWMP has been prepared to ensure that the management of waste during the operational phase of the proposed development is undertaken in accordance with current legal and industry standards including the *Waste Management Act 1996 – 2001 and Amendments* ¹, associated Regulations, *Protection of the Environment Act 2003* ², *Litter Pollution Act 1997* ³ and the new 'Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021' ⁴. In addition, the following guidelines were consulted for healthcare specific waste management practice:

- Health Service Executive (HSE), *Waste Management Awareness Handbook* (2011) ⁵;
- HSE and Department of Health and Children (DOHC), *Healthcare Risk Waste Management: Segregation, Packaging and Storage Guidelines for Healthcare Risk Waste, 4th Edition* (2010) ⁶;
- Radiological Protection Institute of Ireland (RPRI), *Code of Practice on the Design of Diagnostic Medical Facilities where Ionising Radiation is used* (2009) ⁷.

This OWMP aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. The OWMP also seeks to provide guidance on the appropriate collection and transport of waste to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources). The plan estimates the type and quantity of waste to be generated from the proposed development during the operational phase and provides a strategy for managing the different waste streams.

At present, there are no specific guidelines in Ireland for the preparation of OWMPs. Therefore, in preparing this document, consideration has been given to the requirements of national and regional waste policy, legislation and other guidelines.

2.0 OVERVIEW OF WASTEMANAGEMENT IN IRELAND

2.1 National Level

The Government issued a policy statement in September 1998 titled as 'Changing Our Ways' ⁸ which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. A heavy emphasis was placed on reducing reliance on landfill and finding alternative methods for managing waste. Amongst other things, Changing Our Ways stated a target of at least 35% recycling of municipal (i.e. household, commercial and non-process industrial) waste.

A further policy document '*Preventing and Recycling Waste – Delivering Change*' was published in 2002⁹. This document proposed a number of programmes to increase recycling of waste and allow diversion from landfill. The need for waste minimisation at source was considered a priority.

This view was also supported by a review of sustainable development policy in Ireland and achievements to date, which was conducted in 2002, entitled '*Making Irelands Development Sustainable – Review, Assessment and Future Action*'¹⁰. This document also stressed the need to break the link between economic growth and waste generation, again through waste minimisation and reuse of discarded material.

In order to establish the progress of the Government policy document *Changing Our Ways*, a review document was published in April 2004 entitled '*Taking Stock and Moving Forward*'¹¹. Covering the period 1998 . 2003, the aim of this document was to assess progress to date with regard to waste management in Ireland, to consider developments since the policy framework and the local authority waste management plans were put in place, and to identify measures that could be undertaken to further support progress towards the objectives outlined in *Changing Our Ways*.

In particular, *Taking Stock and Moving Forward* noted a significant increase in the amount of waste being brought to local authority landfills. The report noted that one of the significant challenges in the coming years was the extension of the dry recyclable collection services.

The most recent policy document was published in July 2012 titled '*A Resource Opportunity*'¹². The policy document stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention. The document sets out a number of actions, including the following:

- A move away from landfill and replacement through prevention, reuse, recycling and recovery.
- A Brown Bin roll-out diverting organic waste towards more productive uses.
- Introducing a new regulatory regime for the existing side-by-side competition model within the household waste collection market.
- New Service Standards to ensure that consumers receive higher customer service standards from their operator.
- Placing responsibility on householders to prove they use an authorised waste collection service.
- The establishment of a team of Waste Enforcement Officers for cases relating to serious criminal activity will be prioritised.
- Reducing red tape for industry to identify and reduce any unnecessary administrative burdens on the waste management industry.
- A review of the producer responsibility model will be initiated to assess and evaluate the operation of the model in Ireland.
- Significant reduction of Waste Management Planning Regions from ten to three.

While *A Resource Opportunity* covers the period to 2020, it will be subject to a mid-term review in 2016 to ensure that the measures are set out properly and to provide an opportunity for additional measures to be adopted in the event of inadequate performance.

Since 1998, the Environmental Protection Agency (EPA) has produced periodic '*National Waste (Database) Reports*'¹³ detailing among other things estimates for household and commercial (municipal) waste generation in Ireland and the level of recycling, recovery and disposal of these materials. The 2012 National Waste Report,

which is the most recently published report, reported the following key statistics for 2012:

- The total quantity of municipal waste generated in 2012 was 4.6% lower than 2011. The total quantity of municipal waste managed in 2012 was 2.7% lower than 2011.
- The percentage tonnage of municipal waste managed for recovery (59%) exceeded the percentage tonnage managed for disposal (41%) for the first time in 2012. This is largely due to the increased use of residual waste as a fuel.
- 34% of municipal waste managed in Ireland was exported for recovery in 2012. This includes municipal waste exported for energy recovery and for recycling. Export of municipal waste for energy recovery increased by 36% between 2011 and 2012.
- Ireland's recycling rate (40%) in 2012 was close to the EU28 average (42%).
- The tonnage of healthcare risk waste (hazardous) exported from the country has reduced year on year from 2009 (734 tonnes) to 2012 (687 tonnes).

2.2 Regional Level

The proposed development is located in the Local Authority area of Dublin City Council.

The *EMR Waste Management Plan 2015 – 2021* is the new regional waste management plan for the Dublin City Council area published in May 2015. This plan replaces the previous Dublin region plan due to changing National policy as set out in *A Resource Opportunity: Waste Management Policy in Ireland* and changes being enacted by the Waste Framework Directive (2008/98/EC) ¹⁴.

The new 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; and
- 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.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately " 160 per tonne of waste which includes a " 75 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2012*.

The *Dublin City Development Plan 2011 – 2017* ¹⁵ sets out a number of policies and objectives for Dublin City in line with the objectives of the regional waste management plan. The plan identifies the development of recycling in order to minimise the use of landfill as the main objective of the City Council.

Waste policies and objectives with a particular relevance to the proposed development are:

Policies:

- *SI29: To support the principles of good waste management and the implementation of best international practice in relation to waste management in order for Dublin City and the region to become self-reliant in terms of waste management.*
- *SI30: To prevent and minimise waste.*

- *SI32: To encourage and support material recycling.*
- *SI33: To minimise the amount of waste which cannot be prevented and ensure it is disposed of without causing environmental pollution.*

Objectives:

- *SIO59: To provide for municipal/public recycling and communal composting facilities in accessible locations throughout the city.*

2.3 Legislative Requirements

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

- Waste Management Act 1996 (S.I. No. 10 of 1996) as amended by the Waste Management (Amendment) Act 2001¹. Sub-ordinate and associated legislation includes:
 - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended 2011 (S.I. No. 323 of 2011)
 - Waste Management (Collection Permit) Regulations S.I. No. 820 of 2007 as amended 2008 (S.I. No. 87 of 2008)
 - Waste Management (Facility Permit and Registration) Regulations, S.I. No. 821 of 2007 as amended 2008 (S.I. No. 86 of 2008)
 - Waste Management (Licensing) Regulations 2000 (S.I. No. 185 of 2000) as amended 2004 (S.I. No. 395 of 2004), 2010 and (S.I. No. 350 of 2010)
 - Waste Management (Packaging) Regulations 2003 (S.I. No. 61 of 2003) as amended 2004 (S.I. No. 871 of 2004), 2006 (S.I. No. 308 of 2006) and 2007 (S.I. No. 798 of 2007)
 - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
 - Waste Management (Landfill Levy) Regulations 2011 (S.I. No. 434 of 2011), as amended 2015 (S.I. No. 189 of 2015)
 - European Communities (Waste Electrical and Electronic Equipment) Regulations 2011
 - Waste Management (Registration of Brokers and Dealers) Regulations 2008 (S.I. 113 of 2008)
 - Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009), as amended 2015 (S.I. 190 of 2015) and European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 191 of 2015)
 - Waste Management (Hazardous Waste) Regulations, 1998 (S.I. No. 163 of 1998) as amended 2000 (S.I. No. 73 of 2000)
 - Waste Management (Shipments of Waste) Regulations, 2007 (S.I. No. 419 of 2007)
 - Waste Management (Movement of Hazardous Waste) Regulations, 1998 (S.I. No. 147 of 1998)
 - The European Communities (Transfrontier Shipment of Hazardous Waste) Regulations, 1988 (S.I. No. 248 of 1988)
 - European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011)
 - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015)
 - European Communities (Carriage of Dangerous Goods by Road and Use of Transportable Pressure Equipment) Regulations 2011 (S.I. No. 349 of 2011) as amended 2013 (S.I. No. 238 of 2013) and 2015 (S.I. No. 31 of 2015)
- Protection of the Environment Act 2003 (S.I. No. 413 of 2003)

- Litter Pollution Act 1997 (S.I. No. 12 of 1997)

These Acts and subordinate Regulations enable the transposition of relevant European Union Policy and Directives into Irish law.

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 - 2008* and subsequent Irish legislation, is the principle of “*Duty of Care*”. This implies that the waste producer is responsible for waste from the time it is generated through until its legal disposal (including its method of 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 disposal area, waste contractors will be employed to physically transport waste to the final waste disposal site.

It is therefore imperative that facilities management/nominated personnel at the St. James’s Hospital Campus undertake on and off-site management of waste in accordance with all legal requirements. This includes the requirement that a waste contractor handle, transport and recover/recycle/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

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

2.3.1 Dublin City Council Bye-Laws

Bye-Laws for the Storage, Presentation and Collection of Household and Commercial Waste were brought into force by Dublin City Council in May 2013¹⁶. The Bye-Laws set a number of enforceable requirements on waste holders and collectors with regard to storage, separation, presentation and collection of waste within the Dublin City Council functional area. Key requirements under these bye-laws are:

- A management company must ensure that adequate numbers of waste containers are available for use by holders in a multi-use development;
- Segregation of organic waste (Brown Bin) is required for holders of household & commercial waste;
- Outside the Central Commercial District (CCD) collections are only to take place between 6am and 9pm. This is restricted to 8am to 8pm on weekends and bank holidays. Waste is not to be presented for collection before 6pm on the day before collection; and
- Waste operators will only be able to collect waste in defined areas on a designated day which can be determined by the City Council.

The proposed development at the St. James’s Hospital Campus is outside the CCD so it will be necessary to consult with DCC on permissible collection days/times.

The full bye-laws and map showing the CCD area is available from the DCC website.

2.4 Regional Waste Management Service Providers and Facilities

Various contractors offer waste collection services for the commercial sector in the Dublin City region. Details of waste collection permits (granted, pending and withdrawn) for the region are available from the NWCPO.

As outlined in the new regional waste management plan, there is a decreasing number of landfills available in the region. Only three landfills remain operational and are all operated by the private sector. There are a number of other licensed and permitted facilities in operation in the region including waste transfer stations, hazardous waste facilities and integrated waste management facilities. There is one existing thermal treatment facility in Duleek, Co. Meath and a second facility is under construction in Poolbeg in Dublin. The facility in Poolbeg is targeted to be operational to receive municipal waste in late 2017.

A copy of all CORs, waste permits and waste licenses issued are available from the EPA.

3.0 DESCRIPTION OF THE PROJECT

3.1 Location, Size and Scale of the Development

The proposed development on the grounds of the existing St. James's Hospital Campus in Dublin 8 will comprise the following elements:

- A 473 bed children's hospital;
- A 53 bed Family Accommodation Unit; and
- A Children's Research and Innovation Centre (CRIC).

A detailed description of the development is presented in Chapter 2 (Description of the Development) of the National Paediatric Hospital Project EIS.

3.2 Typical Waste Categories

The development of the new children's hospital, Family Accommodation Unit and CRIC will give rise to a wide variety of waste streams during the operational phase. Healthcare waste is defined in the HSE and DOHC *Healthcare Risk Waste Management* publication as "solid or liquid waste arising from healthcare". Waste materials generated will fall into two main categories, namely healthcare non-risk waste (i.e. non-clinical healthcare waste) and healthcare risk waste (hazardous) as illustrated in Figure 3.1. Hazardous waste has been further subdivided in this plan into non-clinical hazardous waste and clinical/risk waste.

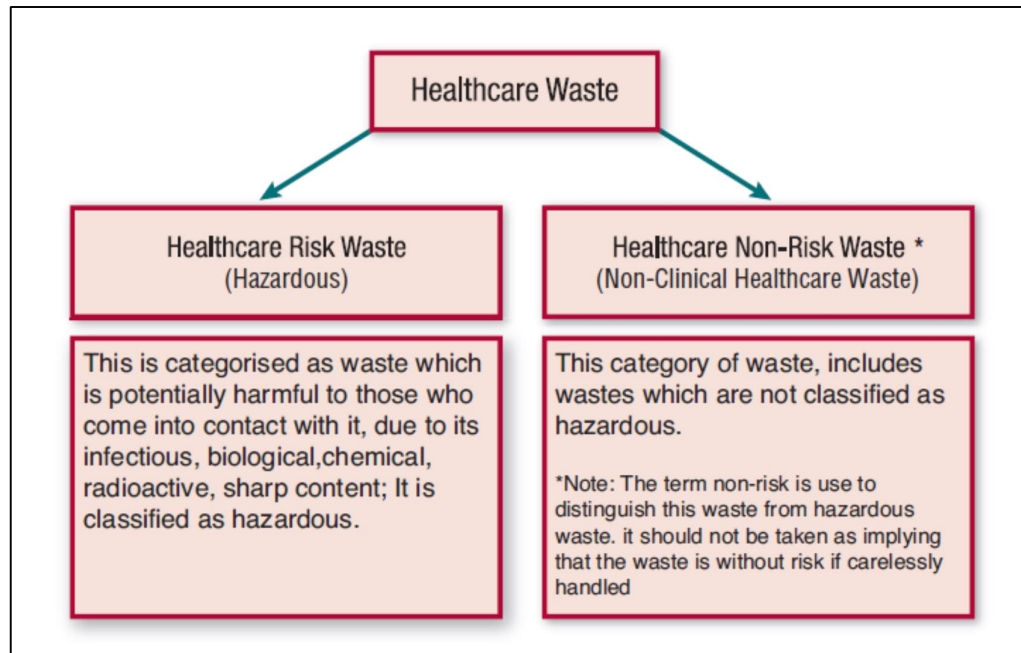


Figure 3.1 Healthcare Waste Categories (Source: HSE, *Waste Management Awareness Handbook*, 2011)

3.2.1 Non-Risk/Non-Clinical Non-Hazardous Waste

The typical non-risk/non-clinical non-hazardous waste streams that will be generated will include the following:

- Dry Mixed Recyclables . includes cardboard, non-confidential paper, confidential paper, newspaper, leaflets plastic packaging and bottles, aluminium cans, tins and Tetra Pak cartons;
- Confidential paper
- Mixed Non-Recyclable /General Waste;
- Organic (food/catering) waste; and
- Glass.

In addition to the typical non-risk/non-clinical non-hazardous waste materials that will be generated on a daily basis, there will be some additional wastes generated on a regular basis that will need to be managed separately including:

- Green/garden waste from landscaping activities;
- Textiles;
- Batteries (non-hazardous. Note: hazardous batteries may also be generated which are referred to in Section 3.2.2)
- Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment (non-hazardous. Note: WEEE containing hazardous components may also be generated which are referred to in Section 3.2.2);
- Metals, timber and mixed C&D waste generated from operational maintenance activities;
- Polystyrene; and
- Furniture (and from time to time other bulky wastes).

3.2.2 Non-Clinical Hazardous Waste

The typical non-clinical hazardous waste streams that will be generated will include the following:

- Printer/toner cartridges;
- Batteries (hazardous. Note: non-hazardous batteries may also be generated which are referred to in Section 3.2.1);
- Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment (containing hazardous components. Note: WEEE not containing hazardous components may also be generated which are referred to in Section 3.2.1);
- Cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc.);
- Fluorescent bulb tubes and other mercury containing waste;
- Waste cooking oil (new children's hospital only); and
- Waste sludge from grease separator (new children's hospital only).

3.2.3 Healthcare Risk Waste (Hazardous)

Healthcare risk waste will be generated in the new children's hospital and CRIC buildings only. The healthcare risk waste streams that will be generated are:

- Healthcare risk wastes segregated into a number of categories as illustrated in Figure 3.2;
- Chemical waste including spent and expired chemicals from laboratories; and
- Radioactive waste (new children's hospital only).

These are the same waste types that are currently generated at the existing St. James's Hospital Campus and would be similar to the waste types generated from a potential future maternity hospital at the site.

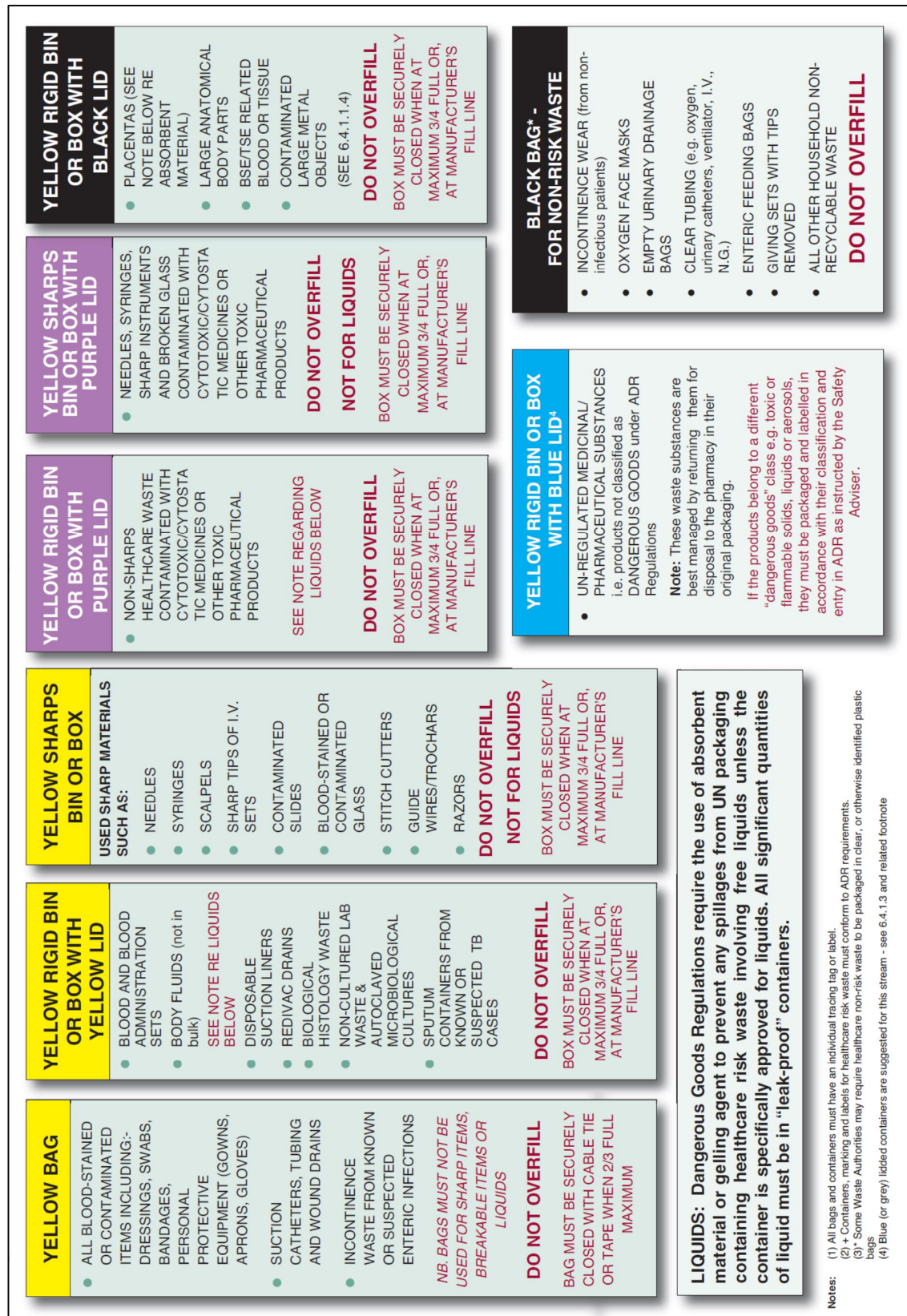


Figure 3.2 Segregation of Healthcare Risk Waste (Source: HSE and DOHC *Healthcare Risk Waste Management*, 2010 and HSE, *Waste Management Awareness Handbook*, 2011)

3.3 European Waste Codes

In 1994, the *European Waste Catalogue* ¹⁷ and *Hazardous Waste List* ¹⁸ were published by the European Commission. In 2002, the EPA published a document titled the *European Waste Catalogue and Hazardous Waste List* ¹⁹, which was a condensed version of the original two documents and their subsequent amendments. This document has recently been replaced by the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* ²⁰ which became valid from the 1st June 2015. This waste classification system applies across the EU and is the basis for all national and international waste reporting, such as those associated with waste collection permits, CORs, permits and licences and EPA National Waste Database.

Under the classification system, different types of wastes are fully defined by a code. The List of Waste (LoW) code (also referred to as European Waste Code or EWC) for typical waste materials expected to be generated during the operation of the proposed development are provided in Table 3.1 below.

Waste Material	LoW Code
Paper and Cardboard	20 01 01
Plastic	20 01 39
Metals	20 01 40
Mixed Municipal Waste	20 03 01
Glass	20 01 02
Biodegradable Kitchen Waste	20 01 08
Biodegradable garden and park wastes	20 02 01
oil and fat	20 01 25-26
Textiles	20 01 11
Batteries and accumulators*	20 01 33-34
Waste electrical and electronic equipment*	20 01 35-36
Chemicals (solvents, pesticides, paints & adhesives, detergents, etc.)*	20 01 13/19/27- 28/29-30
Fluorescent tubes and other mercury containing waste*	20 01 21
Bulky wastes	20 03 07
Healthcare wastes (wastes from natal care, diagnosis, treatment or prevention of disease in humans, includes non-hazardous and hazardous wastes) *	18 01

Table 3.1 Typical waste types generated and LoW codes

(* individual waste type may contain hazardous materials)

4.0 ESTIMATED WASTE ARISING

A Waste Generation Model (WGM) has been used to predict waste types, weights and volumes arising from operations within the proposed new developments at the St. James's Hospital Campus. The predicted wastes generated at the new children's hospital, Family Accommodation Unit and CRIC are presented in the following sections.

4.1 New children's hospital

The WGM used to estimate waste arising in the new children's hospital incorporates building area, use and occupancy and combines these with waste generation data for the existing hospitals at St. James's Hospital, Tallaght Hospital, Temple Street Children's University Hospital and Our Lady's Children's Hospital Crumlin (OLCHC) as well as Irish and US EPA waste generation rates.

