## 10.0 Waste Management

## 10.1 Introduction

This EIS Chapter assesses and evaluates the potential impacts associated with waste management during the construction and operational phases of the development of the new National Maternity Hospital at St. Vincent's University Hospital Campus, Elm Park, Dublin 4.

The proposed development comprises the redevelopment of The National Maternity Hospital at St. Vincent's University Hospital campus, Elm Park, Dublin 4. The proposed new National Maternity Hospital building will be located at the eastern side of the hospital campus and comprises the construction of a building that rises to 5 and 6 storeys above ground level, with one partial basement level, plus additional ancillary plant areas at the roof level. The proposed development also includes an extension to the existing multistorey car park at the north of the campus. The proposed development will be constructed in a sequential manner that allows for the continual operation of the hospital campus and, as such, includes the phased demolition of existing buildings at St. Vincent's University Hospital campus to facilitate clearing the site for the proposed development and the construction of temporary accommodation to facilitate construction sequencing (including a single storey temporary canteen, catering staff changing facilities, household services store and carpenters workshop). The full detail of the nature and extent of the proposed development is set out in Chapter 2 of this ElS and the Draft Construction Management Plan is appended to same.

The assessment has been conducted in the context of current relevant standards and guidance, and identifies any requirements or possibilities for mitigation. The Chapter has been prepared by AWN Consulting Ltd.

# 10.2 Methodology

The assessment of the impacts of the proposed development arising from the generation of waste materials was carried out taking account of the methodology specified in the following guidance documents:

• Environmental Protection Agency (EPA), Guidelines on the Information to be contained in Environmental Impact Statements (EIS) (2002) and Revised Guidelines on the Information to be contained in Environmental Impact Statements Draft (September 2015)

• EPA, Advice Notes on Current Practice (in the Preparation of EIS) (2003) and Revised Guidelines on the Information to be contained in Environmental Impact Statements Draft (September 2015)

An extensive document review was carried out to assist in identifying current and future requirements for waste management and included national and regional waste policies, strategies and reports, such as:

- Department of the Environment, Heritage and Local Government, Changing Our Ways – A Policy Statement on Waste Management (1998);
- Department of the Environment, Heritage and Local Government, Preventing and Recycling Waste Delivering Change (2002);
- Department of the Environment, Heritage and Local Government, Making Ireland's Development Sustainable – Review, Assessment and Future Action, World Summit on Sustainable Development (2002);
- Department of the Environment, Heritage and Local Government, Taking Stock and Moving Forward (2004);
- Department of the Environment, Heritage and Local Government, National Strategy on Biodegradable Waste (2006);
- Department of the Environment, Community and Local Government, A Resource Opportunity - Waste Management Policy in Ireland (2012);
- Eastern-Midlands Region Waste Management Plan 2015 2021; and
- Dublin City Development Plan 2016 2022.

The document review also included Best Practice Guidelines and Codes of Practice, including:

- National Construction and Demolition Waste Council and Department of the Environment, Community and Local Government, Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects (2006);
- FÁS and the Construction Industry Federation, Construction and Demolition Waste Management – a handbook for Contractors and Site Managers (2002);
- BS 5906:2005 Waste Management in Buildings Code of Practice (2005);
- Health Service Executive (HSE) and Department of Health and Children, Healthcare Risk Waste Management Segregation Packaging and Storage Guidelines for Healthcare Risk Waste, 4th Edition (2010);
- HSE, Waste Management Awareness Handbook (2011); and

• Radiological Protection Institute of Ireland, The Code of Practice on the Design of Diagnostic Medical Facilities where Ionising Radiation is used (2009)

As well as Statutory Instruments (as amended) such as:

- Waste Management Act 1996 (No. 10 of 1996) as amended 2001 (S.I. No. 26 of 2001), as amended 2003 (S.I. No. 27 of 2003) and as amended 2011 (S.I. No. 20 of 2011) as well as sub-ordinate and associated legislation;
- Environmental Protection Act 1992 (S.I. No. 7 of 1992) as amended by the Protection of the Environment Act 2003 (S.I. No. 27 and S.I. No. 27 of 2003) and amended by the Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended; and
- Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended by the Protection of the Environment Act 2003 (S.I. No. 27 and S.I. No. 27 of 2003), as amended.

