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Luas Finglas

Environmental Impact Assessment Report 2024

Chapter 19: Material Assets: Resource and Waste Management

BARRY TRANSPORTATION
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Project Ireland 2040
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GLOSSARY OF FREQUENTLY USED TERMS

Term	Definition
AER	Annual Environmental Reports
BRE	Building Research Establishment
CIRIA	Construction Industry Research and Information Association
CEMP	Construction Environmental Management Plan
COR	Certificate of Registration
CSO	Central Statistics Office
CTMP	Construction Stage Traffic Management Plan
C&D RWMP	Construction and Demolition Resource and Waste Management Plan
C&D Waste	Construction and Demolition Waste
DCC	Dublin City Council
DECC	Department for Environment, Climate & Communications
DoEHLG	Department of the Environment, Heritage and Local Government
EIAR	Environmental Impact Assessment Report
EIA	Environmental Impact Assessment
EMWR	Eastern Midlands Waste Region
EPA	Environmental Protection Agency
ESB	Electricity Supply Board
ESBN	Electricity Supply Board Networks Limited
EU	European Union
EC	European Commission
FCC	Fingal County Council
GAC	Generic Assessment Criteria
GDA	Greater Dublin Area
GoI	Government of Ireland
ICF	Irish Concrete Federation
IEMA	Institute of Environmental Management and Assessment
ISO	International Organisation for Standarisation
IT	Information Technology
LoW	List of Waste
LRV	Light Rail Vehicle
MSW	Municipal Solid Waste
NWMPCE	National Waste Management Plan for Circular Economy
OSI	Open Sourced Indicators
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychorinated Biphenyls
PFAs	Per- and Poly-Fluoroalkylated Substances

Term	Definition
PV	Photovoltaic
RO	Railway Order
REACH	Regulation on the Registration, Evaluation, Authorisation and Restriction of Chemicals
RWPO	Regional Waste Planning Offices
TII	Transport Infrastructure Ireland
TPH	Total Petroleum Hydrocarbons
WEEE	Waste Electrical and Electronic Equipment
WFD	Waste Framework Directive
VOC	Volatile Organic compounds
SVOCs	Semi-Volatile Organic compounds

SECTION 19: MATERIAL ASSETS: RESOURCE AND WASTE MANAGEMENT

19.1 Introduction

19.1.1 Purpose of this Report

This chapter of the Environmental Impact Assessment Report (EIAR) describes the likely significant effects of the Luas Finglas (hereinafter referred to as the proposed Scheme) in relation to resource and waste management as well as identifying proposed mitigation measures to minimise any impacts. As part of the TII circular economy pilot project, preliminary designs have considered emerging preferred routes with the objective of achieving national and local circular economy goals as well as circular economy objectives of the proposed Scheme.

In accordance with the requirements of Directive 2014/52/EU of the European Parliament and of the Council of 16th April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment (i.e., the EIA Directive), it describes and assesses the likely direct and indirect significant effects of the proposed Scheme on resource and waste management. This chapter also provides a characterisation of the receiving environment within a study area in the vicinity of the proposed Scheme.

This chapter sets out the relevant guidelines, policy and legislation (refer to section 19.2.2), the methodology used for the assessment (section 19.2.4), the receiving environment (section 19.3) and sets out the predicted impacts of the proposed Scheme on resource use and waste (section 19.4). Section 19.5 sets out mitigation measures to avoid or minimise impacts identified, and details of any residual impacts are described in section 19.6. A list of reference material used to compile this chapter is contained in section 19.9. The assessment is based on identifying and describing the likely significant effects arising from the proposed Scheme.

A site-specific Construction & Demolition Resource and Waste Management Plan (C&D RWMP) has been prepared to manage the waste generated and optimising resources during the Construction Phase of the proposed Scheme (included in the Volume 5 - Appendix A6.5). The C&D RWMP was prepared in accordance with the Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction and Demolition Projects (EPA, 2021a) document and will be implemented (and updated as necessary) by the appointed Contractor in advance of construction commencing. Engagements with regional/national waste management officers will be held prior to commencement to identify the most optimum approach to management of resources and avoidance of waste.

19.1.2 Outline Scheme Description

The proposed Scheme comprises a high-capacity, high-frequency light rail running from Broombridge to Charlestown. It connects Finglas and the surrounding areas with Dublin's wider public transport network. This provides a reliable and efficient public transport service to the city centre via Broombridge.

As shown in Volume 4 - Map Figure 1-1, starting from Broombridge, the proposed Scheme travels northwards, crossing the Royal Canal and the Maynooth railway line adjacent to Broome Bridge. It then runs adjacent to the east of Broombridge Road and the Dublin Industrial Estate. It then crosses the Tolka Valley Park before reaching the proposed St Helena's Stop and then proceeds northwards towards the proposed Luas Finglas Village Stop. From here, the route passes through a new corridor created within the Finglas Garda Station car park, making its eastern turn onto Mellowes Road. The route then proceeds through Mellowes Park, crossing Finglas Road, towards the proposed St Margaret's Road Stop. Thereafter, the proposed line continues along St Margaret's Road before reaching the terminus Stop proposed at Charlestown.

The proposed Scheme has been designed to interchange with existing and future elements of the transport network. This includes interchange opportunities with bus networks at all the new Stops and with mainline rail services at Broombridge. Additionally, a Park & Ride facility is planned to intercept traffic on the N/M2. The proposed Scheme will comprise a number of principal elements as outlined in Table 19-1 and Table 19-2. A full description of the proposed Scheme is provided in the following chapters of this EIAR:

- Chapter 1 (Introduction);
- Chapter 5 (Description of the proposed Scheme); and
- Chapter 6 (Construction Activities).

Table 19-1: Overview of the Key Features of the proposed Scheme

Scheme Key Features	Outline Description
Permanent Scheme Elements	
Light Rail Track	3.9km extension to the Luas Green Line track from Broombridge to Finglas (2.8km of grass track, 700m of embedded track and 360m of structure track)
Depot Stabling Facility	A new stabling facility (with stabling for eight additional LRVs) will be located just south of the existing Broombridge terminus, as an extension of the Hamilton depot area.
Luas Stops	Four Stops located at: St Helena's, Finglas Village, St Margaret's Road, and Charlestown to maximise access from the catchment area including the recently re-zoned Jamestown Industrial Estate.
Main Structures	Two new Light Rail Transit (LRT) bridges will be constructed as part of the proposed Scheme: a bridge over the River Tolka within the Tolka Valley Park and a bridge over the Royal Canal and the Iarnród Éireann (IÉ) railway line at Broombridge. A number of existing non-residential buildings shall be demolished to facilitate the proposed Scheme. In addition, the existing overbridge at Mellowes Park will be demolished.
At Grade Signalised Junctions	10 at grade signalised junctions will be created at: Lagan Road, Ballyboggan Road, Tolka Valley Road, St. Helena's Road, Wellmount Road, Cappagh Road, Mellowes Road, North Road (N2), McKee Avenue, Jamestown Business Park entrance. Note: The junction at Charlestown will be reconfigured but does not have an LRT crossing.
Uncontrolled Crossings	13 at grade uncontrolled crossings (11 pedestrian / cycle crossings and two local accesses located at: Tolka Valley Park, St Helena's, Farnham pitches, Patrickswell Place, Cardiff Castle Road, Mellowes Park, St Margaret's Road, and ESB Networks.

Scheme Key Features	Outline Description
Cycle Facilities	Cycle lanes are a core part of the proposed Scheme in order to facilitate multimodal "cycle-LRV trips". Approximately 3km of segregated cycle lanes and 100m of non-segregated cycle lanes along the route. Covered cycle storage facilities will be provided at Broombridge Terminus, Finglas Village Stop and St Margaret's Stop and within the Park & Ride facility. "Sheffield" type cycle stands will be provided at all stop locations.
Power Substations	Two new traction power substations for the proposed Scheme will be located near Finglas Village Stop behind the existing Fire Station, and near the N2 junction before St Margaret's Road Stop where the current spiral access ramp to the pedestrian overbridge is located. A third substation is required for the Park & Ride facility.
Park & Ride Facility	A new Park & Ride facility, with e-charging substation, located just off the M50 at St Margaret's Stop will be provided with provision for 350 parking spaces and secure cycle storage. The building will feature photovoltaic (PV) panel roofing and is the location for an additional radio antenna. This strategic Park & Ride connecting the N2/M50 to the city centre will increase the catchment area of the proposed Scheme.
Temporary Scheme Elements	
Construction Compounds	There will be three principal construction compounds, two located west of Broombridge Road and one located at the northern extents of Mellowes Park. In addition, there are other secondary site compound locations for small works/storage. Details can be found in Chapter 6 (Construction Activities) of this EIAR.

Table 19-2: Summary of New Bridges of the proposed Scheme

Identity	Location	Description
Royal Canal and Rail Bridge	Approximately 10m east of the existing Broome Bridge and then continuing north, parallel with Broombridge Road on its east side	The proposed bridge is an eight-span structure consisting of two main parts: a variable depth weathering steel composite box girder followed by a constant depth solid concrete slab. The bridge has the following span arrangement: 35 + 47.5 + 30 + 17 + 3x22 + 17m. Steel superstructure extends over the first three spans. The bridge deck is continuous over the full length of 212.5m and has solid approach ramps at both ends.
Tolka Valley Park Bridge	Approximately 30m west of the existing Finglaswood Bridge	A three-span structure with buried end spans, thus appearing as a single span bridge. End spans as well as part of the main span consist of post-tensioned concrete variable depth girder, the central section of the main span is a suspended weathering steel composite box girder. The overall length of the bridge is 65m with spans 10m, 45m, 10m.

19.2 Methodology

19.2.1 Study Area

In accordance with the Institute of Environmental Management and Assessment (IEMA) guide to Materials and Waste in Environmental Impact Assessment, the assessment of materials and waste has utilised two geographically different study areas to examine the use of materials and the generation and management of resources.

The initial study area for the resource and waste management assessment from the proposed Scheme comprises the areas and activities within the proposed Scheme site, including Construction Compounds and temporary land take, where materials / waste will be used and generated.

A second wider study area within the waste management region has been developed to consider resource and waste generation from the proposed Scheme that could be accepted at licensed waste management sites (permitted for waste volume and type) nationally and internationally for treatment, recovery and disposal. This study area also includes the planning authorities within the extents of the proposed Scheme, namely Dublin City Council (DCC) and Fingal County Council (FCC).

