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& Waste Management
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Table of Acronyms

Acronym	Meaning
AER	Annual Environmental Reports
C&D	Construction and Demolition
CCC	Cork County Council
CCDP	Cork County Development Plan
CCTV	Closed Circuit Television
CEMP	Construction Environmental Management Plan
DCC	Dublin City Council
DMC	Domestic Material Consumption
EC	European Commission
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
EU	European Union
EWC	European Waste Catalogue
LCCC	Limerick City and County Council
LoW	List of Waste
SWMP	Site Waste Management Plan
TII	Transport Infrastructure Ireland
WMP	Waste Management Plan

14. Resource Use & Waste Management

14.1 Introduction

This Chapter identifies and assesses the potential for impacts on resource use and waste associated with the proposed Project. The Project Description is provided in Volume 2, Chapter 3; Project Description of the EIAR.

This Chapter describes the baseline conditions; sets out the methodology used; predicts the likely significant impacts of the proposed Project; proposes mitigation measures to avoid or minimise those impacts; and identifies any significant residual impacts once mitigation measures have been implemented. The assessment has been conducted in the context of current relevant standards and guidance and identifies any requirements or possibilities for mitigation.

It is anticipated that impacts on resource use and waste will occur mostly during the construction phase of the proposed Project and so that is the primary focus of this assessment; some consideration is also given to the use of resources and potential generation of waste during operation of the proposed Project, for example through routine maintenance and repairs.

This Chapter should be read in conjunction with the following Chapters, and their Appendices, which expand upon aspects of the proposed Project:

- Volume 3, Chapter 8 Soils, Geology & Hydrogeology;
- Volume 3, Chapter 9: Water;
- Volume 3, Chapter 11: Traffic and Transport; and
- Volume 3, Chapter 16: Cross Cutting Themes.

14.2 Study Area

The proposed Project includes seven sites, two are in County Limerick and five are in County Cork.

The study area for resource use is constrained to consideration of the materials consumed within the footprint of the proposed Project; it does not extend to the areas from which those resources have been obtained. Neither does it include an assessment of the transport routes for the delivery of the materials to site as this is addressed in Volume 3, Chapter 11: Traffic and Transport.

The study area for consideration of waste arisings combines the footprint of the proposed Project, including associated temporary working such as compound sites, and the wider Southern Region (and beyond if required) for the purposes of identifying waste management facilities and locations.

14.3 Consultation

The key issues raised during consultation with prescribed bodies and other consultees in relation to material assets are broadly summarised in Table 14.1.

Table 14.1 Consultation Submissions and Responses.

Consultee Comments	Response
TII August 2019 Assessments and design and construction and maintenance standards are available at TII Publications	TII (NRA) Guidelines have been consulted and are listed in Section 14.5.1 of this chapter.
Limerick County Council provided a response on 10/01/2019 and identified that <i>"In relation to water issues, particularly for those crossings with water courses nearby (e.g. Fantstown p. 28) it would be worth giving specific details of measures designed to prevent run off and local water contamination. This might also arise in S17.4 resource use and waste (p.74) and the provision of a construction and Environmental management Plan (CEMP) would help address these issues."</i>	Measures relating to the storage of waste and the prevention of water pollution are outlined in Section 14.7 of this chapter, in Volume 3, Chapter 9: Water and Volume 5, Appendix 11 Outline CEMP.
Cork County Council provided a response on 12/12/2019 and had no specific issues to raise in relation to waste.	Noted.

