13 Material Assets - Waste Management

13 **MATERIAL ASSETS - WASTE MANAGEMENT 1**

13.1 INTRODUCTION 2
13.2 STUDY METHODOLOGY 2
13.3 THE EXISTING RECEIVING ENVIRONMENT (BASELINE) 5
13.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT 5
13.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT 9
13.6 POTENTIAL CUMULATIVE IMPACTS 10
13.7 DO NOTHING SCENARIO 11
13.8 RISKS TO HUMAN HEALTH 11
13.9 MITIGATION MEASURES 11
13.10 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT 13
13.11 RESIDUAL IMPACTS 14
13.12 MONITORING 14
13.13 REINSTATEMENT 14
13.14 INTERACTIONS 15
13.15 DIFFICULTIES ENCOUNTERED 16
13.16 REFERENCES 16

13.1 Introduction

This Chapter of the EIAR comprises an assessment of the likely impact of the proposed Development on the waste generated from the development as well as identifying proposed mitigation measures to minimise any associated impacts.

A site-specific Construction and Demolition Waste Management Plan (C&DWMP) has been prepared by AWN Consulting Ltd to deal with waste generation during the demolition, excavation and construction phases of the proposed Development and has been included as Appendix 13.1. The C&D WMP was 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 (NCDWC) in conjunction with the Department of the Environment, Heritage and Local Government in July 2006.

A separate Operational Waste Management Plan (OWMP) has also been prepared for the operational phase of the proposed Development and is included as Appendix 13.2 of this Chapter.

These documents will ensure the sustainable management of wastes arising at the Development Site in accordance with legislative requirements and best practice standards.

13.2 Study Methodology

The assessment of the impacts of the proposed Development, arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management, including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports. A summary of the documents reviewed, and the relevant legislation is provided in the C&D WMP and in the OWMP provided in Appendices 13.1 and 13.2.

The proposed development is described in Chapter 2 (Site Context and Description of Development) and considers the following aspects:

- Construction Phase (including Demolition, excavation, and site preparation); and
- Operational Phase.

A desktop study was carried out which included the following:

- Description of the typical waste materials that will be generated during the Construction and Operational Phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the construction and operational phases of the proposed Development have been calculated. The waste types and estimated quantities are based on published data by the EPA in the National Waste Reports and National Waste Statistics, data recorded from similar previous developments, Irish and US EPA waste generation research as well as other available research sources.

Mitigation measures are proposed to minimise the effect of the proposed Development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 13.9

A detailed review of the existing ground conditions on a regional, local, and site-specific scale are presented in Chapter 7 (Land, Soils, Geology, Hydrogeology and Utilities). Chapter 9 also discuss the environmental quality of any soils which will have to be excavated to facilitate construction of the proposed Development.

Legislation and Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation, which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended). European and national waste management policy is based on the concept of 'waste hierarchy', which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal) (Figure 13.1).

Figure 13-1 Waste Hierarchy (Source: European Commission)

The Irish government issues policy documents which outline measures to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document, *Waste Action Plan for a Circular Economy – Waste Management Policy in Ireland*, was published in 2020 and shifts focus away from waste disposal and moves it back up the production chain. The move away from targeting national waste targets is due to the Irish and international waste context changing in the years since the launch of the previous waste management plan, *A Resource Opportunity,* in 2012. The need to embed climate action in all strands of public policy aligns with the goals of the European Green Deal.

The strategy for the management of waste from the construction phase is in line with the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects*, published by the Department of Environment, Heritage and Local Government (DoEHLG) in 2006. The guidance document, *Construction and Demolition Waste*

Management: A Handbook for Contractors and Site Managers (FÁS & Construction Industry Federation, 2002), was also consulted in the preparation of this assessment.