Refer to Volume 4 – Map Figure 19-1 Licenced Inert & Non-Hazardous Landfills surrounding the proposed Scheme and Volume 4 - Map Figure 19-2 Licenced Soil Recovery Facilities surrounding the proposed Scheme

This study area also includes any suitable recovery and waste management infrastructure that could accept resources and or wastes generated by the proposed Scheme. The export of Hazardous Waste to other European Countries for recovery or disposal has also been appraised.

19.2.2 Relevant Guidelines, Policy, and Legislation

19.2.2.1 Directives and Legislation

The following directives and legislation were considered when undertaking the waste and resources assessment:

European Legislation

- Council Regulation 2017/997 of 8th June 2017 amending Annex III to Directive2008/98/EC of the European Parliament and of the council as regards to hazardous property HP "Ecotoxic" (Re: Hazardous Waste);
- Council Directive 1999/31/EC of 26th April 1999 on the landfill of waste (hereafter referred to as the Landfill Directive);
- European Union Directive 2011/92/EU as amended by Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment ('the EIA Directive');
- European Union Directive 2018/851 of the European Parliament and of the Council of 30th
- May 2018 amending Directive 2008/98/EC on waste ('The Waste Framework Directive');
- European Commission Directive 2015/1127 of 10th July 2015 amending Annex II to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives;
- European Commission Regulation No 1357/2014 of 18th December 2014 replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives;
- European Communities (Waste Directive) Regulations 2020 (S.I. No. 323 of 2020) (as amended) (hereafter referred to as the Waste Directive Regulations); and
- European Communities (Waste Directive) Regulations 2011, (S.I. No. 126 of 2011) (as amended).

National Legislation

- Circular Economy and Miscellaneous Provisions Act (2022);
- Waste Management (Facility Permit and Registration) Regulations 2008 (S.I. No. 86/2008) (as amended);
- Waste Management (Facility Permit and Registration) Regulations 2007 (S.I. No. 821/2007);
- Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820/2007) (as amended);
- Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419/2007); and
- Waste Management Act 1996 (as amended).

19.2.2.2 Policy and Guidelines

The methodology used to assess the impacts associated with materials and waste is consistent with, and cognisant of, relevant policy and guideline documents including, but not limited to:

- A Guide to by-products and submitting a by-product notification under Article 27 of the European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) (EPA, 2020);
- A Resource Opportunity – Waste Management Policy in Ireland (Department of the Environment, Climate and Communications, 2019);

- A Waste Action Plan for a Circular Economy, Ireland's National Waste Policy (2020-2025);
- Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Circular Economy Programme 2021-2027 (EPA, 2021a);
- Construction and Demolition Projects (EPA, 2021);
- Construction and Demolition(C&D) Waste (Department of Environment, Climate and Communications, 2021);
- Construction & Demolition Waste, Soil and Stone Recovery / Disposal Capacity – Updated report 2020 (Regional Waste Management Offices 2020);
- Dublin City Development Plan 2022-2028;
- Environmental Protection Agency - Circular Economy Programme 2021-2027 'The Driving Force for Ireland's Move to a Circular Economy' (EPA, 2021);
- European Commission - A new Circular Economy Action Plan - For a cleaner and more competitive Europe (EC, 2020);
- European Union Pathway to a Healthy Planet for All EU Action Plan: 'Towards Zero Pollution for Air, Water and Soil' and associated waste targets for 2030 (European Commission, 2021;
- European Union Construction and Demolition Waste Protocol and Guidelines (European Commission 2018);
- European Green Deal, 2020;
- Fingal Development Plan 2023-2029;
- Green public procurement - Guidance for the Public Sector (EPA, 2021);
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022);
- Guidelines for the Management of Waste from National Road Construction Projects Revision (TII, 2017);
- Guidance on Soil and Stone By-products in the context of Article 27 of the European Communities (Waste Directive) Regulations 2011 (EPA, 2019);
- Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA 2013);
- Guidance on waste acceptance criteria at authorised soil recovery facilities (EPA, 2021);
- IEMA Guide to: Materials and Waste in Environmental Impact Assessment (IEMA, 2020);
- National Waste Statistics Web Resource (EPA, 2021b);
- National Waste Management Plan for a Circular Economy 2024-2030 (RWPO, 2024);
- National Hazardous Waste Management Plan 2021-2027 (EPA, 2021);
- The Management of Waste from National Road Construction Projects (GE-ENV-01101) (TII, 2014);
- Waste Classification – List of Waste and Determining if Waste is Hazardous or non-Hazardous EPA (2015a); amended 2018;
- Waste Minimisation in Construction (SPU SP 133), Construction Industry Research and Information Association (CIRIA), 1997;
- Waste Classification – List of Waste and Determining if Waste is Hazardous or Non-Hazardous (EPA, 2018); and
- Whole-of-Government Circular Economy Strategy 2022-2023 (Department for Environment, Climate & Communications (DECC), 2021).

19.2.2.3 Key Guidelines, Policy, and Legislation

The following section provides a summary of the key guidelines, policy and legislation that are applicable to the design, construction, and assessment of the proposed Scheme and by reference to which the evaluation of the impacts on resources and waste management of the proposed Scheme has been carried out.

Directive 2008/98/EC on Waste (Waste Framework Directive)

The Waste Framework Directive 2008/98/EC outlines concepts and principles of waste management options which include waste prevention, preparing for re-use, recycling, recovery, and safe disposal. It also requires that waste be managed without endangering human health and harming the environment - in particular, without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours, and without adversely affecting the countryside or places of special interest.

The principles that the Waste Framework Directive introduces are: “polluter pays principle”, “extended producer responsibility” and the “waste management hierarchy”. Refer to Figure 19-1. The Waste Framework Directive also requires that Member States adopt waste management plans and waste prevention programmes.

These principles are observed hereinafter. Furthermore, all material requiring disposal shall be handled in accordance with all local regulations and only permitted contractors will be allowed remove specifically consented wastes to licensed or permitted facilities in accordance with legislations referred to below.

Figure 19-1:Waste Hierarchy (Source: European Commission)

The Waste Management Act 1996 (as amended) provides for holding, transportation, recovery, and disposal of waste in such a manner that it does not result in environmental pollution in an Irish context.

Waste Action Plan for A Circular Economy

A Waste Action Plan for a Circular Economy – Ireland’s National Waste Policy 2020 – 2025 (DCCAE, 2020) (hereafter referred to as the National Waste Action Plan) was issued by the Department of Communications, Climate Action and Environment (DCCAE).

The policy is intended to move Ireland toward a circular economy shifting away from waste disposal, favouring circularity and sustainability by identifying and maximising the value of materials through improved design, durability, repair and recycling. The plan sets out the following:

- Project Ireland 2040 sets out the State’s development goals over the next 20 years, and which allows for the opportunity to forecast large, specific waste streams with a focus on preventing or efficiently managing the waste from these areas;
- Prevention of soil arisings which are a significant financial burden on the sector are to progress by placing value on the used material where possible. There is a strong focus on Article 27 and the end of-waste decision making process. These processes are to be streamlined and detailed guidance will be developed for specific problematic materials;
- Use of recycled construction materials will be incentivised (potentially by introducing a levy on virgin aggregates);
- To make national end-of-waste decisions for specific construction and demolition waste streams at the earliest possible stage; and
- Best Practice Guidelines for construction and demolition waste revised to improve the Preparation of Waste Management Plans for Construction and Demolition Waste Projects (EPA, 2021).

This action plan notes that:

'*In a circular economy the value of products and materials is maintained for as long as possible; waste and resource use are minimised, and resources are kept within the economy when a product has reached the end of its life, to be used again and again to create further value.*'

The reuse of excavated material on the proposed Scheme will be optimised using the hierarchy approach shown in Figure 19-2 and as detailed in Chapter 11 (Land & Soils: Soils, Geology & Hydrogeology) of this EIAR.

Figure 19-2:Hierarchy of soil reuse (Source: TII Circular Economy Plan)

National Waste Management Plan for Circular Economy

The National Waste Management Plan for a Circular Economy 2024 – 2030 (RWPO, 2024) is Ireland's new roadmap for waste planning and management. The Plan focuses more on preserving resources by creating a circular economy and shifts away from waste disposal.

The applicable objectives of this action plan to the proposed Scheme are to:

- Shift the focus away from waste disposal and treatment to ensure that materials and products remain in productive use for longer thereby preventing waste and supporting reuse through a policy framework that discourages the wasting of resources and rewards circularity;
- Make producers who manufacture and sell disposable goods for profit environmentally accountable for the products they place on the market; and
- Ensure that measures support sustainable economic models (for example by supporting the use of recycled over virgin materials).

The plan has also been prepared to support and supplement the wider policy base and includes specific targets, policies and actions to enable the waste and resource sector to meet the circularity challenge and accelerate the transition to a circular economy and promotes the use Article 27 by-product notifications and Article 28 end-of-waste processes for end waste materials. The targets set include but are not limited to:

- 0% growth in waste generation by 2030;
- 12% reduction in C&D waste by 2030; and
- 70% Recycling of construction and demolition non-hazardous waste.

National Hazardous Waste Management Plan

The Environmental Protection Agency has prepared a revised National Hazardous Waste Management Plan for the Republic of Ireland covering a six-year period from the date of publication (2021-2027). It sets out the priorities to be pursued to improve the management of hazardous waste, taking into account the

progress made since the previous plan and the waste policy and legislative changes that have occurred since the previous plan was published.

The objectives of the National Hazardous Waste Management Plan are to:

- Support and drive priority prevention actions by industry and the public to reduce the generation of hazardous waste;
- Support the identification of adequate and appropriate collection infrastructure for all hazardous wastes with a view to mitigating environmental and health impacts;
- Endorse the proximity principle such that hazardous wastes are treated as close to the point of production as possible – including within Ireland, where feasible;
- Support effective regulation of the movement and disposal of hazardous wastes in line with national policy priorities; and
- Promotion of safe reuse and recycling pathways in support of the circular economy. The revised National Hazardous Waste Management Plan makes 27 recommendations around prevention, collection, self-sufficiency, regulations, legacy issues, guidance and awareness and implementation.

City / County Development Plans

The proposed Scheme will be in located the Local Authority areas of DCC and FCC. The Development Plans for these Local Authority areas are discussed in further detail below.

