Contents

14 Resource and Waste Management

14.1 Introduction

This chapter describes the likely effects of the proposed development in relation to resource and waste management during the construction, operation and decommissioning phases. Mitigation measures are also recommended to reduce the effects of the waste generated by the proposed development.

A detailed description of the proposed development, including design, operation and decommissioning are described in **Chapter 3** *Proposed Development*.

In summary the proposed development (encompassing the onshore elements in Ireland only) will comprise of the following:

- **Landfall Compound** – a temporary landfall compound at Baginbun, where the high voltage direct current (HVDC) cable will be installed underground, below the beach and cliff at Baginbun Beach, by horizontal directional drilling (HDD);
- **HVDC Cables** – two HVDC electricity cables with a nominal capacity of 500 megawatts (MW), installed underground from the landfall at Baginbun to the converter station, including jointing bays and ground level marker posts at intervals along the route;
- **Converter Station** – a converter station situated close to the existing Eirgrid 220kV Great Island substation in Wexford;
- **Tail Station** - A 220kV Loughtown substation located beside the converter station. The tail station connects the HVAC 220kV cable into the 220kV grid via the existing Eirgrid Great Island substation;
- **MV Substation** – an ESB MV substation will be located outside the converter station and tail station perimeter fences but within the landholding. This substation will provide the MV and LV connections required for the development;
- **Converter Station Construction Compound** - temporary compound for the construction of the converter station and tail station at Great Island;
- **Cable Contractor Compounds** – three temporary cable contractor compounds will be required (i) at the landfall site close to Baginbun Beach (ii) at the proposed converter station and (iii) one along the onshore route in the townland of Lewistown;
- **HDD Compounds** – temporary HDD contractor compounds are required. One will be located close to the cable contractor compound at Baginbun Beach with another HDD compound located at either side of the Campile River Estuary crossing;
- **High Voltage Alternating Current (HVAC) Cables** – one 220 kV HVAC electricity cable circuit consisting of three cables, installed underground

connecting the converter station via the Loughtown tail station to the existing EirGrid Great Island substation;

- **Fibre Optic Cables** – fibre optic cables for operation and control purposes, laid underground with the HVDC and HVAC cables; and
- **Community Gain Roadside Car Parking near Baginbun Beach** – in consultation with Wexford County Council, circa 54 roadside car parking spaces will be constructed; and
- **Community Gain in Ramsgrange Village** – in consultation with Wexford County Council, extension to existing footpaths, four new streetlights and a speed activated sign at Ramsgrange.

This chapter was prepared by Simon Grennan and Dan Garvey, with specialist input from Janet Lynch of Arup. A description of the author's qualifications and experience is presented in **Appendix 1.1**.

14.2 Assessment Methodology

This section sets out the methodology followed in carrying out this resource and waste impact appraisal.

The principal objective of sustainable resource and waste management is to use material resources more efficiently, where the value of products, materials and resources are maintained in the economy for as long as possible and the generation of waste minimised. To achieve resource efficiency there is a need to move from a traditional linear economy to a circular economy (refer to **Figure 14.1**). In December 2015, the European Commission adopted an ambitious Circular Economy Package, which includes revised legislative proposals on waste to stimulate Europe's transition towards a circular economy.

Figure 14.1: Circular Economy (Source: European Environment Agency, 2018)

However, where residual waste is generated, it should be dealt with in a way that follows the waste hierarchy (refer to **Figure 14.2**) and actively contributes to the economic, social and environmental goals of sustainable development.

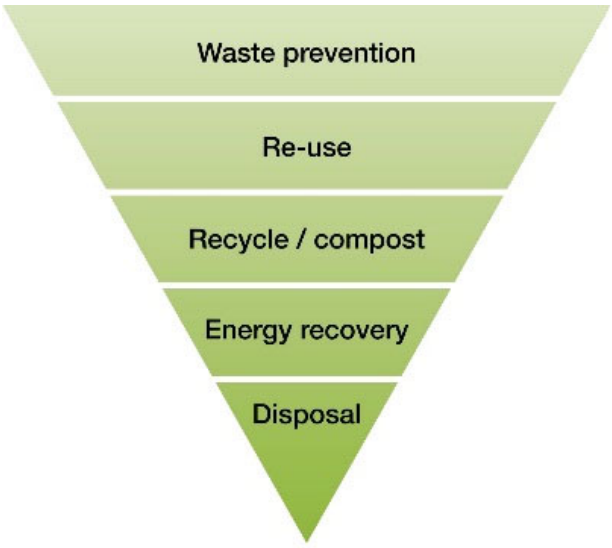

Figure 14.2: Waste Hierarchy (European Union, 2010)

This chapter examines the potential environmental effects of the generation and management of solid waste streams arising from the proposed development, in the context of the existing local and national resource and waste management environment.