The predicted waste generation for the main waste types for the new children's hospital development is presented in Table 4.1.

Waste Type	Weight	
	tonnes/annum	kg/week
Mixed Dry Recyclable Waste	172.1	3310.3
Confidential Paper	54.5	1048.3
Mixed Non-Recyclable Waste	826.3	15890.5
Organic (food/catering) Waste	122.8	2361.1
Glass	4.4	83.8
Polystyrene	2.4	45.6
Timber	25.6	491.9
Batteries	1.2	23.8
WEEE	9.9	190.9
Healthcare Risk Waste	111.4	2142.4
Chemical Wastes	5.1	98.7
Total	1335.7	25687.5

Table 4.1 Predicted waste generation for the main waste types at the new children's hospital

Note: Radioactive waste generated at the new children's hospital has not been quantified separately. Radioactive waste generated will be appropriately stored onsite in short term and long term radioactive stores (in accordance with the RPII Code of Practice 2009). The majority of the radioactive waste will be stored onsite until it decays to background levels and can then be disposed of as risk waste or equipment such as spent generators are collected by the supplier. Therefore the predicted quantum/volume is largely captured in the predicted risk waste figures presented in Table 4.1. It is understood that there may be some radioactive waste that will require collection from the site. This waste will be collected, transported and dealt with in accordance with the licencing requirements of the Office of Radiological Protection (ORP) (Note: The ORP is a successor to the RPII with merged with the Environmental Protection Agency in 2014) and relevant legislation and guidance.

4.2 Family Accommodation Unit

The WGM was used to estimate the predicted waste arising in the Family Accommodation Unit based on the predicted occupancy of the building. These estimates were compared with information on current waste generation rates at the Ronald McDonald House (RMDH) at Our Lady's Children's Hospital Crumlin which were provided by BDP Architects. The predicted waste generation for the Family Accommodation Unit is presented in Table 4.2.

Waste Type	tonnes/annum	kg/week
Mixed Non-Recyclables	12.0	231.0
Dry Mixed Recyclables	19.3	370.7
Organic (food) waste	17.8	342.3
Glass	2.6	49.7
Total Waste	51.7	993.7

Table 4.2 Predicted waste generation for the main waste types at the Family Accommodation Unit

4.3 Children's Research and Innovation Centre

The project architects have advised that the scale of the new CRIC is similar to the existing National Children's Research Centre (NCRC) at OLCCH and, therefore, the waste generation data from the NCRC has been used as an estimate for the predicted waste arising from the new CRIC at the St. James's Hospital Campus.

The predicted waste generation for the main waste types at the CRIC is presented in Table 4.3.

Waste Type	tonnes/annum	kg/week
Mixed Non-Recyclables	2.8	53.8
Dry Mixed Recyclables	1.8	34.6
Organic (food) waste	4.7	90.4
Confidential Paper	0.1	1.9
Glass	0.3	5.8
Healthcare Risk waste	3.67	70.6
Chemical waste	0.26	5.0
Total Waste	13.6	262.1

Table 4.3 Predicted waste generation for the main waste types at the CRIC

5.0 WASTE STORAGE

A dedicated shared waste management area has been allocated in the service yard at basement Level B2 of the new children's hospital. This waste management area has been designed to accommodate the majority of waste generated at the St. James's Hospital Campus including waste from the following:

- new children's hospital;
- Family Accommodation Unit;
- Children's Research and Innovation Centre;
- St. James's (Adult) Hospital and other campus buildings; and
- Potential future maternity hospital.

It is not required to accommodate all waste as certain waste types are and will continue to be collected directly from standalone buildings as follows:

- Healthcare risk waste and chemical waste is and will continue to be collected directly from the existing Pathology Laboratory;
- Non-risk waste is and will continue to be collected directly from the Trinity Centre for Health Sciences and Haughton Institute which are managed by Trinity College Dublin; and

- Chemical waste will be collected directly from the CRIC once the CRIC is operational.

In addition to the shared management area provided in the service yard at Level B2, an external area has been provided for skips for metal, timber and mixed C&D waste generated from operational maintenance activities. A long term external radioactive store (which will be designed/constructed in accordance with the RPII Code of Practice) of 20m² has also been provided to accommodate longer life radioactive waste (Note: A radioactive store for short life radioactive waste will be provided within the new children's hospital. St. James's Hospital already has an internal store for short life radioactive waste).

This section provides information on how waste is to be stored within each new development at the St. James's Hospital Campus and also in the shared waste management areas for the Campus.

This section has been prepared with due consideration of the proposed building layouts, design objectives and existing site practices as well as best practice standards and local/national waste management requirements including those of DCC. In particular, consideration has been given to the following documents:

- BS 5906:2005 Waste Management in Buildings . Code of Practice;
- EMR Waste Management Plan 2015 . 2021;
- DCC Bye-Laws for the Storage, Presentation and Collection of Household and Commercial Waste;
- HSE, Waste Management Awareness Handbook;
- HSE and DOHC, Healthcare Risk Waste Management: Segregation, Packaging and Storage Guidelines for Healthcare Risk Waste; and
- RPII Code of Practice on the Design of Diagnostic Medical Facilities where Ionising Radiation is used.

5.1 New children's hospital

Waste will be generated from a wide variety of activities throughout the new hospital building. Healthcare risk wastes will typically be generated in the treatment rooms, theatres, wards, patient rooms, laboratories. Dry recyclables and non-recyclable waste will be generated throughout the hospital. Confidential and non-confidential paper waste will mainly be generated in offices and staff workstations. Organic (food/catering) waste and glass waste will primarily be generated in food preparation areas, dining areas (i.e. franchise restaurant, café, food kiosks) and dish/pot wash areas. Metals, timber and mixed C&D waste will be generated from operational maintenance activities.

Appropriate colour coded, labelled and secured receptacles will be required for healthcare risk waste generated in the building as set out in the HSE, Waste Management Awareness Handbook (and illustrated in Figure 3.2). The required healthcare risk waste receptacles include:

Clinical waste

- Yellow bags
- Yellow rigid bins or box with yellow lid
- Yellow sharps bin or box

Special waste

- Yellow rigid bin or box with purple lid
- Yellow sharps bin or box with purple lid

- Yellow rigid bin or box with black lid
- Yellow rigid bin or box with blue (or grey) lid

These receptacles will be stored in designated disposal/waste rooms, treatment rooms, theatres, patient rooms, etc. where appropriate. They may be attached to or on treatment trolleys while in use. Yellow bags, yellow rigid bins or boxes with yellow lid and yellow sharps bins or boxes will be transferred into secured UN approved 770 litre yellow clinical waste wheeled bins. Purple, black and blue (or grey) colour coded health care risk waste rigid bins or boxes will be transferred to cages. 770 litre yellow clinical waste wheelie bins and cages for special waste will be provided in disposal/waste rooms throughout the hospital.

Sharps waste may alternatively be managed using UN-approved Bio Systems reusable containers. This is an innovative solution which allows the containers to be reused after washing and disinfection offsite (as opposed to sending the rigid containers for disposal). This system is already in place at the existing St. James's (Adult) Hospital. The waste storage/management areas have been designed so that they can accommodate the traditional single use sharps containers or the Bio Systems reusable containers. However, use of Bio Systems reusable containers is the preferred strategy for the new children's hospital.

Non-risk waste receptacles for dry mixed recyclables and mixed non-recyclables will be strategically positioned in the disposal rooms, hospital corridors, departments, wards and rooms, as required.

Where suitable, it is proposed that office and work station areas will utilise area waste stations (AWSs) for non-risk waste streams as opposed to individual receptacles at desks. AWSs should be conveniently located within 10-15m of workstations, where possible, and would typically include:

- 1 no. 80 . 120 litre receptacle for dry mixed recyclables;
- 1 no. 80 . 120 litre receptacle for mixed non-recyclables; and
- 1 no. 80 . 120 litre receptacle for confidential paper.

Catering areas include the main patient catering, franchise restaurant, café and two food kiosks. Catering areas will have receptacles for dry mixed recyclables, mixed non-recyclables, organic (food/catering) waste, glass waste and waste cooking oil, as appropriate.

The outline waste strategy is that waste will be segregated at source (into the waste types detailed in Section 3.2) into appropriate receptacles. When these receptacles are full, nominated personnel will bring the bags/bins of segregated waste to strategically located restricted access disposal/waste rooms throughout the hospital and place them in the relevant bin/cart/cage. On the lower floors, these disposal rooms will be generally allocated to the various department areas. At ward levels (Levels 04, 05 and 06), a disposal room has been allocated for every two wards of 24 no. beds so that each disposal room will accommodate waste from 48 no. beds. These rooms will be strategically located at the end of each ward adjacent to the FM lift cores. The rooms vary in size throughout the hospital but it is anticipated that each disposal/waste room will accommodate the following - 770 litre clinical waste bin(s), cage(s) for special waste, dry mixed recyclable receptacle, mixed non-recyclable receptacle(s), organic waste receptacle(s) and a glass waste receptacle as appropriate to the department/ward.

When the receptacles in the disposal rooms are full they will be transferred to a shared waste management area in the service yard (Level B2) via the FM lifts. The full bins will be replaced by empty bins so there is permanently a bin available for each waste

type. It is proposed that special and non-risk waste bins/carts/cages will be transferred by AGVs (Automatic Guided Vehicles) or AMRs (Autonomous Motorised Robots). The 770 litre clinical waste wheeled bins, chemical and radioactive waste will be transferred by electric tug (or similar mechanism).

The use of AGV/AMRs for transporting waste may require the use of non-standard sized bins. It is assumed that bins/carts suited to the AGVs/AMRs will be used and provided in the disposal rooms throughout the hospital. Based on initial discussions with suppliers, the maximum size container/cart that an AMR can transport is 0.8m wide and 1m long. It is currently proposed that non-risk waste bins/carts with the following capacity will be used (Note: these are preliminary estimates based on the max. width and length cart that can be transported by an AGV/AMR. The exact dimensions/design of the bins/carts will be determined based on the AGV/AMR technology selected for use in the new children's hospital):

- 800 litre bins/carts/cages for dry mixed recyclables and mixed non-recyclable waste
- 480 litre bins/carts for organic/catering waste
- 245 litre bins/carts for glass waste

When full bins/carts/cages are brought to the shared waste management area by AGV/AMR, electric tug and/or manually, they will be managed as follows:

- Dry mixed recyclable waste bins/carts will be mechanically tipped into a dry recyclable compactor
- Mixed non-recyclable waste bins/carts will be mechanically tipped into a non-recyclable waste compactor (2 provided)
- Organic waste will be transferred from the bins/carts into 240 litre UN-approved bins suitable for collection by the nominated waste contractor
- Glass waste will be transferred from the bins/carts into 240 litre UN-approved bins suitable for collection by the nominated waste contractor
- Confidential Paper bins will be brought to the secure confidential waste holding area
- Batteries, WEEE, fluorescent tubes, printer/toner cartridges will be placed in the relevant bins/cages provided
- Polystyrene will be placed in the relevant containers/FIBC (flexible intermediate bulk containers circa 1m³ capacity) bags provided
- Waste cooking oil will be transferred to the dedicated bunded cooking oil store room
- Chemical waste will be brought by nominated trained personnel to the dedicated chemical store in the shared waste management area.
- Special waste cages (containing purple, black and blue (or grey) colour coded health care risk waste rigid bins or boxes) will be brought to the dedicated secured healthcare risk waste stores
- Reusable sharps in Bio Systems reusable containers will be brought to the dedicated Bio Systems storage room for full containers
- 770 litre clinical waste bins will be brought to the dedicated secured healthcare risk waste stores

Other wastes generated on site will be managed as follows:

- Metals, timber and mixed C&D waste generated from operational maintenance activities will be brought to the dedicated skips provided in the external service yard.
- Longer life radioactive waste will be brought by nominated trained personnel to the external long term radioactive store.

- Waste sludge will collect in the grease separator. The grease separator will be located in a dedicated grease separator room in the service yard (which is separate to the shared waste management area). This will be pumped out by vacuum tanker on a regular basis in accordance with the grease separator's maintenance requirements and in accordance with the requirements of the discharge licence issued by DCC.

The shared waste management area is described in further detail in Section 5.4.

5.2 Family Accommodation Unit

The outline strategy for waste management in the Family Accommodation Unit is that waste will be segregated into appropriate bins at various strategically located AWSs on all floors within the building. When these bins are full, nominated personnel will bring the bins/bags of waste to a dedicated waste storage area (WSA) on the lower ground floor (identified on the drawings as Refuse Store, with an allocated area of approximately 26m²) and place them in the relevant bin/cart/cage. When the receptacles in this WSA are full they will then be transferred to an interim waste room pending transfer by AGV/AMR to the shared waste management area in the service yard of the new children's hospital. The full bins will be replaced by empty bins so there is permanently a bin available for each waste type.

Using the predicted waste generation figures in Table 4.2, waste receptacles and the frequency of transfer to the shared waste management area in the new children's hospital basement have been established and are presented in Table 5.1.

Waste Type	Waste Volume (m ³ /week)	Bin/Cart Size		Collection Frequency
		800L	Other	
Dry Mixed Recyclables	4.3	6		Weekly
Confidential paper	0.1		1 x 120 litre bin	Weekly
Mixed Non-Recyclables	1.1	2		Weekly
Organic Waste	0.6		2 x 480 litre bin	Weekly
Glass	0.1		3 x bottle skips	Every Two weeks
Total	6.2			

Table 5.1 Waste storage requirements for the Family Accommodation Unit

The minimum required area for storage of the above waste receptacles is 24m² (6m x 4m). There will also be space available in the WSA for temporary storage of waste batteries and small WEEE items pending transfer to the shared waste management area. Waste chemicals (i.e. cleaning products) will be stored in the cleaner's store room adjacent to the WSA on the lower ground floor pending transfer to the shared waste management area where they will be placed in a waste chemical storage area.

Any waste fluorescent tubes/lamps generated in the Family Accommodation Unit will be collected and transferred to the shared waste management area where they will be placed in fluorescent tube coffin trolleys.

5.3 Children's Research and Innovation Centre

It is anticipated that waste will be largely generated from the following areas within the building:

- Laboratory and supporting rooms and suites on the lower ground floor/street level;
- Offices/office areas on the ground, first and second floors;
- Photocopying/printing area on the ground floor; and
- Common room on the ground floor (used for staff breaks/lunches).

Appropriate containers (i.e. bins or yellow bags for clinical waste, colour coded rigid containers for special wastes) are required on or adjacent to each workstation for the healthcare risk waste generated during the day. When the bins/yellow bags are full, they will be conveyed by staff to the dedicated healthcare risk WSA on the lower ground floor. Waste chemicals will also be brought to this area and placed in the appropriate storage container. It is intended that this WSA will be used for weekly storage of clinical, special and chemical waste only and should be accessible by authorised personnel only. The risk waste area will require the following bins/equipment:

- 2 no. 770 litre bins for clinical waste;
- 1 no. cage for rigid bins of special wastes; and
- Circa 5 no. chemical cabinets (these would include cabins for segregation of flammable substances, toxic substances, solvents, acids and bases).

The risk WSA will be adequately ventilated and be of fire resistant construction in accordance with the Health and Safety Executive (HSE) UK Guidance Document '*The Storage of flammable liquids in containers*'²¹ and '*Dangerous Substances and Explosive Atmospheres Regulations 2002. Approved Code of Practice and guidance*'²².

Fixer/developer waste will be generated and stored in the dark room. Based on an inspection of the NCRC and discussion with the laboratory manager, it is recommended that the waste fixer/developer is stored in the dark room until a sufficient volume (i.e. 50 litres) is ready for collection by a waste contractor.

To accommodate non-risk waste, AWSs will be provided at strategic locations in the main laboratory area, offices and flexibles areas. Each AWS should include:

- 1 no. 80 . 120 litre bin for dry mixed recyclables; and
- 1 no. 80 . 120 litre bin for mixed non-recyclables.

In addition, provision will be made for confidential paper waste bins and disposal of waste printer toner/cartridges at suitable locations.

The CRIC will have an external WSA at ground level to accommodate storage of waste from the building pending transfer to the shared waste management area in the service yard of the new children's hospital. This area will hold the following bins/equipment:

- 1 no. 1100 litre bin for mixed non recyclables;
- 1 no. 1100 litre bin for dry mixed recyclables;
- 1 no. 240 litre bin for organic (food) waste;
- 1 no. cage for polystyrene (if required);
- 2 no. confidential waste paper bins (if required, confidential paper may be collected directly from the office floors);
- 1 no. cage for WEEE;
- 1 no. small box for batteries;
- 2 no. 770 litre clinical waste bins; and
- 1 no. cage for special wastes.

It is not proposed not to store chemical waste in the external WSA. It will be collected directly from the risk WSA on the lower ground floor. A secured cage will be provided for the clinical and special waste bins and will be at least 6.75m² (4.5m x 1.5m). The minimum area required for the non-risk waste is 14.2m² (4.3m x 3.3m). It is estimated that the above bins will be transferred using a flatbed truck with a tail lift (or similar vehicle) to the shared waste management area at the new children's hospital on a twice weekly or weekly basis.

5.4 Shared Waste Management Area

As previously detailed in section 5.0, a dedicated shared waste management area has been allocated in the service yard at Level B2 in the basement of the new children's hospital. This area is approximately 515m² (plus Environmental Managers office, staff rest room, WC and showers). The shared waste management area will include the following facilities:

- 40 cubic yard compactor for dry mixed recyclable waste with mechanical bin lifter
- 2 no. 40 cubic yard compactors for mixed non-recyclable waste with mechanical bin lifters
- Organic bin holding area
- Glass bin holding area
- Confidential waste paper bin holding room (secured)
- Healthcare risk waste wheelie bin and cage holding rooms for full/empty bins/cages (secured)
- Reusable sharps (Bio Systems) store rooms for full and empty containers (secured)
- Chemical store (secured)
- Waste cooking oil room (bundled)
- Storage areas for batteries (boxes), WEEE (cages), fluorescent tubes (coffins), polystyrene (containers/FIBC bags)
- Bin exchange and bin wash area
- Environmental Managers office, staff rest room, WC and showers

In addition, the following additional shared waste storage areas have been allocated in the external yard:

- 3 no. 14 cu. Yard skips for timber, metal and mixed C&D waste
- Long term radioactive store (20m²) which will be designed/constructed in accordance with the RPII Code of Practice.

The main shared service yard area has been designed to facilitate access/egress for waste collection vehicles as well as delivery vehicles. The external yard will also facilitate access/egress for waste collection vehicles collecting skips and radioactive waste.

As previously detailed in Section 5.0, the shared waste management area (as well as the skips and long term radioactive store in the external yard) has been designed to accommodate the majority of waste generated at the St. James's Hospital Campus including waste from the following:

- new children's hospital;
- Family Accommodation Unit;
- Children's Research and Innovation Centre;
- St. James's (Adult) Hospital and other campus buildings; and
- Potential future maternity hospital.

It is not required to accommodate all waste as certain waste types are and will continue to be collected directly from standalone buildings as follows:

- Healthcare risk waste and chemical waste is and will continue to be collected directly from the existing Pathology Laboratory;
- Non-risk waste is and will continue to be collected directly from the Trinity Centre for Health Sciences and Haughton Institute which are managed by Trinity College Dublin; and
- Chemical waste will be collected directly from the CRIC once the CRIC is operational.

Therefore, with the exception of the aforementioned waste streams, the new shared waste management area will provide a centralised waste management area for the campus.

5.5 Waste Storage Area Design

The shared waste management area should meet the following requirements:

- Floors should be painted with a non-slip paint and should have coved edges.
- Doors into the dedicated waste rooms within the waste management area should be self-closing but a handle is required on both sides of the door to allow the door to be opened from inside and outside the room. Doors should be fitted with a catch to lock back the door into the open position to allow the operative to manoeuvre the container safely with both hands.
- Access to the health risk waste, Bio Systems and chemical stores will be restricted to authorised personnel only.
- Ventilation should provide 6-10 air changes per hour.
- Lighting should have a Lux rating of 220.
- Bin wash area should have a hot and cold water supply, power washer and a floor sloped to a central foul drain to facilitate cleaning of bins, carts, crates and cages.
- A single power supply (suitable for a wet environment) will be required for the power washer for cleaning the bins. 3-phase power supplies (suitable for a wet environment) will be required for the compactors.

The disposal rooms within the new children's hospital, Family Accommodation Unit and the CRIC should be designed to have self-closing doors with handles on both sides, a catch to lock the door into an open position while manoeuvring bins, have suitable lighting and have adequate ventilation to limit the potential for build-up of offensive odours.

In addition, the external WSA at the CRIC should be fitted with a hot and cold water supply and electrical supply for a power washer to allow cleaning of small bins used within the building. A sloped floor and central foul drain to facilitate wash-water run-off will also be required. The bins/carts/cages transferred to the shared waste management area will be cleaned at the dedicated bin wash area at the shared waste management area as required.

Nominated personnel will be required to maintain the waste management storage areas, receptacles (i.e. bins/carts/cages) and equipment in good condition as required by the DCC Waste Bye-Laws.

6.0 WASTE MOVEMENT & COLLECTION

6.1 Waste Movement

It is currently envisaged that the majority of waste materials generated in the new children's hospital will be conveyed from the various disposal rooms on each floor to the shared waste management area using AGVs or AMRs. Discussions are ongoing with equipment providers regarding their suitability and specific requirements. Clinical waste, chemical waste and radioactive waste are not intended to be transported using the AGVs/AMRs at present. The 770 litre clinical waste bins, chemical waste and radioactive waste will be transported manually (with an electric tug or similar) by nominated personnel from the disposal rooms via the FM lifts to the shared waste management area.

When the various bins/carts/cages in the disposal rooms are full, an AGV/AMR will deliver an empty bin/cart/cage to the room, collect a full receptacle and transfer it to the shared waste management area.

A similar approach is intended for movement of waste receptacles from the Family Accommodation Unit WSA to the shared waste management area. When bins are full, an AGV/AMR will bring an empty waste receptacle to the interim WSA, collect the full receptacle and transfer it to the shared waste management area.