Dublin City Development Plan

Dublin City Development Plan 2022 – 2028 (DCC, 2022) outlines four waste-specific policies and five objectives. Of these the most relevant to the proposed Scheme are:

- Policy SI27: *'To support the principles of the circular economy, good waste management and the implementation of best practice in relation to waste management in order for Dublin City and the Region to become self-sufficient in terms of resource and waste management and to provide a waste management infrastructure that supports this objective.'* (DCC, 2022, Section 9.5.5); and
- Objective SIO16: *'To support the implementation of the Eastern-Midlands Regional Waste Management Plan 2015–2021 and any subsequent plans in order to facilitate the transition from a waste management economy towards a circular economy.'* (DCC, 2022, Section 9.5.5).

Fingal Development Plan

The Fingal Development Plan 2023-2029 (FCC, 2023) discusses waste management in Chapter 11 (Infrastructure and Utilities), in which 15 waste management objectives are outlined. The most relevant to the proposed Scheme are:

- Objective Policy IUP20: *'Support the implementation of existing waste management policy and promote education and awareness on all issues associated with waste management, both at industry and community level, including the promotion of waste reduction by encouraging reuse, recycling, and recovery of waste. Fingal County Council will continue to promote and support the objectives of the Eastern and Midlands Region Waste Management Plan 2015–2021, or such plans as may be updated.'* (FCC, 2023, Section 11.6); and
- Objective Policy CAP26: *'Have regard to existing Best Practice Guidance on Waste Management Plans for Construction and Demolition Projects as well as any future updates to these Guidelines in order to ensure the consistent application of planning requirements.'* (FCC, 2023, Section 5.4.4).

Materials Exempted from Waste Categorisation

The Waste Framework Directive sets out the exclusions from the scope of the Directive which includes the following under Article 2(1):

'(b) land (in situ) including unexcavated contaminated soil and buildings permanently connected with land;

(c) uncontaminated soil and other naturally occurring material excavated in the course of construction activities where it is certain that the material will be used for the purposes of construction in its natural state on the site from which it was excavated.'

Materials (*'excavated arisings'* – per IEMA guidance definition) from the proposed Scheme which fall within this provision are therefore not subject to the requirements of EU and National waste legislation and will be treated as a resource on site.

Materials Classified as By-Products

Article 27 of the European Communities Waste Directive Regulations 2011 (Article 5 of the Waste Framework Directive) allows an economic operator 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 can be determined as a by-product if they satisfy all of the following criteria:

a) *'Further use of the substance or object is certain;*
b) *The substance or object can be used directly without any further processing other than normal industrial practice;*
c) *The substance or object is produced as an integral part of the production process; and*
d) *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.'*

Classification of material as a by-product means that the material is approved for a use that is not regulated by waste management legislation, and therefore is not required to be managed as per that legislation. For construction projects, excavated soil and stone can be categorised under this exemption provided the material adheres to the conditions stipulated under Article 27. The economic operator and destination for the material must adhere to all applicable requirements for this exemption to be permitted.

Waste Management Act 1996 (as amended)

Any surplus excavated material will be removed off-site either as a waste or, where appropriate, as a by-product. Where the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011 and having regard for the Circular Economy and Miscellaneous Provisions Act 2022 (Commencement of Certain Provisions) (no. 2) Order 2023 (SI. 344/2023) on 1 July 2023, and any such legislative requirements that may be required at a later date.

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

EPA Guidance on Waste Acceptance Criteria at Authorised Soil Recovery Facilities

The EPA issued guidance in January 2020, titled 'Guidance on waste acceptance criteria at authorised soil recovery facilities.' This guidance applies to licensed, permitted, and registered facilities and provides guidance to facility operators for selecting maximum concentrations and/or trigger levels for relevant contaminants in soil and stone arising from non-greenfield sources.

End-of-Waste Materials

If material from the proposed Scheme is categorised as waste as opposed to a by-product, Article 28 of the European Communities (Waste Directive) Regulations 2011 (Article 6 of the Waste Framework Directive) allows for waste materials to be given End-of-Waste status, following recovery or recycling process, if they meet a set of criteria outlined in the legislation. This means that the material is classified as a product or resource, instead of waste and therefore no longer falls under the jurisdiction of any waste management legislation. The material can therefore re-enter the supply chain.

19.2.3 Data Collection and Collation

19.2.3.1 Data Sources

Relevant information for the waste management assessment was collected through a detailed desktop review of existing data sources, including available EPA, open-sourced indicators (OSI) and Local Authority information. Information collated include the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- A review of the *'Essential Aggregates: Providing for Ireland's needs to 2040'* report (ICF, Essential Aggregates: Providing for Ireland's needs to 2040, 2018) along with annual reports from Irish Concrete Federation have been carried out to ascertain the national and regional availability of construction aggregates. For the purposes of this assessment, primary aggregates have been chosen to act as a proxy indicator for materials given that large quantities of aggregates are typically required for infrastructure projects of a similar nature, e.g. for direct use in unbound bulk fill and subbase, and for indirect use in bound applications such as concrete;
- A review of existing and proposed waste management facilities was completed in the vicinity of the proposed Scheme;
- Description of the typical waste materials/arising that will be generated during the site-clearance/ demolition, Construction, and Operational Phases; and
- Identification of design solutions and / or mitigation measure to prevent waste generation and promote management of waste across the proposed Scheme was undertaken in accordance with the waste management hierarchy.

Estimates of waste generation during the demolition, Construction and Operational Phases of the proposed Scheme have been calculated based on the current information.

19.2.3.2 Field Surveys

As outlined in Chapter 11 (Land & Soils: Soils, Geology & Hydrogeology) of this EIAR, a detailed ground investigation campaign was undertaken to provide detailed, site-specific information on the local ground conditions, including the potential presence of contaminated ground. The findings of this investigation and the assessment undertaken in Chapter 11 were used to inform the assessment in this chapter.

19.2.4 Methodology for the Assessment of Impacts

19.2.4.1 General Approach

The IEMA Materials and Waste Environmental Impact Assessment Guidance (IEMA, 2020) assessment method focuses on determining the likely significant effects of constructing the proposed Scheme on the environment resulting from the consumption of materials and the generation of waste. The IEMA guidance sets out how to assess the significance of environmental effects based on the consideration of the sensitivity of the receptor in combination with the magnitude of the impact. It should be noted that the IEMA guidance assesses landfill void capacity for inert and non-hazardous landfills collated together and hazardous landfills. However, an additional breakdown of impact on landfill void capacity for inert and non-hazardous landfills has been provided separately in section 19.2.4.3.

19.2.4.2 Impact Assessment Criteria

Sensitivity of the Receptor – Materials

The sensitivity of the receptor relates to the availability and type of materials to be consumed by the proposed Scheme. The sensitivity of materials can be determined by identifying where one or more of the criteria from the thresholds detailed in are met. Materials can be a receptor as well as a source of effect. The sensitivity criteria for materials is summarised in Table 19-3.

Table 19-3: Sensitivity Criteria for Materials (IEMA, 2020)

Value	Description
Very High	Are known to be insufficient in terms of production, supply and/or stock; and/or comprise no sustainable features and benefits compared to industry-standard materials. *
High	Are forecast (through trend analysis and other information) to suffer from known issues regarding supply and stock; and/or Comprise little or no sustainable features and benefits compared to industry-standard materials. *
Medium	Are forecast (through trend analysis and other information) to suffer from some potential issues regarding supply and stock; and/or Are available comprising some sustainable features and benefits compared to industry-standard materials. *
Low	Are forecast (through trend analysis and other information) to be generally free from known issues regarding supply and stock; and/or Are available comprising a high proportion of sustainable features and benefits compared to industry-standard materials. *
Negligible	Are forecast (through trend analysis and other information) to be free from known issues regarding supply and stock; and/or Are available comprising a very high proportion of sustainable features and benefits compared to industry-standard materials. *
*Subject to supporting evidence, sustainable features and benefits could include, for example, materials or products that: comprise reused, secondary or recycled content (including excavated and other arisings); support the drive to a circular economy; or in some other way reduce lifetime environmental impacts.	

Sensitivity of the Receptor – Waste

The sensitivity of waste relates to the availability of regional (and where appropriate, national) landfill void capacity in the absence of the proposed Scheme. Landfill capacity is seen as unsustainable and increasingly scarce option for managing waste. The sensitivity of landfill void capacity is assessed by applying the following two-step process:

- The volume of waste for disposal that is predicted to be generated within a defined first study area is calculated by analysing the available data and by providing justified forecasts over the Construction Phase of the proposed Scheme; and
- The volume of forecast waste for disposal within the defined study area is then compared to the remaining landfill void capacity to identify predicted losses in that capacity over the Construction Phase of the proposed Scheme.

The sensitivity of landfill void capacity can be determined through the criteria thresholds detailed in Table 19-4.

Table 19-4: Sensitivity Criteria for Regional Inert, Non-Hazardous and Hazardous Landfill Void Capacity (IEMA, 2020)

Value	Description	
	Inert and Non-Hazardous Landfill	Hazardous Landfill
	Across construction, the baseline / future baseline (i.e. without development) of regional (or where justified, national) inert, non-hazardous, and hazardous landfill void is expected to…	
Very High	Reduce very considerably (by >10%); end during construction or operation; is already known to be unavailable; or would require new capacity or infrastructure to be put in place to meet forecast demand.	Reduce very considerably (by >1%); end during construction or operation; is already known to be unavailable; or would require new capacity or infrastructure to be put in place to meet forecast demand.
High	Reduce considerably: by 6% to 10% as a result of wastes forecast.	Reduce considerably: by 0.5% to 1% as a result of wastes forecast.
Medium	Reduce noticeably: by 1% to 5% as a result of wastes forecast	Reduce noticeably: by 0.1% to 0.5% as a result of wastes forecast.
Low	Reduce minimally: by <1% as a result of wastes forecast.	Reduce minimally: by <0.1% as a result of wastes forecast
Negligible	Remain unchanged, or is expected to increase through a committed change in capacity	Remain unchanged or is expected to increase through a committed change in capacity.

Assessing Magnitude – Materials

The methodology for assessing the magnitude of impact from materials comprises a percentage-based approach that determines the influence of materials consumption on the baseline market capacity (production, stocks or sales), in construction. The approach for assessing the magnitude of impact for materials is detailed in Table 19-5.

