Chapter 19
Material Assets:
Resource and Waste Management

CONTENTS

19. MATERIAL ASSETS: RESOURCE & WASTE MANAGEMENT

19.1 Introduction

This chapter has assessed the potential effects on resource and waste management arising from the DART+ Coastal North project ("the Proposed Development") during the Construction, Operational and Decommissioning Phases based on the draft Railway Order, Chapter 4 (Description of Proposed Development) and Chapter 5 (Construction Strategy).

Chapter 4 (Description of Proposed Development) provides a description of the Proposed Development whilst Chapter 5 (Construction Strategy) describes the construction strategy which will be employed during the Construction Phase of the Proposed Development.

The following aspects of the Proposed Development are particularly relevant to the resource and waste assessment:

- **Design:** Throughout the design for the Proposed Development, consideration has been given to the minimisation of resource usage and the generation of waste through retention of material on site and material reuse;
- **Construction Phase:** Waste will be generated from site clearance, demolition and excavation. General construction waste will also be generated during the Construction Phase. During the construction of the Proposed Development, material usage will be minimised and material will be reused, where possible;
- **Operational Phase:** Waste will be generated from the operation of the Proposed Development. Project related maintenance activities will also generate minor quantities of waste; and
- **Decommissioning Phase:** Waste will be generated from the refurbishment or renewal of the railway infrastructure to enable its continued operation.

The use of resources and the potential for waste and surplus materials to be generated during the Construction, Operational and Decommissioning Phases of the Proposed Development are assessed herein. The potential environmental effects of the use of resources and the generation and management of solid waste arisings are examined in the context of the existing local, regional and national resource and waste management environment. Mitigation measures are identified, where necessary, to reduce the impact of resource use and waste generation from the Proposed Development during the Construction, Operational and Decommissioning Phases.

19.2 Legislation, Policy and Guidance

19.2.1 Guidelines and Policy

The following guidelines and policy documents were considered when undertaking the waste and resources assessment:

- Department of the Environment, Climate and Communications (DECC) (2021a). Whole of Government Circular Economy Strategy 2022-2023;
- DECC (2020). A Waste Action Plan for a Circular Economy: Ireland's National Waste Policy 2020-2025;

- DECC (2019). Consultation on the Transposition of the Circular Economy Waste Package;
- DCC (2022). Dublin City Development Plan 2022-2028;
- Environmental Protection Agency (EPA) (2023a). Construction and Demolition Waste Statistics for Ireland;
- EPA (2023b) Hazardous Waste Statistics for Ireland;
- EPA (2023c). Municipal Waste Statistics for Ireland;
- EPA (2023d). Biodegradable municipal waste to landfill;
- EPA (2022a). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (the 'EPA guidelines');
- EPA (2021a). The Circular Economy Programme 2021-2027;
- EPA (2021b). Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects;
- EPA (2020a). By-Product - Guidance Note. A guide to by-products and submitting a by-product notification under Article 27 of the European Communities (Waste Directive) Regulations, 2011;
- EPA (2020b). Guidance to Planners, Planning Authorities and An Bord Pleanála on the Management of Excess Soil and Stone from Developments;
- EPA (2019) Guidance on Soil and Stone By-products in the context of Article 27 of the European Communities (Waste Directive) Regulations 2011;
- EPA (2018). Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-hazardous;
- FCC (2023). Fingal Development Plan 2023-2029;
- The Institute of Environmental Management & Assessment (IEMA) (2020). Guide to Materials and Waste in Environmental Impact Assessment;
- MCC (2021). Meath County Development Plan 2021-2027;
- Regional Waste Management Planning Offices (RWMPO) (2024). National Waste Management Plan for a Circular Economy 2024-2030;
- Regional Waste Management Offices (2020). Construction & Demolition Waste, Soil and Stone Recovery / Disposal Capacity; and
- Transport Infrastructure Ireland (TII) (2017). The Management of Waste from National Road Construction Projects, GE-ENV-01101.

19.2.2 Directives and Legislation

This assessment has been undertaken in accordance *inter alia* with Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (codification) Text with EEA relevance, as amended by Directive 2014/52/EU ('the EIA Directive'), the Transport Railway Infrastructure Act 2001 (as amended and substituted) ('the 2001 Act') and the European Union (Railway Orders) (Environmental Impact Assessment) (Amendment) Regulations 2021 (S.I. No. 743/2021), which give further effect to transposition of the EIA Directive by amending the 2001 Act.

In addition, the following European and National legislation was considered when undertaking the waste and resources assessment:

- Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste (the 'Waste Framework Directive');

- S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2020 ('the Waste Directive Regulations');
- S.I. No. 86/2008 - Waste Management (Facility Permit and Registration) Regulations 2008, as amended;
- S.I. No. 821/2007 - Waste Management (Facility Permit and Registration) Regulations 2007, as amended;
- S.I. No. 820/2007 - Waste Management (Collection Permit) Regulations 2007, as amended, as amended;
- S.I. No. 419/2007 - Waste Management (Shipments of Waste) Regulations 2007;
- Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste ('the Landfill Directive');
- S.I. No. 126/2011 - European Communities (Waste Directive) Regulations 2011 (as amended);
- The Waste Management Act 1996 (as amended) ('the Waste Management Act'); and
- Circular Economy and Miscellaneous Provisions Act 2022.

A summary of key policy and legislation is included in Appendix A19.1 in Volume 4 of this Environmental Impact Assessment Report (EIAR).

19.2.3 Sustainable Resource and Waste Management Principles

19.2.3.1 The Circular Economy

The principal objective of sustainable resource and waste management is to use material resources more efficiently, where the value of products, material and resources is maintained in the economy for as long as possible such that the generation of waste is minimised. To achieve resource efficiency, there is a need to move from a traditional linear economy to a circular economy, as outlined in Image 19-1.

The Circular Economy and Miscellaneous Provisions Act 2022 defines the circular economy as:

"an economic model and the policies and practices which give effect to that model in which:

> *(a) production and distribution processes in respect of goods, products and materials are designed so as to minimise the consumption of raw materials associated with the production and use of those goods, products and materials,*
>
> *(b) the delivery of services is designed so as to reduce the consumption of raw materials*
>
> *(c) goods, products and materials are kept in use for as long as possible thereby further reducing the consumption of raw materials and impacts harmful to the environment,*
>
> *(d) the maximum economic value is extracted from goods, products, and materials by the persons using them, and*
>
> *(e) goods, products and materials are recovered and regenerated at the end of their useful life"*

The European Union (EU) Circular Economy Action Plan (European Commission, 2020) notes that:

"…the EU needs to accelerate the transition towards a regenerative growth model that gives back to the planet more than it takes, advance toward keepings its resource consumption within planetary boundaries, and therefore strive to reduce its consumption footprint and double its circular material use rate in the coming decade."

Image 19-1 Simplified model of the circular economy for materials and energy (Source: European Environment Agency (EEA), 2016)

The European Commission (2020) has adopted a new Circular Economy Action Plan - one of the main blocks of the European Green Deal, Europe's new agenda for sustainable growth. The Circular Economy Action Plan identifies construction as a key area where there are opportunities for resource efficiency and circularity.