And Local Authority Waste Bye-Laws:

• Dublin City Council, Bye-Laws for the Storage, Presentation and Collection of Household and Commercial Waste (2013).

# 10.3 Receiving Environment

The new National Maternity Hospital will be constructed at St. Vincent's University Hospital Campus, Elm Park, Dublin 4, which is located in the Local Authority area of Dublin City Council.

In terms of waste management, the receiving environment is largely defined by Dublin City Council as the Local Authority responsible for setting and administering waste management activities in the area. This is largely governed by the requirements set out in the Eastern-Midlands Waste Management Plan, 2015 – 2021. This Plan replaces the previous plan for the Dublin region 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).

The Regional Plan sets out the following strategic targets for waste management in the region:

• A 1% reduction per annum in the quantity of household waste generated per capita over the period of the Plan;

- Achieve a recycling rate of 50% of managed municipal waste by 2020; 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.

The Plan does not set a specific target for construction & demolition waste. However, the Waste Framework Directive sets a target for Member States 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 2016 – 2022 sets out a number of policies and objectives for waste management in Dublin City which reflect the objectives of the Regional Waste Management Plan. The Development Plan highlights the strategic approach of the Regional Waste Management Plan to place a stronger emphasis on preventing wastes and materials re-use opportunities. Waste policies from the Development Plan are:

- SI19: 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.
- SI20: To prevent and minimise waste and to encourage and support material sorting and recycling.
- SI21: To minimise the amount of waste which cannot be prevented and ensure it is managed and treated without causing environmental pollution.
- SI22: To ensure that effect is given as far as possible to the "polluter pays" principle.

Bye-Laws for the Storage, Presentation and Collection of Household and Commercial Waste were brought into force by Dublin City Council in May 2013. 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 area. Key requirements under these Bye-Laws which are relevant to the project are summarised as follows:

- 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; and

 Outside the Central Commercial District 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.

The proposed development is outside the Central Commercial District. The full bye-laws and map showing the Central Commercial District area is available from the Dublin City Council website.

# 10.4 Characteristics of the Proposed Development

The potential impacts associated with waste generation and management at the proposed development must be considered for two distinct stages:

- Construction Phase; and
- Operational Phase.

### 10.4.1 Construction Phase

A detailed Construction and Demolition Waste Management Plan has been prepared for the proposed development and is included as Appendix 10.1.

The proposed works will include demolition of a number of existing buildings on the St. Vincent's University Hospital Campus as detailed in Chapter 2 of this EIS. The temporary accommodation constructed to facilitate construction sequencing will also be demolished once it is no longer required. The main demolition wastes that will be generated will typically include structural concrete, metal and timber. Some waste asphalt will also be generated from excavation of existing access routes across the proposed development area. The estimated demolition waste amounts and indicative reuse/recovery/recycling/disposal targets are presented in Table 10.1.

Table 10.1:	Estimated off-site reuse, recovery, recycling and disposal rates for demolition
	waste

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	285	0	0	85	243	15	43
Concrete, brick, tiles and	3538	30	1061	60	2123	10	354
Plasterboard	228	5	11	75	171	20	46
Metals	685	5	34	80	548	15	103
Timber	742	10	74	40	297	50	371
Others	228	40	91	0	0	60	137
Total	5706		1272		3381		1053

In addition, asbestos containing materials have been identified within the buildings to be demolished as detailed in Section 3.3.3 of the Construction and Demolition Waste Management Plan (Appendix 10.1). All asbestos containing materials will require removal by a suitably trained and competent contractor and appropriate transport and disposal offsite prior to commencement of the demolition phase.

In accordance with best practice, pre-demolition surveys will be undertaken prior to commencement of the demolition phase which will refine/verify the demolition waste figures detailed in Table 10.1. Based on the pre-demolition surveys, a detailed demolition plan will be prepared by the Main Contractor.

Based on earthworks data provided by the project engineers (Arup), there will be a significant surplus of made ground and overburden (boulder clay) generated from site clearance and excavations required to facilitate new building foundations, construction of the car park extension, installation of underground services, realignment of access routes and landscaping. The volume of made ground and overburden to be excavated has been estimated by Arup to be approximately 84,137 m<sup>3</sup>. Excavated material will be reused on site as engineering fill, where possible. Material derived from excavations that could be reused as engineering fill would have to be shown to be suitable for such use and will be subject to appropriate control and testing. Material that is not required and/or suitable for reuse onsite will require removal offsite for reuse, recovery and/or disposal, as appropriate.