Table 19-5: Assessing Magnitude for Materials (IEMA,2020)

Value	Description
	The assessment is made by determining whether through a development, the consumption of…
Major	One or more materials is >10% by volume of the regional* baseline availability;
Moderate	One or more materials is between 6% to 10% by volume of the regional* baseline availability;
Minor	One or more materials is between 1% to 5% by volume of the regional* baseline availability
Negligible	No individual material type is equal to or greater than 1% by volume of the regional* baseline availability.
No change	No materials are required.
* or where justified, national.	

Assessing Magnitude – Waste

The magnitude of impact from waste is assessed by determining the percentage of the remaining landfill void capacity that will be depleted by waste produced during the construction of the proposed Scheme. This is the method that best suits the scale and nature of the proposed Scheme. The magnitude criteria for assessing the inert, non-hazardous and hazardous landfill capacity void are detailed in Table 19-6.

Table 19-6: Magnitude Criteria for Inert, Non-Hazardous and Hazardous Landfill Void Capacity (IEMA, 2020)

Value	Description	
	Inert and Non-Hazardous Landfill	Hazardous Landfill
	Across construction, the baseline / future baseline (i.e. without development) of regional (or where justified, national) inert, non-hazardous, and hazardous landfill void is expected to…	
Major	Waste generated by the Scheme will reduce national landfill void capacity baseline # by >10%.	Waste generated by the Scheme will reduce national landfill void capacity baseline # by >1%.
Moderate	Waste generated by the Scheme will reduce national landfill void capacity baseline # by 6% to 10%.	Waste generated by the Scheme will reduce national landfill void capacity baseline # by <0.5% to 1%.
Minor	Waste generated by the Scheme will reduce national landfill void capacity baseline # by 1% to 5%.	Waste generated by the Scheme will reduce national landfill void capacity baseline # by <0.1% to 0.5%.
Negligible	Waste generated by the Scheme will reduce national landfill void capacity baseline # by <1%.	Waste generated by the Scheme will reduce national landfill void capacity baseline # by <0.1%.
No change	Zero waste generation and disposal from the Scheme.	Zero waste generation and disposal from the Scheme.
# Forecast as the worst-case scenario, during a defined Construction and/or Operational Phase		

Landfill void capacity has been used for this assessment. The three inert landfills in the country are all located within the Eastern Midlands Waste Region (EMWR). There are also two non-hazardous landfill facilities in the EMWR.

There is no dedicated hazardous waste landfill capacity in Ireland. Any hazardous waste produced in Ireland that requires disposal has to be exported. Hazardous waste is exported to the UK, Netherlands, Germany and Belgium. Data from the EPA (2019) shows that between 2015 and 2019, the UK accepted the most hazardous waste from Ireland, followed by Netherlands, Germany and Belgium. Given that a large quantity of hazardous waste generated in Ireland is exported, it is noted that under current laws due to Brexit, no hazardous waste can be exported to the UK. For this assessment, and for comparison purposes, hazardous landfill capacity in Germany has been used to assess the likely impacts on hazardous waste landfill capacity.

Significance of Impacts

The potential for significant environmental effects is determined by considering the scale and nature of impacts within the context of the sensitivity of receptors affected as shown in Table 19-7.

Table 19-7: Determining Significance for Materials and Waste

	Magnitude of Impact					
Sensitivity (or Value) of Receptor		No change	Negligible	Minor	Moderate	Major
	Very high	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

For an environmental effect to be considered significant for both materials and wastes, it must fall within the moderate, large or very large category. For an environmental effect to be considered not significant for both materials and wastes, it must fall within either the neutral or slight category.

Mitigation Measures

Where predicted impacts are identified, mitigation measures will be applied in accordance with the requirements of the Waste Management Act and best practice guidance as provided in section 19.5.

19.2.4.3 Identification of Licensed Materials and Waste Management Capacity

A review of existing and proposed waste management facilities was completed in the vicinity EMWR of the proposed Scheme. In the first instance, all licensed or permitted facilities within the Dublin area and surrounding counties were reviewed in terms of waste types authorised for acceptance and available capacity. Due to the estimated volumes of material to be managed, the review was then expanded further to provide a broader overview of waste management facilities within the EMWR. This was carried out through online research, namely through review of Annual Environmental Reports (AERs), information contained in waste licences, permits or certificates, and/or capacity as set out in progress reports for the different waste regions.

The data used to predict the volume of waste to be generated nationally has been based on an average of the published available data, and not based on a forecast as there was no data available prior to 2018. An estimation was made of volumes of materials to be generated during Construction and Operational Phases of the proposed Scheme,

Material types, waste types and quantities arising from the Construction and Operational Phases of the proposed Scheme were predicted to inform the impact assessment, with characterisation of materials undertaken to:

- Classify the types of material to be generated;
- Quantify the volumes material to be generated; and
- Quantify the level of any contamination present to determine the suitability of the material for re-use and for disposal having regard to whether it could be considered inert, non-hazardous, or hazardous.

Construction waste, including demolition and excavation waste, will be the main type of waste generated because of the proposed Scheme.

19.3 Baseline Environment

The baseline environment for resource and waste management in Ireland is described in the following section. Construction waste, including site clearance, demolition material and excavation waste, will be mainly generated as a result of proposed Scheme during the Construction Phase. Waste associated with maintenance activities will also be generated during the Operational Phase of the proposed Scheme.

The proposed Scheme begins at Broombridge, the northern extension of the Luas Green Line. The proposed route extends northwards crossing the Royal Canal before crossing the River Tolka and entering Tolka Valley Park. A historic landfill is understood to have operated within Tolka Valley Park but was decommissioned and capped by DCC at some stage in the 1970's. Historical mapping indicates a quarry site was once present within the Tolka Valley Park, which is likely to have been subsequently backfilled with waste and / or uncontrolled fill. Refer to Chapter 11: Land and soils: Soils, Geology and Hydrogeology) of this EIAR.

A desk study was carried out to establish the existing conditions with regards to waste management in the study area and to identify any other areas of waste and/or uncontrolled fill. It was also undertaken to identify the current and likely future conditions in the absence of the proposed Scheme for resource materials and waste. Baseline data has been collected at national and regional level, including availability of construction aggregates; construction, demolition and excavation waste arisings; as well as information on regional and national waste transfer and treatment and disposal facilities capacity.

19.3.1 Material Assets: Resource Use

In 2018, the Irish Concrete Foundation published the *'Essential Aggregates: Providing for Ireland's needs to 2040'* report in response to Government's Project Ireland 2040 to highlight the strategic importance of aggregates. The report details that Ireland has abundant natural reserves of high-quality aggregates (stone, sand and gravel). Aggregates are also the basic raw materials for concrete products which are ubiquitous in Ireland's built environment. The Irish quarrying industry comprises approximately 500 active large commercial quarries. These quarries produce aggregates from crushed rock, sand and gravel and which are used as key building materials.

Table 19-8 provides a summary of quantities of total aggregates production in Ireland between 2018 to 2022. There are approximately 220 ready-mixed concrete plants, and 20 large scale precast concrete plants located throughout Ireland. In addition, there are 40 plants producing bitumen bound road surfacing materials for Ireland's national road network. Total aggregates in 2022 were 37,000,000 tonnes which is a decline from 38,000,000 tonnes in 2021.

Table 19-8:Total Aggregates Production in Ireland 2018-2022 (ICF Annual Reports,2019-2022)

Year	2018	2019	2020	2021	2022
			Tonnes		
Aggregates	36,000,000	38,000,000	36,000,000	38,000,000	37,000,000

Quantities of ready-mixed concrete in Ireland between 2018 – 2022 are provided in Table 19-9. Ready mixed concrete declined in 2019 from 5,000,000m^3 to 4,700,000m^3 in 2022.Total ready mixed concrete was estimated at 4,700,000m^3 from 2020 to 2022.

Table 19-9: Total Ready Mixed Concrete in Ireland 2018-2022 (ICF Annual Reports,2019- 2022)

Year	2018	2019	2020	2021	2022
			m^3		
Ready mixed concrete	4,900,000	5,000,000	4,750,000	4,750,000	4,700,000

The proposed Scheme will source materials for construction, and it is best practice to use local suppliers and to reuse materials on site. This approach also contributes to the aspirations of the proposed Scheme, a TII pilot circular economy project. This minimises the attendant environmental impact and cost of waste transport and supports the economic well-being of the local communities in line with the proximity principle.

Both secondary and recycled aggregates can be used as alternatives to primary aggregate and have a number of benefits, including the reuse of secondary and waste materials, thereby reducing the impact of primary extraction. Secondary aggregates are typically by-products of industrial processes. These can be sub-divided into manufactured and natural aggregates, depending on their source and can include materials such as pulverised fuel ash, ground granulated blast furnace slag, incinerator bottom ash and recycled glass. Recycled aggregates are typically derived from reprocessing inert materials previously used in construction (e.g. road planning or crushed concrete).

19.3.2 Construction and Demolition Waste

The Waste Framework Directive requires that the majority of non-hazardous C&D waste (minimum of 70% (excluding natural soils and stone)) shall be prepared for reuse, recycled or subjected to other material recovery, including backfilling operations using waste to substitute other materials by 2020.

The National Waste Statistics Summary Report published by the EPA in August 2023 indicates that Ireland's current progress against this C&D waste target is at 78%. Furthermore, according to the report (covering 2021, the latest reference year):

- The quantity of C&D waste generated in Ireland increased to 9 million tonnes from 8.2 million tonnes, an increase of 10%;
- In 2020, soil and stone waste accounted for 85% of total C&D waste, followed by concrete, brick, tile and gypsum waste, accounting for 7%, and mixed C&D waste (4%). Only 0.4% of C&D waste was collected separately as single waste streams (wood, glass, plastic, or metal); and
- 85% was recovered through backfilling (due to the high proportion of soil and stone), 8% was recycled and 7% was disposed of.

A breakdown of the composition of C&D waste in Ireland in 2021 is set out in Table 19-10. 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 scheme and the waste management practices employed on-site.