In the CRIC, all risk waste should be conveyed by scientific personnel to the designated risk WSA on the lower ground floor of the building, as required. When full, the clinical waste bins and special waste cage will be conveyed by nominated personnel to the secured risk WSA in the external waste compound. Similarly, non-risk waste items will be transferred from the AWSs throughout the building to the external WSA by nominated personnel. When the non-risk and risk waste bins in the external compound are full, they will be collected by nominated personnel using a flatbed truck with a tail lift (or similar vehicle) and transferred to the shared waste management area. Chemical waste will be collected by the nominated waste contractor directly from the risk WSA on the lower ground floor of the building to avoid double handling and to ensure it is handled in a safe manner.

Waste generated at the St. James's (Adult) Hospital will be transferred to the shared waste management area via the FM lifts and FM tunnel. Waste generated at standalone building at St. James's Hospital Campus which are currently not and will not be conveyed through the main adult hospital are:

- Pathology Laboratory . Non-risk waste bins only
- Haughton Institute & Trinity Centre for Health Sciences . healthcare risk waste bins only
- All waste from Hospital 2, 4, 5, 6 and the mortuary

Wastes from these buildings will be transferred to shared waste management area by flatbed truck with a tail lift (or similar vehicle).

It is anticipated that waste from a potential future maternity hospital will be conveyed to the shared waste management area via the FM lifts and FM tunnel.

6.2 Waste Collection

The movement of waste collection vehicles to and from the shared waste management area in the basement of the new children's hospital will be via a controlled access route to the basement from Mount Brown Street.

There are numerous private contractors that provide commercial waste collection in the Dublin City area. All waste contractors servicing the proposed development must

hold a valid waste collection permit for the specific waste types collected. All waste collected must be transported to a COR, permitted or licensed facility only.

Waste collections will be planned and staggered to avoid congestion in the service yard and minimise the duration of time waste collection vehicles spend on site.

The facilities management team should be aware of the waste collection arrangements and all waste receptacles must be clearly identified as required by waste legislation and the requirements of the DCC Waste Bye-Laws.

Waste collection arrangements should be agreed with DCC in advance of commencement of operations at the new facilities. Waste will be presented for collection in a manner that will not endanger health, create a risk to traffic, harm the environment or create a nuisance through odours or litter.

7.0 CONCLUSIONS

By implementing the procedures outlined in this OWMP, a high level of recycling and recovery will be achieved at the development. Significant volumes of recyclable materials will be generated and these will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the *EMR Waste Management Plan 2015 – 2021*.

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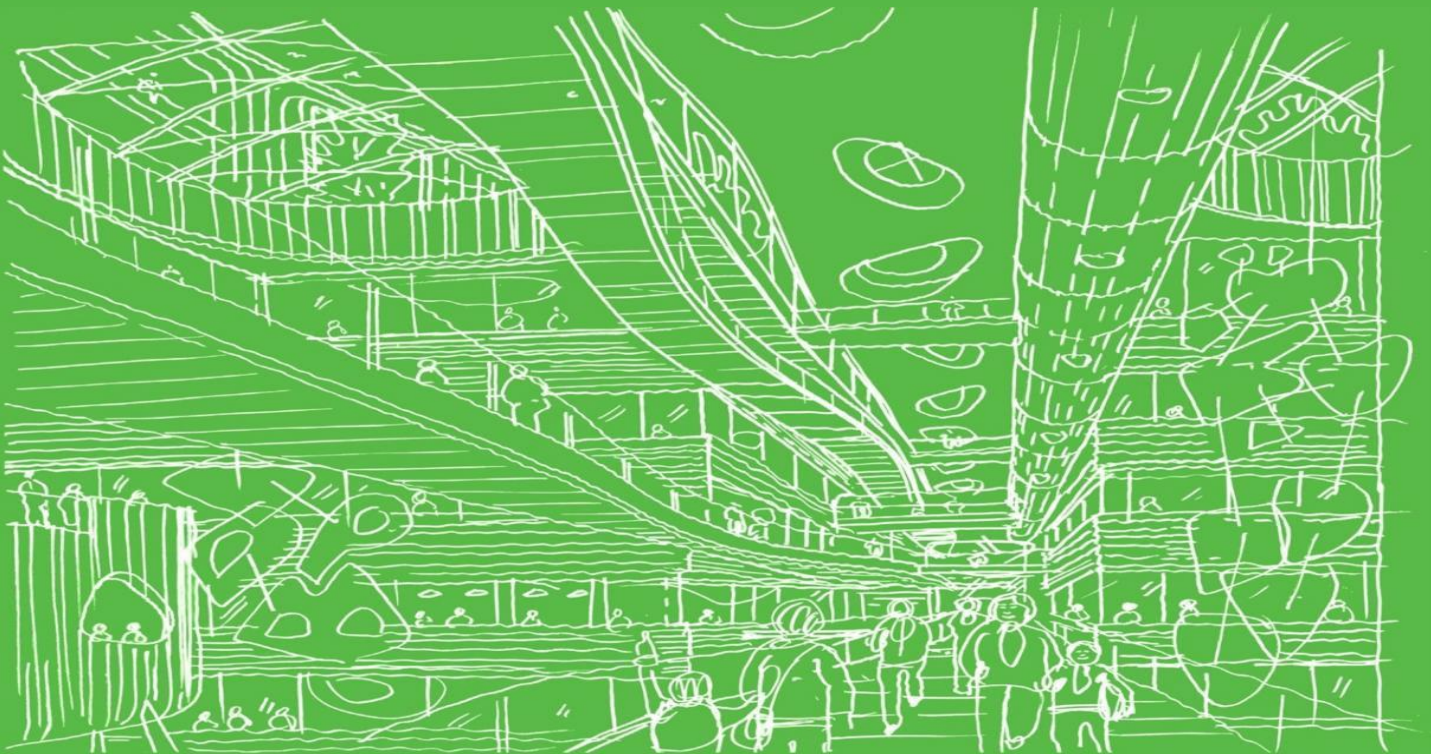
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National Paediatric Hospital Project

Planning Application

Appendix 10.3 – Construction & Demolition Waste Management
Plan for Tallaght Hospital satellite centre



August 2015

APPENDIX 10.3

**CONSTRUCTION &
DEMOLITION WASTE
MANAGEMENT PLAN**

FOR

**TALLAGHT HOSPITAL
SATELLITE CENTRE**

Report Prepared For

**National Paediatric Hospital
Development Board**

Report Prepared By

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Our Reference

RH/14/8182WMR03

Date of Issue

31 July 2015

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Document History

Document Reference		Original Issue Date	
RH/14/8182W/MR03		31 July 2015	
Revision Level	Revision Date	Description	Sections Affected

Record of Approval

Details	Written by	Approved by
Signature		
Name	Robert Hunt	Elaine Neary
Title	Environmental Consultant	Principal Consultant
Date	31 July 2015	31 July 2015

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1.0 INTRODUCTION

As part of the National Paediatric Hospital Project, planning permission is being sought for the construction of a new children's hospital satellite centre at the Tallaght Hospital campus, Tallaght, Dublin 24.

AWN Consulting Ltd. (AWN) has prepared this Construction and Demolition (C&D) Waste Management Plan (WMP) for the proposed development. The purpose of the C&D WMP is to provide information necessary to ensure that the management of C&D waste at the site is undertaken in accordance with current legal and industry standards including the *Waste Management Act 1996 and 2008* ¹, associated Regulations, *Litter Act 1997* ² and the new '*Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021*' ³. In particular, the C&D WMP aims to ensure maximum recycling, re-use and recovery of waste with diversion from landfill, wherever possible. It also seeks to provide guidance on the appropriate collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources).

This C&D WMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of waste to be generated by the proposed development and makes recommendations for management of different waste streams.

2.0 CONSTRUCTION & DEMOLITION WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Irish Government issued a policy statement in September 1998 known as '*Changing Our Ways*' ⁴, which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this report was to recycle at least 50% of C&D waste within a five year period (by 2003), with a progressive increase to at least 85% over fifteen years (i.e. 2013).

In response to the *Changing Our Ways* report, a task force (Task Force B4) representing the waste sector of the already established Forum for the Construction Industry, released a report entitled '*Recycling of Construction and Demolition Waste*' ⁵ concerning the development and implementation of a voluntary construction industry programme to meet the Government's objectives for the recovery of construction and demolition waste.

The most recent national policy document was published in July 2012, entitled '*A Resource Opportunity - Waste Management Policy in Ireland*' ⁶. This document stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention. The document sets out a number of actions in relation to C&D waste and commits to undertake a review of specific producer responsibility requirements for C&D projects over a certain threshold.

The National Construction and Demolition Waste Council (NCDWC) was launched in June 2002, as one of the recommendations of the Forum for the Construction Industry, in the Task Force B4 final report. The NCDWC subsequently produced '*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects*' ⁷ in July 2006 in conjunction with the then Department of the Environment, Heritage and Local Government (DoEHLG). The guidelines outline the issues that need to be addressed at the pre-planning stage of a development all the way through to its completion. These guidelines have been followed in the preparation of this document and include the following elements:

- Predicted C&D wastes and procedures to prevent, minimise, recycle and reuse wastes;
- Waste disposal/recycling of C&D wastes at the site;
- Provision of training for waste manager and site crew;
- Details of proposed record keeping system;
- Details of waste audit procedures and plan; and
- Details of proposed consultation with relevant bodies i.e. waste recycling companies, South Dublin County Council etc.

Section 3 of the Guidelines identifies thresholds above which there is a requirement for the preparation of a C&DWMP for developments. This development requires a C&DWMP under the following criterion:

- New developments including institutional, educational, health and other public facilities, with an aggregate floor area in excess of 1,250m².

Other guidelines followed in the preparation of this report include '*Construction and Demolition Waste Management – a handbook for Contractors and Site Managers*'⁸ published by FÁS and the Construction Industry Federation in 2002.

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

2.2 Regional Level

The proposed development is located in the Local Authority area of South Dublin County Council (SDCC).

The *EMR Waste Management Plan 2015 – 2021* is the new regional waste management plan for the DCC area published in May 2015. This plan replaces the previous Dublin region plan due to changing National policy as set out in *A Resource Opportunity: Waste Management Policy in Ireland* and changes being enacted by the *Waste Framework Directive (WFD) (2008/98/EC)*⁹. The new regional plan sets out the strategic targets for waste management in the region but does not set a specific target for C&D waste. However, the WFD sets Member States a target of '70% preparing for reuse, recycling and other recovery of construction and demolition waste' (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

The '*South Dublin County Development Plan 2010 – 2016*'¹⁰ contains several policies in relation to waste management. The waste policies most relevant to this development are as follows:

- *Policy ES7: Waste Management Regulations*
It is the policy of the Council to implement and monitor the Waste Management Regulations.
- *Policy ES8: Waste Prevention and Reduction*
It is the policy of the Council to promote the prevention and reduction of waste and to cooperate with industry and other agencies in viable schemes to achieve this in accordance with the Waste Management Plan for the Dublin Region and subsequent revisions and updates.
- *Policy ES10: Waste Re-use and Recycling*
It is the policy of the Council to reduce the amount of waste to be landfilled or incinerated and to promote the increased re-use and recycling including the

collection and transfer of product for resale, of materials from all waste streams.

- **Policy ES17 : Construction and Demolition Waste**
It is the policy of the Council to require that planning applications for development (apart from residential developments of less than 15 units) be accompanied by a Waste Management Plan which shall be agreed with the Planning Authority prior to the commencement of Development. The Plan, as a minimum, shall include a provision for the management of all construction and demolition waste arising on site, shall make provision for the recovery or disposal of this waste to authorised facilities by authorised collectors. Where appropriate, the re-use of excavated material from development sites on the site is to be encouraged, for landscaping, land restoration or for preparation for development.

2.3 Legislative Requirements

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

- Waste Management Act 1996 (S.I. No. 10 of 1996) as amended by the Waste Management (Amendment) Act 2001. Sub-ordinate legislation includes:
 - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended 2011 (S.I. No. 323 of 2011)
 - Waste Management (Collection Permit) Regulations S.I No. 820 of 2007 as amended 2008 (S.I No 87 of 2008)
 - Waste Management (Facility Permit and Registration) Regulations, S.I No. 821 of 2007 as amended 2008 (S.I No. 86 of 2008)
 - Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended 2004 (S.I. No. 395 of 2004), 2010 and (S.I. No. 350 of 2010)
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- Protection of the Environment Act 2003 (S.I. No. 413 of 2003)
- Litter Pollution Act 1997 (S.I. No. 12 of 1997)

These Acts and subordinate Regulations enable the transposition of relevant European Union Policy and Directives into Irish law.

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 - 2008* and subsequent Irish legislation, is the principle of “*Duty of Care*”. This implies that the waste producer is responsible for waste from the time it is generated through until its legal recycling, recovery or disposal (including its method of 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).

It is therefore imperative that the National Paediatric Hospital Development Board (NPHDB) ensures that the waste contractors engaged by construction contractors are legally compliant with respect to waste transportation, recycling, recovery and disposal. This includes the requirement that a contractor handle, transport and dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

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

3.0 DESCRIPTION OF THE PROJECT

3.1 Location, Size and Scale of the Development

The subject site is located within the grounds of the existing Tallaght Hospital campus in Tallaght, Dublin 24. The project will involve the construction of a dedicated children's hospital satellite centre building extending from the south-east corner of the existing hospital structure as per the planning drawings. The development will also include the refurbishment of a portion of the existing building to accommodate access to the new building.

There will be some remodelling of existing hospital walls which will mainly consist of removal of approximately 95m of external wall and reconfiguration of internal walls for updated room layouts and access routes. The majority of the new development footprint will be incorporated in the existing building footprint so the required area to be excavated for foundations will be reasonably small. There is no basement construction planned for the new development.

3.2 Details of the Non-Hazardous Wastes to be produced

The waste generated from refurbishment works is not anticipated to be high in volume but will be more difficult to segregate than waste generated from the construction phase, as many of the building materials will be bonded together or integrated i.e. steel reinforcement in concrete and metal or timber stud partition walls.

Some waste asphalt will be generated from excavation of existing access routes and footpaths to the south-east of the existing hospital structure. Additionally, shrubbery and green waste will be generated from removal / excavation of landscaped areas.

Based on earthworks data provided by the project engineers (Roughan & O'Donovan (ROD)), there will be a surplus of made ground and soil/stones generated from site clearance required to facilitate construction of foundations, realignment of access

routes, removal of part of an existing planted mound and general landscaping. Where possible, excavated topsoil will be reused on site.

During the construction phase there will be a surplus of materials, such as off-cuts from timber, concrete blocks, tiles and bricks. Waste from packaging and oversupply of materials will also be generated. There may also be excess concrete delivered to site during construction which will need to be disposed of.

3.3 Anticipated Hazardous Wastes to be produced

3.3.1 Contaminated Soil

A preliminary site investigation was carried out at the site in December 2014 by Causeway Geotech Ltd. There was no evidence of contamination noted during these preliminary site investigation works. The soil samples were analysed for the waste acceptance criteria in accordance with the European Communities (EC) Council Decision 2003/33/EC ¹¹. The results of the analysis were below the threshold for inert waste disposal. An additional phase of site investigation is currently underway which aims to identify any potential contamination at the site.

All excavations should be carefully monitored by a suitably qualified person to ensure potentially contaminated soil is identified and segregated, if encountered. In the unlikely event that any potentially contaminated material is encountered, it will need to be segregated from clean/inert material, tested and classified as either non-hazardous or hazardous using the *HazWasteOnline* application and then classified as clean, inert, non-hazardous or hazardous in accordance with the *EC Council Decision 2003/33/EC* ¹¹.

3.3.2 Fuel/Oils

As fuels and oils are classed as hazardous materials, any on-site storage of fuel/oil, all storage tanks and all draw-off points will be bunded and located in a dedicated, secure area of the site. Provided that these requirements are adhered to and site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel/oil wastage at the site.

3.3.3 Other known Hazardous Substances

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.

3.4 Main C&D Waste Categories

The main non-hazardous and hazardous waste streams that could be generated by the construction and demolition activities at a typical site are shown in Table 3.1. The List of Waste (LoW) code (also referred to as the European Waste Code or EWC) for each waste stream is also shown.

Waste Material	LoW Code
Non-Hazardous:	
Concrete, bricks, tiles, ceramics	17 01
Wood, glass and plastic	17 02
Bituminous mixtures	17 03 02
Metals (including their alloys)	17 04
Soil and stones	17 05
Gypsum-based construction material	17 08
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Hazardous:	
Electrical and electronic components	20 01 35
Batteries and accumulators	20 01 33-34
Wood preservatives	03 02
Liquid fuels	13 07
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13/19/27-30
Soil and stones containing dangerous substances (if encountered)	17 05 03
Other construction and demolition wastes containing dangerous substances	17 09 03

Table 3.1 Typical waste types generated and LoW codes

4.0 WASTE MANAGEMENT

4.1 Refurbishment Waste Generation

The area of the existing hospital to be refurbished has been estimated by the project engineers and includes removal of a section of the external wall and reconfiguration of internal partitions. Figures from previous projects have been used to estimate the approximate breakdown of waste to be generated from the refurbishment works. The waste is segregated by type and estimates have also been made for indicative reuse (onsite and/or offsite), recycling and disposal targets. This breakdown is shown in Table 4.1.

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	4.4	0	0	85	3.7	15	0.7
Concrete, brick, tiles, ceramics	57.0	30	17.1	60	34.2	10	5.7
Plasterboard	11.0	10	1.1	70	7.7	20	2.2
Metals	16.5	5	0.8	80	13.2	15	2.5
Timber	11.0	10	1.1	40	4.4	50	5.5
Others	9.9	0	0	0	0	100	9.9
Total	109.8		20.1		63.2		26.5

Table 4.1 Predicted on and off-site reuse, recycle and disposal rates for refurbishment waste

It should be noted that until a detailed survey of the refurbishment areas has been carried out, it is difficult to predict with a high level of accuracy the waste that will be generated from the proposed works. A refurbishment plan will be prepared by the

contractor prior to commencement of this phase of the project which will refine the waste figures detailed in Table 4.1.

4.2 Construction Waste Generation

Table 4.2 shows the breakdown of C&D waste types produced on a typical site based on data from the EPA *National Waste Reports*¹².

Waste Types	%
Soil & Stones	83
Concrete, Bricks, Tiles, Ceramics, Plasterboard	11
Asphalt, Tar and Tar Products	1
Metals	1
Other	4
Total	100

Table 4.2 Waste materials generated on a typical Irish construction site

Notwithstanding the information in Table 4.2, there will be soil/stones and made ground excavated to facilitate the construction of the new building foundations, the installation of underground services and realignment of access routes. It has been estimated by the project engineers, Roughan and O'Donovan, that the volume of material to be excavated is approximately 1,000m³. The excavated material will comprise made ground, topsoil and subsoil. Any suitable excavated material will be temporarily stockpiled for reuse as landscape fill, where possible. However, it is anticipated that there will be limited opportunities for reuse of the material on-site.

Table 4.3 shows the predicted construction waste generation for the proposed development based on the information available to date along with the targets for management of the waste streams. The predicted waste amounts are based on an average large scale development waste generation rate per m², using the waste breakdown rates shown in Table 4.2.

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Concrete, bricks, tiles, ceramics and plasterboard	13.5	40	5.4	40	5.4	20	2.7
Asphalt, tar and tar Products	4.9	0	0	25	1.2	75	3.7
Metals	1.3	5	0.1	90	1.1	5	0.1
Other	4.9	10	0.5	40	2.0	50	2.4
Total	24.6		6.0		9.7		8.9

Table 4.3 Predicted on and off-site reuse, recycle and disposal rates for construction waste

It should be noted that until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

4.3 Proposed Waste Management Options

Waste materials generated will be segregated on site, where it is practical. Where the on-site segregation of certain wastes types is not practical, off-site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at

source. All waste receptacles leaving site will be covered or enclosed. The appointed waste contractor will collect and transfer the wastes as receptacles are filled. There are numerous waste contractors in the Dublin Region that provide this service.

All waste arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste arisings requiring disposal off-site will be recycled, recovered and/or disposed of at a facility holding the appropriate COR, licence or permit, as required.

Mixed C&D waste (classified under EWC code 17 09 04) can be accepted at a number of facilities in the region including Murphy Environmental Hollywood Ltd., Knockharley Landfill Ltd. and Ballynagran Landfill Ltd. Further details on these facilities are given in the C&D Waste Management Plan for the St. James's Hospital campus (Appendix 10.1).

Other segregated C&D waste will consist of concrete blocks, bricks, tiles, ceramics, hard plastic, metal and glass. A number of waste transfer stations have been identified close to the development which will accept these waste streams for recycling:

- W0079-01: Starus Eco Holding Ltd. (Greenstar Ltd.) . Tallaght;
- W183-01: Starus Eco Holding Ltd. (Greenstar Ltd.) . Ballycoolin;
- W0044-02: Thornton's Recycling Ltd. . Ballyfermot;
- W0152-03: Oxigen Environmental Ltd. . Ballymount; and
- W0227-01: Lawlor Brothers Waste Disposal Ltd. (Access Skip Hire) . Dublin 12.

Plasterboard will be accepted at some of these transfer stations or can be brought to Allied Recycling (Allied) in Naas (WFP-KE-08-0347-01). Allied is one of the three facilities in Ireland that currently recycle plasterboard. The others are McNabb Waste in Downpatrick, NI (LN/09/111/M) and Evirogrind in Co. Donegal (WFP-DL-11-004-01).

Written records will be maintained by the contractor(s) detailing the waste arising throughout the excavation and construction phases, the classification of each waste type, the contact details and waste collection permit number of all waste contractors who collect waste from the site and the end destination details for all waste removed and disposed off-site.

Dedicated bunded storage containers will be provided for hazardous wastes which may arise such as batteries, paints, oils, chemicals etc., if required.

The management of the main waste streams are detailed as follows:

Soil/subsoil and Concrete Surfacing:

Existing asphalt surfacing and made ground/subsoil will be excavated to facilitate construction of the new building foundations, installation of underground services and realignment of access routes.

Any material removed off-site will be carried out by contractors licensed under the *Waste Management Acts 1996 - 2008*, the *Waste Management (Collection Permit) Regulations 2007 and Amendments* and the *Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments*.

Where the excavated soil is found to be clean/inert, the site manager will investigate whether nearby construction sites may require clean fill material, to both minimise the costs of transport and to reuse as much material as possible. If any of the material is

to be reused on another site as by-product (and not as a waste), this will need to be done so in accordance with *Article 27 of the European Communities (Waste Directive) Regulations, 2011 (S.I. No. 126 of 2011), as amended 2011 (S.I. No. 323 of 2011)*. Article 27 requires that certain conditions are met and that by-product decisions are made to EPA, via their online notification form. The EPA are entitled to decide that a notified by-product should in fact be considered as a waste and they are obliged to consult with the economic operator and the relevant local authority before making such a decision. If the material is deemed to be a waste, removal and reuse/recovery/disposal of the material will be carried out in accordance with the relevant waste regulations. The volume of soil to be disposed of will dictate whether a COR, waste permit or waste licence is required by the receiving facility.