In order to establish the appropriate reuse, recovery and/or disposal route for the excavated material it is necessary to firstly classify the material. Arup have assessed the potential for contamination sources on the site and surrounding area with reference to land use and site investigation data. A number of site investigations have been carried out on and close to the St. Vincent's University Hospital Campus. The geology beneath the site is generally comprised of made ground overlying glacial till and limestone bedrock. The made ground was found to contain small amounts of plastic, ash, cinders, brick and wire in isolated locations. The underlying soils are glacial till deposits locally referred to as Dublin Boulder Clay, with some gravel lenses noted within the glacial till. Based on the environmental sampling of the made ground undertaken on the site, the classification of the made ground for disposal purposes ranges from inert (Category A2) to non-hazardous (Category B). None of the material sampled was classified as hazardous for disposal. However, there is a risk that localised ground contamination has occurred on the site. Once the buildings proposed for demolition are demolished, further sampling will be classify the made ground required to accurately and overburden for reuse/recovery/disposal purposes. In addition, a watching brief and discovery procedure for contaminated material will be prepared and adopted by the Main Contractor prior to excavation works commencing on site. These documents should detail how potentially contaminated material will be dealt with during the excavation phase. All potentially contaminated material to be excavated is to be segregated and stockpiled in a contained manner and characterised by a competent professional through laboratory testing. Further information on the existing ground conditions and potential contamination is provided in Chapter 7.0 of this EIS (Soils, Geology and Hydrogeology) and in the Draft Construction Management Plan which is included as Appendix 2.1 to Chapter 2 of this EIS.

AWN have carried out a desktop study to identify the potential end-use options for the excavated soils/stones. This includes a detailed review of the re-use options and an assessment of the capacity of nearby facilities suitable to accept the various classifications of soil. This information is presented in the site specific Construction and Demolition Waste Management Plan which is included as Appendix 10.1. The conclusion of the research is that there are potential options for reuse of some of the material off site and there will be sufficient capacity available at authorised waste facilities in Ireland in 2017/2018 for recovery and disposal of the inert and non-hazardous material. Hazardous soil, if encountered, will require disposal abroad via Transfrontier Shipping of Wastes. There are numerous suitable facilities available in Europe with sufficient capacity to accept this waste should it arise.

During the construction phase, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The Main Contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

Waste will also be generated from construction workers e.g. organic/food waste, comingled recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and sewage sludge from temporary welfare facilities provided onsite for the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment and waste batteries may also be generated from site offices.

The estimated waste amounts and indicative on and offsite reuse/recovery/recycling/disposal targets for the main waste types for all the construction works planned are presented in Table 10.2.

Table 10.2:	Estimated on and off-site reuse, recovery, recycling and disposal rates for
	construction waste

Waste Type	Tonnes	Reuse/Recovery		Recycle		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Concrete, bricks, tiles, ceramics	164	40	66	40	66	20	33
and plasterboard							
Asphalt, tar and tar Products	15	0	0	25	4	75	11
Metals	15	5	1	90	13	5	1
Other	60	10	6	40	24	50	30
Total	254		72		107		75

A Draft Construction Management Plan has been prepared by Arup to accompany the planning application (and is included as Appendix 2.1 to Chapter 2 of this EIS). The construction of the development will be carried out in accordance with this construction methodology. This document will be developed by the Main Contractor to form a detailed Construction Management Plan prior to commencement of the development.

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. All waste arising during the construction phase will be transported offsite by an approved waste contractor holding a current waste collection permit. All waste arising requiring reuse, recycling, recovery or disposal off-site will be brought to facilities holding the appropriate certificate of registration, licence or permit, as required.

## 10.4.2 Operational Phase

A project specific Operational Waste Management Plan has been prepared for the operational phase of the proposed development and is included as Appendix 10.2.