Table 19-10: Quantity of C&D Waste Collected by Authorised Waste Collectors in 2021 (EPA, 2021c)

Waste Materials from C&D Sources	Quantity	Proportion of Material Stream %
Soil, Stone, and Dredging Spoil	7,696,287	85.1
Mixed C&D waste	362,380	4.0
Concrete, Bricks, Tiles and Gypsum	602,235	6.7
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

The proposed Scheme lies entirely within the EMWR and is governed by the requirements of the National Waste Management Plan for a Circular Economy. The following is a description of the current waste management baseline within this region and Ireland as a whole, including information on current waste management facilities and estimates of current capacity. The C&D waste and excavated material generated by the proposed Scheme, will be primarily inert and non-hazardous waste. However, there is also predicted to be small volumes of hazardous waste. As disclosed in the National Waste Management Plan for Circular

Economy Volume I, Ireland had available 32,865,310 tonnes treatment capacity for soil waste in 2021 (NWMPCE, 2024).

Within the EMWR, most of C&D waste is composed of soil and stone with approximately 77% of the C&D waste in the region falling into this category in 2018 as per the Construction and Demolition Waste – Soil and Stone Recovery / Disposal Capacity – updated report 2020 (Eastern Midlands Regional Waste Offices on behalf of DCC, 2020). The remaining C&D waste in the region comprised other materials such as contaminated soil, rubble, metals, timber, plastic, glass and wood. In terms of the proposed Scheme, the majority of the spoil arising from construction and demolition will consist of soil and stone. There are a number of wastes 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.

Within the EMWR, 15 soil recovery facilities, operating under Waste Licence with backfilling capacity, were determined to be either active or within the application process at the end of 2018. Soil recovery facilities are generally worked-out quarries which are being restored using uncontaminated soil to return natural ground levels. The total annual capacity for the region at that time (2018) was 2,411,400 tonnes (Eastern Midlands Regional Waste Offices on behalf of DCC 2020). Licensed capacity is most prominent in the EMWR 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. New licensed facilities are also due to come on stream. Future capacities (new applications and un-commenced operations) exceed 2.1 million tonnes nationally, with 73% of this capacity planned for the EMWR.

As detailed in the EPA's (2020) Guidance on Waste Acceptance Criteria at Authorised Soil Recovery Facilities, the Geological Survey Ireland have set boundaries of geological domains, within these domains' maximum concentrations and / or soil trigger levels that should be adopted for authorised soil recovery facilities when accepting material.

The expected year of closure and the remaining capacity of the soil recovery licensed facilities in the counties surrounding the proposed Scheme are summarised in Table 19-11. The capacities provided are the total capacities. It should be noted that the future potential proportion of that capacity available for the proposed Scheme will be lower, considering other potential construction projects and other waste streams including municipal waste. Volume 4 – Map Figure 19-2 shows the location of the soil recovery facilities surrounding the proposed Scheme.

Table 19-11: Soil Recovery Licensed Facilities in Counties Surrounding the proposed Scheme (Source: Eastern Midlands Regional Waste Offices 2020 and /or EPA Licence Search Website, June 2023)

Facility Name	Licence Number	Status	Authorised Annual Soil Intake (Tonnes)	Remaining Capacity (Tonnes)	Year of Expected Closure	Distance from the proposed Scheme
County Dublin						
Huntstown Inert Waste Recovery (Roadstone)	W0277-03	Active	1,500,000 (soil & stones and dredging spoil 17 05 04 and 20 02 02)	2,555,600	2051	Approx 2.5km northwest
GLV Bay Lane Limited	W0301-01	Authorised Not commenced	532,833	1,332,084	2023	Approx 4.4km northwest
Milverton Waste Recovery (Roadstone)	W0272-01	Active	400,000 (inert soils and stones – 17 05	1,886,795	2025	Approx. 21km north

Facility Name	Licence Number	Status	Authorised Annual Soil Intake (Tonnes)	Remaining Capacity (Tonnes)	Year of Expected Closure	Distance from the proposed Scheme
			04 and 20 02 02)			
County Kildare						
Boherkill - Kildare Sand & Gravel Limited (Kildare Sand & Gravel Limited)	W0295-01	Active	225,000	1,500,000	2029	Approx 48km southwest
Kilsaran Halverstown (Kilsaran Concrete Unlimited Company)	W0300-01	Active	300,000	1,200,000	2025	Approx 38km southwest
N&C Enterprises Limited (N&C Enterprises Limited)	W0292-01	Active	345,000	1,500,000	2031	Approx 38km southwest
Ballinderry GCHL Limited	W0298-01	Application	440,000	1,234,335	2026	Approx 44km west
County Meath						
Clashford Recovery (Clashford Recovery Limited)	W0265-01	Authorised Not commenced	170,000	805,200	Unknown (approx. 4-6 years from commencement)	Approx 21km north
Kiernan Sand & Gravel (Kiernan Sand & Gravel Limited)	W0262-01	Ceased (Below Threshold > 3 years)	167,400	938,100	2027	Approx 28.5km northwest
Mullaghcrone Quarry (Roadstone)	W0278-01	Active	100,000	1,800,000	Unknown	Approx 33km north
Tullykane - Kilsaran Concrete (Kilsaran Concrete)	W0296-01	Active	400,000	5,600,000	2033	Approx 28km northwest
County Wicklow						
Calary Quarry (Roadstone Limited)	W0293-01	Active	300,000	3,280,000	2040	Approx 26km south
Potential total annual licensed soil recovery intake in the counties surrounding the proposed Scheme			**3,600,000 to 4,040,233 (Equivalent to approx.**			

Facility Name	Licence Number	Status	Authorised Annual Soil Intake (Tonnes)	Remaining Capacity (Tonnes)	Year of Expected Closure	Distance from the proposed Scheme
			2,005,000 to 2,244,000m^3)			
Estimated potential remaining licensed soil recovery capacity in the counties surrounding the proposed Scheme.				**19,865,000 to 22,397,779 (Equivalent to approx. 11,000,000 to 12,443,000m^3)**		
Estimated potential remaining licensed soil recovery capacity in the counties surrounding the proposed Scheme at the start of the project (Proposed commencement date 2031)				**12,935,600 (Equivalent to approx. 3,662,954 m^3)**		

Waste transfer stations are facilities that accept C&D waste. Table 19-12 summarises the transfer stations which are currently operational in the counties surrounding the proposed Scheme. Waste transfer stations are facilities whereby wastes can be temporarily deposited reducing the cost and traffic impact by facilitating the bulk haulage of the waste in larger vehicles to the destination.

Table 19-12: Licensed Waste Transfer Stations and Their Permitted C&D Intake per Annum (Source: EPA Licence Search Website, June 2023)

Facility	License Number	Annual Intake (tonnes)	Distance
Co. Dublin			
Strarrus Eco. Holdings Ltd.	W0039-02	150,000 (total including all waste types)	Approx. 7.8km north of proposed Scheme
Dean Waste Co. Limited	W0042-01	45,000 (Commercial and Industrial non-hazardous solids) 105,000 (C&D waste)	Approx. 4.3km south of proposed Scheme
Paidraig Thornton Waste Disposal Ltd	W0277-01	20,000 (maximum C&D waste per annum)	Approx 2.3km northwest of proposed Scheme
Paidraig Thornton Waste Disposal Ltd.	W0044-02	30,000 (maximum C&D waste per annum)	Approx. 5.1km southwest of proposed Scheme
Green Circular Economy Unlimited Company	W0095-01	14,000 (Commercial and Industrial) 3000 (Construction and demolition)	Approx. 5.8km southwest of proposed Scheme
Oxigen Environmental	W0152-01	10,200 (maximum C&D waste per annum)	Approx. 7.3km southwest of proposed Scheme
Rilta Environmental Ltd.	W0192-03	500 (maximum non-hazardous C&D waste per annum)	Approx. 13.8km southwest of proposed Scheme
Irish Packaging Recycling Ltd.	W0263-01	50,000 (maximum C&D waste per annum)	Approx. 7km southwest of proposed Scheme

Facility	License Number	Annual Intake (tonnes)	Distance
Starrus Eco Holdings Ltd	W0183-01 (W183-02 in application)	24,000-30,000 (maximum C&D waste per annum)	Approx. 2.8 km northwest of proposed Scheme
County Meath			
Advanced Environmental Solutions Ltd.	W0131-02	23,750 (maximum C&D waste per annum)	-
Mulleadys Ltd.	W0197-02	8,000 (maximum C&D waste per annum)	-

There are several facilities in the counties surrounding the proposed Scheme which hold a Waste Facility Permit or Certificate of Registration from the applicable Local Authorities. These facilities accept soils and inert waste from construction and demolition activities.

Furthermore, these facilities are all permitted or certified to operate Class 5 (recovery of excavation or dredge spoil), Class 6 (recovery of inert waste - other than excavations or dredging comprising natural materials), and / or Class 7 (recovery of inert waste arising from construction and demolition activity) as described in the Third Schedule of the Waste Management (Facility Permit and Registration) Regulations 2007 (S.I. No. 821/2007). In the instance of Certificates of Registration, the maximum allowable quantities vary as follows: Class 5 - the total quantity of waste recovered at the facility shall not exceed 25,000 tonnes; Class 6 - total waste recovered to not exceed 10,000 tonnes; and Class 7 - the annual intake limit is 10,000 tonnes and the limit to the amount of waste leaving the facility is capped at 1,500 tonnes per annum.

The remaining capacity and the expected year of closure of the active licensed landfill facilities in the counties surrounding the proposed Scheme are summarised below in Table 19-13 (Refer to Volume 4 – Map Figure 19-1 and 19-2 for the locations of these licensed facilities). It should be noted that the capacities provided are total capacities, and the potential proportion of that capacity available to the proposed Scheme in the future will be less than that when other potential construction projects and other waste streams including municipal waste is accounted for.

Table 19-13: Inert Landfill Licensed Capacities in the Eastern and Midland Region (Source: EPA licence search website June 2023 and Eastern Midlands Regional Waste Offices 2020)

Facility Name	License Number and Facility Type	Annual Authorised Intake (Tonnes) per Annum Tonnes	Remaining Capacity Tonnes	Expected Year of Closure	Distance from proposed Scheme
County Dublin					
Integrated Materials Solutions Ltd Partnership, Hollywood Great, Nags Head, The Naul, Dublin	W0129-02 Inert Landfill	500,000 (Inert construction and demolition waste and inert dredging spoils)	3,874,316	2028	Approx 17km north
Walshestown Restoration Ltd	W0254-01 Inert Landfill	330,000 (Total including soil and stones and other waste)	2,105,239	2026/2027	Approx 30km southwest
Kyletalesha Landfill	W0026-03	28,596	95,400	Unlikely to still be accepting	Approx 76km southwest

		inert material recovered in 2020		material in 2025 based on remaining capacity	
Potential total annual licensed soil/C&D waste capacity		**830,000**	**-**	-	
Estimated potential remaining licensed soil / C&D waste capacity			**6,074,955**	-	

Table 19-14 summarises the remaining capacity and the expected year of closure of the non-hazardous licensed landfill facilities in Ireland (Refer to Volume 4 – Map Figure 19-1 and 19-2 for the locations of these licensed facilities). It should be noted that the capacities provided are total capacities, and the potential proportion of that capacity available to the proposed Scheme in the future will be less than that when other potential construction projects and other waste streams including municipal waste are accounted for.