14.2.1 General

This resource and waste management assessment considers the following aspects:

- The legislative context;
- The construction phase, including excavation;
- The operational phase; and
- The decommissioning phase

A literature review was carried out of relevant legislation, policy and best practice guidance (refer to **Appendix 14.1**). A desk study was undertaken which included the following tasks:

- Review of relevant policy and legislation which creates the legal framework for resource and waste management in Ireland, including the Southern Regional Waste Management Plan 2015-2021;
- Description of estimated waste generation during the construction and operational phases; and
- The proposed development was systematically reviewed to identify mitigation and move waste management up the waste hierarchy through implementation of best practice (refer to the **Figure 14.2** and **Appendix 14.1**).

Mitigation measures are proposed to minimise the effect of the proposed development on the environment, reduce the quantity of waste sent for final disposal in so far as possible and to promote sustainable waste management practices. These are described in **Section 14.5**.

14.2.2 Guidance and Legislation

Resource and waste management takes place in a policy and legislative framework. A review of relevant legislation, policy and best practice guidance was undertaken to inform the impact assessment and recommended mitigation.

The key components of EU, national and local policy, legislation and guidance relevant to the proposed development (refer to **Appendix 14.1**) are summarised as follows:

- Prevention of waste is the preferred option such that the value of products, materials and resources are maintained in the economy for as long as possible, the generation of waste is minimised, and the principles of the circular economy are implemented;
- Where construction and operational waste is generated it should be source separated to facilitate reuse, recycling and maximise diversion, including biodegradable waste, from landfill;

- Where waste may not be prevented, reused or recycled it should be transported and disposed in accordance with the Waste Management Acts 1996 to 2016 as amended; and
- Waste may only be transferred from site by a waste collection permit holder and delivered to an authorised waste facility (i.e. a facility which holds a Certificate of Registration, Waste Facility Permit or Waste Licence).

14.2.3 Impact Assessment Methodology

Based on the desk study and review of the relevant legislation, policy and best practice guidance the following factors were considered when determining the significance of the effects, both positive and negative, of the proposed development on the various aspects of the receiving environment:

- The quality and sensitivity of the existing/baseline receiving environment which is described in **Section 14.3**
- The natural resources associated with the proposed development is outlined in **Section 14.3.3**;
- **Section 14.4** describes the potential effects the construction, operation and decommissioning of the proposed development will have on waste management and resource use;
- Mitigation and monitoring measures to be implemented during each phase are addressed in **Section 14.5** with residual effects outlined in **Section 14.6**
- The cumulative and transboundary effects are described in **Section 14.7** with a summary and conclusion provided in **Section 14.8** and **Section 14.9** respectively.

14.3 Baseline Environment

The baseline environment comprises the available material resources and waste management facilities that could potentially be affected by the construction, operation or decommissioning of the proposed development.

Construction waste, including excavated soil and rock, which is not reused, and operational waste will be generated as a result of the proposed development.

In order to establish a baseline and review capacity in relation to construction and operational wastes, a review of published data and statistics was undertaken for Ireland. This information is included to provide the context for the scale of the proposed development in relation to other activities in the country.

14.3.1 Construction and Demolition Wastes

The most recent complete figures published by the EPA relating to Construction and Demolition (C&D) waste are for the year 2017 with 4,749,700 million tonnes of C&D waste finally treated (recovered or disposed) in Ireland. 3,827,100 tonnes of this was comprised of soil and stones.

In Ireland in 2017 the EPA reports that 71% of construction and demolition waste was recovered. In addition to this, 1.2 million tonnes of construction and demolition type material was declared to the EPA as a by-product for reuse under Article 27 of the European Communities (Waste Directive) Regulations 2011, SI No. 126 of 2011 (Article 27). It is not known what proportion of this is comprised of soil and stones materials.

The quantity of C&D waste managed in Ireland is indicative of economic activity. At the peak of the economic and construction boom in 2007, approximately 17.8Mt of C&D waste was collected for treatment. This fell to a low of 3Mt in 2011.

An indicative breakdown of the composition of C&D waste in Ireland in 2017 is set out in **Table 14.1** below. These figures should be considered as a guide only as C&D waste can vary significantly from one project to another, depending on the nature of the development and the waste management practices employed on-site.

Table 14.1: Material Categories of C&D Waste treated in Ireland, 2017

Material from C&D sources	Quantity (tonnes)	% of material stream in reference to total
Soil and Stone	3,827,100	80.6%
Mixed C&D Waste	368,500	7.8%
Concrete, Bricks, Tiles and Similar	312,500	6.6%
Metals	182,000	3.8%
Bituminous Mixtures	40,700	0.9%
Segregated Wood, Glass and Plastic	18,900	0.4%
Total	**4,749,700**	**100%**

The final treatment routes for C&D waste material classes in 2014 are shown in **Figure 14.3**. Recycling was the dominant treatment activity for separated materials (e.g. construction and demolition waste glass). Residues from sorting (e.g. fines) were used as landfill cover (backfilling) and difficult wastes that could not be recovered were disposed of (e.g. residues from sorting of waste, construction and demolition waste containing asbestos or polychlorinated biphenyls (PCBs)).