The proposed development will give rise to a wide variety of waste streams during the operational phase, i.e. when the project is completed, open and occupied. Healthcare waste is defined in the HSE and Department of Health and Children 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). Hazardous waste can be further subdivided into non-clinical hazardous waste and clinical/risk waste. The main waste types will include the following:

- Non-Risk/Non-Clinical Non-Hazardous Waste
  - Co-mingled Recyclables includes cardboard, non-confidential waste paper, newspaper, leaflets, plastic bottles, packaging, aluminum cans, tins and Tetra Pak cartons;
  - o Cardboard;
  - o Confidential Paper;
  - o Mixed Non-Recyclable Waste;
  - o Organic waste (food waste and flowers);
  - o Glass;
  - o Polystyrene;
  - Batteries (non-hazardous. Note: hazardous batteries may also be generated which are referred to below)
  - Waste electrical and electronic equipment including computers, printers and other information and communications technology equipment (nonhazardous. Note: Waste electrical and electronic equipment containing hazardous components may also be generated which are referred to below);
  - Metals, timber and mixed construction and demolition waste generated from operational maintenance activities;

- o Green/garden waste from landscaping activities;
- o Textiles; and
- o Furniture (and from time to time other bulky wastes).
- Non-Clinical Hazardous Waste
  - o Printer/toner cartridges;
  - Batteries (hazardous. Note: non-hazardous batteries may also be generated);
  - Waste electrical and electronic equipment including computers, printers and other equipment (containing hazardous components. Note: Waste electrical and electronic equipment not containing hazardous components may also be generated);
  - Cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc.);
  - o Fluorescent bulb tubes and other mercury containing waste;
  - Waste cooking oil; and
  - o Waste sludge from grease separator.
- Risk Waste
  - Healthcare risk wastes segregated into a number of categories as illustrated in Figure 10.1 (Note: Reusable Bio Systems bins will be used for all risk waste that would have previously gone into single use sharps boxes or yellow rigid plastic containers);
  - Chemical waste including spent and expired chemicals from laboratories; and
  - o Radioactive waste.

The aforementioned waste types are the same waste types that are currently generated at the existing St. Vincent's University Hospital.