14.4 Baseline Environment

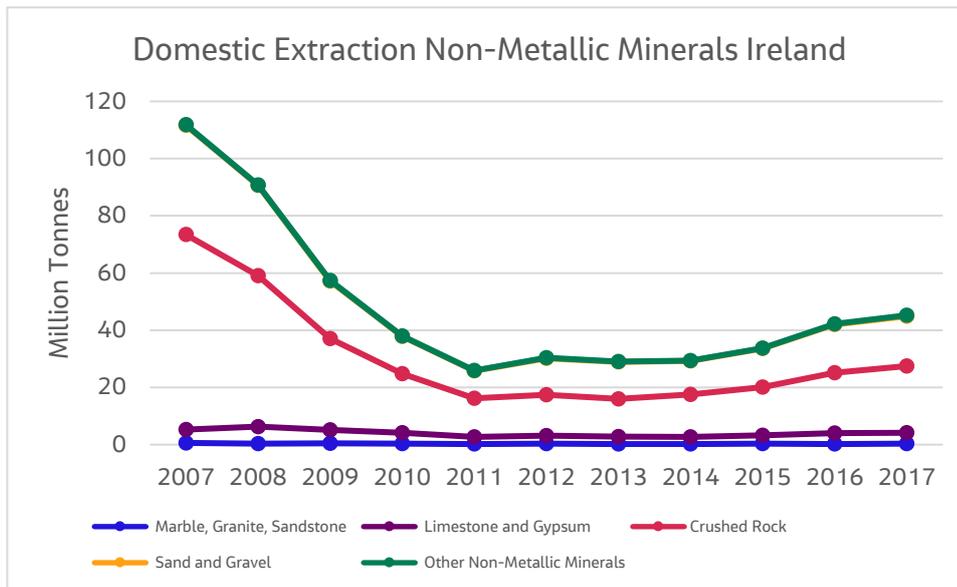
14.4.1 Resource Use

Domestic Material Consumption (DMC) is a measure used by the European Union (EU) to determine resource consumption and efficiency of member states. It is calculated by adding Imports to Domestic Extraction and deducting Exports. Between 2000 and 2007, Ireland had the highest DMC per capita in the European Union, at three times the EU-27 average (Eurostat, 2020). This was due to the construction boom resulting in very high consumption of construction minerals (38 tonnes per capita of minerals alone in 2007; more than twice the average total DMC per capita). Another contributing factor was large-scale agricultural production, resulting in the second highest DMC-biomass per capita in the EU-27 at almost 10 tonnes in 2007.

The economic decline started in 2008 and resulted in the total DMC per capita in Ireland decreasing by 55% between 2007 and 2012, with the use of construction minerals decreasing by 70%. With a DMC per capita of 24.2 tonnes in 2012, Ireland was still the third highest in the EU-27, 77% above the EU-27 average.

Limestone and Gypsum (including Crushed Rock) consumption in Ireland decreased from 72.8 million tonnes in 2007 to 16 million tonnes in 2011 but has been increasing slowly since, to 27.2 million tonnes in 2017. Over the same period Sand and Gravel use decreased from 38.2 million tonnes to 9.6 million tonnes at its lowest level, increasing to 17.4 million tonnes by 2017. See Inset Figure 14.1.

Inset Figure 14.1: Domestic Extraction Non-metallic Minerals Ireland (Source: cso.ie)



14.4.2 Waste

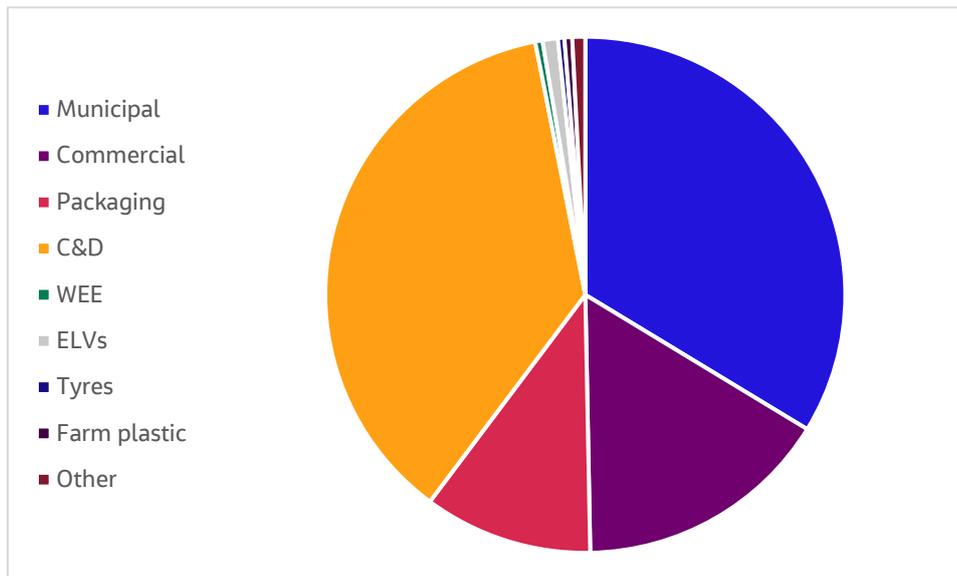
Limerick and Cork County Councils are both within the Southern Waste Region; its Statistical Indicators Annual Report (2012-2015) provides headline data for a variety of waste types generated and managed within its region. This is then used to inform its future waste management plan, details of which are provided in Section 14.5 Assessment Methodology.