Final treatment operations (recycling, backfilling, use as a fuel, disposal) varied greatly between material streams. By far the biggest amount of C&D waste was used for backfilling (a recovery operation), which mainly reflects the dominance of soil and stones in the overall composition mix.

Under the Waste Framework Directive (2008/98/EC) (EC, 2008) there is a target for Member States to achieve 70 per cent material recovery of non-hazardous, non-soil & stones C&D wastes by 2020. Ireland achieved 71 per cent recovery in 2016.

Having adequate authorised treatment capacity for C&D waste is vital to avoid unauthorised C&D waste disposal. The Waste Management Planning Regions have highlighted a lack of treatment capacity for soil and stone. Soil and stone accounted for 80.6 per cent of the total quantity of C&D waste finally treated in 2017 and is a significant waste stream in terms of quantity arising.

The construction sector also generates hazardous waste such as hazardous contaminated soils, lead-acid batteries, waste electrical and electronic equipment, asbestos, solvent-based paints and varnishes, pesticides and waste oils. In 2017 436,000 tonnes of hazardous waste was generated in Ireland. 314,529 tonnes of this was exported for treatment, recovery or disposal abroad.

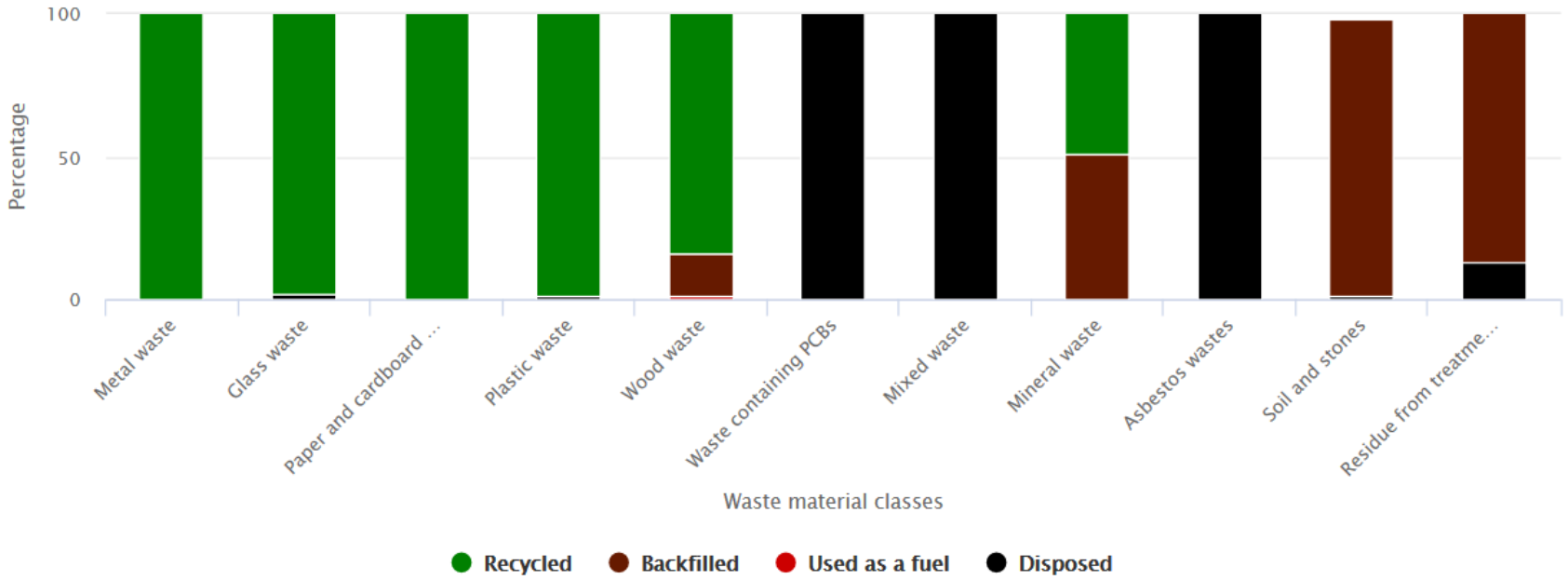

Figure 14.3: Final Treatment for C&D Waste Material Classes in Reference to Total for each Material Class, 2014 (Source: http://www.epa.ie/nationalwastestatistics/constructiondemolition/)

14.3.2 Operational Wastes

Two staff will be employed at the converter station on a 24/7 basis. The tail station will not be manned. Relatively very small quantities of household-type and office-type municipal waste will be generated by them.

The other wastes, which will be generated during operation of the proposed development, will result from maintenance operations. This waste is categorised as hazardous and non-hazardous non-household municipal waste. A portion of this waste will be waste electrical and electronic equipment.