There are currently no Irish guidelines on the assessment of operational waste generation and guidance is taken from industry guidelines, plans and reports including the EMR Waste Management Plan 2015 – 2021, BS 5906:2005 Waste Management in Buildings – Code of Practice, 5. The Dún Laoghaire-Rathdown County Council (DLRCC) 'Dún Laoghaire-Rathdown County Council (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws (2019), DLRCC Guidance Notes for Waste Management in Residential and Commercial Developments (2020), the EPA National Waste Database Reports 1998 – 2018 and the EPA National Waste Statistics Web Resource.

Terminology

Note that the terminology used herein is generally consistent with the definitions set out in Article 3 of the Waste Framework Directive. Key terms are defined as follows:

Waste - Any substance or object which the holder discards or intends or is required to discard.

Prevention - Measures taken before a substance, material or product has become waste, that reduce:

a) the quantity of waste, including through the re-use of products or the extension of the life span of products;
b) the adverse impacts of the generated waste on the environment and human health; or
c) the content of harmful substances in materials and products.

Reuse - Any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.

Preparing for Reuse - Checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing.

Treatment - Recovery or disposal operations, including preparation prior to recovery or disposal.

Recovery - Any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II of the Waste Framework Directive sets out a non-exhaustive list of recovery operations. ***Recycling*** - Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

Disposal - Any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Annex I sets out a non-exhaustive list of disposal operations.

13.3 The Existing Receiving Environment (Baseline)

In terms of waste management, the receiving environment is largely defined by Dún Laoghaire-Rathdown County Council (DLRCC) as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the Eastern-Midlands Region (EMR) Waste Management Plan 2015-2021.

The waste management plan sets out the following 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 Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste 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 National Waste Statistics update published by the EPA in August 2020 identifies that Ireland's current progress against this C&D waste target is at 77% and our progress against 'Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)' is at 51%. Both of these targets are required to be met by 12 December 2020 in accordance with the requirements of the Waste Framework Directive, however the EPA are yet to confirm that these were met.

The Dún Laoghaire-Rathdown County Development Plan 2016 – 2022 also sets policies and objectives for the DLRCC area which reflect those set out in the regional waste management plan.

In terms of physical waste infrastructure, DLRCC no longer operates any municipal waste landfill in the area. There are a number of waste permitted and licensed facilities located in the Eastern-Midlands Waste Region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, hazardous waste treatment facilities, municipal waste landfills, material recovery facilities, waste transfer stations and two waste-to-energy facilities.

13.4 Characteristics of the Proposed Development

Proposed Development

The proposed development comprises 493 residential units delivered in a combination of new apartment buildings (ranging in height from 3- 10 storeys overall in height) and a relocated St. Teresa's Lodge.

St. Teresa's House provides for 6 apartments, comprising 5 no. 2-bed units and 1 no. 3-bed unit. The new build element of 487 units is set out in 11 no. residential development blocks (Blocks A1-C2 and D1 – E2) ranging in height from 3-10 storeys over basement comprising:

- Block A1 (5 storeys) comprising 37 no. apartments (33 no. 1 bed units and 4 no. 2 bed units)
- Block B1 (10 storeys) comprising 55 no. apartments (37 no. 1 bed units, 10 no. 2 bed units and 8no. 3 bed units)
- Block B2 (8 storeys) comprising 42 no. apartments (28 no. 1 beds, 9 no. 2 beds and 5 no. 3 beds)
- Block B3 (8 storeys) comprising 42 no. apartments (28 no. 1 beds, 9 no. 2 beds and 5 no. 3 beds)

- Block B4 (5 storeys) comprising 41 no. apartments (4 no. studio units, 4 no. 1 bed units, 27 no. 2 bed units and 6 no. 3 bed units).
- Block C1 (3 storeys) comprising 10 no. apartments (1 no. studio unit, 3 no. 1 bed units and 6 no. 2 bed units).
- Block C2 (3 storeys) comprising 6 no. apartments (2 no. 1 bed units, 4 no. 2 bed units,) together with a creche facility of 392 sq. m at ground floor level and outdoor play area space of 302sq.m
- Block C3 (1 storey plus basement level) comprising residential amenity space of 451 sq. m.
- Block D1 (6 storeys) comprising 134 no. apartments (12 no. studio units, 22 no. 1 bed units, 90 no. 2 bed units and 10 no. 3 bed units).
- Block E1 (6 storeys) comprising 70 apartment units (34 no. 1 bed units, 26 no. 2 bed units and 10 no. 3 bed units).
- Block E2 (6 storeys) comprising 50 units (1 no. studio unit, 29 no. 1 bed units, 18 no. 2 bed units and 2 no. 3 bed units).