Also as discussed previously, any soil/subsoil deemed to be contaminated will be stored separately to the clean and inert soil/subsoil. The material will be appropriately tested and classified as either non-hazardous or hazardous using the *HazWasteOnline* application and then classified as inert (Category A), inert (suitable for Murphy Environmental Landfill, Category A2), non-hazardous (Category B), stable non-reactive hazardous for disposal in non-hazardous landfill (Category C) or hazardous (Category D) in accordance with the *EC Council Decision 2003/33/EC*, before being transported to a permitted/licensed facility by a suitable contractor. A desktop study of suitable facilities for disposal of excavated soils, dependent on classification, was carried out by AWN and is presented in Appendix 10.1 (St. James's Hospital campus C&D WMP) of the EIS. This study identified facilities which can accept different categories of waste, considers their available capacity and identifies their proximity to the project sites.

Crushed rock or granular fill material will need to be imported to the site for use under building floor slabs, foundations, roads, car parks and paved areas. In the event that it is proposed to use imported fill from another site, the imported material will need to be classified in accordance with Article 27 as discussed above.

Bedrock

Bedrock was not confirmed during site investigations in December 2014. One of the borehole logs recorded encountering "boulder or possible bedrock" at 14.75m below ground level. Therefore, it is not anticipated that bedrock will be encountered during excavation works.

Concrete Blocks, Bricks, Tiles & Ceramics

The majority of concrete blocks, bricks, tiles and ceramics generated as part of the construction works are expected to be clean, inert material and should be recycled, where possible.

Hard Plastic

As hard plastic is a highly recyclable material, much of the plastic generated will be primarily from material off-cuts. All recyclable plastic will be segregated and recycled, where possible.

Timber

Timber that is uncontaminated, i.e. free from paints, preservatives, glues etc., will be disposed of in a separate skip and recycled off-site.

Metal

Metals will be segregated into mixed ferrous, aluminium cladding, high grade stainless steel, low grade stainless steel etc., where practical and stored in skips. Metal is highly recyclable and there are numerous companies that will accept these materials.

Plasterboard

There are currently a number of recycling services for plasterboard in Ireland as detailed above. Plasterboard from the construction phase will be stored in a separate skip, pending collection for recycling. The site manager and project engineers will ensure that oversupply of new plasterboard is carefully monitored to minimise waste.

Glass

Glass materials will be segregated for recycling, where possible.

Waste Electrical and Electronic Equipment (WEEE)

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

Other Recyclables

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

Non-Recyclable Waste

Construction waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate skips or other receptacles. Prior to removal from site, the non-recyclable waste skip/receptacle will be examined by a member of the waste team (see Section 6.0) to determine if recyclable materials have been placed in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle.

Hazardous Wastes

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

It should be noted that until a construction contractor is appointed it is not possible to provide information on the specific destinations of each waste stream. Prior to commencement of development and removal of any waste offsite, details of the proposed destination of each waste stream will be provided to SDCC by the project team.

4.4 Tracking and Documentation Procedures for Off-Site Waste

All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the project Contractor.

All movement of waste and the use of waste contractors will be undertaken in accordance with the *Waste Management Acts 1996 - 2008*, *Waste Management (Collection Permit) Regulations 2007 and Amendments* and *Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments*. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project Waste Manager (see Section 6.0) will maintain a copy of all waste collection permits on-site.

If the waste is being transported to another site, a copy of the Local Authority COR, waste permit or EPA Waste Licence for that site will be provided to the nominated

project Waste Manager. If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) document will be obtained from Dublin City Council (as the relevant authority on behalf of all local authorities in Ireland) and kept on-site along with details of the final destination (permits, licences etc.). A receipt from the final destination of the material will be kept as part of the on-site waste management records.

If any surplus soils/stones is being removed from the site for reuse on another construction site as a by-product, this will need to be done in accordance with *Article 27 of the European Communities (Waste Directive) Regulations, 2011 (S.I. No. 126 of 2011)*. Similarly, if any soils/stones are imported onto the site from another construction site as a by-product, this will be also be done in accordance with Article 27.

All information will be entered in a waste management recording system to be maintained on site.

5.0 ESTIMATED COST OF WASTE MANAGEMENT

An outline of the costs associated with different aspects of waste management is provided below.

The total cost of C&D waste management will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

5.1 Reuse

By reusing materials on site, there will be a reduction in the transport and disposal costs associated with the requirement for a waste contractor to take the material away to landfill.

Clean and inert soils, gravel, stones etc. which cannot be reused on site may be used as capping material for landfill sites, or for the reinstatement of quarries etc. This material is often taken free of charge for such purposes, reducing final waste disposal costs.

5.2 Recycling

Salvageable metals will earn a rebate which can be offset against the costs of collection and transportation of the skips.

Clean uncontaminated cardboard and certain hard plastics can also be recycled. Waste contractors will charge considerably less to take segregated wastes, such as recyclable waste, from a site than mixed waste.

Timber can be recycled as chipboard. Again, waste contractors will charge considerably less to take segregated wastes such as timber from a site than mixed waste.

5.3 Disposal

Landfill charges in the Leinster region are currently at around " 160/tonne (which includes a " 75 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2012*. In addition to disposal costs, waste contractors will also charge a collection fee for skips.

Collection of segregated C&D waste usually costs less than municipal waste. Specific C&D waste contractors take the waste off-site to a licensed or permitted facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill. Clean soil, rubble, etc. is also used as fill/capping material, wherever possible.

6.0 TRAINING PROVISIONS

A member of the construction team will be appointed as the waste manager to ensure commitment, operational efficiency and accountability during the construction and refurbishment phases of the project.

6.1 Waste Manager Training and Responsibilities

The nominated waste manager will be given responsibility and authority to select a waste team if required, i.e. members of the site crew that will aid him/her in the organisation, operation and recording of the waste management system implemented on site. The waste manager will have overall responsibility to oversee, record and provide feedback to the client on everyday waste management at the site. Authority will be given to the waste manager to delegate responsibility to sub-contractors, where necessary, and to coordinate with suppliers, service providers and sub-contractors to prioritise waste prevention and material salvage.

The waste manager will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on site. The waste manager will also be trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and be knowledgeable in how to implement this C&D WMP.

6.2 Site Crew Training

Training of site crew is the responsibility of the waste manager and, as such, a waste training program should be organised. A basic awareness course will be held for all site crew to outline the C&D WMP and to detail the segregation of waste materials at source. This may be incorporated with other site training needs such as general site induction, health and safety awareness and manual handling.

This basic course will describe the materials to be segregated, the storage methods and the location of the Waste Storage Areas (WSAs). A sub-section on hazardous wastes will be incorporated into the training program and the particular dangers of each hazardous waste will be explained.

7.0 RECORD KEEPING

Records will be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the construction waste arisings on site. A copy of the Waste Collection Permits, Certificates of Registration, Waste Facility Permits and Waste Licences will be maintained on site at all times.

The waste manager or delegate will record the following;

1. Waste taken for reuse off-site;
2. Waste taken for recycling;
3. Waste taken for disposal; and
4. Reclaimed waste materials brought on-site for reuse.

For each movement of waste on or off-site, a signed docket will be obtained by the Waste Manager from the contractor, detailing the weight and type of the material and the source and destination of the material. This will be carried out for each material type. This system will also be linked with the delivery records. In this way, the percentage of construction waste generated for each material can be determined.

The system will allow the comparison of these figures with the targets established for the recovery, reuse and recycling of construction waste presented earlier and to highlight the successes or failures against these targets.

8.0 OUTLINE WASTE AUDIT PROCEDURE

8.1 Responsibility for Waste Audit

The appointed Waste Manager will be responsible for conducting a waste audit at the site during the construction phase of the development.

8.2 Review of Records and Identification of Corrective Actions

A review of all the records for the waste generated and transported on or off-site should be undertaken mid-way through the project. If waste movements are not accounted for, the reasons for this should be established in order to see if and why the record keeping system has not been maintained. The waste records will be compared with the established recovery/reuse/recycling targets for the site.

Each material type will be examined, in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Waste management costs will also be reviewed.

Upon completion of the construction phase, a final report will be prepared, summarising the outcomes of waste management processes adopted and the total recycling/reuse/recovery figures for the development.

9.0 CONSULTATION WITH RELEVANT BODIES

9.1 Local Authority

Once a construction contractor has been appointed and prior to removal of any waste materials offsite, details of the proposed destination of each waste stream will be provided to SDCC for their approval.

SDCC will also be consulted, as required, throughout the refurbishment, excavation and construction phases in order to ensure that all available waste reduction, reuse and recycling opportunities are identified and utilised and that compliant waste management practices are carried out.

9.2 Recycling/Salvage Companies

Companies that specialise in C&D waste management will be contacted to determine their suitability for engagement. Where a waste contractor is engaged, each company will be audited in order to ensure that relevant and up-to-date waste collection permits and facility COR/permits/licences are held. In addition, information regarding individual construction materials will be obtained, including the feasibility of recycling each material, the costs of recycling/reclamation and the means by which

the wastes will be collected and transported off-site, and the recycling/reclamation process each material will undergo off site.

10.0 REFERENCES

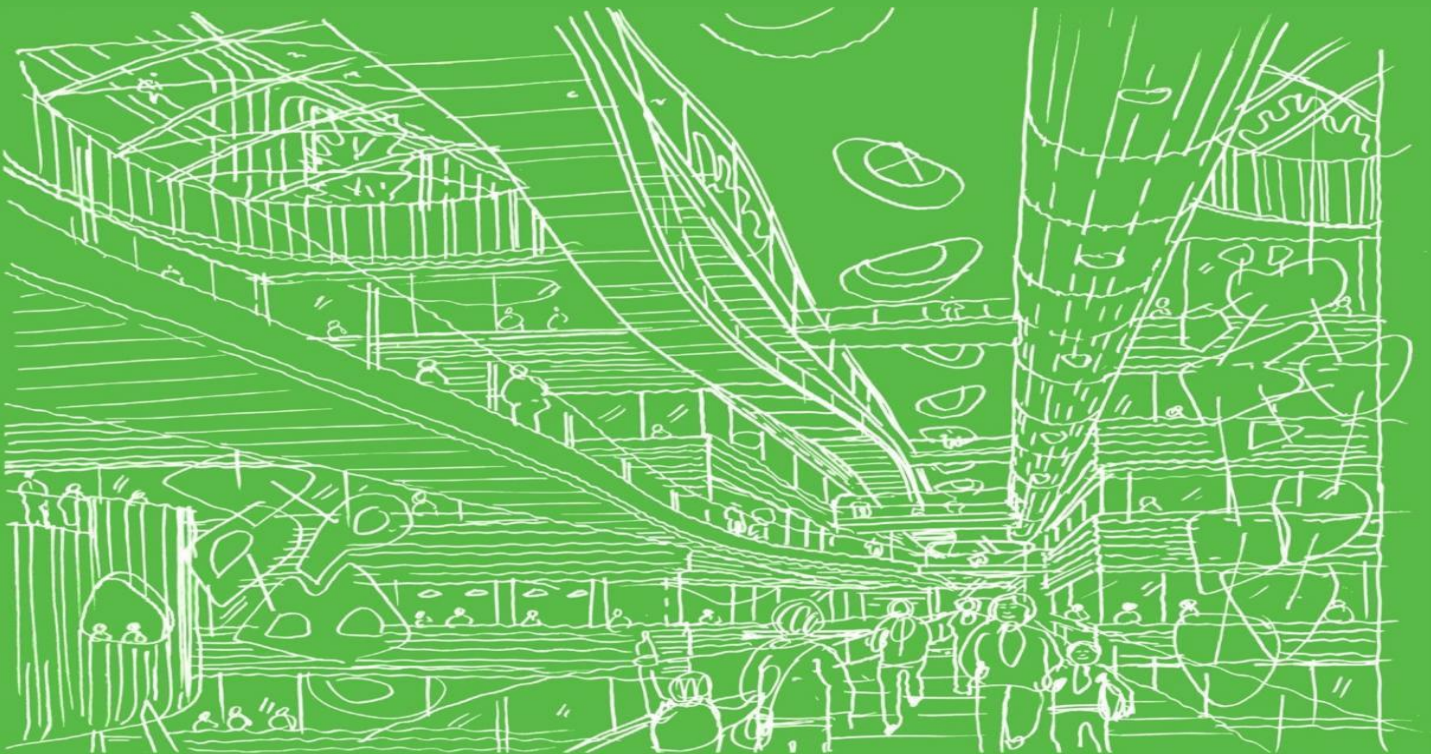
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National Paediatric Hospital Project

Planning Application

Appendix 10.4 – Operational Waste Management Plan for Tallaght
Hospital satellite centre



August 2015

APPENDIX 10.4

**OPERATIONAL WASTE
MANAGEMENT PLAN**

FOR

**TALLAGHT HOSPITAL
SATELLITE CENTRE**

Report Prepared For

**National Paediatric Hospital
Development Board**

Report Prepared By

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Our Reference

RH/14/8182WMR04

Date of Issue

30 July 2015

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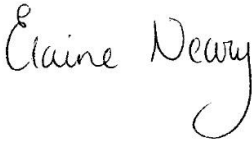
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Document History

Document Reference		Original Issue Date	
RH/14/8182W/MR04		30 July 2015	
Revision Level	Revision Date	Description	Sections Affected

Record of Approval

Details	Written by	Approved by
Signature		
Name	Robert Hunt	Elaine Neary
Title	Environmental Consultant	Principal Consultant
Date	30 July 2015	30 July 2015

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1.0 INTRODUCTION

As part of the National Paediatric Hospital Board Development Project, planning permission is being sought for the construction of a new children's hospital satellite centre at the Tallaght Hospital campus, Tallaght, Dublin 24.

AWN Consulting Ltd. (AWN) has prepared this Operational Waste Management Plan (OWMP) to ensure that the management of waste during the operational phase of the proposed development is undertaken in accordance with current legal and industry standards including the *Waste Management Act 1996 – 2001 and Amendments* ¹, associated Regulations, *Protection of the Environment Act 2003* ², *Litter Pollution Act 1997* ³ and the new *'Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021'* ⁴. In addition, the following guidelines were consulted for healthcare specific waste management practice:

- Health Service Executive (HSE) and Department of Health and Children (DOHC), *Healthcare Risk Waste Management: Segregation, Packaging and Storage Guidelines for Healthcare Risk Waste, 4th Edition* (2010) ⁵; and
- HSE, *Waste Management Awareness Handbook* (2011) ⁶.

This OWMP aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. The OWMP also seeks to provide guidance on the appropriate collection and transport of waste to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources). The plan estimates the type and quantity of waste to be generated from the proposed development during the operational phase and provides recommendations for management of different waste streams.

At present, there are no specific guidelines in Ireland for the preparation of OWMPs. Therefore, in preparing this document, consideration has been given to the requirements of national and regional waste policy, legislation and other guidelines.

2.0 OVERVIEW OF WASTEMANAGEMENT IN IRELAND

2.1 National Level

The Government issued a policy statement in September 1998 titled as *'Changing Our Ways'* ⁷ which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. A heavy emphasis was placed on reducing reliance on landfill and finding alternative methods for managing waste. Amongst other things, *Changing Our Ways* stated a target of at least 35% recycling of municipal (i.e. household, commercial and non-process industrial) waste.

A further policy document *'Preventing and Recycling Waste – Delivering Change'* was published in 2002 ⁸. This document proposed a number of programmes to increase recycling of waste and allow diversion from landfill. The need for waste minimisation at source was considered a priority.

This view was also supported by a review of sustainable development policy in Ireland and achievements to date, which was conducted in 2002, entitled *'Making Ireland's Development Sustainable – Review, Assessment and Future Action'* ⁹. This document also stressed the need to break the link between economic growth and waste generation, again through waste minimisation and reuse of discarded material.

In order to establish the progress of the Government policy document *Changing Our Ways*, a review document was published in April 2004 entitled *'Taking Stock and*

Moving Forward'¹⁰. Covering the period 1998 . 2003, the aim of this document was to assess progress to date with regard to waste management in Ireland, to consider developments since the policy framework and the local authority waste management plans were put in place, and to identify measures that could be undertaken to further support progress towards the objectives outlined in *Changing Our Ways*.

In particular, *Taking Stock and Moving Forward* noted a significant increase in the amount of waste being brought to local authority landfills. The report noted that one of the significant challenges in the coming years was the extension of the dry recyclable collection services.

The most recent policy document was published in July 2012 titled 'A Resource Opportunity'¹¹. The policy document stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention. The document sets out a number of actions, including the following:

- A move away from landfill and replacement through prevention, reuse, recycling and recovery.
- A Brown Bin roll-out diverting organic waste towards more productive uses.
- Introducing a new regulatory regime for the existing side-by-side competition model within the household waste collection market.
- New Service Standards to ensure that consumers receive higher customer service standards from their operator.
- Placing responsibility on householders to prove they use an authorised waste collection service.
- The establishment of a team of Waste Enforcement Officers for cases relating to serious criminal activity will be prioritised.
- Reducing red tape for industry to identify and reduce any unnecessary administrative burdens on the waste management industry.
- A review of the producer responsibility model will be initiated to assess and evaluate the operation of the model in Ireland.
- Significant reduction of Waste Management Planning Regions from ten to three.

While *A Resource Opportunity* covers the period to 2020, it will be subject to a mid-term review in 2016 to ensure that the measures are set out properly and to provide an opportunity for additional measures to be adopted in the event of inadequate performance.

Since 1998, the Environmental Protection Agency (EPA) has produced periodic 'National Waste (Database) Reports'¹² detailing among other things estimates for household and commercial (municipal) waste generation in Ireland and the level of recycling, recovery and disposal of these materials. The 2012 National Waste Report, which is the most recently published report, reported the following key statistics for 2012:

- The total quantity of municipal waste generated in 2012 was 4.6% lower than 2011. The total quantity of municipal waste managed in 2012 was 2.7% lower than 2011.
- The percentage tonnage of municipal waste managed for recovery (59%) exceeded the percentage tonnage managed for disposal (41%) for the first time in 2012. This is largely due to the increased use of residual waste as a fuel.
- 34% of municipal waste managed in Ireland was exported for recovery in 2012. This includes municipal waste exported for energy recovery and for recycling. Export of municipal waste for energy recovery increased by 36% between 2011 and 2012.
- Ireland's recycling rate (40%) in 2012 was close to the EU28 average (42%).

- The tonnage of healthcare risk waste (hazardous) exported from the country has reduced year on year from 2009 (734 tonnes) to 2012 (687 tonnes).

2.2 Regional Level

The proposed development is located in the Local Authority area of South Dublin County Council (SDCC).

The *EMR Waste Management Plan 2015 – 2021* is the new regional waste management plan for the SDCC area published in May 2015. This plan replaces the previous Dublin region plan due to changing National policy as set out in *A Resource Opportunity: Waste Management Policy in Ireland* and changes being enacted by the Waste Framework Directive (2008/98/EC) ¹³.

The new 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; and
- 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.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately " 160 per tonne of waste which includes a " 75 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2012*.

The 'South Dublin County Development Plan 2010 – 2016' ¹⁴ contains several policies in relation to waste management. The waste policies most relevant to this development are as follows:

- *Policy ES7: Waste Management Regulations*
It is the policy of the Council to implement and monitor the Waste Management Regulations.
- *Policy ES8: Waste Prevention and Reduction*
It is the policy of the Council to promote the prevention and reduction of waste and to cooperate with industry and other agencies in viable schemes to achieve this in accordance with the Waste Management Plan for the Dublin Region and subsequent revisions and updates.
- *Policy ES10: Waste Re-use and Recycling*
It is the policy of the Council to reduce the amount of waste to be landfilled or incinerated and to promote the increased re-use and recycling including the collection and transfer of product for resale, of materials from all waste streams.

2.3 Legislative Requirements

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

- Waste Management Act 1996 (S.I. No. 10 of 1996) as amended by the Waste Management (Amendment) Act 20011. Sub-ordinate and associated legislation includes:
 - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended 2011 (S.I. No. 323 of 2011)

- Waste Management (Collection Permit) Regulations S.I. No. 820 of 2007 as amended 2008 (S.I. No. 87 of 2008)
- Waste Management (Facility Permit and Registration) Regulations, S.I. No. 821 of 2007 as amended 2008 (S.I. No. 86 of 2008)
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- The European Communities (Transfrontier Shipment of Hazardous Waste) Regulations, 1988 (S.I. No. 248 of 1988)
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- Protection of the Environment Act 2003 (S.I. No. 413 of 2003)
- Litter Pollution Act 1997 (S.I. No. 12 of 1997)

These Acts and subordinate Regulations enable the transposition of relevant European Union Policy and Directives into Irish law.

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 - 2008* and subsequent Irish legislation, is the principle of “*Duty of Care*”. This implies that the waste producer is responsible for waste from the time it is generated through until its legal disposal (including its method of 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 disposal area, waste contractors will be employed to physically transport waste to the final waste disposal site.

It is therefore imperative that facilities management/nominated personnel at the new satellite centre undertake on and off-site management of waste in accordance with all legal requirements. This includes the requirement that a waste contractor handle, transport and recover/recycle/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

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

2.3.1 South Dublin County Council Bye-Laws

Bye-Laws for the Storage, Separation at Source, Presentation and Collection of Commercial Waste were brought into force by South Dublin County Council in 2007¹⁵. The Bye-Laws set a number of enforceable requirements on waste holders and collectors with regard to storage, separation, presentation and collection of waste within the Dublin City Council functional area. Key requirements under these bye-laws are:

- A holder shall store waste in an appropriate waste container within the curtilage of a commercial premises or such other place as has been approved in writing by the Council.
- A holder shall separate at source biowaste if a door-to-door collection service for such waste is provided. Where such a collection service is provided, the biowaste fraction shall be stored separately by the holder in an appropriate waste container.
- An authorised waste collector shall only collect commercial waste during the designated hours on the designated collection day, unless otherwise authorised in writing by the Council.

The full text of the bye-laws is available from the SDCC website.

2.4 **Regional Waste Management Service Providers and Facilities**

Various contractors offer waste collection services for the commercial sector in the South County Dublin region. Details of waste collection permits (granted, pending and withdrawn) for the region are available from the NWCPO.