Table 19-14: Non-Hazardous Landfill Licensed Capacities in the Eastern and Midland Region (Source: Eastern Midlands Regional Waste Offices 2024 and EPA Licence Search Website January 2024)

Facility Name	Licence Number and Facility Type	Status	Annual Authorised Intake (Tonnes)	Remaining Capacity (Tonnes)	Year of Expected Closure	Distance from proposed Scheme
County Meath						
Knockharley Landfill	W0146-04	Active	440,000	88,000	2028	Approx 31km north
County Kildare						
Drehid Landfill	W0201-03	Active	120,000	400,000 of permitted void space for phase 13-14 pending construction completion of Phase 15	2028	Approx 66.1km
County Cavan						
Corranure Landfill	W0077-04	Inactive however soil and stone accepted for remedial works	45,000	-	2019	Approx 108.1km
County Wicklow						
Ballynagran Residual Landfill (Greenstar Holdings Ltd)	W0165-02 Non-Hazardous Landfill	Active	28,000 (C&D waste)	Research shows 630,000 tonnes overall capacity (350,000m^3 remaining capacity) However new planning application states 8 of 21 cells still to be developed	Current licence - 2026	Approx 47.5km south
Total Annual authorised intake			**633,000 tonnes**			
Total Remaining Capacity				**1,118,000 tonnes**		
Total Remaining Capacity (from 2031)				**750,000 tonnes**		

The facilities listed in Table 19-11 to Table 19-14 are indicative of the types of facilities available to take waste likely to be generated during the Construction Phase of the proposed Scheme.The objective of the proposed Scheme is targeted at re-using 90% of materials in and around the proposed scheme with the view of using Article 27 and 28 processes to maximize circularity. It is estimated that the project will require about 35 tonnes of capacity (estimated quantities include demolition waste 1,400 tonnes, 30,000 tonnes surplus excavated material and 900 tonnes hazardous waste). From the assessment there is adequate capacity in the region to handle the various waste streams.

The final destinations cannot be determined at this stage of the proposed Scheme as it is dependent on the Contractor and will be informed by up-to-date information on the available facilities and their capacities when the project is at the Construction Phase.

19.3.3 Hazardous Waste

The EPA has reported that Ireland generated 466,941 tonnes of hazardous waste in 2021, and approximately 65% of the hazardous waste generated was from industry, 32% was from the construction sector and 3% was from municipal sources such as households, small businesses, educational facilities etc.

There has been an increase in the treatment of hazardous waste in Ireland. 2021 is the first year in which a higher percentage of hazardous waste was treated in Ireland than was exported for treatment. The majority (52%) of Ireland's hazardous waste was treated in Ireland either on site of generation or at hazardous waste facilities. However, Ireland does not have the facilities required to treat the full range of hazardous wastes it produces and therefore a further 48% was exported for treatment in 2021.

Irish hazardous waste treatment facilities treated 148,575 tonnes of hazardous waste to non-hazardous status in 2021. The waste types treated included used motor oil, healthcare wastes, sludges, filter cakes, absorbents, laboratory and chemical waste, contaminated soils, and household hazardous waste from civic amenity sites. This waste is treated until it is non-hazardous; the non-hazardous waste that results is then further treated either in Ireland or abroad.

Within Ireland, there are two facilities that can accept asbestos wastes. Details of these sites are provided in Table 19-15.

Table 19-15: Existing Waste Facility Permit Able to Accept Asbestos in Ireland (Source: EPA Website, August 2023)

Facility Name	Licence Number	Status	Annual Authorised Intake (Tonnes)
Veolia Environmental Services Technical Solutions Limited	W0050-02	Licenced	3,000 tonnes of hazardous C&D waste
Rilta Environmental / ENVA Ireland Limited	W0192-03	Licenced	8,100 tonnes per annum of specifically C&D materials containing asbestos 17 06 01*(Insulation containing asbestos) & 17 06 05*(Other construction material containing Asbestos)

According to the EPA, in 2021 the total amount of contaminated soil generated in Ireland fell by almost 46,000 tonnes and for the first time almost all treatment of contaminated soils (99%) took place in Ireland. Exports of contaminated soil have decreased to less than 1% of soils generated.

19.4 Potential Impacts

This following section details the likely impacts as a result of resource use and waste generation during the demolition, excavation, and construction phases of the proposed Scheme.

19.4.1 Do Nothing Scenario

The Do-Nothing Scenario is the scenario in which the proposed Scheme does not proceed as planned and no development occurs. Under this scenario, there will be no effects as there will be no construction phase or operational phase occurring to use materials or generate waste. The resource and waste impact would be Negligible.

19.4.2 Construction Phase

19.4.2.1 Demolition

To provide the sufficient space for the construction of the proposed Scheme, a certain amount of land take will be required, which will result in site clearance, demolition of number of buildings and structures including pedestrian overbridge and buildings.

Chapter 12 (Land Take) of this EIAR assesses the impact of the proposed Scheme property on residential and public areas located along the route and in particular those properties which will need to be temporarily and permanently acquired and or will be impacted by the proposed Scheme. Chapter 6 (Construction Activities) of this EIAR and Volume 5 - Appendix A6.1 (CEMP) provide further details on the general approach to demolition for the proposed Scheme and lists the properties to be demolished in advance of the main construction works. A summary of structures to be demolished under the project is provided in Table 19-16.

Table 19-16: List of Structures to be Demolished

No.	Area/ Section	Location
1	S31.1	Iarnród Éireann ramp from Broombridge Road to Northern Platform
2	S31.1	Unit 124 Broombridge Close, Glen Industrial Estate to west of Broombridge Road. The building to the north of the existing entrance into Glen Industrial Estate
3	S31.1	Former Layertite building to East of Broombridge Road
4	S31.2	Park Building in Tolka Valley Park at Proposed Compound Location
5	S32.3	Finglas Garda Station PEM building, and boundary reconfiguration works. (OPW)
6	S33.1	Two DCC-owned Parks building along the proposed alignment just to north of Mellowes Road and behind the Parks Superintendent's House
7	S33.1	Pedestrian bridge at southern end of St Margaret's Road over N2.
8	S33.3	North Road Motor Company and associated buildings at southern end of St Margaret's Road
9	S32.3	Pizza Hut building and outbuilding at southern end and to the east of St Margaret's Road
10	S32.3	Shed at 234 McKee Avenue along boundary with Pizza Hut.
11	S32.3	Outbuilding at Kylemore's plot adjacent to 234 McKee Avenue.
12	S33.3	Discount DIY North Road for Park & Ride at southern end and to the west of St Margaret's Road and beside Aldi
13	S33.4	Manhattan Peanuts Ltd. Substation Building at western end of the site and to the east of St Margaret's Road
14	S33.4	Four outbuildings / extensions at Jamestown Business Park: Side extension to south of Finglas Auto Building; Outbuilding to rear of Envision Health and Fitness; Outbuilding in green area to rear of Dunns Seafare Ltd.; Lean-to extension at loading bay of Sail Installations and Logistics
15	Various	Existing boundaries being altered / replaced along route (mainly on Broombridge Road, Finglas Village and St Margaret's Road areas)

The waste which is predicted to arise as a result of demolition will be classified as either inert or non-hazardous wastes, including concrete, bricks, glass, and metals. However, hazardous waste predicted to arise when demolishing existing buildings, structures and infrastructure include asbestos containing materials, bituminous, oils, chemicals, and waste electrical and electronic equipment (WEEE). All material generated from the proposed Scheme will be considered for reuse for construction within the proposed Scheme or in other construction projects in accordance with Article 27 of the Waste Directive Regulations. 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 Article 27, as appropriate. It is predicted that an overall recovery rate of 95% can be achieved for construction and demolition (C&D) wastes (excluding soils and stones). Demolition waste to be generated from the proposed Scheme is provided in Table 19-17.

Table 19-17: Summary of Predicted Key Demolition Waste Generated from the proposed Scheme.

Waste type Indicative waste classification	Waste Classification	Total tonnage	Quantity of demolition waste to be reused, recycled, recovered (tonnes)	Quantity of demolition waste to be sent for disposal (tonnes)
Asphalt from existing roads	Non-hazardous	18,498	17,573	925
Concrete, bricks, tiles and similar	Inert	8,428	8,006	421
Steel	Non-hazardous	657	624.2	32.8
Segregated wood, glass and plastic	Inert	676	642.2	33.8
Total		28,259	26,845.4	1,412.6
% recycled / recovered / landfill			95%	5%

The potential impact of Demolition Waste during the Construction Phase, prior to mitigation is slight adverse. The sensitivity is low, magnitude is moderate, and the effects are Short-term.

19.4.2.2 Excavation Phase

The nature of the design approach is to "design out wastes" with a consideration for shallow excavation as part of this approach. The proposed Scheme will involve shallow excavation and associated earthworks (Refer to Chapter 6: Construction Activities) to facilitate the required vertical alignment, subgrade preparation and foundation construction to achieve the required design levels. Earthworks including excavation of station boxes section, open cut, and cut and cover sections will take place and will result in large quantities of excavated soil, stone and made ground. Excess material will also be generated and will require placement elsewhere within the proposed Scheme, or removal off-site. All stripped (excavated) topsoil is intended to be reused (i.e. no surplus topsoil) however not all excavated material might be suitable for re-use on the proposed Scheme. These will be classified as a waste unless they can meet the by-product test conditions.

Table 19-18 provides the forecast quantities of excavated material likely to be generated by the proposed Scheme which have been classified under Article 27, as inert, non-hazardous and hazardous. It has been predicted that approximately 500m³ (900 tonnes) of the excavated material would be classified as contaminated.