Each residential unit has associated private open space in the form of a terrace/balcony.

Resident amenity space c. 451 sq. m. accommodating a gym and studio space at basement level; residents' lounge/café, work booths/meeting room and reception/foyer/parcel store at ground floor.

Crèche facility of 392. sq. m.

252 no. residential car parking spaces (161 no. at basement level and 91 no. at surface level) and 20 motorcycle spaces at basement level are proposed. 8 no. car parking spaces for creche use are proposed at surface level.

1056 no. bicycle parking spaces (656 no. at basement level and 400 no. at surface level).

15,099.7 sq. m. public open space in the form of a central parkland, garden link, woodland parkland (incorporating an existing folly), a tree belt, entrance gardens, plazas, terraces, gardens, and roof terraces for Blocks B2 and B3.

Demolition Phase

There will be a quantity of waste materials generated from the demolition of all of the existing ancillary buildings and extensions and some existing hard standing areas on site, as well as from the excavation of the building foundations.

Further detail on the waste materials likely to be generated during the demolition works are presented in the project-specific C&D WMP in Appendix 13.1. The C&D WMP provides an estimate of the main waste types likely to be generated during the C&D phase of the proposed development. The reuse, recycling/recovery and disposal rates have been estimated using the EPA National Waste Reports and these are summarised in Table 13.1.

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	150.5	0	0.0	85	127.9	15	22.6
Concrete, Bricks, Tiles, Ceramics	852.8	30	255.8	65	554.3	5	42.6

Waste Type	Tonnes	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Plasterboard	66.9	30	20.1	60	40.1	10	6.7
Asphalts	16.7	0	0.0	25	4.2	75	12.5
Metals	250.8	5	12.5	80	200.7	15	37.6
Slate	133.8	0	0.0	85	113.7	15	20.1
Timber	200.7	10	20.1	60	120.4	30	60.2
Asbestos	2.5	0	0.0	0	0.0	100	2.5
Total	**1674.7**		**308.5**		**1161.3**		**204.7**

Table 13-1 Estimated off-site reuse, recycle and disposal rates for demolition waste

Construction Phase

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 oversupply of materials will be kept to a minimum and opportunities for reuse of suitable materials maximised.

In addition, topsoil, sub soil and made ground will require excavation to facilitate the proposed basement, site levelling, construction of foundations, along with the installation of underground services. It is estimated that c. 45,000m^3 of material will require excavation. It is envisaged that the majority of this material will be removed off-site, with only 1,500m^3 of topsoil remaining onsite. If the material that requires removal from Site 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 Act 1996, as amended), and the Regulations made threunder. The volume of waste requiring recovery/disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as by-product under Article 27 classification (European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011).

In order to establish the appropriate reuse, recovery and/or disposal route for the soils and stones to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous. Environmental soil analysis will be carried out prior to removal of the material on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste including potential pollutant concentrations and leachability. It is anticipated that the surplus material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities/landfills in Ireland or, in the unlikely event of hazardous material being encountered, be transported for treatment/recovery or exported abroad for disposal in suitable facilities.

Waste will also be generated from Construction Phase workers e.g., organic/food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins, and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided on-site during the Construction Phase. Waste printer/toner cartridges, waste electrical and

electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

Further details on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific C&D WMP appended to this EIAR. The C&D WMP provides an estimate of the main waste types likely to be generated during the Construction Phase of the proposed Project and these are summarised in Table 13.2.