As outlined in the new regional waste management plan, there is a decreasing number of landfills available in the region. Only three landfills remain operational and are all operated by the private sector. There are a number of other licensed and permitted facilities in operation in the region including waste transfer stations, hazardous waste facilities and integrated waste management facilities. There is one existing thermal treatment facility in Duleek, Co. Meath and a second facility is under construction in Poolbeg in Dublin. The facility in Poolbeg is targeted to be operational to receive municipal waste in late 2017.

A copy of all CORs, waste permits and waste licenses issued are available from the EPA.

3.0 DESCRIPTION OF THE PROJECT

3.1 Location, Size and Scale of the Development

The subject site is located on the grounds of the existing Tallaght Hospital campus in Tallaght, Dublin 24. This satellite centre will provide secondary care for the Great Dublin Area (GDA), providing urgent and outpatient care. A detailed description of the development is presented in Chapter 2 (Description of the Development) of the National Paediatric Hospital Project EIS.

3.2 Typical Waste Categories

The development of the satellite centre at Tallaght will generate a variety of waste streams during the operational phase. Healthcare waste is defined in the HSE and DOHC Healthcare Risk Waste Management publication as solid or liquid waste arising from healthcare. Waste materials generated will fall into two main categories, namely healthcare non-risk waste (i.e. non-clinical healthcare waste) and healthcare risk waste (hazardous) as illustrated in Figure 3.1. Hazardous waste has been further subdivided in this plan into non-clinical hazardous waste and clinical/risk waste.

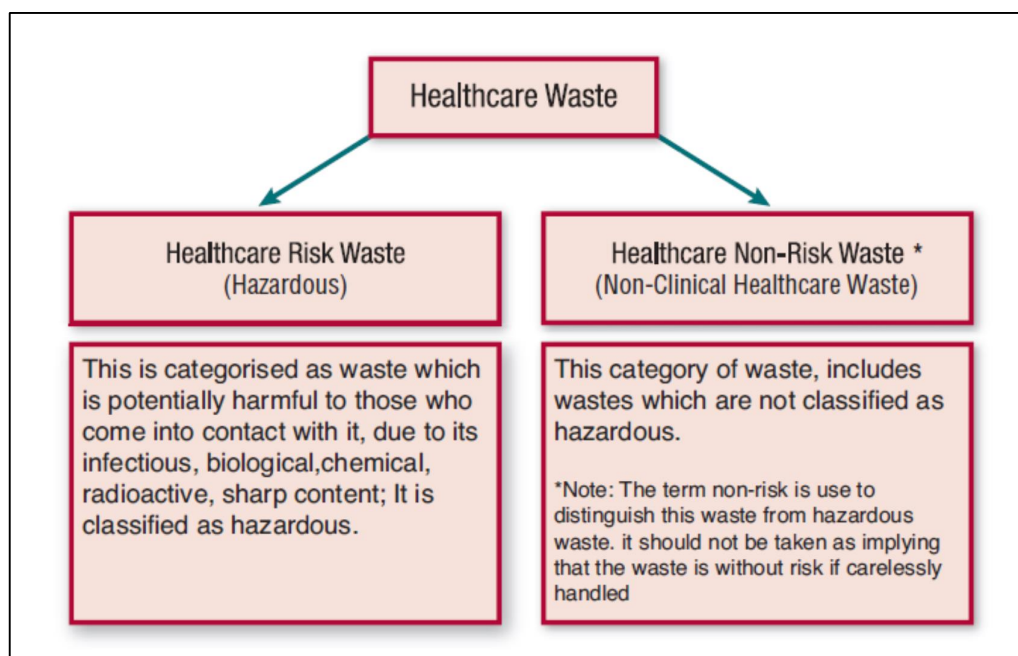


Figure 3.1 Healthcare Waste Categories (Source: HSE, *Waste Management Awareness Handbook*, 2011)

3.2.1 Non-Risk/Non-Clinical Non-Hazardous Waste

The typical non-risk/non-clinical non-hazardous waste streams that will be generated will include the following:

- Dry Mixed Recyclables . includes cardboard, non-confidential paper, confidential paper, newspaper, leaflets plastic packaging and bottles, aluminium cans, tins and Tetra Pak cartons;
- Confidential paper
- Mixed Non-Recyclable /General Waste;
- Organic (food/catering) waste; and
- Glass.

In addition to the typical non-risk/non-clinical non-hazardous waste materials that will be generated on a daily basis, there will be some additional wastes generated on a regular basis that will need to be managed separately including:

- Green/garden waste from landscaping activities;
- Textiles;
- Batteries (non-hazardous. Note: hazardous batteries may also be generated which are referred to in Section 3.2.2)
- Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment (non-hazardous. Note: WEEE containing hazardous components may also be generated which are referred to in Section 3.2.2);
- Metals, timber and mixed C&D waste generated from operational maintenance activities;
- Polystyrene ((where deliveries are directly to the satellite centre and not received elsewhere in Tallaght Hospital); and
- Furniture (and from time to time other bulky wastes).

3.2.2 Non-Clinical Hazardous Waste

The typical non-clinical hazardous waste streams that will be generated will include the following:

- Printer/toner cartridges;
- Batteries (hazardous. Note: non-hazardous batteries may also be generated which are referred to in Section 3.2.1);
- Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment (containing hazardous components. Note: WEEE not containing hazardous components may also be generated which are referred to in Section 3.2.1);
- Cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc.);
- Fluorescent bulb tubes and other mercury containing waste;

3.2.3 Healthcare Risk Waste (Hazardous)

The healthcare risk waste streams that will be generated are segregated into a number of categories as illustrated in Figure 3.2.

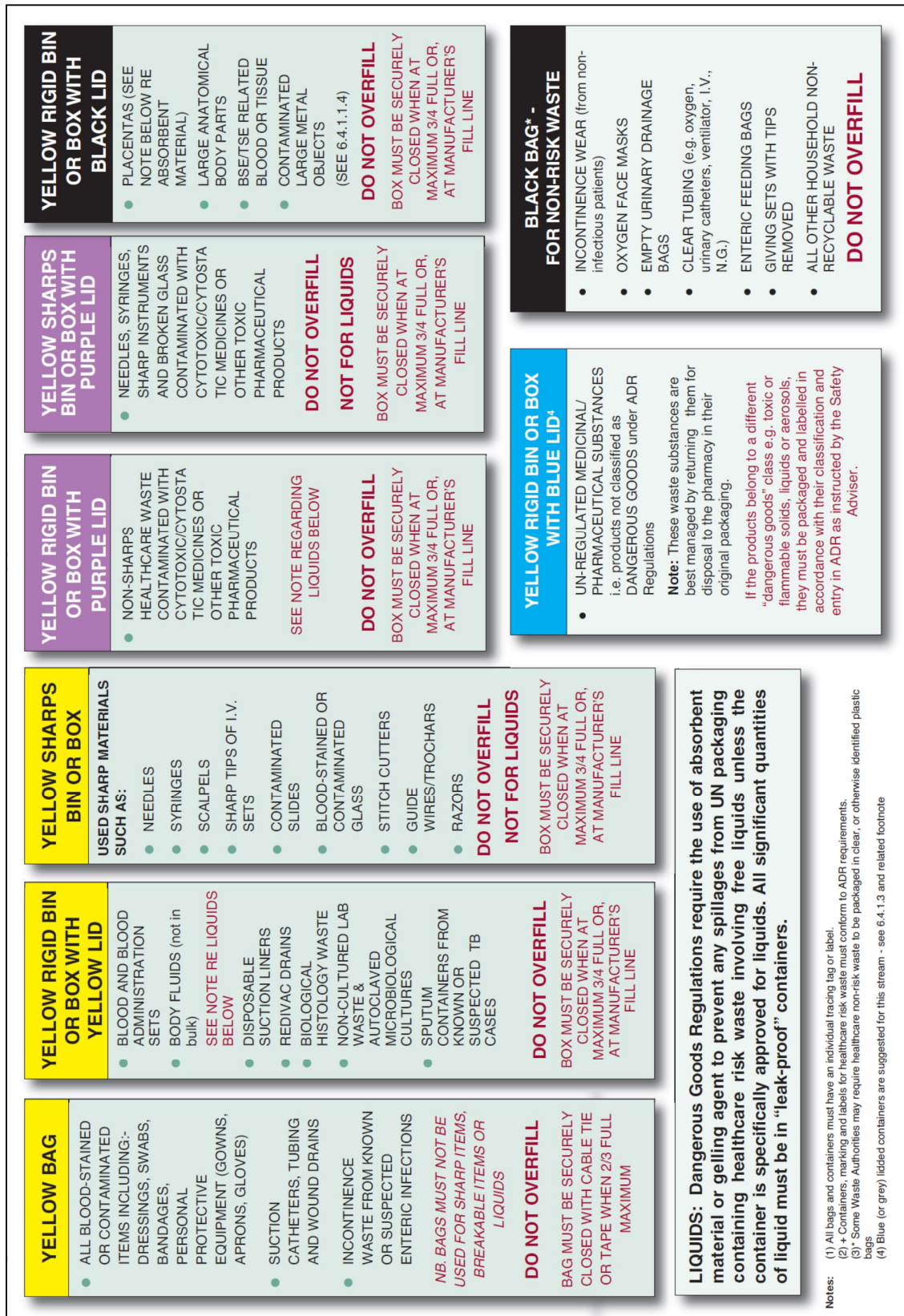


Figure 3.2 Segregation of Healthcare Risk Waste (Source: HSE and DOHC *Healthcare Risk Waste Management*, 2010 and HSE, *Waste Management Awareness Handbook*, 2011)

3.3 European Waste Codes

In 1994, the *European Waste Catalogue* ¹⁶ and *Hazardous Waste List* ¹⁷ were published by the European Commission. In 2002, the EPA published a document titled the *European Waste Catalogue and Hazardous Waste List* ¹⁸, which was a condensed version of the original two documents and their subsequent amendments. This document has recently been replaced by the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* ¹⁹ which became valid from the 1st June 2015. This waste classification system applies across the EU and is the basis for all national and international waste reporting, such as those associated with waste collection permits, CORs, permits and licences and EPA National Waste Database.

Under the classification system, different types of wastes are fully defined by a code. The List of Waste (LoW) code (also referred to as European Waste Code or EWC) for some of the typical waste materials expected to be generated during the operation of the proposed development are provided in Table 3.1 below.

Waste Material	LoW Code
Paper and Cardboard	20 01 01
Plastic	20 01 39
Metals	20 01 40
Mixed Municipal Waste	20 03 01
Glass	20 01 02
Biodegradable Kitchen Waste	20 01 08
Biodegradable garden and park wastes	20 02 01
oil and fat	20 01 25-26
Textiles	20 01 11
Batteries and accumulators*	20 01 33-34
Waste electrical and electronic equipment*	20 01 35-36
Chemicals (solvents, pesticides, paints & adhesives, detergents, etc.)*	20 01 13/19/27- 28/29-30
Fluorescent tubes and other mercury containing waste*	20 01 21
Bulky wastes	20 03 07
Healthcare wastes (wastes from natal care, diagnosis, treatment or prevention of disease in humans, includes non-hazardous and hazardous wastes) *	18 01

Table 3.1 Typical waste types generated and LoW codes

(* individual waste type may contain hazardous materials)

4.0 ESTIMATED WASTE ARISING

A Waste Generation Model (WGM) has been used to predict waste types, weights and volumes arising from operations within the proposed new satellite centre. The WGM incorporates building area, use and projected patient numbers and combines these with waste generation data from Temple Street Children's University Hospital as well as Irish and US EPA waste generation rates. The figures presented below represent the estimated waste generation in the new children's hospital satellite centre at Tallaght Hospital only and do not include existing waste volumes from the rest of the Tallaght Hospital campus.

The estimated waste generation for the satellite centre at Tallaght Hospital is presented in Table 4.1.

Waste Type	tonnes/annum	kg/week
Mixed Non-Recyclables	57	1,095
Dry Mixed Recyclables	7	142
Organic (food) waste	10	188
Cardboard	8	146
Confidential Paper	4	68
Polystyrene (where deliveries received directly to the satellite centre)	<1	2
Glass	<1	5
Healthcare risk waste	17	330
Total Waste*	103	1,977

Note: * The above waste figures are estimates for the purpose of recommending waste storage requirements and are based on predicted patient numbers.

Table 4.1 Estimated waste generation for the main waste types at Tallaght Hospital satellite centre

5.0 WASTE STORAGE

This section provides information on how waste is to be stored within the new development. This section has been prepared with due consideration of the proposed building layout, design objectives and existing site practices as well as best practice standards and local/national waste management requirements including those of SDCC. In particular, consideration has been given to the following documents:

- BS 5906:2005 Waste Management in Buildings . Code of Practice;
- EMR Waste Management Plan 2015 . 2021;
- SDCC Bye-Laws for the Storage, Segregation at Source Presentation and Collection of Commercial Waste; and
- HSE, Waste Management Awareness Handbook; and
- HSE and DOHC Healthcare Risk Waste Management Publication.

Waste materials will be generated from a wide variety of activities throughout the satellite centre. Healthcare risk wastes will typically be generated in the urgent care areas, outpatient care and other treatment rooms. Dry recyclables and non-recyclable waste will be generated throughout the satellite centre. Confidential and non-confidential paper waste will be generated from offices and staff workstations. Organic (food/catering) waste will typically be generated in the café food preparation and dining area, kitchens and in the pantries (provided for staff and also for parents).

Appropriate colour coded, labelled and secured receptacles will be required for healthcare risk waste generated in the building as set out in the HSE, Waste Management Awareness Handbook (and illustrated in Figure 3.2). The healthcare risk waste receptacles which may be required include:

Clinical waste

- " Yellow bags
- " Yellow rigid bins or box with yellow lid
- " Yellow sharps bin or box

Special waste

- " Yellow rigid bin or box with purple lid
- " Yellow sharps bin or box with purple lid
- " Yellow rigid bin or box with black lid
- " Yellow rigid bin or box with blue (or grey) lid

These receptacles will be stored in designated disposal hold rooms, treatment rooms, patient rooms, etc. where appropriate. They may be attached to or on treatment trolleys while in use. Yellow bags, yellow rigid bins or boxes with yellow lid and yellow sharps bins or boxes will be transferred into secured UN approved 770 litre yellow clinical waste wheeled bins. Purple, black and blue (or grey) colour coded health care risk waste rigid bins or boxes will be transferred to cages. 770 litre yellow clinical waste wheelie bins and cages for special waste will be provided in disposal hold rooms.

Sharps waste may alternatively be managed using UN-approved Bio Systems reusable containers. This system allows the containers to be reused after washing and disinfection offsite (as opposed to sending the rigid containers for disposal).

Non-risk waste receptacles for dry mixed recyclables and mixed non-recyclables will be strategically placed around the satellite centre in treatment rooms, at the pantries, at the café and along the corridors as appropriate. Organic waste bins will be provided in the pantries, kitchen and at the café.

Where suitable, it is proposed that office and work station areas will utilise area waste stations (AWSs) for non-risk waste streams as opposed to individual bins at desks. AWSs should be conveniently located within 10-15m of workstations, where possible, and would typically include:

- 1 no. 80 . 120 litre bin for dry mixed recyclables;
- 1 no. 80 . 120 litre bin for mixed non-recyclables; and
- 1 no. 80 . 120 litre bin for confidential paper.

The outline waste strategy is that segregated waste collected as above will be brought at regular intervals throughout the day to restricted access disposal hold rooms on the ground and first floor of the new development. The allocated rooms are located in the urgent care department on the ground floor and in the outpatients department on the first floor but will be used for waste from all departments, as required. It is anticipated that the disposal rooms will accommodate, at least, one 770 litre clinical waste wheelie bin, one cage for special waste, one dry mixed recyclable bin, one mixed non-recyclable bins, one organic waste bin and bins for glass waste.

When the bins/cages in the disposal hold rooms are full they will be transferred to a larger secured internal waste storage area (WSA). This area will have capacity for the following waste receptacles:

- 2 no. 1100 litre bins for mixed non-recyclable waste
- 1 no. 1100 litre bins for dry mixed recyclable waste
- 1 no. 240 litre bin for organic waste
- 1 no. cage for cardboard
- FIBC (Flexible Intermediate Bulk Container) bag or similar container for polystyrene (if required)
- 120 litre bin for glass waste
- 2 no. confidential waste paper bins (if required, confidential paper may be collected directly from the office floors)
- 1 no. cage for WEEE
- 1 no. small box for batteries
- 1 no. fluorescent tube coffin
- 2 no. 770 litre bins for clinical waste
- 1 no. cage for special waste

5.1 Waste Storage Area Design

The disposal hold rooms and the WSA should meet the following requirements:

- Floors should be painted with a non-slip paint and should have coved edges.
- Doors should be self-closing but a handle is required on both sides of the door to allow the door to be opened from inside and outside the room. Doors should be fitted with a catch to lock back the door into the open position to allow the operative to manoeuvre the container safely with both hands.
- Access to these rooms should be restricted to authorised personnel only.
- Ventilation should provide 6-10 air changes per hour to limit the potential for build-up of offensive odours.
- Lighting should have a Lux rating of 220.

In addition, the WSA should be fitted with a hot and cold water supply and electrical supply for a power washer to allow cleaning of small bins in the area. A sloped floor and central foul drain to facilitate wash-water run-off will also be required.

Nominated personnel will be required to maintain the disposal holds and WSA and receptacles (i.e. bins/cages) in good condition as required by the SDCC Waste Bye-Laws.

6.0 WASTE MOVEMENT & COLLECTION

All risk and non-risk waste will be conveyed by staff and cleaners to the disposal hold rooms within the new satellite centre. When full, the bins will be transferred manually to the secured internal WSA by nominated personnel.

On a weekly basis, waste will be transferred by nominated personnel from the internal WSA via the hospital link corridors to the existing Tallaght Hospital waste management compound.

Waste collection vehicles will be able to collect waste directly from main waste management compound on agreed collection days.

There are numerous private contractors that provide commercial waste collection in the South Dublin County area. All waste contractors servicing the development must hold a valid waste collection permit for the specific waste types collected. All waste collected must be transported to registered, permitted or licensed facility only.

Waste type collections should be planned and staggered to avoid congestion in the waste management compound and minimise the duration of time waste collection vehicles spend on site.

All waste receptacles must be clearly identified as required by waste legislation and the requirements of the SDCC Waste Bye-Laws. Waste will be presented for collection in a manner that will not endanger health, create a risk to traffic, harm the environment or create a nuisance through odours or litter.

7.0 ADDITIONAL WASTE MATERIALS

In addition to the typical waste materials that are generated on a daily basis, there will be some additional waste types generated from time to time that will need to be managed separately. A non-exhaustive list is presented below.

Waste Electrical and Electronic Equipment (WEEE)

The WEEE Directive 2002/96/EC and associated Waste Management (WEEE) Regulations 2005 have been enacted to ensure a high level of recycling of electronic and electrical equipment. It is the manufacturers responsibility to take back the WEEE, regardless of whether a replacement product is purchased or not and retailers are

required to take back WEEE where a similar product is purchased. WEEE from the satellite centre will be managed in accordance with existing procedures at the Tallaght Hospital.

Batteries

A take-back service for waste batteries and accumulators (e.g. rechargeable batteries) is in place in order to comply with the Waste Management (Batteries and Accumulators) Regulations 2008. Waste batteries must be separately collected for recycling and recovery of resources and the producer is responsible for arranging and financing this. Waste batteries can be temporarily stored in the internal WSA and transferred to the main waste management compound for collection.

Printer Toner and Cartridges

Waste printer toners and cartridges from the new satellite centre will be collected in office/workstation areas, as required, and managed in accordance with existing procedures. Most printer toner/cartridge providers will provide a collection service for waste materials or collection can be arranged for charities.

Fluorescent Tubes (and other mercury containing waste)

Any waste fluorescent tubes generated within the new development will be collected for hazardous recovery/disposal by a suitably licenced waste contractor. An area has been allowed for in the WSA for a fluorescent tube coffin trolley to temporarily store tubes pending collection.

Chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc)

Chemicals (such as solvents, pesticides, paints, etc) are largely generated from building cleaning and maintenance works. These waste chemicals will be managed in accordance with existing procedures and removed from the hospital for disposal by an approved waste contractor.

Green/Garden Waste and C&D Waste

Garden waste will be generated from upkeep of landscaped areas around the new satellite centre development and will be managed in accordance with existing procedures for waste generated from landscaping activities at the campus. Typical C&D waste material such as timber, metals and mixed C&D are normally generated from operational maintenance activities and this will continue to be managed in line with existing procedures once the satellite centre is operational.

Textiles

Where possible, waste textiles should be recycled or donated to a charity organisation for reuse.

Furniture (and other bulky wastes)

Furniture and other bulky waste items (such as carpet etc.) may occasionally be generated at the development. Separate arrangements will need to be made with waste contractors for collection of furniture and other bulky wastes.

8.0 CONCLUSIONS

By implementing the procedures outlined in this OWMP, a high level of recycling, reuse and recovery will be achieved at the development. Where significant volumes of recyclable materials are being generated, these will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the *EMR Waste Management Plan 2015 – 2021*.