# Figure 10.1: Segregation of Healthcare Risk Waste

YELLOW RIGID BIN OR BOX WITH BLACK LID BLACK LID PLACENTAS (SEE NOTE BELOW RE ABSORBENT MATERIAL) LARGE ANATOMICAL BODY PARTS BSETSE RELATED BLOOD OR TISSUE CONTAMINATED LARGE METAL OBJECTS (SEE 6.4.1.1.4) DO NOT OVERFILL BCX MUST BE SECURELY CLOSED WHEN AT MANUFACTURER'S FILL LINE	BLACK BAG* - R NON-FIISK WASTE A NON-FIISK WASTE A NINENCE WEAR (from non- ous patients) SEN FACE MASKS FY URINARY DRAINAGE R TUBING (e.g. oxygen, y catheters, ventilator, I.V., y catheters, ventilator, I.V.,
YELLOW SHARPS BIN OR BOX WITH PURPLE LID • NEEDLES. SYRINGES. SHARP INSTRUMENTS AND BROKEN GLASS CONTAMINATED WITH CYTOTOXIC/CYTOSTA TIC MEDICINES OR OTHER TOXIC PHARMACEUTICAL PRONUCTS PONOT OVERFILL NOT FOR LIQUIDS BOX MUST BE SECURELY CLOSED WHEN AT MANUFACTURERS FILL LINE	OR BOX     ID <sup>4</sup> LID <sup>4</sup> LID <sup>4</sup> CINAL/     Infector       BSTANCES     Infector       BSTANCES     OXYG       ad as     OXYG       under ADR     OXYG       ad as     OXYG       infector     Intheir       / in their     OXYG       a different     CLEA       A di L C
YELLOW RIGID BIN OR BOX WITH PURPLE LID • NON-SHARPS HEALTHCARE WASTE CONTAMINATED WITH CYTOTOXIC/CYTOSTA TIC MEDICINES OR OTHER TOXIC PHARMACEUTICAL PRODUCTS SEE NOTE REGARDING LIQUIDS BELOW LIQUIDS BELOW DO NOT OVERFILL BOX MUST BE SECURELY CLOSED WHEN AT MAXIMUM 34 FULL OR AT MANUFACTURER'S FILL LINE	YELLOW RIGID BIN WITH BLUE • UN-REGULATED MEDIC PHARMACEUTICAL SUI i.e. products not classifie DANGEROUS GOODS of Regulations Note: These waste subs best managed by returni disposal to the pharmacy disposal to the pharmacy original packaging. If the products belong to "dangerous goods" class e flammable solids, liquids oo they must be packaged and accordance with their classi entry in ADR as instructed th Adviser.
YELLOW SHARPS BIN OR BOX USED SHARP MATERIALS SUCH AS: • NEEDLES • SYRINGES • SYRINGES • SYRINGES • SYRINGES • SYRINGES • SYRINGES • STARP TIPS OF I.V. • STARP TIPS OF I.V. • STIRD OR • CONTAMINATED • CONTAMINATED	NOT FOR LIQUIDS BOX MUST BE SECURELY CLOSED WHEN AT MAXIMUM 34 FULL OR, AT MANUFACTURER'S FILL LINE FILL LINE FILL LINE the use of absorbent s from UN packaging e liquids unless the significant quantities in clear. or otherwise identified plastic related foonce
YELLOW RIGID BIN OR BOX WITH YELLOW LID BLOOD AND BLOOD ADMINISTRATION SETS BODY FLUIDS (not in bulk) SEE NOTE RE LIQUIDS BUCTON LINERS BIOLOGICAL HISTOLOGY WASTE NON-CULTURED LAB WASTE & NON-CULTURED LAB WASTE & NON-CULTURED LAB WASTE & NON-CULTURES FROM KONTAINERS FROM KONTAINERS FROM SUSPECTED TB CASES	DO NOT OVERFILL BOX MUST BE SECURELY BOX MUST BE SECURELY CLOSED WHEN AT MAXIMUM 34 FULL OR, AT MANUFACTURER'S FILL LINE FILL LINE aboods Regulations require in to prevent any spillage risk waste involving fre y approved for liquids. All M-proof" containers.
YELLOW BAG ALL BLOOD-STAINED OR CONTAMINATED TIEMS INCLUDING DRESSINGS, SWABS, BANDAGES, BANDAGES, PROTECTIVE PROTECTIVE COURTENT (GOWNS, APRONS, GLOVES) SUCTION CATHETERS, TUBING APRONS, GLOVES) SUCTION CATHETERS, TUBING APRONS, GLOVES) INCONTINENCE WASTE FROM KNOWN OR SUSPECTED ENTERIC INFECTIONS MB. BAGS MUST NOT BE URLING NB. BAGS MUST NOT BE URLING NB. BAGS MUST NOT BE URLING	DO NOT OVERFILL BAG MUST BE SECURELY CLOSED WITH CABLE TIE OR TAPE WHEN 2/3 FULL MAXIMUM MAXIMUM LIQUIDS: Dangerous C material or gelling age containing healthcare containing healthcare container is specifically of liquid must be in "lea 01 liquid must be in "lea 01 liquid must be in "lea (1) All bage and containers must heav (2) * Containers, matring and labbis (3) Blue (or grey) lidded containers any rec bage

Source: HSE and Department of Health and Children, Healthcare Risk Waste Management, 2010 and HSE, Waste Management Awareness Handbook, 2011

The predicted waste arising from the new National Maternity Hospital at the St. Vincent's University Hospital Campus have been determined based on waste generation data for the existing National Maternity Hospital at Holles Street taking into account the proposed increase in the number of beds that will be provided in the new hospital. It is proposed that shared waste management facilities will be provided on the Campus to manage the waste from both the new National Maternity Hospital and St. Vincent's University Hospital. The predicted waste generation rates for the main waste types for the new National Maternity Hospital have been combined with the waste generation rates for St. Vincent's University Hospital to present the overall waste generation rate for the two hospitals (Table 10.3).

 Table 10.3:
 Overall predicted waste generation for the main waste types for the new

 National Maternity Hospital and St. Vincent's University Hospital

Waste Type	Weight				
wase type	tonnes/week	tonnes/year			
Recyclables (co-mingled)	1.7	90			
Cardboard	1.3	68			
Confidential Paper	0.5	25			
Mixed Non-Recyclable Waste	26.0	1354			
Organic (food/catering) Waste	2	104			
Glass	0.1	6			
Mixed Construction & Demolition Waste	1.1	57			
Batteries	<0.1	1			
Waste Electrical and Electronic Equipment	0.2	8			
Fluorescent Tubes	0.02	1			
Waste Cooking Oil	0.13	7			
Healthcare Risk Waste	6	293			
Bio-systems Waste	3	160			
Excluded Risk Wastes	1	44			
Total	42.66	2,218.4			

Waste receptacles will be located in the dirty utilities, treatment rooms, theatres, departments, wards, kitchenettes/ward pantries, patient rooms and along hospital corridors, where appropriate. The waste receptacles will be colour coded and labelled and will facilitate segregation of waste at source. Signage will be posted on or above the bins to specify the waste types that are acceptable, where appropriate.