The Southern Waste Region includes ten county council areas with a combined population of 1,585,906. Using population statistics from cso.ie and the SWR report, the proportion of different waste arisings can be calculated. Table 14.2 shows the proportions of each type for the SWR; Inset Figure 14.2 shows this by way of a chart.

Table 14.2: Total and Percentage of Waste Arisings by Waste Type, Southern Waste Region

Waste Type	Tonnes	% of Total waste Arisings
Municipal	937,270	34
Commercial	444,054	16
Packaging	291,807	10
Construction & Demolition (C&D)	1,020,363	37
WEE (Electrical)	12,677	0.5
ELVs (End of Life Vehicles)	26,328	1
Farm Plastic	13,425	0.5
Other	22,317	1
Total	2,779,425	100

Inset Figure 14.2 Waste Arisings by Waste Type, Southern Waste Region



At over 1 million tonnes in 2017, Construction and Demolition waste had the highest proportion of waste arisings, followed closely by municipal waste.

This was a rise compared to previous years, as a result of an increase in volume output in the construction sector of 16.3% in 2017. This growth put pressure on the processing options for C&D waste with the EPA prioritizing the applications for inert soil & recovery facilities and licensed an additional 1.4MT during 2017. Non-hazardous-non-inert C&D waste has very few processing options in Ireland and is mainly restricted to being directed to lined landfills, using void space that otherwise might be available for municipal waste disposal. Export options were identified in 2017 and this is set to continue as a necessary option going forwards.

Baseline information for each site is not available for resource use or waste; it is not measured at such a local level. However, it can be reasonably assumed that the resource use and waste baseline is confined to the operation of the public road level crossings, which is the equivalent of domestic resource use and waste for a single dwelling and would be in line with per capita consumption and waste arisings statistics for Ireland and the Southern waste Region.

14.5 Assessment Methodology

14.5.1 Legislation, Policy & Guidance Overview

Legislation and Policy

The overarching policy and legislation applicable to the proposed Project is set out at Volume 2, Chapter 4: EIA Process and Methodology. In addition, the following legislation has been reviewed:

- The EU Waste Framework Directive (2008/98/EC);
- The Waste Management Act 1996 (as amended);
- The European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011); and
- Waste Classification – List of Waste and Determining if Waste is Hazardous or Non-Hazardous (EPA 2015).

In addition, the following EU, national, regional and local policy documents were reviewed:

- EU Construction & Demolition Waste Management Protocol (EC 2016);
- A Resource Opportunity – Waste Management Policy in Ireland (DoCELG2 2012);
- Construction & Demolition Waste: Soil and Stone Recovery / Disposal Capacity (RPS on behalf of DCC 2016);
- Southern Region Waste Management Plan 2015-2021;
- Cork County Development Plan; and
- Limerick County Development Plan.

European Union 7th Environment Action Programme to 2020

Turning waste into a resource is one key to a circular economy. The objectives and targets set in European legislation have been key drivers to improve waste management, stimulate innovation in recycling, limit the use of landfilling, and create incentives to change consumer behaviour. If countries engage in re-manufacturing, reusing and recycling, and if one industry's waste becomes another's raw material, it is possible to move to a more circular economy where waste is eliminated, and resources are used in an efficient and sustainable way.