9.0 REFERENCES

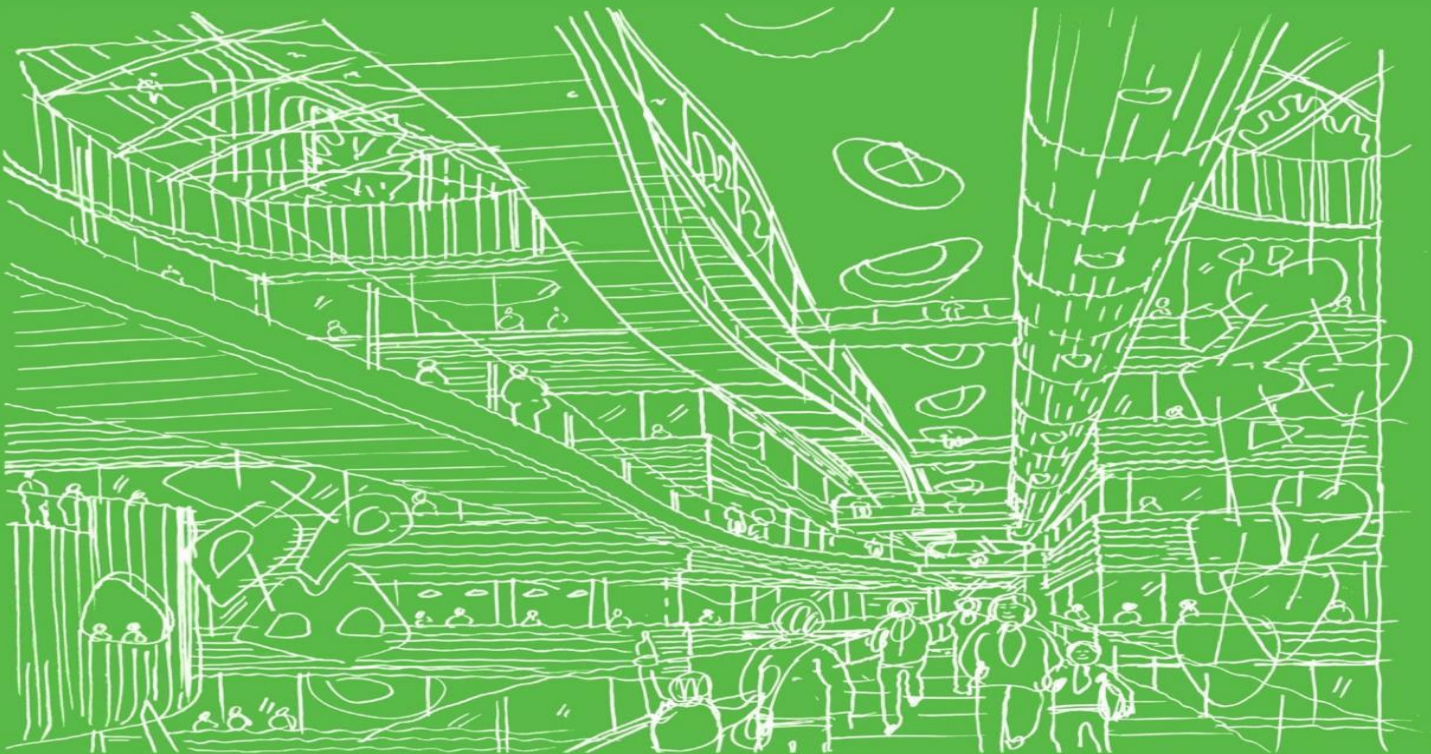
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National Paediatric Hospital Project

Planning Application

Appendix 10.5— Construction & Demolition Waste Management Plan for Connolly Hospital satellite centre



August 2015

APPENDIX 10.5

**CONSTRUCTION &
DEMOLITION WASTE
MANAGEMENT PLAN**

FOR

**CONNOLLY HOSPITAL
SATELLITE CENTRE**

Report Prepared For

**National Paediatric Hospital
Development Board (NPHDB)**

Report Prepared By

Robert Hunt, Environmental Consultant
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Our Reference

RH/14/8182WMR05

Date of Issue

31 July 2015

Cork Office


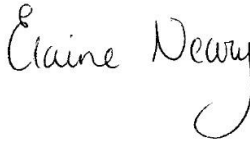
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Document History

Document Reference		Original Issue Date	
RH/14/8182W/MR05		31 July 2015	
Revision Level	Revision Date	Description	Sections Affected

Record of Approval

Details	Written by	Approved by
Signature		
Name	Robert Hunt	Elaine Neary
Title	Environmental Consultant	Principal Consultant
Date	31 July 2015	31 July 2015

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1.0 INTRODUCTION

As part of the National Paediatric Hospital Project, planning permission is being sought for the construction of a new children's hospital satellite centre at the Connolly Hospital campus, Blanchardstown, Dublin 15.

AWN Consulting Ltd. (AWN) has prepared this Construction and Demolition (C&D) Waste Management Plan (WMP) for the proposed development. The purpose of the C&D WMP is to provide information necessary to ensure that the management of C&D waste at the site is undertaken in accordance with current legal and industry standards including the *Waste Management Act 1996 and 2008*¹, associated Regulations, *Litter Act 1997*² and the new '*Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021*'³. In particular, the C&D WMP aims to ensure maximum recycling, re-use and recovery of waste with diversion from landfill, wherever possible. It also seeks to provide guidance on the appropriate collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources).

This C&D WMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of waste to be generated by the proposed development and makes recommendations for management of different waste streams.

2.0 CONSTRUCTION & DEMOLITION WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Irish Government issued a policy statement in September 1998 known as '*Changing Our Ways*'⁴, which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this report was to recycle at least 50% of C&D waste within a five year period (by 2003), with a progressive increase to at least 85% over fifteen years (i.e. 2013).

In response to the *Changing Our Ways* report, a task force (Task Force B4) representing the waste sector of the already established Forum for the Construction Industry, released a report entitled '*Recycling of Construction and Demolition Waste*'⁵ concerning the development and implementation of a voluntary construction industry programme to meet the Government's objectives for the recovery of construction and demolition waste.

The most recent national policy document was published in July 2012, entitled '*A Resource Opportunity - Waste Management Policy in Ireland*'⁶. This document stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention. The document sets out a number of actions in relation to C&D waste and commits to undertake a review of specific producer responsibility requirements for C&D projects over a certain threshold.

The National Construction and Demolition Waste Council (NCDWC) was launched in June 2002, as one of the recommendations of the Forum for the Construction Industry, in the Task Force B4 final report. The NCDWC subsequently produced '*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects*'⁷ in July 2006 in conjunction with the then Department of the Environment, Heritage and Local Government (DoEHLG). The guidelines outline the issues that need to be addressed at the pre-planning stage of a development all the way through to its completion. These guidelines have been followed in the preparation of this document and include the following elements:

- Predicted C&D wastes and procedures to prevent, minimise, recycle and reuse wastes;
- Waste disposal/recycling of C&D wastes at the site;
- Provision of training for waste manager and site crew;
- Details of proposed record keeping system;
- Details of waste audit procedures and plan; and
- Details of consultation with relevant bodies i.e. waste recycling companies, Fingal County Council etc.

Section 3 of the Guidelines identifies thresholds above which there is a requirement for the preparation of a C&DWMP for developments. This development requires a C&DWMP under the following criterion:

- New developments including institutional, educational, health and other public facilities, with an aggregate floor area in excess of 1,250m².

Other guidelines followed in the preparation of this report include '*Construction and Demolition Waste Management – a handbook for Contractors and Site Managers*'⁸ published by FÁS and the Construction Industry Federation in 2002.

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

2.2 Regional Level

The proposed development is located in the Local Authority area of Fingal County Council (FCC).

The *EMR Waste Management Plan 2015 – 2021* is the new regional waste management plan for the DCC area published in May 2015. This plan replaces the previous Dublin region plan due to changing National policy as set out in *A Resource Opportunity: Waste Management Policy in Ireland* and changes being enacted by the *Waste Framework Directive (WFD) (2008/98/EC)*⁹. The new regional plan sets out the strategic targets for waste management in the region but does not set a specific target for C&D waste. However, the WFD sets Member States a target of '70% preparing for reuse, recycling and other recovery of construction and demolition waste' (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

The *Fingal Development Plan 2011 – 2017*¹⁰ sets out objectives and policies for the Fingal area that will guide their actions in regard to physical infrastructure and environment as well as the facilitator of social, cultural and economic development. In particular, a number of specific development objectives and policies have been prepared with regard to Waste Management including:

Policy:

- *Conform to the European Union, National and Regional policy in all matters relating to the production, handling, treatment and disposal of waste*

Objectives:

- Objective WM01:
Prevent and minimise the generation of waste in accordance with the Waste Management Plan for the Dublin Region.

- Objective WM03:
Introduce provisions to separate recyclable refuse, especially for new large-scale residential and mixed-use developments. Ensure new developments include well designed facilities to accommodate the 3 bin collection system and bottle banks. Alternative infrastructural systems which deliver an equivalent level of recycling, e.g. vacuum waste collection systems are also to be encouraged.
- Objective WM17:
Undertake public information campaigns aimed at alerting businesses, householders, and farmers as to the dangers associated with the disposal of hazardous waste.

2.3 Legislative Requirements

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

- Waste Management Act 1996 (S.I. No. 10 of 1996) as amended by the Waste Management (Amendment) Act 2001. Sub-ordinate legislation includes:
 - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended 2011 (S.I. No. 323 of 2011)
 - Waste Management (Collection Permit) Regulations S.I. No. 820 of 2007 as amended 2008 (S.I. No 87 of 2008)
 - Waste Management (Facility Permit and Registration) Regulations, S.I. No. 821 of 2007 as amended 2008 (S.I. No. 86 of 2008)
 - Waste Management (Licensing) Regulations 2000 (S.I. No. 185 of 2000) as amended 2004 (S.I. No. 395 of 2004), 2010 and (S.I. No. 350 of 2010)
 - Waste Management (Packaging) Regulations 2003 (S.I. No. 61 of 2003) as amended 2004 (S.I. No. 871 of 2004), 2006 (S.I. No. 308 of 2006) and 2007 (S.I. No. 798 of 2007)
 - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
 - Waste Management (Landfill Levy) Regulations 2011 (S.I. No. 434 of 2011), as amended 2015 (S.I. No. 189 of 2015)
 - European Communities (Waste Electrical and Electronic Equipment) Regulations 2011
 - Waste Management (Registration of Brokers and Dealers) Regulations 2008 (S.I. 113 of 2008)
 - Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009), as amended 2015 (S.I. 190 of 2015) and European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 191 of 2015)
- Protection of the Environment Act 2003 (S.I. No. 413 of 2003)
- Litter Pollution Act 1997 (S.I. No. 12 of 1997)

These Acts and subordinate Regulations enable the transposition of relevant European Union Policy and Directives into Irish law.

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 - 2008* and subsequent Irish legislation, is the principle of “*Duty of Care*”. This implies that the waste producer is responsible for waste from the time it is generated through until its legal recycling, recovery or disposal (including its method of 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).

It is therefore imperative that the National Paediatric Hospital Development Board (NPHDB) ensures that the waste contractors engaged by construction contractors are legally compliant with respect to waste transportation, recycling, recovery and disposal. This includes the requirement that a contractor handle, transport and dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

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

3.0 DESCRIPTION OF THE PROJECT

3.1 Location, Size and Scale of the Development

The subject site is located within the grounds of the existing Connolly Hospital campus in Blanchardstown, Dublin 15. The project will involve the development of a new dedicated children's hospital satellite centre extending to the south of the existing hospital structure as per the planning drawings. The development will also include the refurbishment of a portion of the existing building to accommodate access to the new building.

There will be some minor remodelling required of a short section (approximately 3m) of external wall of the existing hospital building to allow for the new building to tie in to the existing hospital.

The footprint of the new development will be mainly on open landscaped ground outside the footprint of the existing hospital and will require the excavation of topsoil and underlying soil/stones. There is no basement construction planned for the new development.

3.2 Details of the Non-Hazardous Wastes to be produced

The waste generated from refurbishment works is not anticipated to be high in volume but will be more difficult to segregate than waste generated from the construction phase, as many of the building materials will be bonded together or integrated i.e. steel reinforcement in concrete and metal or timber stud partition walls.

Small amounts of waste asphalt will be generated from works to realign the existing access routes to service the new development. Additionally, shrubbery and green waste will be generated from excavation of landscaped areas.

Based on earthworks data provided by the project engineers (Roughan & O'Donovan (ROD)), there will be a surplus of made ground and soil/stones generated from site clearance required to facilitate construction of foundations, realignment of access routes and general landscaping. Where possible, excavated topsoil will be reused on site.

During the construction phase there will be a surplus of materials, such as off-cuts from timber, concrete blocks, tiles and bricks. Waste from packaging and oversupply of materials will also be generated. There may also be excess concrete delivered to site during construction which will need to be disposed of.

3.3 Anticipated Hazardous Wastes to be produced

3.3.1 Contaminated Soil

A preliminary site investigation was carried out at the site in December 2014 by Causeway Geotech Ltd. There was no evidence of contamination noted during these preliminary site investigation works. The soil samples were analysed for the waste acceptance criteria in accordance with the European Communities (EC) Council Decision 2003/33/EC¹¹. The results of the analysis were below the threshold for inert waste disposal. An additional phase of site investigation is currently underway which aims to identify any potential contamination at the site.

All excavations should be carefully monitored by a suitably qualified person to ensure potentially contaminated soil is identified and segregated if encountered. In the unlikely event that any potentially contaminated material is encountered, it will need to be segregated from clean/inert material, tested and classified as either non-hazardous or hazardous using the *HazWasteOnline* application and then classified as clean, inert, non-hazardous or hazardous in accordance with the *EC Council Decision 2003/33/EC*¹¹.

3.3.2 Fuel/Oils

As fuels and oils are classed as hazardous materials, any on-site storage of fuel/oil, all storage tanks and all draw-off points will be bunded and located in a dedicated, secure area of the site. Provided that these requirements are adhered to and site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel/oil wastage at the site.

3.3.3 Other known Hazardous Substances

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.

3.4 Main C&D Waste Categories

The main non-hazardous and hazardous waste streams that could be generated by the construction and demolition activities at a typical site are shown in Table 3.1. The List of Waste (LoW) code (also referred to as the European Waste Code or EWC) for each waste stream is also shown.

Waste Material	LoW Code
Non-Hazardous:	
Concrete, bricks, tiles, ceramics	17 01
Wood, glass and plastic	17 02
Bituminous mixtures	17 03 02
Metals (including their alloys)	17 04
Soil and stones	17 05
Gypsum-based construction material	17 08
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Hazardous:	
Electrical and electronic components	20 01 35
Batteries and accumulators	20 01 33-34
Wood preservatives	03 02
Liquid fuels	13 07
Chemicals (solvents, pesticides, paints, adhesives, detergents etc.)	20 01 13/19/27-30
Soil and stones containing dangerous substances (if encountered)	17 05 03
Other construction and demolition wastes containing dangerous substances	17 09 03

Table 3.1 Typical waste types generated and LoW codes

4.0 WASTE MANAGEMENT

4.1 Refurbishment Waste Generation

The area of the existing hospital to be refurbished has been estimated by the project engineers and includes removal of a short section of the external wall and reconfiguration of internal partitions. Figures from previous projects have been used to estimate the approximate breakdown of waste to be generated from the refurbishment works. The waste is segregated by type and estimates have also been made for indicative reuse (onsite and/or offsite), recycling and disposal targets. This breakdown is shown in Table 4.1.

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	0.4	0	0	85	0.3	15	0.1
Concrete, brick, tiles, ceramics	4.7	30	1.4	60	2.8	10	0.5
Plasterboard	0.9	10	0.1	70	0.6	20	0.2
Metals	1.4	5	0.1	80	1.1	15	0.2
Timber	0.9	10	0.1	40	0.4	50	0.4
Others	0.8	0	0	0	0	100	0.8
Total	9.1		1.7		5.2		2.2

Table 4.1 Predicted on and off-site reuse, recycle and disposal rates for refurbishment waste

It should be noted that until a detailed survey of the refurbishment areas has been carried out, it is difficult to predict with a high level of accuracy the waste that will be generated from the proposed works. A refurbishment plan will be prepared by the

contractor prior to commencement of this phase of the project which will refine the waste figures detailed in Table 4.1.

4.2 Construction Waste Generation

Table 4.2 shows the breakdown of C&D waste types produced on a typical site based on data from the EPA *National Waste Reports*¹².

Waste Types	%
Soil & Stones	83
Concrete, Bricks, Tiles, Ceramics, Plasterboard	11
Asphalt, Tar and Tar Products	1
Metals	1
Other	4
Total	100

Table 4.2 Waste materials generated on a typical Irish construction site

Notwithstanding the information in Table 4.2, there will be soil/stones and made ground excavated to facilitate the construction of the new building foundations, the installation of underground services and realignment of access routes. It has been estimated by the project engineers, Roughan and O'Donovan, that the volume of material to be excavated is approximately 4,000m³. The excavated material will comprise made ground, topsoil and subsoil. Any suitable excavated material will be temporarily stockpiled for reuse as landscape fill, where possible. However, it is anticipated that there will be limited opportunities for reuse of the material on-site.

Table 4.3 shows the predicted construction waste generation for the proposed development based on the information available to date along with the targets for management of the waste streams. The predicted waste amounts are based on an average large scale development waste generation rate per m², using the waste breakdown rates shown in Table 4.2.

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Concrete, bricks, tiles, ceramics and plasterboard	17.7	40	7.1	40	7.1	20	3.5
Asphalt, tar and tar Products	6.4	0	0	25	1.6	75	4.8
Metals	1.6	5	0.1	90	1.4	5	0.1
Other	6.4	10	0.6	40	2.6	50	3.2
Total	32.1		7.8		12.7		11.6

Table 4.3 Predicted on and off-site reuse, recycle and disposal rates for construction waste

It should be noted that until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

4.3 Proposed Waste Management Options

Waste materials generated will be segregated on site, where it is practical. Where the on-site segregation of certain wastes types is not practical, off-site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at

source. All waste receptacles leaving site will be covered or enclosed. The appointed waste contractor will collect and transfer the wastes as receptacles are filled. There are numerous waste contractors in the Dublin Region that provide this service.

All waste arisings will be handled by an approved waste contractor holding a current waste collection permit. All waste arisings requiring disposal off-site will be disposed of at a facility holding the appropriate COR, licence or permit, as required.

Mixed C&D waste (classified under EWC code 17 09 04) can be accepted at a number of facilities in the region including Murphy Environmental Hollywood Ltd., Knockharley Landfill Ltd. and Ballynagran Landfill Ltd. Further details on these facilities are given in the C&D Waste Management Plan for the St. James's Hospital campus (Appendix 10.1).

Other segregated C&D waste will consist of concrete blocks, bricks, tiles, ceramics, hard plastic, metal and glass. A number of waste transfer stations have been identified close to the development which will accept these waste streams for recycling:

- W0079-01: Starus Eco Holding Ltd. (Greenstar Ltd.) . Tallaght;
- W183-01: Starus Eco Holding Ltd. (Greenstar Ltd.) . Ballycoolin;
- W0044-02: Thornton's Recycling Ltd. . Ballyfermot;
- W0152-03: Oxigen Environmental Ltd. . Ballymount; and
- W0227-01: Lawlor Brothers Waste Disposal Ltd. (Access Skip Hire) . Dublin 12.

Plasterboard will be accepted at some of these transfer stations or can be brought to Allied Recycling (Allied) in Naas (WFP-KE-08-0347-01). Allied is one of the three facilities in Ireland that currently recycle plasterboard. The others are McNabb Waste in Downpatrick, NI (LN/09/111/M) and Evirogrind in Co. Donegal (WFP-DL-11-004-01).

Written records will be maintained by the contractor(s) detailing the waste arising throughout the excavation and construction phases, the classification of each waste type, the contact details and waste collection permit number of all waste contractors who collect waste from the site and the end destination details for all waste removed and disposed off-site.

Dedicated bunded storage containers will be provided for hazardous wastes which may arise such as batteries, paints, oils, chemicals etc., if required.

The management of the main waste streams are detailed as follows:

Soil/subsoil and Concrete Surfacing:

Existing asphalt surfacing and made ground/subsoil will be excavated to facilitate construction of the new building foundations, installation of underground services and realignment of access routes.

Any material removed off-site will be carried out by contractors licensed under the *Waste Management Acts 1996 - 2008*, the *Waste Management (Collection Permit) Regulations 2007 and Amendments* and the *Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments*.

Where the excavated soil is found to be clean/inert, the site manager will investigate whether nearby construction sites may require clean fill material, to both minimise the costs of transport and to reuse as much material as possible. If any of the material is to be reused on another site as by-product (and not as a waste), this will need to be done so in accordance with *Article 27* of the *European Communities (Waste Directive)*

Regulations, 2011 (S.I. No. 126 of 2011), as amended 2011 (S.I. No. 323 of 2011). Article 27 requires that certain conditions are met and that by-product decisions are made to EPA, via their online notification form. The EPA are entitled to decide that a notified by-product should in fact be considered as a waste and they are obliged to consult with the economic operator and the relevant local authority before making such a decision. If the material is deemed to be a waste, removal and reuse/recovery/disposal of the material will be carried out in accordance with the relevant waste regulations. The volume of soil to be disposed of will dictate whether a COR, waste permit or waste licence is required by the receiving facility.

Also as discussed previously, any soil/subsoil deemed to be contaminated will be stored separately to the clean and inert soil/subsoil. The material will be appropriately tested and classified as either non-hazardous or hazardous using the *HazWasteOnline* application and then classified as inert (Category A), inert (suitable for Murphy Environmental Landfill, Category A2), non-hazardous (Category B), stable non-reactive hazardous for disposal in non-hazardous landfill (Category C) or hazardous (Category D) in accordance with the *EC Council Decision 2003/33/EC* before being transported to a permitted/licensed facility by a suitable contractor. A desktop study of suitable facilities for disposal of excavated soils, dependent on classification, was carried out by AWN and is presented in Appendix 10.1 (St. James's Hospital campus C&D WMP) of the EIS. This study identified facilities which can accept different categories of waste, considers their available capacity and identifies their proximity to the project sites.

Crushed rock or granular fill material will need to be imported to the site for use under building floor slabs, foundations, roads, car parks and paved areas. In the event that it is proposed to use imported fill from another site, the imported material will need to be classified in accordance with Article 27 as discussed above.

Bedrock

The borehole logs from the site investigations carried out in December 2014 detailed encountering weathered limestone from as little as 1.3m below ground level in one of the four locations drilled. If bedrock is encountered, excavated bedrock will be reused or disposed of off-site.

Concrete Blocks, Bricks, Tiles & Ceramics

The majority of concrete blocks, bricks, tiles and ceramics generated as part of the construction works are expected to be clean, inert material and should be recycled, where possible.

Hard Plastic

As hard plastic is a highly recyclable material, much of the plastic generated will be primarily from material off-cuts. All recyclable plastic will be segregated and recycled, where possible.

Timber

Timber that is uncontaminated, i.e. free from paints, preservatives, glues etc., will be disposed of in a separate skip and recycled off-site.

Metal

Metals will be segregated into mixed ferrous, aluminium cladding, high grade stainless steel, low grade stainless steel etc., where practical and stored in skips. Metal is highly recyclable and there are numerous companies that will accept these materials.

Plasterboard

There are currently a number of recycling services for plasterboard in Ireland as detailed above. Plasterboard from the construction phase will be stored in a separate

skip, pending collection for recycling. The site manager and project engineers will ensure that oversupply of new plasterboard is carefully monitored to minimise waste.

Glass

Glass materials will be segregated for recycling, where possible.