DECC published the Whole of Government Circular Economy Strategy 2022 – 2023 in December 2021 (DECC, 2021a). The Strategy aims to support and implement measures that significantly reduce Ireland's circularity gap, so that Ireland's rate is above the EU average by 2030.

In July 2022, the Oireachtas enacted the Circular Economy and Miscellaneous Provisions Act, 2022. This Act places the Strategy and the commitment to a circular economy on a clear statutory footing. It underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, which retains the value of resources in our economy for as long as possible and that will to significantly reduce our greenhouse gas emissions. The Act is a key step in the successful transition of Ireland's economy to a circular economy and is evidence of the State's commitment to the achievement of that goal.

19.2.3.2 The Waste Hierarchy

Where residual waste generation is unavoidable, it will be dealt with in a way that follows the waste hierarchy (as illustrated in Image 19-2 and set out in the Waste Framework Directive).

The waste hierarchy supports the need to achieve efficient use of material resources, minimise the amount of waste produced (or otherwise increase its value as a resource) and reduce, as far as possible, the amount of waste that is disposed to landfill.

Image 19-2 Waste Hierarchy (Source: European Commission)

Other topics related to resource and waste management, such as Construction Phase traffic impacts, water quality impacts and mineral resources are considered in the following chapters:

- Construction Phase traffic impacts are considered in Chapter 6 (Traffic & Transportation);
- Water quality and pollution risk are considered in Chapter 10 (Water); and
- Mineral resources are considered in Chapter 9 (Land and Soils), Chapter 11 (Hydrogeology), Chapter 17 (Material Assets: Non-Agricultural Properties) and Chapter 18 (Material Assets: Utilities).

19.3 Methodology

19.3.1 Study Area

The study area for waste and resources generation assessment from the Proposed Development comprises the areas and activities within the Proposed Development boundary (see Chapter 4 (Description of the Proposed Development)).

Waste from the Proposed Development may be accepted at sites nationally and internationally (which are suitably permitted or licensed for the waste volume and type) for treatment, recovery and / or disposal. However, as waste management planning in Ireland takes place on a regional basis, the study area generally for waste treatment, recovery and disposal comprises Dublin and the Eastern Midlands Waste Region (EMWR), which takes in the 12 local authority administrative areas listed in Table 19-1.

Table 19-1 Dublin and Eastern Midlands Waste Region Local Authorities

Local Authority	Local Authority
Dublin City Council	Longford County Council
Fingal County Council	Louth County Council
South Dublin County Council	Meath County Council
Dún-Laoghaire Rathdown County Council	Offlay County Council
Kildare County Council	Westmeath County Council
Laois County Council	Wicklow County Council

Where data is available at a local authority or regional level, this has been used. National data has been used where this is the only available level at which the data in question is published.

19.3.2 Appraisal Method for Assessment of Impacts

The potential environmental impacts of solid waste generation and resource use and management associated with proposed development were assessed with respect to the Construction, Operational and Decommissioning Phases. These impacts may be neutral, positive or negative, and are dependent on the measures employed to prevent and / or manage the resources used and waste generated.

19.3.2.1 Assessment Methodology

The likely impacts are assessed by describing waste and by-products generation and management from the Proposed Development and comparing this to the current waste and by-product management baseline in Ireland. The impact assessment and waste management options have been considered with regard to the waste hierarchy and the Waste Framework Directive.

The following factors were considered when determining the significance of the impacts of the Proposed Development on the various aspects of the receiving environment:

- Desk study of current practices for waste and by-product management in Ireland;

- Data gathered on the types and quantities of waste and by-product generation and management from the Proposed Development;
- An assessment of the likely environmental impacts that may arise from the quantity of waste requiring disposal, in line with the significance criteria from the EPA Guidelines (EPA, 2022a), as set out in Chapter 1 (Introduction);
- The surplus materials arising and waste infrastructure capacity in the EMWR in which the Proposed Development is located; and
- A review of the Proposed Development in the context of the waste hierarchy and circular economy principles to determine the mitigation measures required.

19.3.3 Data Collection and Collation

A desk study was undertaken, comprising reviews of:

- The relevant policy and legislation which creates the waste and resource management legal framework in Ireland;
- The Proposed Development design to identify appropriate mitigation and move waste management up the waste hierarchy through implementation of best practice, where possible;
- Estimated surplus materials and by-product generation for the Construction Phase of the Proposed Development;
- Estimated surplus materials and by-product generation for the Operational Phase of the Proposed Development;
- Types, quantities and management of construction and demolition (C&D) waste arisings generated in Ireland, the relevant Local Authority and EMWR;
- Types, quantities and management of municipal waste generated in Ireland; and
- Availability (type and capacity) of waste infrastructure within the Local Authority jurisdiction and EMWR.

19.3.4 Waste Management Principles

The following principles of the waste hierarchy, in line with the Waste Framework Directive, will be taken cognisance of by the appointed Contractor during the Construction Phase as outlined in Section 1.7 of the CDWMP, which is included as Sub-Appendix E of the Construction Environmental Management Plan (CEMP) in Appendix A5.1 of Volume 4 of this EIAR (Assignment of Responsibilities).

19.3.4.1 Prevention and Minimisation

Waste prevention and minimisation are the most environmentally sustainable means of managing surplus materials. The principles of prevention and minimisation of waste are inherent in the design of the Proposed Development, including, for example, consideration of the use of sustainable construction materials and the re-use of excavated materials, where possible.

19.3.4.2 Reuse

Regulation 27 of the European Union (Waste Directive) Regulations 2011 (as amended by Regulation 15 of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2020), allows a material producer to determine, under certain circumstances, that a material is a by-product and not a waste. Substances or objects, such as soil and stones produced during construction projects, can be determined as a by-product if they satisfy all of the following criteria:

- Further use of the substance or object is certain;
- The substance or object can be used directly without any further processing other than normal industrial practice;
- The substance or object is produced as an integral part of the production process; and
- Further use is lawful, in that the substance or object fulfils all relevant product, environmental and health protection requirements for the specific use and will not lead to overall adverse environmental or human health impacts.

Substances or objects will be a by-product if they meet each of the conditions detailed in Regulation 27. The baseline area for reuse of by-products in accordance with Regulation 27 comprises the whole country, as no regional distinction is made in the Regulation 27 register.

Where it is proposed to use a Regulation 27 EPA notification in relation to excavation material from the Proposed Development, the appointed Contractor will be responsible for ensuring compliance with Regulation 27 of the European Union (Waste Directive) Regulations 2011 (as amended) including notification to the EPA, seeking a determination from the EPA on the matter and compliance with all relevant Agency guidance on the matter.

Where it is proposed to use soil from off-site which is a by-product and subject to Regulation 27 of the European Union (Waste Directive) Regulations 2011 (as amended), the appointed Contractor is responsible for carrying out any necessary due diligence regarding the material and ensuring that all EPA guidelines relating to that Regulation 27 notification have been complied with before the soil is imported into the site. Where feasible, appropriate and available, construction by-products arising from other sites will be used in the development of this site in place of virgin materials.

19.3.4.3 Recycling, Recovery and Disposal

Where surplus materials are generated that cannot be reused, these will be regarded as waste and will be delivered to recycling, recovery or disposal facilities authorised in accordance with the Waste Management Act, 1996, as amended, which hold a Certificate of Registration, Waste Facility Permit or EPA Waste Licence.