Waste Type	Tonne	Reuse		Recycle/Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	862.9	10	86.3	80	690.3	10	86.3
Timber	732.2	40	292.9	55	402.7	5	36.6
Plasterboard	261.5	30	78.4	60	156.9	10	26.1
Metals	209.2	5	10.5	90	188.3	5	10.5
Concrete	156.9	30	47.1	65	102.0	5	7.8
Other	392.2	20	78.4	60	235.3	20	78.4
Total	**2614.9**		**593.6**		**1775.5**		**245.8**

Table 13-2 Estimated off-site reuse, recycle and disposal rates for construction waste.

Operational Phase

As noted in Section 13.1, an OWMP has been prepared for the proposed Project and is included as Appendix A13.2 to the EIAR. The OWMP provides a strategy for segregation (at source), storage and collection of all wastes generated within the building during the Operational Phase including dry mixed recyclables, organic waste and mixed non-recyclable waste as well as providing a strategy for management of waste glass, batteries, WEEE, printer/toner cartridges, chemicals, textiles, waste cooking oil and furniture.

The total estimated waste generation for the proposed Project for the main waste types based on the AWN Waste Generation Model (WGM) is presented in Table 13.3, below, and is based on the uses and areas as advised by the Project Architects (O'Mahony Pike). Further unit breakdowns can be found in Appendix 13.2.

Waste type	Waste Volume (m^3/week)		
	Residential Units (Combined)	Childcare Facility	Café Unit
Organic Waste	7.21	0.04	0.06
DMR	52.81	1.38	0.13
Glass	1.39	0.00	0.01
MNR	25.14	0.61	0.17
Total	**86.55**	**2.03**	**0.37**

Table 13-3 Estimated Operational Waste Volume m3/week for the development

The residents will be required to provide and maintain appropriate waste receptacles within their units to facilitate segregation at source of these waste types. The location of the bins within the units will be at the discretion of the residents. As required, the residents and tenants will need to bring these segregated wastes from their units to their allocated Waste Storage Areas (WSAs). All WSAs can be viewed on the plans submitted with the application.

The OWMP seeks to ensure the proposed Project contributes to the targets outlined in the *EMR Waste Management Plan 2015-2021* and the DLRCC waste Bye-laws.

Mitigation measures proposed to manage impacts arising from wastes generated during the Operational Phase of the proposed Project are summarised below.

13.5 Potential Impact of the Proposed Development

This section details the potential waste effects associated with the proposed Project.

Construction Phase

The proposed Development will generate a range of non-hazardous and hazardous waste materials during site demolition, excavation and construction. General housekeeping and packaging will also generate waste materials, as well as typical municipal wastes generated by construction employees, including food waste. Waste materials will be required to be temporarily stored on-site pending collection by a waste contractor. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the Development Site and in adjacent areas. The indirect effect of litter issues is the presence of vermin in areas affected. In the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative.***

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste, resulting in indirect negative environmental impacts, including pollution. It is essential that all waste materials are dealt with in accordance with all applicable legal requirements, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. In the absence of mitigation, the effect on the local and regional environment is likely to be ***Long-term, significant*** and ***negative.***

Wastes arising will need to be taken to suitably registered / permitted / licensed waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. There are numerous licensed waste facilities in the EMR which can accept hazardous and non-hazardous waste materials, and acceptance of waste from the Development Site would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative.***

There is a quantity of excavated material which will need to be excavated to facilitate the proposed development. A detailed review of the existing ground conditions on a regional, local site-specific scale are presented in Chapter 7. It is anticipated that most if not all of excavated material will need to be removed off-site due to the limited opportunity for reuse onsite. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative.***

Operational Phase

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 small volumes of waste being sent unnecessarily to landfill. In the absence of mitigation, the effect on the local and regional environment is likely to be ***Long-term, significant*** and ***negative.***

The nature of the development means the generation of waste materials during the operational phase is unavoidable. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling).