The EU's 7th Environment Action Programme sets out environmental policy for the EU to 2020 and a vision to 2050. It identifies three key objectives:

- *"To protect, conserve and enhance the Union's natural capital;*
- *To turn the Union into a resource-efficient, green, and competitive low-carbon economy; and*
- *To safeguard the Union's citizens from environment-related pressures and risks to health and wellbeing,"*

In line with this programme and its policy objectives, waste policy for the EU identifies the following priority objectives:

- *"To reduce the amount of waste generated;*
- *To maximise recycling and re-use;*
- *To limit incineration to non-recyclable materials;*
- *To phase out landfilling to non-recyclable and non-recoverable waste;*
- *To ensure full implementation of the waste policy targets in all Member States."*

The methodology used to assess the impacts associated with waste had appropriate regard to relevant guidance including, but not limited to:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA August 2017 Draft);
- Guidelines for the Management of Waste from National Road Construction Projects Revision 1 (TII 2014);
- Guidance on Soil and Stone By-products in the context of Article 27 of the European Communities (Waste Directive) Regulations 2011 (EPA 2019);
- Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Waste Projects (Department of Environment Heritage and Local Government 1 July 2006);
- Design Manual for Roads and Bridges (UK) LA110 Material Assets and Waste (Highways England, Transport Scotland, Welsh Government & Department for Infrastructure NI, August 2019); and
- CIRIA document 133 Waste Minimisation in Construction (CIRIA 1997).

Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects, 2006 (DCCAIE.gov.ie)

The purpose of these Guidelines, produced by the Department of Communications, Climate Action and the Environment, is to promote an integrated approach to construction and demolition (C&D) waste management, throughout the duration of a project. They are designed to promote sustainable development, environmental protection and optimum use of resources. The Guidelines provide guidance on the preparation of Project Construction and Demolition Waste Management Plans (WMP) for certain classes of project, which exceed specified threshold limits. The guidelines are designed to reflect the European Union 'waste hierarchy' of reducing the amount of waste produced in the first instance, reusing what it is possible to do so, recycling what cannot be reused and then only as a last resort disposing of the waste to a licenced facility. This hierarchy has been refined in recent years to reflect the policy requirements of a circular economy and much more emphasis is now given to waste becoming a raw material in another process. Notwithstanding, the guidelines are still applicable.

The Guidelines require that a Construction and Demolition WMP is prepared where there is the potential for the proposed Project to exceed specific thresholds, which are set out in Table 14.3.

Table 14.3 C&D Projects/Development Thresholds

Item	Description of C&D Projects/Development
1	New residential development of 10 houses or more.
2	New developments other than (1) above, including institutional, educational, health and other public facilities, with an aggregate floor area in excess of 1,2500 m ² .
3	Demolition/renovation/refurbishment projects generating in excess of 100m ³ in volume, of C&D waste.
4	Civil Engineering projects producing in excess of 500m ³ of waste, excluding waste materials used for development works on the site.

The Waste Management Plan (WMP) must provide an overall framework for the management of all waste arising on the sites. The WMP must also take account of the waste hierarchy which favours, in descending order: waste prevention and minimisation, material reuse, material recovery and recycling, energy recovery from waste, disposal of waste to licensed landfill.

Regional and County Waste Policies

The waste arisings from the proposed Project are governed by the requirements as set out in the Southern Region Waste Management Plan 2015 – 2021. The proposed Project will be generating waste over two county councils (County Cork and County Limerick).

Cork County Development Plan 2014 – 2020 paragraph 11.7.10 requires the thresholds for C&D WMPs as set out in the 2006 Guidelines are adhered to. In addition, paragraph 11.7.11 states that:

"Where appropriate, developers will be encouraged to reuse excavated material from their development sites for landscaping, land restoration or to be reused in the building process. The aim of this assessment will be to establish clear proposals for the reuse, reduction and recycling of waste at the outset of the development."

Limerick County Development Plan for 2010 to 2016 includes Objective IN O47:

"It is the objective of the Council to ensure that all significant construction/demolition projects include construction and demolition waste management plans. These plans should seek to focus on waste minimisation in general and optimise waste prevention, re-use and recycling opportunities and are required for developments of five or more housing units or commercial or industrial developments on sites in excess of 0.5 hectares."