All wastes removed from site will be transported by the holder of an appropriate waste collection permit, granted in accordance with the S.I. No. 820/2007 - Waste Management (Collection Permit) Regulations 2007, as amended.

The option of disposal is the least desirable outcome for surplus material generated by the Proposed Development and will only be considered where it is not possible to deliver wastes for recycling or recovery to appropriately permitted / licensed facilities for reuse / recycling purposes.

In addition, where waste facility capacity does not exist within Ireland for management of specific waste streams, such as hazardous soils, these will be transported by the holder of an appropriate waste collection permit, granted in accordance with S.I. No. 820/2007 - Waste Management (Collection Permit) Regulations 2007, as amended, and subsequently exported for treatment, recovery or disposal in accordance with the provisions of S.I. No. 419/2007 - Waste Management (Shipments of Waste) Regulations 2007, and in accordance with current practice in Ireland.

It will be the responsibility of the appointed Contractor, under the Waste Management Act 1996, as amended, and as detailed in the Construction and Demolition Waste Management Plan (CDWMP) (refer to Sub Appendix E of Appendix A5.1 (CEMP) in Volume 4 of this EIAR), to ensure that all material delivered to authorised waste facilities is correctly classified and will meet the waste acceptance criteria of the receiving site.

It will be the responsibility of the appointed Contractor to secure agreements for reuse, recycling or disposal of surplus materials from the Proposed Development in construction projects or authorised facilities, where appropriate, in accordance with the Waste Management Act 1996, as amended, and associated regulations.

Where feasible, recycled components or materials will be used in the Proposed Development in place of virgin materials. The use of recycled components or materials are subject to the provisions of the Waste Management Act 1996, as amended, and Regulation 28 of the European Union (Waste Directive) Regulations 2011 (as amended).

19.3.5 Consultation

No specific consultation was carried out in relation to this topic. For further information regarding the overall consultation for the DART+ Coastal North project refer to Chapter 1 (Introduction) in Volume 2 of this EIAR.

19.3.6 Difficulties Encountered / Limitations

This Chapter of the EIAR has been prepared based upon the best available information and in accordance with current best practice and relevant guidelines. There were no particular technical difficulties encountered in the preparation of this chapter of the EIAR.

19.4 Receiving Environment

19.4.1 Construction and Demolition Waste

19.4.1.1 National

List of Waste (LoW) codes for typical C&D wastes are included in Appendix A19.2 in Volume 4 of this EIAR.

In 2021, the latest year for which there are published statistics available, 9 million tonnes of C&D waste was generated in Ireland, representing an increase of 800,000 tonnes from 2020 (EPA, 2023a). Of this waste, approximately 7.7 million tonnes comprised soil and stones, making up approximately 85% of the material waste stream.

A breakdown of the composition of C&D waste in Ireland in 2021 is set out in Table 19-2. These figures should be considered as a guide only, as C&D waste can vary significantly from one project to another, depending on the nature of the development and the waste management practices employed on-site.

Table 19-2 Composition of C&D waste material collected in Ireland in 2021 (EPA, 2023a)

C&D Waste	Quantity (tonnes)	Proportion of material stream
Soils stone and dredging spoil	7,696,287	85.1%
Concrete, bricks, tile, and gypsum	608,235	6.7%
Mixed C&D waste	362,380	4.0%
Metal	257,558	2.8%
Bituminous mixtures	87,343	1.0%
Segregated wood, glass, and plastic	31,946	0.4%
Total	**9,043,749**	**100%**

Data issued by the EPA demonstrates that final treatment operations (backfilling, recycling, energy recovery, disposal) of C&D waste materials varied greatly between material streams. By far the largest quantity of C&D waste was used for backfilling (a recovery operation), which generally reflects the dominance of soil and stones in the overall composition mix.

The EPA reports that Ireland achieved 85% material recovery of construction and demolition waste in 2021 (EPA, 2023a). Under the Waste Framework Directive Member States must achieve 70% of material recovery of non-hazardous, non-soil-and-stone C&D waste by 2020.

National authorised capacity statistics for soil recovery facilities are presented in the National Waste Management Plan for a Circular Economy 2024-2030 (RWMPO, 2024). Table 19-3 outlines the national breakdown of all soil recovery facilities in Ireland in 2021. Table 19-4 outlines the existing capacity of operational facilities accepting inert waste throughout Ireland.

Table 19-3 Soil recovery facilities in Ireland 2021 (RWMPO, 2024)

Type of authorisation	No. of facilities	Available treatment capacity for soil waste	Soil waste accepted in 2020 (tonnes)	Remaining available treatment capacity for soil waste from 2022 (tonnes)
Licenced	16	4,746,400 (annual)	2,773,687	25,272,206 (lifetime)
Permitted	230	9,939,156 (lifetime)	2,436,586	6,686,156 (lifetime)
Registered	228	3,598,291 (lifetime)	578,470	906,948 (lifetime)
Total	**474**	-	**5,788,746**	**32,865,310**

Table 19-4 Operational facilities accepting inert waste in Ireland (RWMPO, 2024)

Facility	Location	Annual licenced capacity (tonnes)	Accepted 2019 (tonnes)	Accepted 2020 (tonnes)	Accepted 2021 (tonnes)	Accepted 2022 (tonnes)
Integrated Materials Solution (W0129-02)	Dublin	500,000	420,392	487,131	421,520	324,083
Walshestown Restoration Ltd. (W0254-01)	Kildare	330,000	229,650	283,986	329,572	271,743
Kyletalesha Landfill (W0026-03)	Laois	47,100	25,085	28,597	2,218	71,554
Boliden Tara Mines Limited (P0516-04)	Meath	-	509,235	417,573	15,555	334,632
Total (excluding Tara Mines)		**877,100**	**675,127**	**799,714**	**753,310**	**667,380**
Total (including Tara Mines)		**N/A**	**1,184,362**	**1,217,286**	**768,865**	**1,002,012**

As discussed in Section 19.3.4.2, Regulation 27 of the European Union (Waste Directive) Regulations 2011 (as amended) allows a material producer to declare, under prescribed circumstances, that a material is a by-product and not a waste and can therefore be reused on site or off-site within the industry.

On receipt of Regulation 27 notifications to the EPA, materials can be determined as a waste or a by-product. In some cases, no determination has been issued by the EPA, meaning the material has not been determined as a waste. In 2021, the EPA received by-product notifications for approximately 12.5 million tonnes of soil and stone material (EPA, 2023a). The EPA determined that 459,836 tonnes of the soil and stone notified were by-product, as notified, and 600 tonnes were waste. Notifications for 152,400 tonnes were withdrawn. The estimated quantity of soil and stone material notified in 2021 for which no determination was made was approximately 11.9 million tonnes.

The EPA reports that a total of 466,941 tonnes of hazardous waste was generated in Ireland in 2021, representing a decrease of over 90,000 tonnes (or 16%) since 2020 (EPA, 2023b). Hazardous waste types include wastes from dredging spoil, contaminated soils, waste treatment, solvents and hazardous elements of waste electrical and electronic equipment. The EPA notes that 2021 is the first year that Ireland treated a higher percentage of hazardous waste (52%) than was exported for treatment.