Waste Electrical and Electronic Equipment (WEEE)

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

Other Recyclables

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

Non-Recyclable Waste

Construction waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate skips or other receptacles. Prior to removal from site, the non-recyclable waste skip/receptacle will be examined by a member of the waste team (see Section 6.0) to determine if recyclable materials have been placed in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle.

Hazardous Wastes

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

It should be noted that until a construction contractor is appointed it is not possible to provide information on the specific destinations of each waste stream. Prior to commencement of development and removal of any waste offsite, details of the proposed destination of each waste stream will be provided to FCC by the project team.

4.4 Tracking and Documentation Procedures for Off-Site Waste

All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the project Contractor.

All movement of waste and the use of waste contractors will be undertaken in accordance with the *Waste Management Acts 1996 - 2008*, *Waste Management (Collection Permit) Regulations 2007 and Amendments* and *Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments*. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project Waste Manager (see Section 6.0) will maintain a copy of all waste collection permits on-site.

If the waste is being transported to another site, a copy of the Local Authority COR, waste permit or EPA Waste Licence for that site will be provided to the nominated project Waste Manager. If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) document will be obtained from Dublin City Council (as the relevant authority on behalf of all local authorities in Ireland) and kept on-site along with details of the final destination (permits, licences etc.). A receipt from the final

destination of the material will be kept as part of the on-site waste management records.

If any surplus soils/stones is being removed from the site for reuse on another construction site as a by-product, this will need to be done in accordance with *Article 27 of the European Communities (Waste Directive) Regulations, 2011 (S.I. No. 126 of 2011)*. Similarly, if any soils/stones are imported onto the site from another construction site as a by-product, this will be also be done in accordance with Article 27.

All information will be entered in a waste management recording system to be maintained on site.

5.0 ESTIMATED COST OF WASTE MANAGEMENT

An outline of the costs associated with different aspects of waste management is provided below.

The total cost of C&D waste management will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

5.1 Reuse

By reusing materials on site, there will be a reduction in the transport and disposal costs associated with the requirement for a waste contractor to take the material away to landfill.

Clean and inert soils, gravel, stones etc. which cannot be reused on site may be used as capping material for landfill sites, or for the reinstatement of quarries etc. This material is often taken free of charge for such purposes, reducing final waste disposal costs.

5.2 Recycling

Salvageable metals will earn a rebate which can be offset against the costs of collection and transportation of the skips.

Clean uncontaminated cardboard and certain hard plastics can also be recycled. Waste contractors will charge considerably less to take segregated wastes, such as recyclable waste, from a site than mixed waste.

Timber can be recycled as chipboard. Again, waste contractors will charge considerably less to take segregated wastes such as timber from a site than mixed waste.

5.3 Disposal

Landfill charges in the Leinster region are currently at around " 160/tonne (which includes a " 75 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2012*. In addition to disposal costs, waste contractors will also charge a collection fee for skips.

Collection of segregated C&D waste usually costs less than municipal waste. Specific C&D waste contractors take the waste off-site to a licensed or permitted facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill. Clean soil, rubble, etc. is also used as fill/capping material, wherever possible.

6.0 TRAINING PROVISIONS

A member of the construction team will be appointed as the waste manager to ensure commitment, operational efficiency and accountability during the construction and refurbishment phases of the project.

6.1 Waste Manager Training and Responsibilities

The nominated waste manager will be given responsibility and authority to select a waste team if required, i.e. members of the site crew that will aid him/her in the organisation, operation and recording of the waste management system implemented on site. The waste manager will have overall responsibility to oversee, record and provide feedback to the client on everyday waste management at the site. Authority will be given to the waste manager to delegate responsibility to sub-contractors, where necessary, and to coordinate with suppliers, service providers and sub-contractors to prioritise waste prevention and material salvage.

The waste manager will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on site. The waste manager will also be trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and be knowledgeable in how to implement this C&D WMP.

6.2 Site Crew Training

Training of site crew is the responsibility of the waste manager and, as such, a waste training program should be organised. A basic awareness course will be held for all site crew to outline the C&D WMP and to detail the segregation of waste materials at source. This may be incorporated with other site training needs such as general site induction, health and safety awareness and manual handling.

This basic course will describe the materials to be segregated, the storage methods and the location of the Waste Storage Areas (WSAs). A sub-section on hazardous wastes will be incorporated into the training program and the particular dangers of each hazardous waste will be explained.

7.0 RECORD KEEPING

Records will be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the construction waste arisings on site. A copy of the Waste Collection Permits, Certificates of Registration, Waste Facility Permits and Waste Licences will be maintained on site at all times.

The waste manager or delegate will record the following;

1. Waste taken for reuse off-site;
2. Waste taken for recycling;
3. Waste taken for disposal; and
4. Reclaimed waste materials brought on-site for reuse.

For each movement of waste on or off-site, a signed docket will be obtained by the Waste Manager from the contractor, detailing the weight and type of the material and the source and destination of the material. This will be carried out for each material type. This system will also be linked with the delivery records. In this way, the percentage of construction waste generated for each material can be determined.

The system will allow the comparison of these figures with the targets established for the recovery, reuse and recycling of construction waste presented earlier and to highlight the successes or failures against these targets.

8.0 OUTLINE WASTE AUDIT PROCEDURE

8.1 Responsibility for Waste Audit

The appointed Waste Manager will be responsible for conducting a waste audit at the site during the construction phase of the development.

8.2 Review of Records and Identification of Corrective Actions

A review of all the records for the waste generated and transported on or off-site should be undertaken mid-way through the project. If waste movements are not accounted for, the reasons for this should be established in order to see if and why the record keeping system has not been maintained. The waste records will be compared with the established recovery/reuse/recycling targets for the site.

Each material type will be examined, in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Waste management costs will also be reviewed.

Upon completion of the construction phase, a final report will be prepared, summarising the outcomes of waste management processes adopted and the total recycling/reuse/recovery figures for the development.

9.0 CONSULTATION WITH RELEVANT BODIES

9.1 Local Authority

Once a construction contractor has been appointed and prior to removal of any waste materials offsite, details of the proposed destination of each waste stream will be provided to FCC for their approval.

FCC will also be consulted, as required, throughout the refurbishment, excavation and construction phases in order to ensure that all available waste reduction, reuse and recycling opportunities are identified and utilised and that compliant waste management practices are carried out.

9.2 Recycling/Salvage Companies

Companies that specialise in C&D waste management will be contacted to determine their suitability for engagement. Where a waste contractor is engaged, each company will be audited in order to ensure that relevant and up-to-date waste collection permits and facility COR/permits/licences are held. In addition, information regarding individual construction materials will be obtained, including the feasibility of recycling each material, the costs of recycling/reclamation and the means by which the wastes will be collected and transported off-site, and the recycling/reclamation process each material will undergo off site.

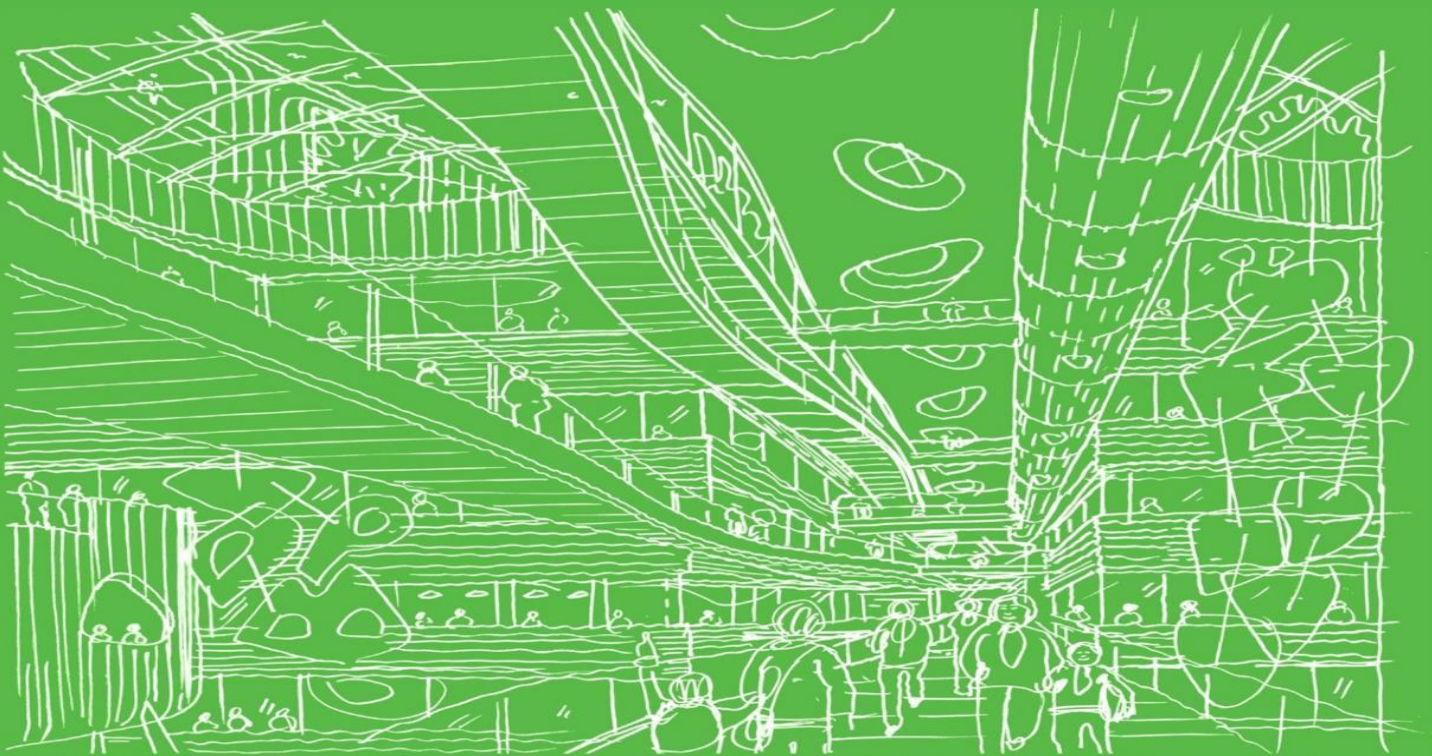
10.0 REFERENCES

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 - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended 2011 (S.I. No. 323 of 2011);
 - Waste Management (Collection Permit) Regulations S.I No. 820 of 2007 as amended 2008 (S.I No 87 of 2008);
 - Waste Management (Facility Permit and Registration) Regulations, S.I No. 821 of 2007 as amended 2008 (S.I No. 86 of 2008);
 - Waste Management (Licensing) Regulations 2000 (S.I. No. 185 of 2000) as amended 2004 (S.I. No. 395 of 2004), 2010 and (S.I. No. 350 of 2010);
 - Waste Management (Packaging) Regulations 2003 (S.I. No. 61 of 2003) as amended 2004 (S.I. No. 871 of 2004), 2006 (S.I. No. 308 of 2006) and 2007 (S.I. No. 798 of 2007);
 - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997);
 - Waste Management (Landfill Levy) Regulations 2011 (S.I. No. 434 of 2011), as amended 2015 (S.I. No. 189 of 2015);
 - European Communities (Waste Electrical and Electronic Equipment) Regulations 2011;
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National Paediatric Hospital Project

Planning Application

Appendix 10.6 – Operational Waste Management Plan
for Connolly Hospital satellite centre



August 2015

APPENDIX 10.6

**OPERATIONAL WASTE
MANAGEMENT PLAN**

FOR

**CONNOLLY HOSPITAL
SATELLITE CENTRE**

Report Prepared For

**National Paediatric Hospital
Development Board**

Report Prepared By

Robert Hunt, Environmental Consultant
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Our Reference

RH/14/8182WMR06

Date of Issue

30 July 2015

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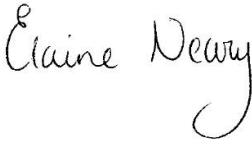
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Document History

Document Reference		Original Issue Date	
RH/14/8182W/MR06		30 July 2015	
Revision Level	Revision Date	Description	Sections Affected

Record of Approval

Details	Written by	Approved by
Signature		
Name	Robert Hunt	Elaine Neary
Title	Environmental Consultant	Principal Consultant
Date	30 July 2015	30 July 2015

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1.0 INTRODUCTION

As part of the National Paediatric Hospital Board Development Project, planning permission is being sought for the construction of a new children's hospital satellite centre at the Connolly Hospital campus, Blanchardstown, Dublin 15.

AWN Consulting Ltd. (AWN) has prepared this Operational Waste Management Plan (OWMP) to ensure that the management of waste during the operational phase of the proposed development is undertaken in accordance with current legal and industry standards including the *Waste Management Act 1996 – 2001 and Amendments* ¹, associated Regulations, *Protection of the Environment Act 2003* ², *Litter Pollution Act 1997* ³ and the new *'Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021'* ⁴. In addition, the following guidelines were consulted for healthcare specific waste management practice:

- Health Service Executive (HSE) and Department of Health and Children (DOHC), *Healthcare Risk Waste Management: Segregation, Packaging and Storage Guidelines for Healthcare Risk Waste, 4th Edition* (2010) ⁵; and
- HSE, *Waste Management Awareness Handbook* (2011) ⁶.

This OWMP aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. The OWMP also seeks to provide guidance on the appropriate collection and transport of waste to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil or water resources). The plan estimates the type and quantity of waste to be generated from the proposed development during the operational phase and provides recommendations for management of different waste streams.

At present, there are no specific guidelines in Ireland for the preparation of OWMPs. Therefore, in preparing this document, consideration has been given to the requirements of national and regional waste policy, legislation and other guidelines.

2.0 OVERVIEW OF WASTEMANAGEMENT IN IRELAND

2.1 National Level

The Government issued a policy statement in September 1998 titled as *'Changing Our Ways'* ⁷ which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. A heavy emphasis was placed on reducing reliance on landfill and finding alternative methods for managing waste. Amongst other things, *Changing Our Ways* stated a target of at least 35% recycling of municipal (i.e. household, commercial and non-process industrial) waste.

A further policy document *'Preventing and Recycling Waste – Delivering Change'* was published in 2002 ⁸. This document proposed a number of programmes to increase recycling of waste and allow diversion from landfill. The need for waste minimisation at source was considered a priority.

This view was also supported by a review of sustainable development policy in Ireland and achievements to date, which was conducted in 2002, entitled *'Making Ireland's Development Sustainable – Review, Assessment and Future Action'* ⁹. This document also stressed the need to break the link between economic growth and waste generation, again through waste minimisation and reuse of discarded material.

In order to establish the progress of the Government policy document *Changing Our Ways*, a review document was published in April 2004 entitled *'Taking Stock and*

*Moving Forward*¹⁰. Covering the period 1998 . 2003, the aim of this document was to assess progress to date with regard to waste management in Ireland, to consider developments since the policy framework and the local authority waste management plans were put in place, and to identify measures that could be undertaken to further support progress towards the objectives outlined in *Changing Our Ways*.

In particular, *Taking Stock and Moving Forward* noted a significant increase in the amount of waste being brought to local authority landfills. The report noted that one of the significant challenges in the coming years was the extension of the dry recyclable collection services.

The most recent policy document was published in July 2012 titled 'A Resource Opportunity'¹¹. The policy document stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention. The document sets out a number of actions, including the following:

- A move away from landfill and replacement through prevention, reuse, recycling and recovery.
- A Brown Bin roll-out diverting organic waste towards more productive uses.
- Introducing a new regulatory regime for the existing side-by-side competition model within the household waste collection market.
- New Service Standards to ensure that consumers receive higher customer service standards from their operator.
- Placing responsibility on householders to prove they use an authorised waste collection service.
- The establishment of a team of Waste Enforcement Officers for cases relating to serious criminal activity will be prioritised.
- Reducing red tape for industry to identify and reduce any unnecessary administrative burdens on the waste management industry.
- A review of the producer responsibility model will be initiated to assess and evaluate the operation of the model in Ireland.
- Significant reduction of Waste Management Planning Regions from ten to three.

While *A Resource Opportunity* covers the period to 2020, it will be subject to a mid-term review in 2016 to ensure that the measures are set out properly and to provide an opportunity for additional measures to be adopted in the event of inadequate performance.

Since 1998, the Environmental Protection Agency (EPA) has produced periodic 'National Waste (Database) Reports'¹² detailing among other things estimates for household and commercial (municipal) waste generation in Ireland and the level of recycling, recovery and disposal of these materials. The 2012 National Waste Report, which is the most recently published report, reported the following key statistics for 2012:

- The total quantity of municipal waste generated in 2012 was 4.6% lower than 2011. The total quantity of municipal waste managed in 2012 was 2.7% lower than 2011.
- The percentage tonnage of municipal waste managed for recovery (59%) exceeded the percentage tonnage managed for disposal (41%) for the first time in 2012. This is largely due to the increased use of residual waste as a fuel.
- 34% of municipal waste managed in Ireland was exported for recovery in 2012. This includes municipal waste exported for energy recovery and for recycling. Export of municipal waste for energy recovery increased by 36% between 2011 and 2012.
- Ireland's recycling rate (40%) in 2012 was close to the EU28 average (42%).

- The tonnage of healthcare risk waste (hazardous) exported from the country has reduced year on year from 2009 (734 tonnes) to 2012 (687 tonnes).

2.2 Regional Level

The proposed development is located in the Local Authority area of Fingal County Council (FCC).

The *EMR Waste Management Plan 2015 – 2021* is the new regional waste management plan for the FCC area published in May 2015. This plan replaces the previous Dublin region plan due to changing National policy as set out in *A Resource Opportunity: Waste Management Policy in Ireland* and changes being enacted by the Waste Framework Directive (2008/98/EC) ¹³.

The new 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; and
- 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.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately " 160 per tonne of waste which includes a " 75 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2012*.

The '*Fingal Development Plan 2011 – 2017*' ¹⁴ sets out objectives and policies for Fingal that will guide their actions in regard to physical infrastructure and environment as well as their role as the facilitator of social, cultural and economic development. In particular, a number of specific development objectives and policies have been prepared with regards to Waste Management including:

Policy:

- *Conform to the European Union, National and Regional policy in all matters relating to the production, handling, treatment and disposal of waste*

Objectives:

- Objective WM01:
Prevent and minimise the generation of waste in accordance with the Waste Management Plan for the Dublin Region.
- Objective WM03:
Introduce provisions to separate recyclable refuse, especially for new large-scale residential and mixed-use developments. Ensure new developments include well designed facilities to accommodate the 3 bin collection system and bottle banks. Alternative infrastructural systems which deliver an equivalent level of recycling, e.g. vacuum waste collection systems are also to be encouraged.
- Objective WM16:
Provide, at each of the Waste Recycling Centres, for the reception of household hazardous wastes such as batteries, waste oil and waste paint.

2.3 Legislative Requirements

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

- Waste Management Act 1996 (S.I. No. 10 of 1996) as amended by the Waste Management (Amendment) Act 2001. Sub-ordinate and associated legislation includes:
 - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended 2011 (S.I. No. 323 of 2011)
 - Waste Management (Collection Permit) Regulations S.I No. 820 of 2007 as amended 2008 (S.I No 87 of 2008)
 - Waste Management (Facility Permit and Registration) Regulations, S.I No. 821 of 2007 as amended 2008 (S.I No. 86 of 2008)
 - Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended 2004 (S.I. No. 395 of 2004), 2010 and (S.I. No. 350 of 2010)
 - Waste Management (Packaging) Regulations 2003 (S.I. No. 61 of 2003) as amended 2004 (S.I. No. 871 of 2004), 2006 (S.I. No. 308 of 2006) and 2007 (S.I. No. 798 of 2007)
 - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
 - Waste Management (Landfill Levy) (Amendment) Regulations 2012 (S.I. No. 221 of 2012), as amended 2015 (S.I. No. 189 of 2015)
 - European Communities (Waste Electrical and Electronic Equipment) Regulations 2011
 - Waste Management (Registration of Brokers and Dealers) Regulations 2008 (S.I. 113 of 2008)
 - Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009), as amended 2015 (S.I. 190 of 2015) and European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 191 of 2015)
 - Waste Management (Shipments of Waste) Regulations, 2007 (S.I. No. 419 of 2007)
 - Waste Management (Movement of Hazardous Waste) Regulations, 1998 (S.I. No. 147 of 1998)
 - The European Communities (Transfrontier Shipment of Hazardous Waste) Regulations, 1988 (S.I. No. 248 of 1988)
 - European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011)
 - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015)
 - European Communities (Carriage of Dangerous Goods by Road and Use of Transportable Pressure Equipment) Regulations 2011 (S.I. No. 349 of 2011) as amended 2013 (S.I. No. 238 of 2013) and 2015 (S.I. No. 31 of 2015)
- Protection of the Environment Act 2003 (S.I. No. 413 of 2003)
- Litter Pollution Act 1997 (S.I. No. 12 of 1997)

These Acts and subordinate Regulations enable the transposition of relevant European Union Policy and Directives into Irish law.

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 - 2008* and subsequent Irish legislation, is the principle of “*Duty of Care*”. This implies that the waste producer is responsible for waste from the time it is generated through until its legal disposal (including its method of 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 disposal area, waste contractors will be employed to physically transport waste to the final waste disposal site.

It is therefore imperative that facilities management/nominated personnel at the new satellite centre undertake on and off-site management of waste in accordance with all

legal requirements. This includes the requirement that a waste contractor handle, transport and recover/recycle/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

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

2.4 Regional Waste Management Service Providers and Facilities

Various contractors offer waste collection services for the commercial sector in the Fingal region. Details of waste collection permits (granted, pending and withdrawn) for the region are available from the NWCPO.

As outlined in the new regional waste management plan, there is a decreasing number of landfills available in the region. Only three landfills remain operational and are all operated by the private sector. There are a number of other licensed and permitted facilities in operation in the region including waste transfer stations, hazardous waste facilities and integrated waste management facilities. There is one existing thermal treatment facility in Duleek, Co. Meath and a second facility is under construction in Poolbeg in Dublin. The facility in Poolbeg is targeted to be operational to receive municipal waste in late 2017.

A copy of all CORs, waste permits and waste licenses issued are available from the EPA.

3.0 DESCRIPTION OF THE PROJECT

3.1 Location, Size and Scale of the Development

The subject site is located on the grounds of the existing Connolly Hospital campus in Blanchardstown, Dublin 15. The project will involve the development of a new dedicated children's hospital satellite centre extending to the south of the existing hospital structure as per the planning drawings. The development will include the construction of a new extension to the existing building as well as refurbishment and reconfiguration of a small portion of the existing building to meet the requirements of the new dedicated healthcare facility. This satellite centre will provide secondary care for the Great Dublin Area (GDA), providing urgent and outpatient care. A detailed description of the development is presented in Chapter 2 (Description of the Development) of the National Paediatric Hospital Project EIS.