In relation to baseline waste generation for municipal waste in Ireland, statistics are reported at a national level. The most recently published EPA statistics relate to 2017. The statistics show that 1,520,290 tonnes of municipal waste was generated by households and 1,247,753 tonnes of municipal waste was generated by other sources in Ireland. In terms of waste type, 2,232,933 tonnes were household and similar waste, 488,182 tonnes were bulky waste and 46,928 tonnes were waste electrical and electronic equipment.

Very small quantities of biodegradable wastes will be produced. The EPA statistics do not give a figure for total quantity of biodegradable waste produced. The quantity of biodegradable waste landfilled in 2018 was 190,000 tonnes, compared to 307,000 in 2017.

14.3.3 Natural Resources

The main use of materials by the proposed development will be in the construction phase. The bulk materials, which will be used, will include weak-mix and reinforced concrete, crushed stone, sand, structural steel and reinforcing steel. The HVAC, HVDC and fibre optic cables and the electronic and electrical equipment for the converter station and tail station will be comprised of various metals, plastics and composite materials. Timber and metal will be used in temporary works, during the construction phase. Concrete, crushed stone and sand will be sourced in the south-east region. Other materials will be sourced nationally and internationally.

According to CSO, construction turnover in Ireland was €19.4 billion in 2016. The value of civil engineering construction for utility projects (NACE Rev 2 activity code 422 - water, electrical and telecommunications, excluding buildings) in 2016 was €379 million. The total value of the construction of residential and buildings (NACE Rev 2 activity code 412) was €7.3 billion in 2016. The value of ready-mix concrete production in Ireland in 2018 was €341 million.

These figures indicate the scale of the civil engineering and building sector in Ireland and the level of availability and consumption of building materials. The industry in Ireland has grown since 2016.

14.4 Potential Effects

14.4.1 Do-nothing Scenario

In the scenario where the proposed development does not proceed as planned, the resource and waste management effects described in this chapter would not arise.

14.4.2 Construction Phase

14.4.2.1Waste Management

Site Clearance

Prior to commencing work the Contractor will be required to strip vegetation and topsoil from a number of the working areas along the length of the proposed development, principally the converter station and tail station, the off-road portion of the cable route between Great Island and Campile River Estuary, the HDD compounds at the Campile River Estuary, the Contractor's compound at Lewistown, and the landfall site near Baginbun Beach.

Excavated topsoil will be reused within the proposed development. Should it be required that material is delivered off site for storage, reuse or recovery the contractor will ensure that the appropriate waste authorisation is in place.

Excavation

Excavations will be required at the converter station, tail station landfall site and along the onshore cable route. The ground level of the converter station platform has been chosen to balance the volume of excavated material with the volume of fill. Excavated material will be used in the screening berms, which will be located to the south and the east of the converter station platform. Thus, the export of spoil will be avoided. However, up to 20,500m^3 of structural fill will be imported.

A significant proportion of the surplus excavation material from the landfall site and cable route will consist of uncontaminated soil, stone and naturally occurring material which will be reused in its natural state within the site. This reuse is certain and as such the material is not deemed to be a waste in accordance with Article 2 of the Waste Framework Directive (2008/98/EC) (EC, 2008) and Section 3 (c) of the Waste Management Act 1996 (as amended).

Surplus greenfield soil or stone (or equivalent) will be moved off-site as material or a by-product according to criteria as set out in the Directive, and in accordance with EPA guidance.

Where removal of waste from site is required this will be delivered for recovery or recycling at licenced and/or permitted waste facilities.

For the onshore cable installed in arable land and under roadways it is estimated that approximately 21,000 cubic metres of spoil will be excavated from the trench. Of this, it is estimated that 70% will be reused in the trench. The cables will be installed in ducts and the ducts will have a granulated well compactable thermally suitable material around the ducts.

For the onshore cable installed along roads, the aggregate material from the roads will be stockpiled and re-used within the site, where possible.

During construction an estimated 6,000 tonnes surplus excavation material, arising from the proposed development, will require removal from site. Where feasible and subject to testing, this material is likely to be used as a by-product in construction, provided the material itself and its proposed end use complies with the provisions of Article 27. A review will be undertaken by the construction contractor for suitable construction projects for reuse of this material in accordance with Article 27 e.g. projects requiring materials specified in Transport Infrastructure Ireland Series 600 Specification for Earthworks.

In the event that an Article 27 declaration is not feasible for all or part of the surplus excavation material, it will be delivered for recovery or disposal to a facility authorised in accordance with the Waste Management Act, 1996.

Where excavated material containing hazardous substances is discovered as part of the proposed development this will be delivered to a facility authorised to accept hazardous wastes in accordance with the terms of an Industrial Emissions Licence or Waste Licence or exported from Ireland for treatment, recovery or disposal in accordance with current industry practice and the provisions of the Waste Management (Shipments of Waste) Regulations, 2007 S.I. No. 419 of 2007.