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the Development Site and in adjacent areas. The knock-on effect of litter issues is the presence of vermin in affected areas. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***short-term, significant*** and ***negative.***

Waste contractors will be required to service the proposed Development on a regular basis to remove waste. The use of non-permitted waste contractors or unauthorised 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. However, in the absence of mitigation, the effect on the local and regional environment is likely to be ***Long-term, significant*** and ***negative.***

13.6 Potential Cumulative Impacts

Construction Phase

Multiple permissions remain in place for both residential and commercial developments within the vicinity of the development. In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap in the construction phase. This would require multiple vehicles / waste contractors / waste receptacles being required to service the developments. Due to the high number of waste contractors in the Dublin region there would be sufficient contractors available to handle waste generated from a large number of these sites simultaneously, if required. Similar waste materials would be generated by all the developments.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative effects associated with waste generation and waste management. As such the effect will be **short-term, not significant and negative.**

Operational Phase

There are existing residential and commercial developments in close proximity. All of the current and potential developments will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely improve the efficiencies of waste collections in the area.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts

associated with waste generation and waste management. As such the effect will be a **long-term, imperceptible and neutral.**

13.7 Do Nothing Scenario

If the proposed Development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no excavation or construction or operational waste generated at this Site. There would, therefore, be a neutral effect on the environment in terms of waste.

The site is zoned for development and it is likely that in the absence of this subject proposal that a development of a similar nature would be progressed on the site that accords with national and regional policies to promote sustainable growth therefore the likely significant effects would be similar to this proposal..

13.8 Risks to Human Health

The potential impacts on human beings in relation to the generation of waste during the demolition, construction and operational phases would occur from the incorrect management of waste. This 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 C&DWMP and OWMP, will ensure appropriate management of waste and avoid any negative impacts on the local population. **long-term, imperceptible and neutral.**

13.9 Mitigation Measures

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

Construction Stage

The following mitigation measures will be implemented during the construction phase of the proposed Development:

As previously stated, a project specific C&D WMP has been prepared in line with the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* (DoEHLG, 2006), and is included as Appendix 13.1. Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the demolition, excavation and construction phases of the proposed Development.

- Prior to commencement, the C&D WMP (Appendix 13.1), detailing additional measures required as a result of planning conditions.
- The provisions of the C&D WMP shall be fully implemented throughout the duration of the proposed construction and demolition phases.

A quantity of topsoil, sub soil, clay and made ground will need to be excavated to facilitate the proposed Development. It is estimated that all or most of the c. 45,000 m^3 of excavated material will need to be removed off-site, with only 1,500m^3 of topsoil remaining onsite for reuse in landscaping. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen with an aim to 'design out waste';
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling, and recovery. The following waste types, at a minimum, will be segregated:
    - Concrete rubble (including ceramics, tiles, and bricks);
    - Plasterboard;
    - Metals;
    - Glass; and
    - Timber.
- Left over materials (e.g., timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible;
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A Waste Manager will be appointed to ensure effective management of waste during the demolition, excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled, or recovered, where possible, to avoid material designated for disposal;
- All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted, or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.
- Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. 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). EPA approval will be obtained prior to moving material as a by-product.

These mitigation measures will ensure that the waste arising from the construction phase of the proposed Development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, and the Regulations made thereunder and the Litter Pollution Act 1997, and the *EMR Waste Management Plan 2015 – 2021*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

Operational Stage

As previously stated, a project specific OWMP has been prepared and is included as Appendix 13.2.

- The Operator / Buildings Manager of the Site during the operational phase will be responsible for ensuring – allocating personnel and resources, as needed – the ongoing implementation of this OWMP, ensuring a high level of recycling, reuse, and recovery at the Site of the proposed Development.

In addition, the following mitigation measures will be implemented:

- The Operator / Buildings Manager will ensure on-Site segregation of all waste materials into appropriate categories, including (but not limited to):

  - Organic waste;
  - Dry Mixed Recyclables;
  - Mixed Non-Recyclable Waste;
  - Glass;
  - Waste electrical and electronic equipment (WEEE);
  - Batteries (non-hazardous and hazardous);
  - Cooking oil;
  - Light bulbs;
  - Cleaning chemicals (pesticides, paints, adhesives, resins, detergents, etc.);
  - Furniture (and from time-to-time other bulky waste); and
  - Abandoned bicycles.