3.2 Typical Waste Categories

The development of the satellite centre at Connolly will generate a variety of waste streams during the operational phase. Healthcare waste is defined in the HSE and DOHC Healthcare Risk Waste Management publication as 'solid or liquid waste arising from healthcare'. Waste materials generated will fall into two main categories, namely healthcare non-risk waste (i.e. non-clinical healthcare waste) and healthcare risk waste (hazardous) as illustrated in Figure 3.1. Hazardous waste has been further subdivided in this plan into non-clinical hazardous waste and clinical/risk waste.

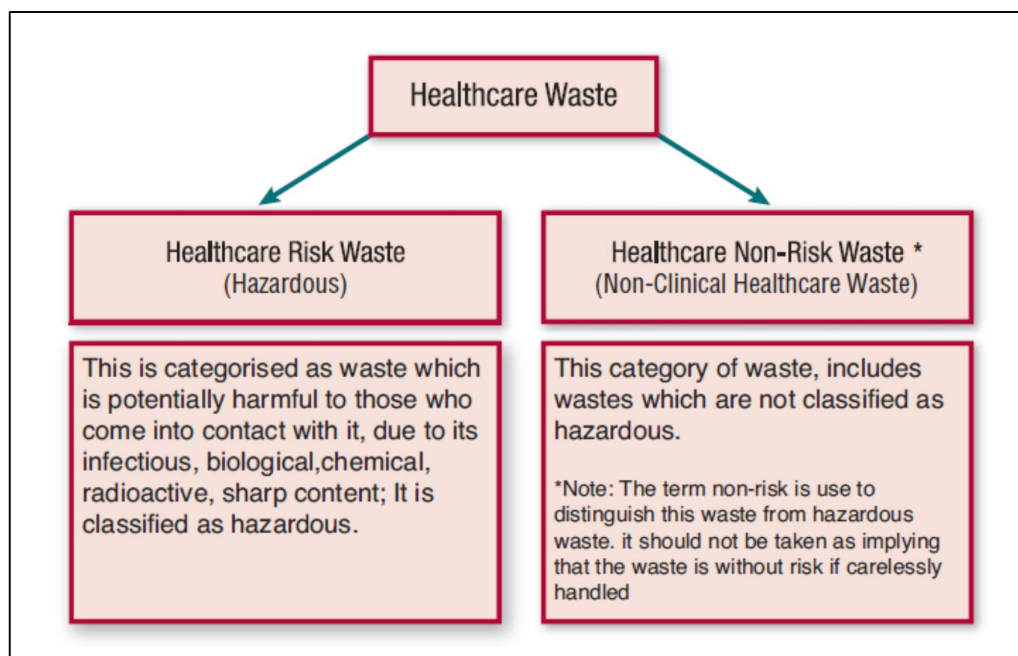


Figure 3.1 Healthcare Waste Categories (Source: HSE, *Waste Management Awareness Handbook*, 2011)

3.2.1 Non-Risk/Non-Clinical Non-Hazardous Waste

The typical non-risk/non-clinical non-hazardous waste streams that will be generated will include the following:

- Dry Mixed Recyclables . includes cardboard, non-confidential paper, confidential paper, newspaper, leaflets plastic packaging and bottles, aluminium cans, tins and Tetra Pak cartons;
- Confidential paper
- Mixed Non-Recyclable /General Waste;
- Organic (food/catering) waste; and
- Glass.

In addition to the typical non-risk/non-clinical non-hazardous waste materials that will be generated on a daily basis, there will be some additional wastes generated on a regular basis that will need to be managed separately including:

- Green/garden waste from landscaping activities;
- Textiles;
- Batteries (non-hazardous. Note: hazardous batteries may also be generated which are referred to in Section 3.2.2)
- Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment (non-hazardous. Note: WEEE containing hazardous components may also be generated which are referred to in Section 3.2.2);
- Metals, timber and mixed C&D waste generated from operational maintenance activities;
- Polystyrene; and
- Furniture (and from time to time other bulky wastes).

3.2.2 Non-Clinical Hazardous Waste

The typical non-clinical hazardous waste streams that will be generated will include the following:

- Printer/toner cartridges;
- Batteries (hazardous. Note: non-hazardous batteries may also be generated which are referred to in Section 3.2.1);
- Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment (containing hazardous components. Note: WEEE not containing hazardous components may also be generated which are referred to in Section 3.2.1);
- Cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc.);
- Fluorescent bulb tubes and other mercury containing waste;

3.2.3 Healthcare Risk Waste (Hazardous)

The healthcare risk waste streams that will be generated are segregated into a number of categories as illustrated in Figure 3.2.

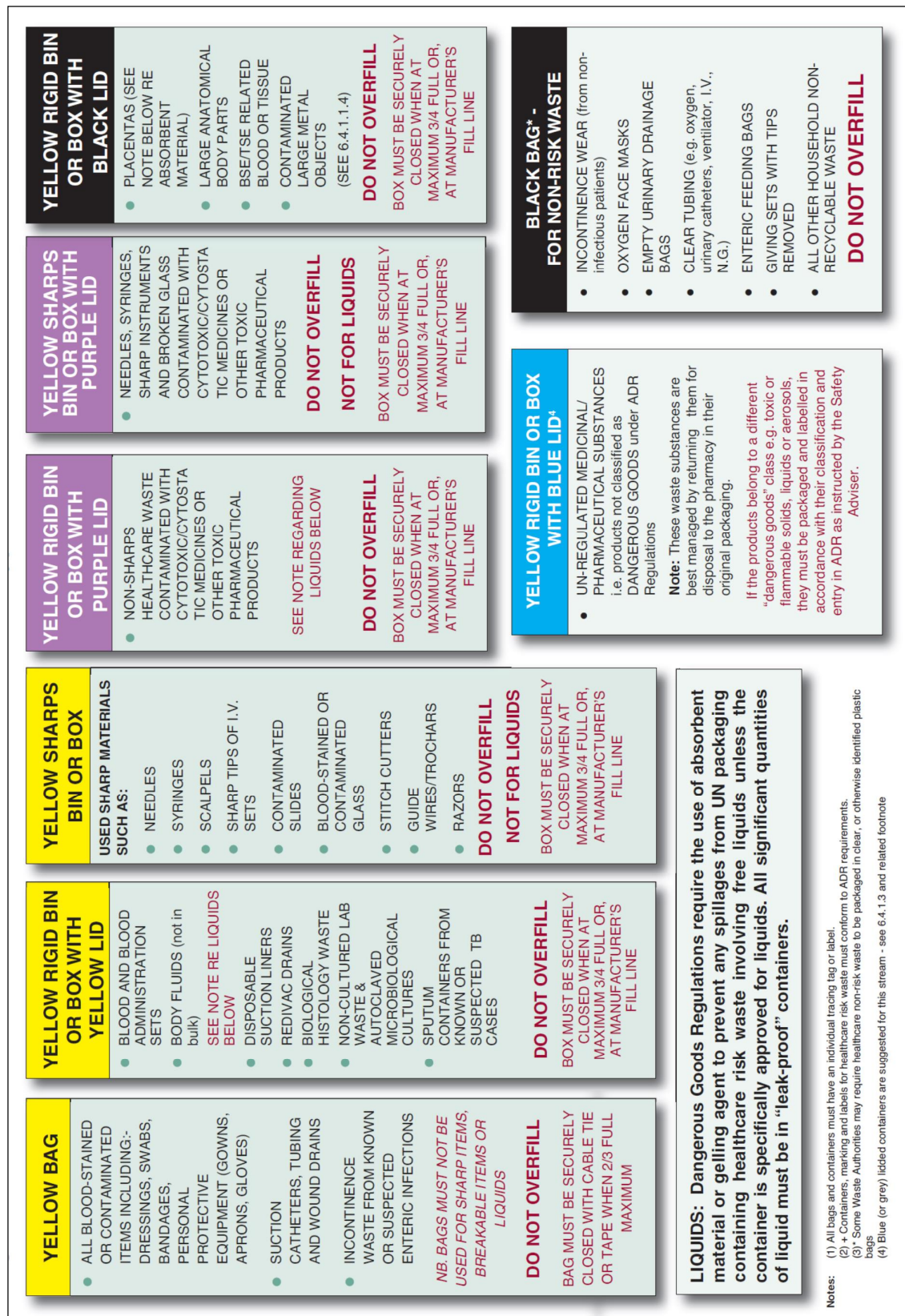


Figure 3.2 Segregation of Healthcare Risk Waste (Source: HSE and DOHC *Healthcare Risk Waste Management*, 2010 and HSE, *Waste Management Awareness Handbook*, 201

3.3 European Waste Codes

In 1994, the *European Waste Catalogue* ¹⁶ and *Hazardous Waste List* ¹⁷ were published by the European Commission. In 2002, the EPA published a document titled the *European Waste Catalogue and Hazardous Waste List* ¹⁸, which was a condensed version of the original two documents and their subsequent amendments. This document has recently been replaced by the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* ¹⁹ which became valid from the 1st June 2015. This waste classification system applies across the EU and is the basis for all national and international waste reporting, such as those associated with waste collection permits, CORs, permits and licences and EPA National Waste Database.

Under the classification system, different types of wastes are fully defined by a code. The List of Waste (LoW) code (also referred to as European Waste Code or EWC) for some of the typical waste materials expected to be generated during the operation of the proposed development are provided in Table 3.1 below.

Waste Material	LoW Code
Paper and Cardboard	20 01 01
Plastic	20 01 39
Metals	20 01 40
Mixed Municipal Waste	20 03 01
Glass	20 01 02
Biodegradable Kitchen Waste	20 01 08
Biodegradable garden and park wastes	20 02 01
oil and fat	20 01 25-26
Textiles	20 01 11
Batteries and accumulators*	20 01 33-34
Waste electrical and electronic equipment*	20 01 35-36
Chemicals (solvents, pesticides, paints & adhesives, detergents, etc.)*	20 01 13/19/27- 28/29-30
Fluorescent tubes and other mercury containing waste*	20 01 21
Bulky wastes	20 03 07
Healthcare wastes (wastes from natal care, diagnosis, treatment or prevention of disease in humans, includes non-hazardous and hazardous wastes) *	18 01

Table 3.1 Typical waste types generated and LoW codes

(* individual waste type may contain hazardous materials)

4.0 ESTIMATED WASTE ARISING

A Waste Generation Model (WGM) has been used to predict waste types, weights and volumes arising from operations within the proposed new satellite centre. The WGM incorporates building area, use and projected patient numbers and combines these with waste generation data from Temple Street Children's University Hospital as well as Irish and US EPA waste generation rates. The figures presented below represent the estimated waste generation in the new children's hospital satellite centre at Connolly Hospital only and do not include existing waste volumes from the rest of the Connolly Hospital campus.

The estimated waste generation for the satellite centre at Connolly Hospital is presented in Table 4.1.

Waste Type	tonnes/annum	kg/week
Mixed Non-Recyclables	61	1,176
Dry Mixed Recyclables	8	153
Organic (food) waste	11	202
Cardboard	8	157
Confidential Paper	4	73
Polystyrene	<1	2
Glass	<1	6
Healthcare Risk Waste	18	354
Total Waste	110	2,122

*Note: * The above waste figures are estimates for the purpose of recommending waste storage requirements and are based on predicted patient numbers.*

Table 4.1 Estimated waste generation for the main waste types at Connolly Hospital satellite centre

5.0 WASTE STORAGE

This section provides information on how waste is to be stored within the new development. This section has been prepared with due consideration of the proposed building layout, design objectives and existing site practices as well as best practice standards and local/national waste management requirements including those of FCC. In particular, consideration has been given to the following documents:

- BS 5906:2005 Waste Management in Buildings . Code of Practice;
- EMR Waste Management Plan 2015 . 2021;
- HSE, Waste Management Awareness Handbook; and
- HSE and DOHC Healthcare Risk Waste Management Publication.

Waste materials will be generated from a wide variety of activities throughout the satellite centre. Healthcare risk wastes will typically be generated in the urgent care areas, outpatient care and other treatment rooms. Dry recyclables and non-recyclable waste will be generated throughout the satellite centre. Confidential and non-confidential paper waste will be generated from offices and staff workstations. Organic (food/catering) waste will typically be generated in the café food preparation and dining area and in the pantries.

Appropriate colour coded, labelled and secured receptacles will be required for healthcare risk waste generated in the building as set out in the HSE, Waste Management Awareness Handbook (and illustrated in Figure 3.2). The healthcare risk waste receptacles which may be required include:

Clinical waste

- " Yellow bags
- " Yellow rigid bins or box with yellow lid
- " Yellow sharps bin or box

Special waste

- " Yellow rigid bin or box with purple lid
- " Yellow sharps bin or box with purple lid
- " Yellow rigid bin or box with black lid
- " Yellow rigid bin or box with blue (or grey) lid

These receptacles will be stored in designated disposal hold rooms, treatment rooms, patient rooms, etc. where appropriate. They may be attached to or on treatment trolleys while in use. Yellow bags, yellow rigid bins or boxes with yellow lid and yellow sharps bins or boxes will be transferred into secured UN approved 770 litre yellow clinical

waste wheeled bins. Purple, black and blue (or grey) colour coded health care risk waste rigid bins or boxes will be transferred to cages. 770 litre yellow clinical waste wheelie bins and cages for special waste will be provided in disposal hold rooms.

Sharps waste may alternatively be managed using UN-approved Bio Systems reusable containers. This system allows the containers to be reused after washing and disinfection offsite (as opposed to sending the rigid containers for disposal).

Non-risk waste receptacles for dry mixed recyclables and mixed non-recyclables will be strategically placed around the satellite centre in treatment rooms, at the pantries, at the café and along the corridors as appropriate. Organic waste bins will be provided in the pantries and at the café.

Where suitable, it is proposed that office and work station areas will utilise area waste stations (AWSs) for non-risk waste streams as opposed to individual bins at desks. AWSs should be conveniently located within 10-15m of workstations, where possible, and would typically include:

- 1 no. 80 . 120 litre bin for dry mixed recyclables;
- 1 no. 80 . 120 litre bin for mixed non-recyclables; and
- 1 no. 80 . 120 litre bin for confidential paper.

The outline waste strategy is that segregated waste collected as above will be brought at regular intervals throughout the day to restricted access disposal hold rooms on the ground and first floor of the new development. The allocated rooms are located in the urgent care department on the ground floor and in the outpatients department on the first floor but will be used for waste from all departments, as required. It is anticipated that the disposal hold rooms will accommodate, at least, one 770 litre clinical waste wheelie bin, one cage for special waste, one dry mixed recyclable bin, one mixed non-recyclable bins, one organic waste bin and bins for glass waste.

When the bins/cages in the disposal hold room are full they will be transferred to a larger secured internal waste storage area (WSA) (Referred to as Waste Disposal on the drawings). This area will have capacity for the following waste receptacles:

- 2 no. 1100 litre bins for mixed non-recyclable waste
- 1 no. 1100 litre bins for dry mixed recyclable waste
- 1 no. 240 litre bin for organic waste
- 1 no. cage for cardboard
- FIBC (Flexible Intermediate Bulk Container) bag or similar container for polystyrene (if required)
- 120 litre bin for glass waste
- 2 no. confidential waste paper bins (if required, confidential paper may be collected directly from the office floors)
- 1 no. cage for WEEE
- 1 no. small box for batteries
- 1 no. fluorescent tube coffin
- 2 no. 770 litre bins for clinical waste
- 1 no. cage for special waste

5.1 Waste Storage Area Design

The disposal hold rooms and the WSA should meet the following requirements:

- Floors should be painted with a non-slip paint and should have coved edges.

- Doors should be self-closing but a handle is required on both sides of the door to allow the door to be opened from inside and outside the room. Doors should be fitted with a catch to lock back the door into the open position to allow the operative to manoeuvre the container safely with both hands.
- Access to these rooms should be restricted to authorised personnel only.
- Ventilation should provide 6-10 air changes per hour to limit the potential for build-up of offensive odours.
- Lighting should have a Lux rating of 220.

In addition, the WSA should be fitted with a hot and cold water supply and electrical supply for a power washer to allow cleaning of bins in the area. A sloped floor and central foul drain to facilitate wash-water run-off will also be required.

Nominated personnel will be required to maintain the disposal holds and WSA and receptacles (i.e. bins/cages) in good condition as required by the SDCC Waste Bye-Laws.

6.0 WASTE MOVEMENT & COLLECTION

All risk and non-risk waste will be conveyed by staff and cleaners to the disposal hold rooms within the new satellite centre. When full, the bins will be transferred manually to the secured internal WSA by nominated personnel.

Waste will be transferred from the internal WSA to an external waste marshalling area for collection by a permitted waste contractor on agreed collection days.

There are numerous private contractors that provide commercial waste collection in the Fingal area. All waste contractors servicing the development must hold a valid waste collection permit for the specific waste types collected. All waste collected must be transported to a registered, permitted or licensed facility only.

Waste type collections should be planned and staggered to avoid congestion in the service yard and minimise the duration of time waste collection vehicles spend on site.

All waste receptacles must be clearly identified as required by waste legislation. Waste will be presented for collection in a manner that will not endanger health, create a risk to traffic, harm the environment or create a nuisance through odours or litter.

7.0 ADDITIONAL WASTE MATERIALS

In addition to the typical waste materials that are generated on a daily basis, there will be some additional waste types generated from time to time that will need to be managed separately. A non-exhaustive list is presented below.

Waste Electrical and Electronic Equipment (WEEE)

The WEEE Directive 2002/96/EC and associated Waste Management (WEEE) Regulations 2005 have been enacted to ensure a high level of recycling of electronic and electrical equipment. It is the manufacturers responsibility to take back the WEEE, regardless of whether a replacement product is purchased or not and retailers are required to take back WEEE where a similar product is purchased. WEEE will be stored in the internal WSA and presented for collection as required.

Batteries

A take-back service for waste batteries and accumulators (e.g. rechargeable batteries) is in place in order to comply with the Waste Management (Batteries and Accumulators) Regulations 2008. Waste batteries must be separately collected for

recycling and recovery of resources and the producer is responsible for arranging and financing this. Waste batteries will be temporarily stored in the internal WSA and presented for collection as required.

Printer Toner and Cartridges

Waste printer equipment from the new satellite centre will be collected in office/workstation areas, as required, and managed in accordance with existing procedures. Most printer toner/cartridge providers will provide a collection service for waste materials or collection can be arranged for charities.

Fluorescent Tubes (and other mercury containing waste)

Any waste fluorescent tubes generated within the new development will be collected for hazardous recovery/disposal by a suitably licenced waste contractor. An area has been allowed for in the WSA for a fluorescent tube coffin trolley to temporarily store tubes pending collection.

Chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc)

Chemicals (such as solvents, pesticides, paints, etc) are largely generated from building maintenance works. These waste chemicals will be appropriately stored on site and removed from the hospital for disposal by an approved waste contractor.

Green/Garden Waste

Garden waste will be generated from upkeep of landscaped areas around the new satellite centre development. Garden waste will be appropriately stored and collection arranged as appropriate.

Textiles

Where possible, waste textiles should be recycled or donated to a charity organisation for reuse.

Furniture (and other bulky wastes)

Furniture and other bulky waste items (such as carpet etc.) may occasionally be generated at the development. Separate arrangements will need to be made with waste contractors for collection of furniture and other bulky wastes.

8.0 CONCLUSIONS

By implementing the procedures outlined in this OWMP, a high level of recycling, reuse and recovery will be achieved at the development. Where significant volumes of recyclable materials are being generated, these will be segregated at source to reduce waste contractor costs and ensure maximum diversion of materials from landfill, thus achieving the targets set out in the *EMR Waste Management Plan 2015 – 2021*.

9.0 REFERENCES

1. Waste Management Act 1996 (S.I. No. 10 of 1996) as amended by the Waste Management (Amendment) Act 2001. Subordinate and associated legislation includes:
 - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended 2011 (S.I. No. 323 of 2011);
 - Waste Management (Collection Permit) Regulations S.I No. 820 of 2007 as amended 2008 (S.I No 87 of 2008);
 - Waste Management (Facility Permit and Registration) Regulations, S.I No. 821 of 2007 as amended 2008 (S.I No. 86 of 2008);
 - Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended 2004 (S.I. No. 395 of 2004), 2010 and (S.I. No. 350 of 2010);
 - Waste Management (Packaging) Regulations 2003 (S.I. No. 61 of 2003) as amended 2004 (S.I. No. 871 of 2004), 2006 (S.I. No. 308 of 2006) and 2007 (S.I. No. 798 of 2007);
 - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997);
 - Waste Management (Landfill Levy) (Amendment) Regulations 2012 (S.I. No. 221 of 2012), as amended 2015 (S.I. No. 189 of 2015);
 - European Communities (Waste Electrical and Electronic Equipment) Regulations 2011;
 - Waste Management (Registration of Brokers and Dealers) Regulations 2008 (SI 113 of 2008).
 - Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009), as amended 2015 (S.I. 190 of 2015) and European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 191 of 2015).
 - Waste Management (Shipments of Waste) Regulations, 2007 (S.I. No. 419 of 2007)
 - Waste Management (Movement of Hazardous Waste) Regulations, 1998 (S.I. No. 147 of 1998)
 - The European Communities (Transfrontier Shipment of Hazardous Waste) Regulations, 1988 (S.I. No. 248 of 1988)
 - European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011)
 - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015)
 - European Communities (Carriage of Dangerous Goods by Road and Use of Transportable Pressure Equipment) Regulations 2011 (S.I. No. 349 of 2011) as amended 2013 (S.I. No. 238 of 2013) and 2015 (S.I. No. 31 of 2015)
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11. DoECLG, *A Resource Opportunity - Waste Management Policy in Ireland* (2012).
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13. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.
14. Fingal County Council, *Fingal Development Plan 2011 . 2017* (2011).
15. Fingal County Council, *Presentation and Storage of Waste Bye-Laws* (2006).
16. European Waste Catalogue - Council Decision 94/3/EC (as per Council Directive 75/442/EC).
17. Hazardous Waste List - Council Decision 94/904/EC (as per Council Directive 91/689/EEC).
18. EPA, *European Waste Catalogue and Hazardous Waste List* (2002).
19. EPA, *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2015).