Where HDD is used to install the cables, the ground around the drilling head will not be removed but will be compacted. The bentonite mixture which will be used as the lubricant for the drilling head will be recycled in a closed-loop system. A small volume of soil and bentonite will leave the trench at the entrance of the HDD but this will be minimal (i.e. a few cubic metres of soil plus a small volume of bentonite). This material will be handled and disposed-of in accordance with applicable waste legislation.

General Construction Works

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

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

- Soil and stone;
- Concrete, brick, tiles and ceramics;
- Asphalt/tar;
- Metals;
- Liquid wastes (wheel-wash run-off, sanitary waste from portable toilets) and
- Wood.

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

- Bituminous material
- Waste electrical and electronic components;
- Batteries;
- Asbestos;
- Wood preservatives;
- Liquid fuels; and
- Contaminated soil.

In the case of the proposed development, the most likely type of construction waste will be bituminous material from road excavation, surplus concrete and unusable or damaged ducting segments which will arise on site. In addition, where asbestos is uncovered on site (i.e. asbestos watermains), the Asbestos Containing Material will be double-bagged, stored, collected and removed from site by a competent contractor and disposed of in accordance with the relevant procedures and legislation. As requested by Wexford County Council the appointed contractor will have a sufficient stock of pipe on site in order to minimise the repair time by the local authority.

Estimated quantities of construction waste streams are summarised in **Table 14.2**. Liquid wastes (such as contained wheel-wash runoff, and sanitary waste) will be contained and dispatched off-site for disposal at appropriately licensed or permitted facilities.

Table 14.2 Estimated Quantities of Construction Phase Waste / Material Streams

Material	Quantity / Comment
Municipal waste (includes food waste and waste from welfare facilities) and biological/ sanitary waste	50 tonnes
Office papers	2.5 tonnes
PET plastics	1.5 tonnes
Soil and Stone	Up to 6,300 cubic metres: Target: 0 waste
Concrete	Target: 0 waste
Steel reinforcement bar (rebar)	Target: 0 waste
Welded Wire Mesh	All to be re-used

Material	Quantity / Comment
Steel (prefabricated)	Target: 0 waste
Cables	All off-cuts to be recycled
Wood and timbers	De-nailed, segregated and recycled
Metal cladding	Target: 0 waste
Paint	Target: 0 waste
Engine oil, lubricants, filters	Target: all maintenance to be carried out off-site. Should these hazardous waste streams arise within contractors' compounds, they will be treated and disposed-of as hazardous waste
Concrete admixture, resin, epoxy	Treated and disposed of as hazardous waste
Bituminous material	Approximately 2,400m^3

The predicted quantities of these waste streams are small in the wider context of the national generation of waste materials, with an **imperceptible adverse effect** on waste recycling / processing and disposal facilities.

14.4.2.2Resource Use

The final ground level of the converter station platform has been chosen to balance the volume of excavated material with the volume of fill. Excavated material will be used in the screening berms, which will be located to the south and the east of the converter station platform. It is, however, likely that imported structural fill will be required under the converter station footprint. The estimated maximum quantity is 20,500 cubic metres of crushed stone structural fill.

For the cables, a weak mix concrete (typically 14:1 sand: cement) will be required for most of the cable route. A standard concrete pad will be required at the base of the joint-bay. Approximately 4800 cubic metres of weak mix concrete will be required for the trenching (HVDC and HVAC).

Bentonite (or similar HDD drilling head lubrication material) will be handled and removed by the drilling contractor. The volume of bentonite required will be in the order of five cubic metres per shift at the Campile River Estuary crossing, and 15 cubic metres per day at the landfall.

Crushed stone will be used on the footprint of the construction compounds, with up to 10,800 cubic metres of stone required on a temporary basis. This

stone will be re-used following demobilisation and reinstatement of the construction compounds.

During construction it is estimated that 400MWh of power will be consumed in temporary site facilities, and 1,700MWh for construction activities.

Total potable water consumption is estimated at 100 cubic metres during construction.

Diesel will be used in construction equipment and for transport of material and the construction workforce.

Table 14.3: Estimated quantities of resource usage during the construction phase

Material	Estimated Quantity/Comment
Crushed stone (permanent and temporary)	13,100m^3
Structural Steel	460 tonnes
Roof and wall external cladding	7,200m^2
Concrete	4,400m^3
Reinforced steel in concrete	900 tonnes
Weak mix concrete for HVDC and HVAC	4,800m^3
Asphalt (for permanent access road and station internal roads)	950m^3
Sub-stone base for permanent access road and station internal roads)	2,600m^3

The total investment to Greenlink will be €400 million, of which less than half will be the investment in the proposed development. This figure will be spent over circa three years and a significant proportion will be for materials such as electrical and electronic equipment, which will be sourced overseas. The proposed development will represent significantly less than 1% of the total annual turnover of the construction industry in Ireland. Consequently, the proposed development is not expected to have a significant impact on the capacity of the construction industry in Ireland.