19.4.1.2 Regional

The Regional Waste Management Offices (RWMO) have published an updated Construction & Demolition Waste, Soil and Stone Recovery / Disposal Capacity report (2020), which states that:

> "*(Licensed) capacity is the most prominent in the EMR which has a healthy supply of active capacity and substantial new capacity due to come on stream. The Region contains 80% of the active national capacity."*

A summary of the facilities with a waste licence and the corresponding capacity in the EMWR is presented in Table 19-5. A summary of the facilities with a waste facility permit and the corresponding capacity for the EMWR is presented in Table 19-6. A summary of the facilities with a certificate of registration and the corresponding capacity for the EMWR is presented in Table 19-7.

Table 19-5 Summary of EMWR Waste Capacity – Facilities with Waste Licence (RWMO, 2020)

County	No. Facilities	Annual Capacity (application stage) (tonnes)	Annual Capacity (licensed, un-commenced) (tonnes)	Annual Capacity (active and available) (tonnes)
Dublin (Fingal)	3	532,833	-	1.900,000
Meath	5	-	670,000	167,400
Kildare	5	740,000	570,000	344,000
Wicklow	2	-	300,000	-
EMWR Sub-total	15	1,272,833	1,540,000	2,411,400

Table 19-6 Summary of EMWR Waste Capacity – Facilities with Waste Permit (RWMO, 2020)

No. Facilities	Permitted capacity (lifetime) (tonnes)	Intake 2018 (tonnes)	Remaining capacity (lifetime) (tonnes)
49	2,665,197	546,012	1,333,523

Table 19-7 Summary of EMWR Waste Capacity – Facilities with Certificates of Registration (RWMO, 2020)

No. Facilities	Permitted capacity (lifetime) (tonnes)	Intake 2018 (tonnes)	Remaining capacity (lifetime) (tonnes)
43	394,934	102,724	188,288

19.4.2 Material Assets: Resource Use

A report entitled Essential Aggregates: Providing for Ireland's Needs to 2040 (Irish Concrete Federation, 2019) was published in 2019 which quantifies Ireland's natural aggregate reserves and highlights the importance of aggregates to Irish development. At the time of publication, the report noted that Ireland had approximately 500 active large commercial quarries, approximately 220 ready mixed concrete plants, 20 large scale precast concrete plants and 40 plants producing bitumen bound road surfacing materials.

The Irish Concrete Federation quantifies the annual production of these materials in Ireland on their website (Irish Concrete Federation, 2024), with the 2022 figures (the most recent available) being as follows:

- Five million cubic metres of ready-mixed concrete;
- 135 million concrete blocks;

- 38 million tonnes of aggregates;
- Two million tonnes of bituminous road surfacing materials; and
- Two million square metres of paving products.

Table 19-8 provides an overview of aggregates production in Ireland from 2013 to 2018.

Table 19-8 Total Aggregates Production in Ireland 2013-2018 (Source: Irish Concrete Federation, 2018)

Year	2013	2014	2015	2016	2017	2018
Aggregates (tonnes)	25,000,000	26,000,000	28,000,000	33,000,000	32,000,000	36,000,000

Table 19-9 provides an overview of ready mixed concrete production in Ireland in from 2013 to 2018.

Table 19-9 Total Ready Mixed Concrete in Ireland 2013-2018 (Source: Irish Concrete Federation, 2018)

Year	2013	2014	2015	2016	2017	2018
Ready Mixed Concrete (m^3)	2,400,000	3,000,000	3,500,000	4,100,000	4,500,000	4,900,000

19.4.3 Municipal Waste

Municipal waste will be generated in small quantities during the Construction, Operational and Decommissioning Phases of the Proposed Development.

Municipal waste in Ireland is made up of household waste, commercial waste and other waste that, because of its nature or composition, is similar to household waste. According to the EPA, Ireland generated 3.17 million tonnes of municipal waste in 2021 (EPA, 2023c).

Of the 3.17 million tonnes of municipal waste generated in Ireland in 2021, 41% was used in energy recovery, 26% was used in material recycling, 16% was landfilled, 15% was used in composting / anaerobic digestion and 1% was unmanaged. Of the 3.17 million tonnes of municipal waste, 57% is estimated to be from households and 43% is estimated to be from commercial and public service sources. Since 2001, significant changes have occurred in the management of municipal waste in Ireland, notably the dramatic decline in landfilling over this period, accompanied by increased levels of recycling in the early 2000s and subsequently an increase in the share of municipal waste sent for energy recovery since 2011.

In September 2020, the Government published a new national waste strategy, the Waste Action Plan for Circular Economy (DECC, 2020). The following targets were noted in the Plan for municipal waste in Ireland, which will be implemented using waste collection permit conditions:

- Municipal solid waste (MSW) recycling rate of 55%, 60% and 65% by 2025, 2030 and 2035 respectively; and
- Limit the amount of MSW to landfill to 10% by 2035.

To achieve these targets from the 30% recycling rate in 2020, improvements are required in waste reduction, segregation, and contamination rates. The EPA estimates that (Government of Ireland, 2019):

> *"… Ireland's municipal recycling (including organic waste for composting and anaerobic digestion through the organic bin) rate could increase from 41% to 62% if all recyclable (including organic) material was removed from the general waste bins and placed into the correct mixed dry recycling and organic waste bins."*

Biodegradable municipal waste (BMW) comprises those elements of the municipal waste stream that will degrade biologically, for example food waste, garden and parks waste, wastepaper and cardboard. Under the Landfill Directive, Ireland is committed to meeting targets for the diversion of BMW from disposal to landfill. The quantity of BMW disposed to landfill in 2022 was 129,572 tonnes (EPA, 2023d).

Capacity from composting and anaerobic digestion, municipal waste landfill, Material Recovery Facilities (MRFs), integrated waste management facilities, municipal waste incinerators and cement kilns accepting wastes for co-incineration can all be used to treat municipal waste.

19.5 Description of Potential Impacts

This section presents the potential impacts of the Proposed Development that may occur in the absence of mitigation on resource and waste management. This informs the need for mitigation or monitoring to be proposed (as described in Section 19.6). Predicted residual impacts, taking into account any proposed mitigation, are then presented in Section 19.7.

19.5.1 Characteristics of the Proposed Development

19.5.1.1 Construction Phase

Aspects considered in the assessment of resource use and waste management for the Construction Phase included the following:

- Site clearance and demolition: removal of vegetation, hard standing and structures, and removal of / modifications to overbridge OBB80/80A/80B (carrying Railway Terrace Bridge), overbridge OBB81 (Drogheda Station footbridge) and underbridge UBK01 (Dublin Road R132);
- Excavation: excavation of below ground material such as soil and stones;
- Imported material: import of materials for the construction of new buildings / bridges / rail infrastructure;
- Construction: waste materials generated from and in relation to the construction of new buildings / bridges / rail infrastructure; and
- Municipal waste: generation of municipal waste materials.

19.5.1.2 Operational Phase

Aspects considered in the assessment of resource use and waste generation for the Operational Phase included the following:

- Project related C&D waste: generation of project related C&D waste from maintenance of buildings / /bridges / rail infrastructure; and
- Municipal waste: generation of municipal waste materials.

19.5.1.3 Decommissioning Phase

Aspects considered in the assessment of resource use and waste generation for the Decommissioning Phase included the following:

- Project related C&D waste: generation of project related C&D waste from the refurbishment or renewal of the railway infrastructure to enable its continued operation; and
- Municipal waste: generation of municipal waste materials.