- The Operator / Buildings Manager will ensure that all waste materials will be stored in colour coded 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;
- The Operator / Buildings Manager will ensure that all waste collected from the Site of the proposed Development will be reused, recycled, or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available; and
- The Operator / Buildings Manager will ensure that all waste leaving the Site will be transported by suitable permitted contractors and taken to suitably registered, permitted, or licensed facilities.

The effective implementation of these mitigation measures will ensure the waste arising from the proposed development during the operational phase is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, and Regulations made thereunder, *the Litter Pollution Act 1997*, the *EMR Waste Management Plan 2015 – 2021* and the DLRCC waste bye-laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

13.10 Predicted Impacts of the Proposed Development

The effective implementation of the mitigation measures outlined in Section 13.9 will ensure that the high rate of reuse, recovery and recycling is achieved at the development during the demolition, excavation and construction phases as well as during the operational phase. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

Construction Stage

A carefully planned approach to waste management as set out in Section 13.9 and adherence to the C&D WMP during the construction and demolition phase will ensure that the effect on the environment will be **short-term, imperceptible and neutral**.

Operational Stage

During the operational phase, a structured approach to waste management as set out in Section 13.9 will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted effect of the operational phase on the environment will be **long-term, imperceptible and neutral**.

13.11 Residual Impacts

Adherence to the mitigation measures outlined in Section 13.9 will ensure that there are no significant impacts on resource or waste management from the proposed development. The management of waste during the construction phase in accordance with the Construction & Demolition Waste Management Plan (C&D WMP) and during the operational phase in accordance with the Operational Waste Management Plan (OWMP) will ensure the development meets the requirements of regional and national waste legislation and promote the management of waste in line with the priorities of the waste hierarchy. The residual impact will be ***neutral*** and ***imperceptible***.

13.12 Monitoring

The management of waste during the construction phase should be monitored to ensure compliance with relevant local authority requirements, and effective implementation of the C&D WMP including maintenance of waste documentation.

The management of waste during the operational phase should be monitored to ensure effective implementation of the OWMP by the building management company and the nominated waste contractor(s).

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 demolition, excavation and construction phases where there is a potential for waste management to become secondary to progress and meeting construction schedule targets. The C&D WMP 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 contractors 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.

Operational Phase

During the operational phase, waste generation volumes should be monitored against the predicted waste volumes outlined in the OWMP. There may be opportunities to reduce the number of bins and equipment required in the WSAs where estimates have been too conservative. Reductions in bin and equipment requirements will improve efficiency and reduce waste contactor costs.

13.13 Reinstatement

The potential impact on waste during the decommissioning phase of the Proposed Development would be if the building waste to be demolished or refurbished.

The decommissioning of the proposed development will generate a range of non-hazardous and hazardous waste materials during site demolition / refurbishment. General housekeeping and packaging will also generate waste materials, as well as typical municipal wastes generated by construction employees, including food waste. Waste materials will be required to be temporarily stored on-site pending collection by a waste contractor. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The indirect effect of litter issues is the presence of vermin in areas affected. In the absence of

mitigation, the effect on the local and regional environment is likely to be indirect, **short-term, significant and negative.**

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste, resulting in indirect negative environmental impacts, including pollution. It is essential that all waste materials are dealt with in accordance with the European Union, regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. In the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, long-term, significant and negative.**

Wastes arising will need to be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. There are numerous licensed waste facilities in the EMR which can accept hazardous and non-hazardous waste materials, and acceptance of waste from the development site would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region and within Ireland. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, short-term, significant and negative.**

13.14 Interactions

Adherence to the mitigation measures outlined in Section 13.9 will ensure that there are no significant impacts on resource or waste management from the proposed development. The management of waste during the construction phase in accordance with the C&D WMP and during the operational phase in accordance with the OWMP will meet the requirements of regional and national waste legislation and promote the management of waste in line with the priorities of the waste hierarchy.