The predicted quantities of resources that will be consumed during construction are typical for a construction project of this scale, with a slight adverse effect on resources predicted to arise from the use of key construction materials.

14.4.3 Operations Phase

14.4.3.1Direct Effects

When compared to the waste generated during construction and demolition phases, the waste generated during operations will be negligible as it will mainly be associated with two personnel who will be stationed at the converter station at all times. Approximately twenty staff will be employed when Greenlink is operational. Approximately five will be directly associated with the operation of the proposed development. As mentioned above, two staff will be employed at the converter station on a 24/7 basis. Relatively very small quantities of household-type and office-type municipal waste will be generated by the workforce. Sanitary waste generated on-site will be contained and dispatched for disposal off-site at appropriately permitted or licenced facilities. **Table 14.4** presents the estimated office-type waste quantities generated in converter station and at the off-site location, at which the remaining staff will work.

Table 14.4 Estimated Quantities of Operations Phase Waste Streams

Material	Annual Quantity
Municipal waste and food waste	5 tonnes
Office papers	0.25 tonnes
PET plastics	0.15 tonnes

The other wastes, which will be generated during operation of the proposed development, will result from maintenance operations. These can be categorised as repair replacement and planned upgrade.

- Repair replacement:
  - Typically, converter submodules are replaced every year for repair. The module itself weighs approx. 350kg however that submodule will be repaired and returned to service during subsequent repair works. The specific equipment within the converter submodule that is replaced are minor plant items of a few kilogrammes each year.
- Planned upgrade:
  - planned replacement of control system to replace electronic equipment into the existing cubicles. This typically would occur after 15 years' service. Equipment replaced would only be minor kilogrammes.
  - planned replacement of transformer cooling radiators, only once during lifetime of station. Quantity of radiator steel is expected to be circa 10t.

The operation of the converter station and tail station will have ongoing electrical power requirements.

14.4.3.2Indirect effects

The operation of Greenlink will support renewable generation by reducing curtailment at times of surplus generation. The indirect effect will be to reduce fuel consumption in fossil fuel power plants, and the generation of waste by solid fuel power plants.

14.4.4 Decommissioning

As mentioned in **Chapter 3** *Proposed Development*, once the interconnector ceases operation the proposed development will be decommissioned. Equipment and all above ground structures at the converter station and tail station will be removed, and the site returned to its previous state. Once the above ground structures have been demolished, crushed stone and bituminous road surfacing will be removed, and soil imported to topsoil the footprint of the converter station and tail station site. Concrete, structural steel, reinforcing steel, metal cladding and waste electrical and electronic equipment will be the main other materials to be generated by the demolition works. Underground cables will remain in-situ as there would be more of an environmental impact in their removal. Above ground structures along the cable route will be removed, and their locations reinstated.

Greenlink is anticipated to provide employment for 20 to 30 people on site during the decommissioning phase. The workforce will generate household-type municipal waste.

Topsoil will be imported to reinstate the pasture which had been displaced by the hard surfaces and buildings.

Table 14.5 Estimated Quantities of Decommissioning Phase Waste / Material Streams

Material	Estimated Quantity / Comment
Municipal waste and food waste	1.7 tonnes *
Office paper	0.1 tonnes*
PET plastics	0.05 tonnes*
Crushed stone	5000 tonnes
Concrete	4400 tonnes
Steel reinforcement bar	870 tonnes
Structural steel	460 tonnes
Transformers (without oil)	688t

Material	Estimated Quantity / Comment
Valves/modules	270t
Switchgear	80t
Miscellaneous WEEE	116t
Metal cladding	7200 m^2
Transformer Oil	352,000l
Generator fuel	4500l
Miscellaneous engine oil, lubricants, filters	Should these hazardous waste streams arise during the demolition works, they will be treated and disposed-of as hazardous waste
Bituminous material	1000m^3

* assumes present-day rates of waste generation.

Waste from the decommissioning of the proposed development will be minimised wherever possible or delivered to authorised waste facilities in accordance with the relevant Irish waste legislation. It is expected that, by the time the proposed development will need to be decommissioned, circular economy principles will be in full operation and nearly all of the material arising from the decommissioning works will be reusable. Consequently, it is expected that there will be no significant effects on resources or waste management from the decommissioning phase.

Electrical power, water and fuel will be used during the decommissioning phase. The quantities will be relatively insignificant.

14.5 Mitigation Measures and Monitoring

14.5.1 Mitigation

14.5.1.1 Construction Phase

Construction Waste Management Strategy

This Construction Waste Management Strategy (CWMS) will be part of the Construction Environmental Management Plan (CEMP) which is attached as **Appendix 4.1**. The CWMS includes the following:

- Description of the proposed development;

- Quantities of wastes arising including procedures for minimisation/reuse/recycling and storage;
- Estimated cost of waste management;
- Management structure, roles and responsibilities for C&D waste including names of responsible persons, qualifications and training;
- Procedures for education of workforce and planned dissemination programme;
- Record keeping procedures;
- Details of waste contractors and recycling and disposal sites, including copies of relevant permits or licences;
- Waste auditing protocols, and
- Procedures change management and approval protocols.