19.5.2 'Do Nothing' Impact

The 'Do-Nothing' alternative considers the likely scenario that would arise, assuming the Proposed Development were not progressed, i.e., if nothing were done. In the 'Do-Nothing' scenario, the Proposed Development would not be constructed, and the waste materials described herein would not be generated. The resultant resource use and waste impact would be neutral.

19.5.3 Construction Phase

19.5.3.1 Introduction

The Construction Phase of the Proposed Development is described in more detail in Chapter 5 (Construction Strategy) in Volume 2 of this EIAR. The use of resources and generation of waste for the aspects outlined in Section 19.5.1 and the resultant resource and waste impacts are described in this section. Typical C&D Wastes that are likely to arise during the Construction Phase of the Proposed Development are set out in Appendix A19.2 in Volume 4 of this EIAR, including EPA LoW codes.

The most environmentally sustainable means of managing demolition, excavation and construction material is its prevention and minimisation. The principles of waste management are detailed in Section 19.2.3. The appointed Contractor will be responsible for the implementation of these principles for the Proposed Development. There has been a shift in focus in recent years towards best practice waste management and waste minimisation in construction and an increase in the reuse of construction by-products in projects.

19.5.3.2 Site Clearance and Demolition Waste

The Contractor will be required to carry out site clearance works at some locations (including for construction compounds, access roads or substation sites) throughout the Proposed Development prior to the commencement of construction. Site clearance works will include the removal of vegetation such as trees, climbing plants, shrubs, vines or any other unwanted materials (including non-organic material) or equipment. This will result in the generation of minor quantities of organic waste material which will be removed from site by a waste collection permit holder and delivered to an authorised composting or organic waste facility. Segregation facilities will be provided, where necessary, to ensure that the recovery and recycling of such wastes is maximised.

The Construction Phase works for the Proposed Development are between Dublin City Centre (north of Connolly Station) and Drogheda MacBride Station and will include the demolition and removal of some existing bridge infrastructure such as staircases, parapets, dividing walls of a footbridge, the demolition of McGrath's Lane Overbridge (OBB80/80A/80B), modifications to the Drogheda Station footbridge (OBB81) and the widening of the Dublin Road underbridge (UBK01) in Drogheda. For McGrath's Lane Overbridge (OBB80/80A/80B), demolition and removal works will take place at track level. Refer to Sub Appendix E of Appendix A5.1 (CEMP) in Volume 4 of this EIAR for the CDWMP which includes further information on the demolition management measures during the works. Further information on where demolition is required is presented in Chapter 4 (Description of Proposed Development) and Chapter 5 (Construction Strategy) in Volume 2 of this EIAR.

Materials to be demolished and removed will predominantly comprise structural concrete and masonry stone. Table 19-10 shows the estimated quantities of waste that will be generated by demolition activities in connection with the Proposed Development.

Table 19-10 Estimated demolition waste types and quantities

C&D Waste	Quantity
Drogheda Station footbridge (OBB81)	
Steel	8 tonnes
Concrete	9 tonnes
McGrath's Lane overbridge (OBB80/80A/80B)	
Concrete	619 tonnes
Masonry Stone	1,888 tonnes
Howth Junction & Donaghmede Station	
Steel	16 tonnes
Concrete	1,233 tonnes
Concrete block	123 tonnes
Metal cladding	102 tonnes
Metal mesh	1 tonne
Tiles	29 tonnes
Glazing panels	5 tonnes
Plasterboard	2 tonnes
Roof membrane	1 tonne
Railing	474 m

The material within Table 19-10 will be considered for reuse within the Proposed Development or in other construction projects in accordance with Regulation 27 of the European Union (Waste Directive) Regulations 2011 (as amended). It will be the responsibility of the appointed Contractor to review the feasibility of reuse of materials and ensure that the necessary testing is undertaken to demonstrate compliance with Regulation 27, as appropriate.

Materials will require on-site segregation by waste classification and if not suitable for reuse, will be delivered to an authorised recycling, recovery or disposal facility. The least preferable option is disposal to an authorised facility and will only be considered by the appointed Contractor when reasonable opportunities for reuse, recycling and recovery are unavailable.

Considering the minor quantities of C&D waste that will be generated during the site clearance and demolition works and the available treatment capacity for the C&D waste generated (refer to Section 19.4), the predicted impact of site clearance and demolition waste, in the absence of mitigation is negative, not significant and short-term.

19.5.3.3 Excavation Waste

Excavation waste will arise from activities such as:

- Excavation for utility diversions;
- Excavation for track lowering;
- Excavation for concrete trough routes for cable management;
- Excavation for buried PVC ducts;
- Excavation for foundations;
- Excavation of drainage trenches;
- Excavation for substations;
- Excavation for retaining walls;
- Excavation at Dublin Road Bridge (UBK01);
- Excavation of earthwork bund at Drogheda Depot; and
- Excavation for track realignment.

It is estimated that approximately 184,800 tonnes of excavated material will be generated from the permanent works associated with the Proposed Development.

Throughout the Proposed Development, the excavation works will involve the removal of material comprised of made ground (comprising a mixture of bitmac, concrete, ballast material, reworked material, plastic, red brick and glass), topsoil, subsurface material and ballast. A breakdown of the estimated quantities of the various excavation materials that will arise during permanent works associated with the Proposed Development is provided in Table 19-11.

Table 19-11 Estimated unbulked excavation quantities from permanent works associated with the proposed development

Material	Unbulked quantity (tonnes)	Material Management Options
Made ground	119,455	Subject to testing to determine if it is suitable for the proposed end use, off-site re-use in accordance with Regulation 27, or off-site recovery or disposal to a suitably authorised facility, in accordance with the Waste Management Act, 1996, as amended. 4% of the made ground samples (refer to Table 19-13) were deemed hazardous due to high total organic carbon, dissolved organic carbon, elevated metals and hydrocarbons which would require off-site disposal to a suitably authorised facility, in accordance with the Waste Management Act, 1996, as amended.
Topsoil	4,334	On site re-use as part of the Proposed Development.
	19,665	Subject to testing to determine if it is suitable for the proposed end use, off-site re-use in accordance with Regulation 27, or off-site recovery or disposal to a suitably authorised facility, in accordance with the Waste Management Act, 1996, as amended.
Subsoil (including pile arising material)	29,214	Subject to testing to determine if it is suitable for the proposed end use, off-site re-use in accordance with Regulation 27, or off-site recovery or disposal to a suitably authorised facility, in accordance with the Waste Management Act, 1996, as amended.
Ballast	12,091	Subject to testing to determine if it is suitable for the proposed end use, off-site re-use in accordance with Regulation 27, or off-site recovery or disposal to a suitably authorised facility, in accordance with the Waste Management Act, 1996, as amended.
Total	**184,759**	

A breakdown of the main locations in which the majority of the excavated material in Table 19-11 are derived from is presented in Sections 9.4 and 9.7 of Chapter 9 (Land and Soils) in Volume 2 of this EIAR.

A breakdown of the estimated excavation quantities of the various materials that will arise during temporary works associated with the Proposed Development is provided in Table 19-12.