When these receptacles have been appropriately filled, the bags/bins/containers will be transferred to dedicated waste disposal hold rooms which will be strategically located throughout the hospital close to wards, treatment areas and food service areas, as required.

When the receptacles in the waste disposal hold rooms have been appropriately filled, they will be transferred manually to an external shared waste marshalling area via the service lifts and central services corridor at Level 0 (in the National Maternity Hospital building). The full bins will be replaced by empty bins so there is always a bin available for each waste type in the waste disposal hold rooms. Radioactive wastes will be transferred separately from their point of use to the dedicated radioactive waste store at Level 0.

The shared waste marshalling area will also be used for the temporary storage of all waste from St. Vincent's University Hospital excluding radioactive waste which will be stored (with radioactive waste from the new National Maternity Hospital) in the dedicated radioactive waste store at Level 0.

Waste will be stored in dedicated receptacles in the shared waste marshalling area pending collection/transfer offsite on a regular basis by a permitted waste contractor.

Further detail is provided in the Operational Waste Management Plan which is included as Appendix 10.2.

# 10.5 Potential Impact of the Proposed Development

This Section deals with the potential waste impacts associated with the proposed development.

### 10.5.1 Construction Phase

The demolition, bulk excavation and construction phases of the project will generate a wide range of non-hazardous and hazardous waste materials. Correct segregation, storage, handling and transport of waste will be required to ensure litter is not generated at the St. Vincent's University Hospital Campus and does not become a nuisance to the public and attract vermin.

The use of non-permitted waste contractors or unlicensed facilities could give rise to inappropriate management of waste and result in environmental impacts/pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices in line with the Construction and Demolition Waste Management Plan (Appendix 10.1).

Made ground and overburden will be excavated to facilitate construction of the proposed development. A recent ground investigation indicated that the material would generally be classed as inert or non-hazardous for disposal purposes but hotspots of contamination may be encountered during the excavations. If contaminated material is not correctly identified, segregated and appropriately classified, there may be incorrect handling of the material which could impact negatively on workers as well as water and soil environments, both onsite and offsite.

In the event that the Construction and Demolition Waste Management Plan is not implemented, it is unlikely that the target reuse/recycling/recovery rate of 70% (outlined in the Waste Framework Directive) will be achieved.

## 10.5.2 Operational Phase

This development is planned to accommodate a large number of patients, staff, contractors and visitors. The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to significant volumes of waste being sent unnecessarily to landfill. In addition, the requirements of the Dublin City Council Waste Bye-laws and Development Plan, along with the targets outlined in the Eastern-Midlands Region Waste Management Plan, 2015 – 2021, would not be met.

Again, the use of non-permitted waste contractors or unlicensed facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices in line with the Operational Waste Management Plan (Appendix 10.2).

In addition, if waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the Campus and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and surrounding areas.

#### 10.6 Mitigation Measures

This Section outlines the measures that will be employed in order to reduce the amount of waste produced at the development, manage the wastes generated in a responsible method and handle the waste in such a manner as to minimise the effects on the environment.

### 10.6.1 Construction Phase

As stated in Section 10.4.1, a project specific Construction and Demolition Waste Management Plan has been prepared to deal with waste generation during the demolition, bulk excavation and construction phases of the project and is included as Appendix 10.1. The Construction and Demolition Waste Management Plan has been prepared in accordance with the Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects document produced by the National Construction and Demolition Waste Council in conjunction with the Department of Environment and Local Government in July 2006. The Plan will be employed to ensure effective waste management and waste prevention, minimisation, reuse, recycling, recovery and disposal of waste material generated at the site.

Mitigation measures proposed are summarised below and are described in more detail in Appendix 10.1:

- Building materials should be chosen with an aim to 'design out waste';
- On-site segregation of non-hazardous waste materials into appropriate categories, where possible, including:
  - Excavated made ground/overburden will be classified and segregated into inert (Category A), inert (Category A2), non-hazardous (Category B), stable non-reactive hazardous for disposal in non-hazardous landfill (Category C) or hazardous (Category D);
  - o concrete, bricks, tiles, ceramics and plasterboard
  - o metals; and
  - o timber
- On-site segregation of all hazardous waste materials into appropriate categories including:
  - o Asbestos containing materials;
  - o Contaminated soils (if encountered);
  - o Waste oil and fuels; and
  - o Paints, glues, adhesives and other known hazardous substances.