Table 19-18: Summary of Predicted Quantities of Excavated Materials, That are Classified as Inert, Non-Hazardous and Hazardous

Excavated Materials		Volume (m³)	Tonnage
Total excavated material volume		30,000	54,000
Excavated material to be reused on site		13,000	23,400
Total surplus excavated material		**17,000**	**30,600**
Classification of Article 27 non-compliant surplus material as waste	Hazardous	500	900
	Non-Hazardous	1,000	1,800
	Inert	15,500	27,900

For further detail on the locations and extent of contaminated land, refer to Chapter 11 (Land and Soils: Soils, Geology and Hydrogeology). Refer also to Appendix A11.2 of this chapter for the generic quantitative Risk assessment report. For further information on the impacts on water and groundwater associated with contaminated land, refer to Chapter 10 (Water) of this EIAR.

The potential impact of excavation waste during the Construction Phase, prior to mitigation is slight adverse. The sensitivity is low, magnitude is moderate, and the effects are short-term.

19.4.2.3 Construction Activities

Materials that will be required to construct the proposed Scheme include soil, aggregates, asphalt, concrete, steel, plant, fuel, oils, material finishes, glass, and wood.

There will be impacts associated with the generation of waste and transportation for onward disposal, an inevitable output of any construction project, no matter the scale. Such waste includes surplus materials which can arise from over-ordering or mishandling of construction materials, packaging waste, as well as mixed municipal waste and food waste associated with the construction staff working on the sites. There will also be hazardous wastes generated associated with the maintenance of construction machinery or with chemicals required as part of construction processes. These hazardous wastes will be managed and disposed of in an environmentally friendly manner.

For information on the impacts associated with the transportation of materials and waste as part of the Construction phase, refer to Chapter 13 (Air Quality), Chapter 14 (Climate), Chapter 15 (Noise and Vibration) and Chapter 18 (Material assets: Traffic and Transport). The potential impact of construction waste is slight adverse. The sensitivity is low, magnitude is moderate, and effects are short-term.

19.4.2.4 Consumption of Materials During Construction

The quantities of key materials likely to be consumed during construction activities are estimated in Table 19-19.

Table 19-19:Summary of Estimated Materials Consumption

Material Type	Unit	Quantities
Concrete	m^3	6,058
Steel	t	742
Limestone or granite	m^3	3,493
Waterproof and membranes	m^2	19,402
Flat bottom rails	t	693
Sleepers - concrete	Nr	10,670 (approximately)

The choice of whether to use primary or secondary or recycled aggregates, or a combination of both, will ultimately be made by the Contractor after considering a combination of factors, such as sources, specification, production and transport of available materials. However, during construction the proposed Scheme has a commitment to source at least 20% (by weight, volume, value) of materials from re-used or recycled sources.

19.4.2.5 Hazardous Waste

Construction activities tend to produce some hazardous waste. This waste largely derives from plant maintenance activities and include oils and grease from equipment maintenance, batteries, waste paint and solvents, as well as contaminated soils and stones with respect to excavated material. There may also be residue left in drums or containers utilised for certain construction activities, for example, paint cans, solvent containers and empty fuel cans.

The hazardous waste which will potentially be generated during the Construction Phase of the proposed Scheme will comprise a relatively small proportion of the total construction waste. Most of these hazardous wastes will arise from contaminated soils and stones. With regards to excavated material, one potential source of contamination across the whole proposed Scheme alignment is from made ground. Analysis of the ground investigation data has been carried out to estimate the proportion of made ground that is likely

to be considered hazardous. A distinct deposit of made ground characterised by an elevated concentration of anthropogenic material was designated as Historic Waste.

Site investigations and engagements propose a historic landfill may have operated within Tolka Valley Park but was decommissioned and capped by DCC during the 1970s. Information detailing the specific nature of the waste or the spatial extent of the landfill within the park is limited. The 2021/2022 Ground investigation, environmental testing carried out on recovered samples identified heavy metals, TPH, PAH, PCB, VOC and SVOCs in the soils. The levels reported did not exceed the Generic Assessment Criteria (GAC) for human health in a Public Open Space (Park) scenario. Based on this data, the material is classified as non-hazardous (Class U1). However, it should be noted that landfill material is inherently variable and as such an allowance for encountering Class U2 material within Tolka Valley Park will also be considered. Class U2 material is defined as material having hazardous chemical or physical properties requiring special measures for its excavation, handling, storing, transportation, deposition, and disposal (TII, 2011).

As reported by the EPA in 2021, the majority (52%) of Ireland's hazardous waste was treated in Ireland either at site of generation or at hazardous waste facilities. However, Ireland does not have the facilities required to treat the full range of hazardous wastes it produces and therefore a further 48% was exported abroad for treatment in 2021. As detailed by the EPA Waste Statistics in 2021, in Ireland approximately all treatment of contaminated soils (99 %) took place in Ireland.

Based on the above and in consultation with hazardous waste companies it is considered that the majority of contaminated soils will be treated. For the purposes of this assessment, it has been assumed that approximately 52% of the hazardous waste (excluding soils) and approximately 99% of contaminated soils generated by the proposed Scheme will be treated with remaining material exported. All asbestos waste will be sent for off-site disposal. The potential impact of hazardous construction waste during the Construction Phase is slight adverse. The sensitivity is low, the magnitude is moderate, and the effects are short-term prior to mitigation.

PFAs (Per- and Polyfluoroalkyl Substances)

PFAs (per- and polyfluoroalkyl substances) are a group of synthetic chemicals used in various industries, including the rail industry, and are valued for different properties. PFAs are likely to be present in small amounts in some materials used in the light rail sector including, for example, lubricants and hydraulic fluids.

All proposed operations Contractors for the proposed Scheme will be required to manage procurement of such materials in accordance with REACH, and to manage wastes in accordance with local and national legislation. This will form part of the procurement strategy for the Client.

In the meantime, any product that contains PFAs will be managed in accordance with environmental standards to prevent spillage and/or environmental risks.

The disposal of residual product will be in accordance with local legislation (similar to the management of other wastes) and as such only a permitted contractor will be allowed to remove such waste. From there, the wastes will be treated at an appropriately authorised facility. The operator will be required to have appropriate safety management and environmental management systems in place to deal with the possible effects of a spillage.

It is expected that the use of PFAs will shortly be phased out by the European Chemicals Agency (ECHA).

19.4.2.6 Other Waste Types

Surplus material and waste (excluding excess excavated materials) may occur where material supply exceeds material demand. While some surplus materials have reuse potential, other materials will be considered as waste and fall under relevant regulatory controls. Materials brought to site but not fully utilised for their original purpose can also result in other waste such as damages, off-cuts and surplus products. Waste packaging from the construction materials will also be generated on-site during construction.

There will also be municipal solid waste (MSW) generated by construction workers e.g. canteen, office and staff welfare waste that will need to be managed. However, the amounts predicted to be generated are negligible and their impact will be neutral or slight. These wastes will be managed in accordance with the waste hierarchy.

It is anticipated that small quantities of waste would be generated through the Electricity Supply Board Networks Ltd (ESBN) works. During trench excavation, excavated material would be stockpiled and reused to backfill the trench.

19.4.3 Operational Phase

It is unlikely that waste generated during the Operational Phase of the proposed Scheme would be considered significant. However, it is acknowledged that operational waste would be generated from the Stops, stabling site and other areas associated with the proposed Scheme.

Waste generated includes office waste, canteen and staff welfare waste and which will need to be managed. The potential impact of waste is neutral or slight as the amount of waste expected to be generated is negligible. The magnitude is minor, and the effects are long-term

Maintenance wastes are likely to be generated from the depot and maintenance yards and which would include hazardous wastes such as waste oils and greases, paints, chemicals. There will be small amounts of dust, grit, sand and litter waste generated through cleaning and maintenance. WEEE such as Information Technology (IT) and telecommunications equipment, appliances, lighting equipment, electrically powered tools and batteries will be generated during the operation of the proposed Scheme. PFAs are likely to be present in small amounts in some materials used in the light rail sector, for example, lubricants and hydraulic fluid. It is expected that the use of PFAs will shortly be phased out by the European Chemicals Agency (ECHA). In the meantime, any product that contains PFAs will be managed in accordance with environmental standards to prevent spillage and/or environmental risks. Operational Contractors will be required to manage procurement of such materials in accordance with REACH regulations and waste will be managed and treated at an appropriate authorized facility.

The potential impact of waste is neutral or slight, sensitivity is low, magnitude is minor, and the effects are long-term.

19.4.4 Summary Of Impacts

Construction and Excavation Phase Impacts are summarized in Table 19-20.

Table 19-20:Summary of Impacts for Construction Activities

Assessment Topic	Potential Impact
Demolition Waste	Slight Adverse, Low, Moderate, and Short-term
Excavation Waste	Slight Adverse, Low, Moderate, and Short-term
Construction Waste	Slight Adverse, Low, Moderate, and Short-term
Hazardous Construction Waste	Slight Adverse, Low, Moderate, and Short-term
Municipal Waste	Neutral or Slight, Low, Minor, and Short-term

Operational waste Impacts are summarized in Table 19-21.

Table 19-21:Summary of Impacts for Operational Activities

Assessment Topic	Potential Impact
Maintenance waste	Neutral or Slight, Low, Minor and Long-term
Municipal waste	Neutral or Slight, Low, Minor and Long-Term

19.5 Mitigation and Monitoring Measures

Mitigation measures, as set out in the following sections, aim to minimise the impact to the environment of the proposed Scheme through good material resource efficiency practices. All materials consumed and waste generated by the proposed Scheme will be managed in accordance with circular economy principles and the waste hierarchy, with prevention, reuse, recycling, and other recovery methods favoured over disposal.

19.5.1 Designing for the Circular Economy

In line with commitments of the proposed Scheme to circular economy goals, the proposed Scheme will use a circular approach in construction for resource efficiency, minimize the use of materials, energy and other resources in order to reduce environmental impacts and costs. A circular economy is an alternative to a traditional linear economy (of make, use, dispose) in which resources are kept in use for as long as possible; maximum value is extracted from these resources while in use; and where assets, elements, products, components and materials are recovered and regenerated at the end of each service life. Throughout the construction of the proposed Scheme, solutions will be implemented to minimise the consumption of materials and the generation of waste throughout the lifecycle of the proposed scheme.

There are five principles that will be implemented throughout the construction period of the proposed Scheme to ensure that consumption of materials and the generation of waste is minimised throughout the lifecycle of the proposed Scheme.