Table 19-12 Estimated unbulked excavation quantities from temporary works associated with the Proposed Development

Material	Unbulked quantity (tonnes)	Material Management Options
Made ground (temporary hardstanding material)	233,479	Subject to testing to determine if it is suitable for the proposed end use, off-site re-use in accordance with Regulation 27, or off-site recovery or disposal to a suitably authorised facility, in accordance with the Waste Management Act, 1996, as amended.
Crushed rock (piling platform material – compliant with TII Series 600 6F specifications)	15,620	Subject to testing to determine if it is suitable for the proposed end use, off-site re-use in accordance with Regulation 27, or off-site recovery or disposal to a suitably authorised facility, in accordance with the Waste Management Act, 1996, as amended.
Total	**249,099**	

It should also be noted that approximately 128,170 tonnes of topsoil material will be removed from within the site boundary to accommodate the temporary works. This material will be removed, before being stored on site and subsequently reinstated throughout the Proposed Development.

The made ground (temporary hardstanding material) and crushed rock (piling platform material – compliant with TII Series 600 6F specifications) noted in Table 19-12 will be imported to site and removed following the completion of the temporary works for off-site re-use in accordance with Regulation 27, where feasible, or off-site recovery or disposal to a suitably authorised facility, in accordance with the Waste Management Act, 1996 (as amended).

Further information on disposal options of the materials generated during temporary and permanent works is provided in Table 19-13. A project specific ground investigation (GI) was carried out along the length of the current rail network which included the collection of 193 samples which were analysed for environmental quality. Of the 193 samples, 102 were classified as made ground (defined above as material comprising a mixture of bitmac, concrete, ballast material, reworked material, plastic, red brick and glass) and were deemed unsuitable for soil recovery. Of those samples, 81 were classified as inert, 16 were classified as non-hazardous, one was classified as non-hazardous with asbestos and four were classified as hazardous. Chapter 9 (Land and Soils) concluded that the made ground samples which were not classified as hazardous or containing asbestos may be suitable for a soil recovery facility if further analysis of the material is undertaken by weighing the anthropogenic materials to confirm if they constitute less than 2% of the soil sample.

Of the 91 samples taken from natural ground beneath the site, 74 samples were classified as suitable for recovery at a soil recovery facility, 14 were classified as inert and 3 were classified as non-hazardous. Table 9.16 in Chapter 9 (Land and Soils) outlined the disposal options from the GI and is reproduced below in Table 19-13.

Table 19-13 Disposal Options

Made Ground	No. of Samples	%
Inert	81	79%
Non-hazardous	16	16%
Non-hazardous with asbestos	1	1%
Hazardous	4	4%
Total	**102**	**100%**
Natural ground	**No. of Samples**	**%**
Soil recovery facility	74	81%
Inert	14	15%
Non-hazardous	3	3%
Total	**91**	**100%**
Overall	**No. of Samples**	**%**
Soil recovery facility	74	38%
Inert landfill	95	49%
Non-hazardous landfill	19	10%
Non-hazardous with asbestos landfill	1	1%
Hazardous disposal	4	2%
Total	**193**	**100%**

Further details of the existing and historical GI reports located along the Proposed Development are provided in Chapter 9 (Land and Soils).

It is estimated based on currently available GI information and soil testing that up to approximately 4,300 tonnes of the unbulked excavated material arising from the permanent works may be suitable for reuse on site. The estimated unbulked excavated material arising from the temporary works that may be suitable for reuse on site is approximately 128,170 tonnes.

However, all material for reuse will be tested to ensure it is suitable for its proposed end use, thereby minimising the importation and exportation of materials from the site. The suitability of excavated materials will be assessed with the requirements of TII Specification for Roadworks.

During track lowering works, it is anticipated that new or recycled ballast will be brought to site. The existing ballast that is removed from site (approximately 12,100 tonnes – refer to Table 19-11) to cater for this new or recycled ballast will be delivered to an authorised waste facility for re-use, recycling or disposal.

In line with current practice in Ireland, surplus materials and wastes from the Proposed Development will be managed as follows:

- Where reasonably practicable, naturally occurring excavated material will be reused within construction in the Proposed Development in accordance with Article 3 of the Waste Management Act 1996, as amended;

- Excavation material will be used as engineering and landscaping material within the Proposed Development and on other projects requiring the types of materials generated to the maximum possible extent, through Regulation 27. Reuse of topsoil and excavated material within the Proposed Development is proposed, where practicable. The material will also be subject to testing to ensure it is suitable for its proposed end use;
- Should material require recycling prior to reuse in accordance with the law, it will be delivered to facilities which are authorised under the Waste Management Act 1996, as amended (i.e., which hold a Certificate of Registration, Waste Facility Permit and / or EPA Waste Licence as appropriate). Examples of recycling / recovery activities for excavation material include:
  - Processing of stone to produce construction aggregate;
  - Backfilling of quarries; and
  - Raising land for site improvement or development.
- Any hazardous waste arising will be managed by the appointed Contractor in accordance with the applicable legislation;
- Screening of material may be undertaken for the Proposed Development, which will be a decision for the appointed Contractor; and
- In accordance with the law, all wastes removed from site will be transported by the holder of the appropriate waste collection permit, granted in accordance with S.I. No. 820/2007 - Waste Management (Collection Permit) Regulations 2007.

It will be the responsibility of the appointed Contractor to secure agreements for acceptance of surplus excavation materials from the Proposed Development in authorised and regulated facilities, in accordance with the Waste Management Act 1996 (as amended), and the relevant regulations.

All material from the excavation works will need to be tested by the appointed Contractor for quality and contamination. Material that is not contaminated could potentially be reused as general fill or general landscape fill material in the construction works under the provisions of Regulation 27 of the European Union (Waste Directive) Regulations 2011 (as amended). Material that meets the necessary acceptance criteria but is not required on site will be delivered to an authorised soil recovery facility.

Material that requires recycling will be sent to authorised waste facilities and may be used in accordance with Regulation 28 of the European Union (Waste Directive) Regulations 2011 (as amended). Regulation 28 sets the criteria which must be complied with, and which the EPA must use to determine if a waste reaches “end of waste” status and becomes a material.

Where excavated material containing hazardous substances is discovered as part of the Proposed Development, this will be delivered to a facility authorised to accept hazardous wastes. It may also be exported from Ireland for treatment, recovery or disposal. Export of hazardous waste from the proposed development outside of the State is subject to a Europe-wide control system founded on Regulation (EC) No. 1013/2006 of the European Parliament and of the Council of 14 June 2006 on Shipments of Waste (‘the Transfrontier Shipment Regulations’). This legislation is supplemented by the Waste Management (Shipments of Waste) Regulations 2007, as amended (S.I. No. 419 of 2007), which makes Dublin City Council responsible for the enforcement of this regulatory system throughout Ireland. Export of hazardous waste from site outside the state will comply with the procedures set out in this legislation.

Considering the available treatment capacity for the C&D waste generated during the excavation works, the predicted impact of excavation waste during the Construction Phase, in the absence of mitigation, is negative, moderate and short-term.

19.5.3.4 Imported Material

The Construction Phase will require the importation of a number of key construction materials for the Proposed Development works. This material will include items such as concrete, blockwork, structural steel, ballast and fill material. Table 19-14 provides an estimate of the quantities of the major materials required to complete the Construction Phase of the Proposed Development.