Land & Soils

During the Construction Phase excavated topsoil, made ground, fill, sub-soil and clay (c. 45,000m^3) will be generated from the excavations required to facilitate site levelling, construction of the basements and construction of new foundations. It is estimated that all or most of the c. 45,000m^3 of excavated material will need to be removed off-site, with only 1,500m^3 remaining for reuse. Where material has to be taken off-site it will be taken for reuse or recovery, where practical, with disposal as last resort. Adherence to the mitigation measures in Chapter 13 and the requirements of the C&D WMP, will ensure the effect is ***long-term, imperceptible*** and ***neutral.***

Traffic & Transportation

Local 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 proposed Project. The increase in vehicle movements as a result of waste generated during the Construction Phase will be *temporary* in duration. There will be an increase in vehicle movements in the area as a result of waste collections during the Operational Phase but these movement will be imperceptible in the context of the overall traffic and transportation increase and has been addressed in Chapter 12 (Traffic and Transport). Provided the mitigation measures detailed in Chapter 12, Chapter 13 and the requirements of the OWMP (included as Appendix A13.2) are adhered to, the effects should be *short to* ***long-term, imperceptible*** and ***neutral.***

Population & Human Health

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 C&D WMP and OWMP, will ensure appropriate management of waste and avoid any negative impacts on the local population. The effects should be *long-term*, *imperceptible* and *neutral.*

13.15 Difficulties Encountered

It is difficult to predict with precision 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.

There is a number of licensed, permitted and registered waste facilities in the Greater Dublin Arra. However, these sites may not be available for use when required or may be limited by the waste contractor selected to service the development in the appropriate phase. In addition, there is potential for more suitably placed waste facilities or recovery facilities to become operational in the future which may be more beneficial from an environmental perspective.

The ultimate selection of waste contractors and waste facilities would be subject to appropriate selection criteria proximity, competency, capacity, serviceability, and cost.

13.16 References

- Waste Management Act 1996 (No. 10 of 1996) as amended.
- Protection of the Environment Act 2003, (No. 27 of 2003) as amended.
- Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended
- Eastern-Midlands Region Waste Management Plan 2015 – 2021 (2015).
- Department of Environment and Local Government (DoELG) Waste Management – Changing Our Ways, A Policy Statement (1998).
- Forum for the Construction Industry – Recycling of Construction and Demolition Waste.
- Department of Environment, Communities and Local Government (DoECLG), A Resource Opportunity - Waste Management Policy in Ireland (2012).
- Department of Environment, Heritage 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 (CIF), Construction and Demolition Waste Management – a handbook for Contractors and Site Managers (2002).
- Dún Laoghaire-Rathdown County Council (DLRCC), Dún Laoghaire-Rathdown County Council Development Plan 2016-2022 (2016)
- Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended
- EPA, Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous (2015)

- Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.
- Environmental Protection Agency (EPA), National Waste Database Reports 1998 – 2012.
- EPA and Galway-Mayo Institute of Technology (GMIT), EPA Research Report 146 – A Review of Design and Construction Waste Management Practices in Selected Case Studies – Lessons Learned (2015).
- BS 5906:2005 Waste Management in Buildings – Code of Practice.
- DoEHLG, Sustainable Urban Housing: Design Standards for New Apartments, Guidelines for Planning Authorities (2018).
- DLRCC, County Council (Storage, Presentation and Segregation of Household and Commercial Waste) Bye-Laws (2019).
- Department of Housing, Planning & Local Government, Guidelines for Planning
- Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (2018)
- European Commission, Environmental Impact Assessment of Projects:
- Guidance on the preparation of the Environmental Impact Assessment Report (2017)
- EPA, Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (2017).
- Department of Communications, Climate Action and Environment (DCCAE), *Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025* (Sept 2020).