The five key principles are:

- Minimise resource consumption and waste generation: Identifying and specifying materials that can be acquired responsibly, in accordance with a recognised industry standard (e.g. consider opportunities for materials to be returned to the supplier for future reuse (e.g. steel and concrete elements). The proposed Scheme will source /use sustainable materials and methods to reduce consumption of energy and other resources as well as the volume of waste generated;
- Design for re-use and recovery: identifying, securing and using materials that already exist on-site, or can be sourced from other projects (e.g. by considering reusing materials where possible). The proposed Scheme will recycle / recover at least 95% of construction and demolition waste;
- Design for materials optimisation: simplifying layout and form to minimise material use, using standard design parameters, balancing cut, and fill, maximising the use of renewable materials and materials with recycled content (e.g. using material from low-carbon or sustainable sources);
- Design for off-site construction: maximising the use of prefabricated structure and components, encouraging a process of assembly rather than construction; and
- Design for the future (deconstruction and flexibility): identifying how materials can be designed to be more easily adapted over an asset lifetime and how deconstruction and demounting of elements can be maximised at end of first life.

19.5.2 Construction Phase

19.5.2.1 Applying the Waste Hierarchy as a Priority Order to the Management of Waste

All waste will be managed in accordance with the waste hierarchy as set out in the Waste Framework Directive (2008/98/EC), in such a way as to prevent harm to human health, amenity and the environment.

The primary objective in the construction of the proposed Scheme will be at the top of the waste hierarchy on zero avoidable waste, i.e. preventing waste and reusing waste wherever possible. As such, the aim will be not to focus on lower value recycling and other recovery, and in any case most construction and demolition waste is already ‘recovered’ in some form.

The waste hierarchy will feature departures from for particular types of waste, where justified, in order to ensure minimal environmental impact. It is important to understand any potential wider implications and thus any unintended consequences of managing waste. For example, there will be instances where avoiding waste in the first instance would create greater environmental impact. Consideration therefore will be given by the Contractor to the relationship with other factors such as materials consumption, energy usage and the emission of carbon. The general measures detailed in Table 19-22 will be undertaken during the Construction Phase to ensure waste is managed in accordance with the waste hierarchy.

Table 19-22:Waste Management Best Practice Actions to be Adopted During the Construction Phase

Stage in Hierarchy	Action
Prevention	Standard sizes for most items will be used to avoid specials and cutting on-site. Materials will be ordered to size with minimum waste (BRE, 2012).
Prevention	Off-site construction, prefabricated products / modules and pre-cast units will be used where possible (BRE, 2012; EPA, 2015b).
Prevention	Take-back scheme arrangement with suppliers will be used. All packaging, cable drums and pallets will be collected by suppliers and not broken up (BRE, 2012).
Prevention / Preparation for Reuse	Materials will be reused (i.e. all excavated materials) on-site where possible. (BRE, 2012).
Prevention	Main Contractor will work with all Subcontractors to identify waste minimisation and encourage all Subcontractors to reuse or recycle their own waste materials, in particular packaging (BRE, 2012).
Reduction and Recycling	Packaging requirements in materials procurement will be reduced and recycled content specified (EPA, 2015b).
Prevention	Hoarding posts will be reused, and shuttering systems used where these are required (EPA, 2015b).

19.5.2.2 Construction Environmental Management Plan

During the Construction Phase of the proposed Scheme, the Contractor will ensure the compliant management of all waste generated by the construction activities. Circular economy principles will be incorporated within the management of materials during the Construction Phase in order to reduce the amount of materials used and waste generated by the proposed Scheme.

A Construction Environmental Management Plan (CEMP) has been prepared and is included in Appendix A6.1, and which will be updated and finalised by the appointed Contractor prior to construction commencing. The CEMP comprises [all] of the construction mitigation measures, which are set out in this EIAR, and will be updated with any additional measures which may be required by the conditions attached to An Bord Pleanála's decision. Implementation of the CEMP will ensure disruption and nuisance are kept to a minimum. The plan has regard to the guidance contained in EPA Best Practice Guidelines in preparation of resource Management plans for construction and Demolition Projects.

The CEMP is a working document and will be finalised by the Contractor following appointment and prior to commencing works on site. All the content provided in this CEMP will be implemented in full by the appointed Contractor and its finalisation by the appointed Contractor will not affect the robustness and adequacy of the information presented and relied upon in this EIAR.

The CEMP is a dynamic document, and the appointed Contractor will ensure that it remains up to date for the duration of the construction period. The CEMP may need to be altered during the lifecycle of the construction period to take account of monitoring results, legislative changes, outcomes of third-party consultations etc. Additional appendices may be added to the CEMP to accommodate monitoring results,

permits etc. However, the finalisation of the CEMP by the appointed Contractor will not affect the robustness and adequacy of the information presented here and relied upon in this EIAR."

The CEMP (Volume 5 - Appendix A6.1) also details the requirement for the Contractor to update the Construction & Demolition Resource and Waste Management Plan (C&D RWMP) with site specific information. The C&D RWMP (EIAR A6.5) incorporates all the measures outlined in this chapter and Chapter 11 (Land and Soils: Soils, Geology and Hydrogeology) and identifies how waste arisings are to be controlled and managed during the course of the proposed Scheme, in particular how waste prevention principles will be applied and how on-site waste will be minimised. The C&D RWMP is prepared in accordance with the best practice guidance (DECC, 2021).

The C&D RWMP includes:

- Roles and responsibilities with regards to waste management;
- Key materials and estimated quantities of waste generated;
- Waste Management measures;
- Procedures for Communication;
  - Internal
  - External
- Environmental management procedures; and
  - Environmental Awareness programmes
  - Compliance and Review
  - Monitoring
  - Audits
- Environmental Management.
  - Environmental Commitments
  - Site Management
  - Traffic Management (Appendix A6.2)
  - Invasive Species Management (Appendix A6.3)
  - Construction and Demolition Waste Management
  - Environmental Incidence Reporting

19.5.2.3 Waste Excavated Material

All remaining balance of surplus excavated material will be classified as ‘waste’. See Section 19.4.2.2 for further details on the classification of the waste. The sections below set out the proposed mitigation measures for managing inert, non-hazardous and hazardous waste generated by the proposed Scheme.

While being retained on-site, the excavated material will be properly managed and stored in order to reduce impacts associated with storage of soil and stone. Different types of excavated material will be stored separately, i.e. where applicable, made ground will be stockpiled separate to soils and subsoils, which will be stockpiled separate to rock.

Any contaminated land will be stockpiled separately from all other material in order to minimise the risk of cross contamination. Stockpiling shall be strictly controlled so as to ensure that impacts to the environment surrounding the Northwood site are kept to a minimum. There will be three separate stockpile storage areas, namely an area for the storage of material to be reused within the proposed Scheme, an area for storage of by-product material, and an area for excavated material which is to be removed from site.

Inert Excavated Waste

It is predicted that the remaining non-compliant Article 27 material classified as inert would be reused on site for backfilling such as bunding and landscaping purposes. Therefore, there would be no surplus inert excavated material requiring management off site or disposal.

Non-Hazardous Excavated Waste

It is predicted that approximately 30,000m^3 (54,000 tonnes) of non-hazardous / inert excavated waste would be generated from the proposed Scheme. Approximately 13,000m^3 (23,400 tonnes) would be reused on site for backfilling and used for bunding and landscaping purposes. This leaves a remaining 17,000m^3 (30,000 tonnes) of non-hazardous excavated material that would be classified as a waste and need to be managed off site, i.e. sent to landfill.

Any waste to be removed from site will be transported by vehicles in possession of a valid Waste Collection Permit. Any waste removed will be sent to a suitably licensed, permitted or registered waste facility for compliant handling and recovery or disposal.

Hazardous Excavated Waste

It is predicted that approximately 500m^3 (900 tonnes) of excavated hazardous waste would be generated by the proposed Scheme.

As detailed by the EPA Waste Statistics in 2021, in Ireland the majority (52%) of Ireland's hazardous waste was treated in Ireland either on site of generation or at hazardous waste facilities and rest of 48% was exported abroad for treatment in 2021. Further in 2021, almost all treatment of contaminated soils (99 per cent) took place in Ireland.

Based on the above and in consultation with hazardous waste companies, it is considered that the majority of contaminated soils will be treated. For the purposes of this assessment, it has been assumed that approximately 52% of the hazardous waste (excluding soils) and approximately 99% of contaminated soils generated by the proposed Scheme will be treated with remaining material exported. All asbestos waste will be sent for off-site disposal.

Soil Recovery Facilities

Section 19.3.2 provides details on the available capacity of soil recovery facilities in proximity to the proposed Scheme. Table 19-11 shows that the annual authorised intake at soil recovery facilities in the surrounding counties of the proposed Scheme is between approximately 3.6 million and 4 million tonnes.

19.5.3 Operational Phase

Operational Phase impacts associated with material and waste management at Stops and during maintenance are predicted to not be significant in the context of the proposed Scheme.

All wastes generated during this phase will be managed in accordance with the waste hierarchy. Operational waste plans will be prepared by the future Operator in order to ensure that the aims of the proposed Scheme Sustainability Plans are met. The future Operator will be required to have a Sustainability Plan, linked to the ISO 14001 accreditation (or similar).

The assessment of any environmental impacts and effects associated with materials and waste during maintenance or any large-scale future renewal or improvement works, will be undertaken by the future Operator in accordance with all legal and other necessary requirements. The future Operator will be required to be accredited to ISO 14001 Environmental Management Systems (or similar) for the operation and maintenance of the proposed Scheme.

19.6 Residual Impacts

The implementation of mitigation measures proposed will result in a reduction in resources consumed and waste generated thereby reducing the impact of the proposed Scheme. The mitigation and control measures will be implemented. As a result of the mitigation measures, the residual impacts associated with the construction of the proposed Scheme will not be Significant. No significant effects are predicted during the operation of the proposed Scheme.

19.7 Cumulative Impacts

The cumulative assessment of relevant plans and projects has been undertaken separately in Chapter 24 of this EIAR.

19.8 Difficulties Encountered in Compiling Information

There was sufficient information available to conduct a robust assessment of the likely significant impacts for this chapter however resources available for some baseline assessments were limited or outdated (more than 5 years) during the assessment period. It must be noted that information provided in this report is based on available data/reports at the time of the assessment and supplemented by engagements with stakeholders.

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