Table 19-14 Estimated quantities of major construction materials required

Material	Estimated Quantity
Fill and ballast	
Imported engineering fill (permanent works)	230,588 tonnes
Imported engineering fill (temporary works)	250,749 tonnes
Ballast	16,841 tonnes
Bridge materials	
In-situ concrete	3,832 tonnes
Pile concrete	674 tonnes
Blinding concrete	257 tonnes
Precast concrete	1,464 tonnes
Ballast	108 tonnes
Reinforcement	353 tonnes
Structural steel - carbon	70 tonnes
Structural steel - stainless	11 tonnes
Pavement - asphalt	283 tonnes
Pavement - base / sub-base	1,169 tonnes
Kerbs	44 tonnes
Brickwork and blockwork	114 tonnes
External materials (4 no. Signalling Equipment Buildings (SEBs) and 8 no. substations)	
Asphalt	7,902 tonnes
Concrete	1,253 tonnes
Wildflower planting	4,955 m2
Hedge	6,069 m2
Concrete post and wire fence	2,361 m
Security palisade fence	3,282 m
Cable trough	792 m

Material	Estimated Quantity
Internal materials (1 no. Track Paralleling Hut (TPH), 4 no. Telecommunications Equipment Rooms (TERs), 4 no. SEBs and 8 no. substations)	
140mm thick blockwork walls	980 tonnes
Cavity blockwork wall	930 tonnes
In-situ reinforced concrete slab	1,337 tonnes
Precast concrete slab	2,556 tonnes
Concrete strip foundations	684 tonnes
Cable troughing	736 m
Overhead Line Equipment (OHLE) masts	
Copper cables (includes contact, catenary, centenary etc.)	200,188 m
Aluminium cables (earthing, bonding and other cables)	84,478 m
Steel mast poles (including portal frames)	1,317 tonnes
Pile concrete	9,160 tonnes
Malahide Turnback	
Modular reinforced retaining earth wall with geotextiles / geogrids and paladin fencing	400 m

The quantities of materials listed in Table 19-14 represent a small proportion of the Irish quantities manufactured per year, which are outlined in Section 19.4.2. As an example, the estimated quantity of concrete required for the construction of the Proposed Development represents less than 0.4% percent of the total quantity produced in Ireland per annum.

The imported bulk fill for the temporary works will consist of capping and sub-base material for construction compounds and access roads. These will comply with TII Series 600 6F specifications for the capping material and TII Series 800 for the sub-base material. This material will be imported to site and, upon completion of temporary works, will be subject to Regulation 27 testing to ensure compliance with TII Series 600 and 800 specifications for reuse for other construction projects. Where the material does not comply with TII Series specifications, it will be sent for off-site recovery or disposal at a suitable facility.

Córas Iompair Éireann (CIÉ) is committed to implementing and maintaining the Green Public Procurement process and will apply circular economy principles, where practicable. The appointed Contractor will be required to maximise the use of secondary or recycled aggregates in line with tender specifications, depending on engineering constraints.

Importation of material to the Proposed Development site will be carried out throughout the Construction Phase, with different materials being required at different times. The main direct impacts associated with the importation of construction materials arise from the gathering / manufacture of the materials, and the fact that, once the materials are used within the Proposed Development, they are no longer available for other uses.

There will also be impacts associated with the importation of materials through the requirement of heavy goods vehicles for delivery of the material and the use of materials. Impacts on other environmental aspects are addressed in Chapter 6 (Traffic and Transportation), Chapter 12 (Air Quality), Chapter 13 (Climate), and Chapter 14 (Noise and Vibration) in Volume 2 of this EIAR.

The materials required for the Construction Phase of the Proposed Development will be locally and nationally sourced are generally readily available in Ireland. The predicted impact associated with imported materials is negative, slight and permanent.

19.5.3.5 Construction Waste

Construction works and temporary works facilities are also likely to generate construction waste. Construction waste is defined as waste which arises from construction activities, including surplus and damaged products and materials arising during construction work or used temporarily during the course of on-site activities.

Construction waste can vary significantly from site to site but typically would include the following non-hazardous fractions:

- Soil and stone;
- Concrete, brick, tiles and ceramics;
- Bituminous mixtures;
- Metals;
- Wood; and
- Other.

The hazardous waste streams which could arise from construction activities include the following:

- Waste electrical and electronic equipment (WEEE) components;
- Batteries;
- Asbestos;
- Wood preservatives;
- Adhesives;
- Paints;
- Liquid fuels; and
- Contaminated soil.

Also included within this definition are surplus and damaged products and materials arising in the course of construction work or used temporarily during the course of on-site activities.

In the case of the Proposed Development, the most likely type of general construction waste will be concrete, ballast stone, steel, bricks and metals from the electrical cables (copper, aluminium and steel) that may arise on-site. Quantities of these materials are estimated to be small. As an example, concrete and bricks are assumed to be between approximately 5% to 10% of construction material delivered to site (WRAP, 2014). There is adequate capacity for the management of such wastes. Segregation facilities will be provided to ensure that recovery and recycling of such wastes are maximised.

Considering the minor quantities of construction waste that will be generated during the Construction Phase and the available treatment capacity for C&D waste, the predicted impact of construction waste during the Construction Phase, in the absence of mitigation, is negative, not significant and short-term.

19.5.3.6 Municipal Waste

Minor quantities of general municipal waste will be generated by construction workers during the Construction Phase (e.g., from site offices and welfare facilities). Segregation facilities will be provided on the construction site, if necessary, to ensure that recovery and recycling of such wastes is maximised.

Considering the minor quantities of municipal waste that will be generated during the Construction Phase and the available treatment capacity for municipal waste, the predicted impact of municipal waste during the Construction Phase, in the absence of mitigation, is negative, imperceptible and short-term.

19.5.3.7 Summary of Predicted Construction Phase Impacts

A summary of the predicted (pre-mitigation) impacts during the Construction Phase is set out in Table 19-15.

Table 19-15 Summary of predicted Construction Phase impacts, in the absence of mitigation

Assessment Topic	Predicted Impact (pre-mitigation and monitoring)
Site Clearance and Demolition Waste	Negative, not significant and short-term
Excavation Waste	Negative, moderate and short-term
Imported Materials	Negative, slight and permanent
Construction Waste	Negative, not significant and short-term
Municipal Waste	Negative, imperceptible and short-term

The Construction Phase of the Proposed Development is not predicted to give rise to significant impacts.

19.5.4 Operational Phase

Maintenance of rail infrastructure is likely to be required during the Operational Phase. However, these activities will be infrequent and will generate only minor quantities of waste. Impacts from material consumption will also arise during the maintenance of the Proposed Development. However, no significant materials consumption is anticipated during the Operational Phase.

All waste generated during the Operational Phase will be transferred from site by a waste collection permit holder and delivered to an authorised waste facility (i.e., a facility which holds a Certificate of Registration, Waste Facility Permit or Waste Licence) for the specific waste types it receives.

Municipal waste will be generated from passengers accessing the rail service. However, the quantity of municipal waste generated is expected to be minimal. All municipal waste generated during the Operational Phase will be managed in accordance with the existing waste management practices operated by CIÉ.