The Construction Waste Management Strategy (CWMS) addresses waste generation and arrangements made for prevention, reuse, recycling disposal and collection of recyclables and wastes. The CWMS, which will be incorporated into the CEMP, will be agreed with GIL and submitted to Wexford County Council for approval prior to the commencement of the works.

Construction – General

In addition to the measures inherent in the design of the project, which will be implemented during the construction phase, the following mitigation measures will be implemented:

- The contractor will minimise waste disposal so far as is reasonably practicable;
- Waste from the proposed development will be transported by authorised waste collectors in accordance with the relevant Irish waste legislation;
- Source segregation: Where possible, metal, timber, glass and other recyclable material will be segregated during construction works and removed off site to a permitted/licensed facility for recycling. Waste stream colour coding, and photographs of wastes to be placed in each container as required, will be used to facilitate segregation. Where waste generation cannot be avoided this will maximise the quantity and quality of waste delivered for recycling and facilitate its movement up the waste hierarchy away from landfill disposal and reduce its environmental effect;
- Material management: 'Just-in-time' delivery will be used so far as is reasonably practicable to minimise material wastage;
- Supply chain partners: The contractor will engage with the supply chain to supply products and materials that use minimal packaging, and segregate packaging for reuse;
- Waste Auditing: The contractor will record the quantity in tonnes and types of waste and materials leaving site during the construction phase;
- Waste fuels/oils will be generated from equipment used on-site during construction and will be classified as hazardous waste. Such wastes will be

stored in a secure, bunded area on-site prior to collection by a Contractor who holds the appropriate waste collection permit;

- Possibilities for re-use of clean non-hazardous excavation material as fill on the site or in landscaping works will be considered following appropriate testing to ensure material is suitable for its proposed end use. Where excavation material cannot be re-used within the proposed works the Contractor will endeavour to send material for re-use as a by-product, recovery or recycling so far as is reasonably practicable. Re-use as a by-product can be done under an Article 27 notification once the established EPA criteria for such re-use are met;
- The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material, which is recovered, and which is disposed of; and
- The contractor will ensure that any off-site interim storage or waste management facilities for excavated material have the appropriate waste licences or waste facility permits in place.

14.5.1.2Operational Phase

As the effect of operational waste is predicted to be imperceptible no mitigation is recommended. In operation, the proposed development will require ongoing power input to operate the converter station and tail station. This will have a **slight adverse long-term effect** on the power available on the grid.

14.5.1.3Decommissioning Phase

It is expected that, by the time the proposed development will need to be decommissioned, circular economy principles will be in full operation and nearly all of the material arising from the decommissioning works will be reusable. For the decommissioning phase, a materials management plan will be prepared, which will cover the same topics and be based on the same general principles as the construction phase CWMS, described above, updated to reflect best practice at the time. During the decommissioning phase the contractor will segregate materials at source and ensure that all waste and recoverable materials leaving site will be collected by authorised collectors and delivered to permitted facilities in accordance with the relevant Irish legislation, pertaining at the time.

14.5.2 Monitoring

Monitoring required as part of the detailed CWMS will be undertaken and recorded by the contractor.

Apart from good housekeeping practices no additional monitoring is considered necessary with respect to effects from operational wastes from the proposed development.

Implementation of the decommissioning materials management plan will be monitored, in a manner similar to the monitoring proposed for the CWMS, updated to reflect best practice at the time.

14.6 Residual Effects

14.6.1 Construction Phase

The residual effect of construction waste is expected to be **imperceptible adverse and short term**. The residual effect of construction resource use will be **slight adverse and long-term**.

14.6.2 Operational Phase

The residual effect of operational waste is expected to be **imperceptible and permanent**, with a **slight adverse long-term effect** associated with power use for operation of the converter station and tail station.

14.6.3 Decommissioning Phase

Waste from the decommissioning phase of the proposed development will be minimised wherever possible or delivered to authorised waste facilities in accordance with the relevant Irish waste legislation. As such, there will not be a significant effect on resources or waste management.

14.7 Cumulative and Transboundary Effects

14.7.1 Cumulative Effects

14.7.1.1 Cumulative Effects of All Elements of Greenlink

The proposed development forms part of the Greenlink project, which also includes offshore elements, and works in the United Kingdom. All elements of Greenlink will use natural resources and produce waste, primarily in the construction and demolition phases. The scale of the Greenlink construction activities will be very small relative to the scale of the construction industry, and the natural resource supply and C&D waste infrastructure in Ireland and the UK. Consequently, the cumulative construction impacts are not expected to be significant.