- All wastes will be segregated at source, where possible.
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site. The waste storage area(s) will be assigned and all construction staff provided with training regarding the waste management procedures on commencement of the project;
- Left over materials (e.g. timber off-cuts) and any suitable construction materials shall be re-used on-site where possible;
- All waste leaving site will be reused, recycled or recovered where possible;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted and/or licenced facilities;
- All waste leaving the site will be recorded and copies of relevant documentation maintained; and
- Any nearby sites requiring clean fill 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 by-product (and not as a waste), this will be done in accordance with Article 27 of the EC (Waste Directive) Regulations (2011) as detailed in Appendix 10.1.

These mitigation measures will ensure that the waste arising from the demolition, bulk excavation and construction phases of the development is dealt with in compliance with the provisions of the Waste Management Act 1996 as amended and sub-ordinate and associated regulations, the Litter Act of 1997 as amended and the Eastern-Midlands Region Waste Management Plan (2015 - 2021). It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

### 10.6.2 Operational Phase

As stated in Section 10.4.2, a project specific Operational Waste Management Plan has been prepared to deal with waste generation from the proposed development, once operational, including St. Vincent University Hospital and is included as Appendix 10.2.

Mitigation measures proposed are summarised below and are described in more detail in Appendix 10.2:

- On-site segregation of all waste materials into appropriate categories including (but not limited to):
  - o Non-Risk/Non-Clinical Non-Hazardous Waste
    - Recyclables (co-mingled);
    - Cardboard;

- Confidential Paper;
- Organic/catering waste (food waste and flowers);
- Mixed Non-Recyclable Waste;
- Glass;
- Polystyrene;
- Batteries (non-hazardous)
- Waste electrical and electronic equipment including computers, printers and other equipment (non-hazardous);
- Metals, timber and mixed construction and demolition waste generated from operational maintenance activities;
- Green/garden waste from landscaping activities;
- Textiles; and
- Furniture
- o Non-Clinical Hazardous Waste
  - Printer/toner cartridges;
  - Batteries (hazardous);
  - Waste electrical and electronic equipment including computers, printers and other equipment (containing hazardous components);
  - Cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc.);
  - Fluorescent bulb tubes and other mercury containing waste;
  - Waste cooking oil; and
  - Waste sludge from grease separator.
- o Risk Waste
  - Healthcare risk wastes segregated into a number of categories as illustrated in Figure 10.1;
  - Chemical waste including spent and expired chemicals from laboratories; and
  - Radioactive waste.
- All waste materials will be stored in colour coded labelled bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;
- All non-risk waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities; and

• All waste leaving the site will be recorded and copies of relevant documentation maintained.

These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, and sub-ordinate and associated regulations, the Litter Act of 1997, as amended, and the Eastern-Midlands Region Waste Management Plan (2015 - 2021). It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

# 10.7 Predicted Impact of the Proposed Development

The implementation of the mitigation measures outlined in Section 10.6 for the proposed development will ensure that a high rate of reuse, recycling and recovery is achieved at the development during the construction phase as well as during the operational phase. It will also ensure that European, national and regional legislative requirements with regard to waste are met and associated targets for the management of waste are achieved. Primarily, implementation of the project specific Construction and Demolition and Operational Waste Management Plans will minimise the volume of waste requiring to be disposed of at landfill.

# 10.7.1 Construction Phase

A carefully planned approach to waste management and adherence to the Construction and Demolition Waste Management Plan during the construction phase will ensure that the impact on the environment will be neutral, short-term and imperceptible. The opportunities for waste materials to be reused off-site will provide positive impacts in the resourcing of materials for other developments and reduce the requirement for raw material extraction.

### 10.7.2 Operational Phase

During the operational phase, a structured approach to waste management will promote resource efficiency and waste minimisation. Provided the Operational Waste Management Plan is implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be neutral, long term and imperceptible.

#### 10.7.3 'Do Nothing' Scenario

For the Do Nothing Scenario, there will be no construction activities on the St. Vincent's University Hospital site (other than normal maintenance activities) and as a result there will be no construction and demolition waste materials generated. As mentioned in Section 10.5.1, there may be hotspots of contamination within the footprint of the proposed development. The Do Nothing Scenario would leave this potential contamination in situ.