The predicted impacts of maintenance waste and municipal waste during the Operational Phase is negative, not significant and long-term.

19.5.5 Decommissioning Phase

The DART+ Coastal North project is providing rail infrastructure which will enable an increase in frequency and capacity on the Northern Line and the Howth Branch in the coming years. It is not intended that this infrastructure will be decommissioned, but rather, as the infrastructure reaches the end of its design life, it will likely be refurbished or renewed to enable continued operation of the railway. Any such future renewal or refurbishment may require additional construction works, which would be similar to, but of a much lesser impact (in terms of extent and duration) than, the Construction Phase associated with the DART+ Coastal North project.

19.6 Mitigation Measures

19.6.1 Construction Phase

The Construction Phase is not predicted to give rise to significant negative impacts. However, a suite of mitigation measures is outlined below which the Contractor will implement, and in any event, the Contractor will ensure that waste arisings will be managed in accordance with the waste hierarchy and in compliance with the provisions of the Waste Management Acts, 1996, as amended.

A CDWMP has been prepared and is included in Appendix A5.1 (CEMP), sub-appendix E, in Volume 4 of this EIAR. This has been prepared and will be implemented by the appointed Contractor in line with the 'Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects' (EPA, 2021b). The CDWMP outlines how waste arising during the Construction Phase of the Proposed Development will be managed in a way that ensures compliance with the provisions of the Waste Management Acts, 1996, as amended. The appointed Contractor will update the CDWMP in advance of construction commencing.

The following mitigation measures will be implemented during construction by the appointed Contractor, to ensure the maximum quantity of material is reused in the Proposed Development, to comply with the provisions of the Waste Management Acts, 1996, as amended, and to contribute to achieving the objectives set out in the Waste Action Plan for a Circular Economy (DECC, 2020):

- Where waste generation cannot be avoided, waste disposal will be minimised;
- Opportunities for reuse of materials, by-products and wastes will be sought throughout the Construction Phase of the Proposed Development;
- Possibilities for reuse of clean non-hazardous excavation material as fill on the site will be considered following appropriate testing to ensure material is suitable for its proposed end use;
- Where non-hazardous excavation material cannot be reused within the Proposed Development works, material will be sent for recycling or recovery;

- Excavations of made ground will be monitored by an appropriately qualified person to ensure that any hotspots of possible contamination are properly identified, with the contaminated material segregated and disposed of appropriately;
- Any identified contaminated material will be segregated and stored in an area where there is no possibility of runoff generation or infiltration to ground or surface water drainage. Care will be taken to ensure that the hotspot does not cross contaminate clean soils elsewhere throughout the site;
- If encountered, any potential asbestos during the Construction Phase will be managed using standard health and safety measures as outlined in 'Asbestos-containing Materials (ACMs) in Workplaces: Practical Guidelines on ACM Management and Abatement' (HSA, 2013). This document states that "*removal of asbestos from contaminated soil will require a specialist asbestos contractor for any friable asbestos to be removed" and "a risk assessment by an independent competent person should determine the most appropriate control measures and remediation strategies*" (HSA, 2013);
- The site will be maintained to prevent litter and regular litter picking will take place throughout the site;
- 'Just-in-time' delivery will be used to minimise material wastage;
- Paints, sealants and hazardous chemicals will be stored in secure, bunded locations;
- All staff on-site will be trained on how to minimise waste (i.e., training, induction, inspections and meetings);
- Materials on-site will be correctly and securely stored;
- Where possible, metal, timber, glass and other recyclable material will be segregated and removed off-site to a permitted / licensed facility for recycling. Waste stream colour coding and photographs will be used to facilitate segregation;
- On-site office and food waste arising will be source separated at least into dry mixed recyclables, biodegradable and residual wastes;
- Waste bins, containers, skip containers and storage areas will be clearly labelled with waste types which they should contain, including photographs as appropriate;
- Segregated skips will be used within a designated waste segregation area to be located in the on-site Construction Compound (particularly for hazardous, gypsum, metal, timber, inert waste and general waste);
- The appointed Contractor will record the quantity in tonnes and types of waste and materials leaving the site during the Construction Phase. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material which is recovered, which is recycled and which is disposed of;
- Waste generated on-site will be removed as soon as practicable following generation for delivery to an authorised waste facility;
- The appointed Contractor will ensure that any off-site interim storage facilities for excavation material have the appropriate Certificate of Registration, Waste Facility Permit and / or EPA Waste Licence in place;
- Where Regulation 27 notifications are required in relation to the Proposed Development, the appointed Contractor will complete and submit these Regulation 27 notifications to the EPA for by-product reuse; and

- The relevant appropriate waste authorisation will be in place for all facilities that wastes are delivered to (i.e., Certificate of Registration, Waste Facility Permit and / or EPA Waste Licence).

19.6.2 Operational Phase

CIÉ will re-use and recycle materials throughout the site, to the maximum extent possible, and make use of local suppliers when importing materials to site during the Operational Phase, thereby minimising potential impacts. The sustainable resource and waste management principles detailed in Section 19.2.3 will be implemented to ensure that the waste hierarchy is adhered to.

As the effect of Operational Phase waste is predicted to be not significant, no further mitigation measures are required.

19.6.3 Decommissioning Phase

The DART+ Coastal North project is providing rail infrastructure which will enable an increase in frequency and capacity on the Northern Line and the Howth Branch in the coming years. It is not intended that this infrastructure will be decommissioned, but rather, as the infrastructure reaches the end of its design life, it will likely be refurbished or renewed to enable continued operation of the railway. Any such future renewal or refurbishment may require additional construction works, which would be similar to, but of a much lesser impact (in terms of extent and duration) than, the Construction Phase associated with the DART+ Coastal North project. The mitigation measures outlined herein for the Construction Phase, will be applied as appropriate, during any future decommissioning.

19.7 Residual Effects

19.7.1 Construction Phase

The Construction Phase of the Proposed Development is not predicted to give rise to any significant residual impacts with the adoption of sustainable resource and waste management principles and with the implementation of the identified mitigation measures. A summary of the predicted residual impacts during the Construction Phase, following the implementation of the appropriate mitigation measures, is set out in Table 19-16.

Table 19-16 Summary of predicted Construction Phase residual impacts

Assessment Topic	Predicted Impact (pre-mitigation and monitoring)	Residual impact (post mitigation)
Site Clearance and Demolition Waste	Negative, not significant and short-term	Negative, not significant and short-term
Excavation Waste	Negative, moderate and short-term	Negative, slight and short-term
Imported Material	Negative, slight and permanent	Negative, slight and permanent
Construction Waste	Negative, not significant and short-term	Negative, not significant and short-term
Municipal Waste	Negative, imperceptible and short-term	Negative, imperceptible and short-term

19.7.2 Operational Phase

The Operational Phase of the Proposed Development is not predicted to give rise to any significant residual impacts with the adoption of sustainable resource and waste management principles. The residual impact on resource and waste management is predicted to be negative, not significant and long-term.

19.7.3 Decommissioning Phase

No significant residual impacts on resource and waste management as a result of the Decommissioning Phase of the Proposed Development have been identified.

19.8 Cumulative Effects

The cumulative assessment of the relevant plans and projects is undertaken in Chapter 26 (Cumulative Effects) in Volume 2 of this EIAR.

19.9 References

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