Similarly, the demolition phase of Greenlink will produce demolition waste, on a scale which is expected to be very small relative to the scale of the C&D waste infrastructure in the UK. Consequently, the cumulative demolition impacts are not expected to be significant.

The operation of Greenlink will use minimal resources and produce minimal waste. Consequently, the cumulative operational impacts are not expected to be significant.

14.7.1.2Cumulative Effects with Other Projects

The proposed development may also give rise to cumulative effects with other proposed developments, either consented or currently under construction. Two projects, which are of sufficient scale to have the potential to give rise to significant cumulative effects, have been identified. These are Great Island – Kilkenny 110kV Line Uprate Project and the Great Island Energy Storage System. These projects are described in **Chapter 18**, **Section 8.4.4**.

Both projects will consume natural resources and generate construction, operation and demolition waste. All three projects will generate similar types of construction waste and the construction phases are expected to coincide. It is expected that the Line Uprate project and the Energy storage project will employ the same type of mitigation measures to minimise the generation of such waste. The scale of the construction activities associated with the three projects will be small relative to the scale of the construction industry, and the natural resource supply and C&D waste infrastructure in Ireland. Consequently, the cumulative construction impacts on natural resources and waste infrastructure are not expected to be significant.

The operation of the proposed development and the Line Uprate project will be similar in that they will consume minimal resources and generate minimal waste during operation. The operation of the Energy Storage project may use more resources and generate more waste. However, relative to the scale of the natural resource supply and C&D waste infrastructure in Ireland, the resources use and waste generation of all three projects will be insignificant. Consequently, the cumulative operational impacts on natural resources and waste infrastructure are not expected to be significant.

According to the environmental reported submitted with the Energy Storage project planning application, the project is expected to have a 20-year life. The environmental reported submitted with the Line Uprate project does not specify the life of the project. It is assumed that it will have at least a 40-year life, which is similar to the proposed development. The demolition of the Energy Storage project is expected to occur 20 years before the other two projects and any cumulative impacts on natural resource use and waste infrastructure are expected to be negligible. The demolition of the Line Uprate project and the proposed development are expected to occur at the same time. The demolition activities will be small relative to the scale of the natural resource supply and C&D waste infrastructure in Ireland. Consequently, the cumulative demolition impacts are not expected to be significant.

14.7.2 Transboundary Effects

Considering the nature and location of the proposed development as described in **Chapter 3** and **Chapter 4** significant transboundary effects are not predicted.

14.8 Impact Assessment Summary

Phase	Potential Effects	Mitigation & Monitoring	Residual Effects
Construction	*Waste:* Generation of waste during site clearance, excavation and general construction works. Considering the predicted quantities of these waste streams are small in the wider context of the national generation of waste materials, with an **imperceptible adverse effect** on waste recycling / processing and disposal facilities.	Implementation of a Construction Waste Management Plan. Ongoing monitoring as part of the Construction Environmental Management Plan to ensure all opportunities for reduction, reuse and recycling are taken.	Imperceptible adverse effect
	Resource Use required during construction include the use of weak mix concrete, bentonite, crushed stone. In addition, power and water usage will be required. The predicted quantities of resources that will be consumed are typical for a construction project of this scale, with a **slight adverse effect** on resources predicted to arise from the use of key construction materials.		Slight adverse and long-term.
Operation	*Waste:* Considering the limited occupancy of the converter station site relatively very small quantities of household-type and office-type municipal waste will be generated. Maintenance works associated with the proposed development will generate municipal waste. The potential effects are predicted to be **imperceptible**.	Considering the imperceptible effect, no mitigation measures are required. Good housekeeping practices to be implemented.	Imperceptible and permanent
	Resource Usage: The operation of the converter station and tail station will have ongoing electrical power requirements. This		Slight adverse long-term effect

Phase	Potential Effects	Mitigation & Monitoring	Residual Effects
	demand will have a **slight adverse long-term effect**. However indirectly the proposed development will support renewable generation by reducing curtailment, reduce fuel consumption in fossil fuel power plant and the generation of waste.		
Decommissioning	*Waste:* It is expected that, by the time the proposed development will need to be decommissioned, circular economy principles will be in full operation and nearly all of the material arising from the decommissioning works will be reusable. Consequently, it is expected that the effects on resources or waste management from the decommissioning phase are **not significant.**	Implementation of a decommissioning materials management plan which will cover the same topics as the CWMS, updated to reflect best practice at the time.	Not Significant
	Resource Usage: Electrical power, water and fuel will be used during the decommissioning phase. The quantities will be relatively insignificant.		Not Significant

14.9 Conclusion

As is stated above, with the implementation of the proposed mitigation measures and monitoring, slight adverse long-term effects on resource usage during construction and operation are predicted. The predicted residual effect on waste management during construction and operation are predicted to be imperceptible, adverse and imperceptible and permanent, respectively.

The residual effect on waste management and resource usage during decommissioning will not be significant.

14.10 References

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