As regards operational waste, the existing waste management procedures at the St. Vincent's University Hospital Campus will continue with facilities and maintenance staff ensuring that waste is managed in accordance with the relevant legislation and best practice guidelines.

#### 10.7.4 Worst Case Scenario

The potential construction and operational phase impacts outlined in Section 10.5 represent the worst case scenario. Mitigation measures have been outlined in Section 10.6 and detailed in the project specific Construction and Demolition and Operational Waste Management Plans (Appendix 10.1 and 10.2) as well as the Draft Construction Management Plan (which is included as Appendix 2.1 to Chapter 2 of this EIS) to mitigate these potential impacts.

### 10.8 Monitoring

### 10.8.1 Construction Phase

The objective of setting targets for waste management is only achieved if the actual waste generation volumes are calculated and compared. This is particularly important during the construction and demolition phase where there is a potential for waste management to become secondary to progress and meeting construction schedule targets. The Construction and Demolition Waste Management Plan specifies the need for a waste manager to be appointed who will have responsibility to monitor the actual waste volumes being generated and to ensure that the Main Contractor and sub-contractors are segregating waste as required. Where targets are not being met, the waste manager should identify the reasons for targets not being achieved and work to resolve any issues. Recording of waste generation during the project will enable better management of waste contractor requirements and identify trends. The data should be maintained to advise on future projects.

#### 10.8.2 Operational Phase

During the operational phase, facility management personnel should monitor waste generation volumes against the predicted waste volumes outlined in the Operational Waste Management Plan. There may be opportunities to reduce the equipment and number of bins required where estimates have been too conservative. Reductions in equipment/bin requirements will reduce waste contractor costs and reduce workload on facilities management personnel. Waste legislation and Dublin City Council Waste Bye-Laws should also be consulted on a regular basis in case of any changes which may impact on waste management procedures.

### 10.9 Reinstatement

No reinstatement is required. The excavation space will be occupied by the proposed new buildings and infrastructure.

### **10.10 Interactions and Potential Cumulative Impacts**

#### 10.10.1 Interactions

The interactions between waste management and the relevant EIS topics are addressed below.

### Soils, Geology and Hydrogeology

A potential impact on the soils, geological and hydrogeological environment includes the excavation and removal of made ground and overburden and reuse/recovery/disposal of this material off site. Proposed mitigation includes the controlled excavation of made ground and overburden in accordance with the relevant waste legislation and best practice standards. This is addressed in this Chapter and Chapter 7 of this EIS (Soil, Geology and Hydrogeology).

In addition, incorrect storage and management of waste or the use of unauthorised waste hauliers and/or receiving facilities could give rise to inappropriate management of waste and result in negative environmental impacts on the soil and hydrogeological environments. Implementation of the project specific Construction and Demolition and Operational Waste Management Plans as well the Draft Construction Management Plan will ensure appropriate management of waste and the use of permitted hauliers and authorised receiving facilities.

#### Traffic and Transportation

Traffic and transportation will be impacted by the additional vehicle movements generated by removal of waste from the site during the construction and operational phases of the development. However, the increase in vehicle movements as a result of waste removal during the construction phase will be temporary in duration. There will be an imperceptible increase in waste collections from the site during the operational phase. The potential and predicted impacts and mitigation measures with regard to traffic are addressed in Chapter 6 of this EIS (Traffic & Transportation).

### Human Beings

The potential impacts on human beings in relation to the generation of waste during the construction and operational phases are that incorrect management of waste could result in littering which could cause a nuisance to the public and attract vermin. A carefully planned approach to waste management and adherence to the project specific Construction and Demolition and Operational Waste Management Plans as well the Draft Construction Management Plan will ensure appropriate management of waste.

### 10.10.2 Potential Cumulative Impacts

Planning permission has recently been granted for a number of developments in the vicinity of the site. The most relevant developments are the construction of a sheltered accommodation housing development, a new apartment complex, extensions to two nearby nursing homes, a new broadcasting facility at the RTE Campus and redevelopment works at the RDS Campus. These developments would be likely to have generally similar impacts arising from the generation of waste materials. There is no interaction between such impacts that would lead to a significant cumulative impact in terms of waste management.