Legislative Exemptions

The European Union (Waste Directive) regulations 2011 set out the exclusions from the scope of the Directive which includes the following under Article 3(1)(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 from the Proposed Project which fall within this provision are therefore not subject to the requirements of EU and National waste legislation.

Article 27 of the European Communities (Waste Directive) Regulations 2011 allows an economic operator to decide, under certain circumstances, that material is a by-product and not a waste. The following conditions must be met in this case:

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

Classification of material as a by-product means that the material is of a type that is not regulated by waste management legislation, and therefore is not required to be managed as per that legislation. For such 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.

14.5.2 Data Collection Methods

Online data sources used in the collation of data were:

- Southern Waste Region Annual Statistics;
- www.cso.ie population statistics for small areas; and
- www.ec.europa.eu/Eurostat.com European Union statistics on resource productivity.

Consultation with a number of key stakeholders has also been undertaken. Cork County Council provided a response on 12/12/2019 and had no specific issues to raise in relation to waste. Limerick County Council provided a response on 10/01/2019 and identified that *"In relation to water issues, particularly for those crossings with water courses nearby (e.g. Fantstown p. 28) it would be worth giving specific details of measures designed to prevent run off and local water contamination. This might also arise in S17.4 resource use and waste (p.74) and the provision of a construction and Environmental management Plan (CEMP) would help address these issues."*

The other consultees and prescribed bodies consulted in July 2019 have not raised any concerns in relation to waste.

Resource use in terms of 'fill' and other materials required, has been estimated by the proposed Project construction team and used in this assessment to consider the potential impacts of this.

Equally, waste types and quantities arising from the construction and operation of the proposed Project have been estimated by the project construction and design engineers to inform the impact assessment.

14.5.3 Assessment Method

The determination of significance for resource use and waste follows the DMRB Guidance LA110 for Material Assets (Resource Use) and waste. Significance category descriptions and significance criteria are set out in Table 14.4 and Table 14.5.

Table 14.4 Resource Use and Waste Significance Criteria

Significance Category	Description
Very Large	<p>Material assets:</p> <p>1) no criteria: use criteria for large categories.</p> <p>Waste:</p> <p>1) >1% reduction or alteration in national capacity of landfill, as a result of accommodating waste from a project; or</p> <p>2) construction of new (permanent) waste infrastructure is required to accommodate waste from a project.</p>
Large	<p>Material assets</p> <p>1) project achieves <70% overall material recovery / recycling (by weight) of non-hazardous Construction and Demolition Waste (CDW) to substitute use of primary materials; and</p> <p>2) aggregates required to be imported to site comprise <1% re-used /recycled content; and</p> <p>3) project sterilises ≥ 1 mineral safeguarding site and/or peat resource.</p> <p>Waste</p> <p>1) >1% reduction in the regional capacity of landfill as a result of accommodating waste from a project; and</p> <p>2) >50% of project waste for disposal outside of the region.</p>
Moderate	<p>Material assets:</p> <p>1) project achieves less than 70% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials; and</p> <p>2) aggregates required to be imported to site comprise re-used/recycled content below the relevant regional percentage target.</p> <p>Waste:</p> <p>1) >1% reduction or alteration in the regional capacity of landfill as a result of accommodating waste from a project; and</p> <p>2) 1-50% of project waste for disposal outside of the region.</p>
Slight	<p>Material assets:</p> <p>1) project achieves 70-99% overall material recovery / recycling (by weight) of non-hazardous CDW to substitute use of primary materials;</p> <p>and</p> <p>2) aggregates required to be imported to site comprise re-used/recycled content in line with the relevant regional percentage target.</p> <p>Waste</p> <p>1) $\leq 1\%$ reduction or alteration in the regional capacity of landfill; and</p> <p>2) waste infrastructure has sufficient capacity to accommodate waste from a project, without compromising integrity of the receiving infrastructure (design life or capacity) within the region.</p>

Significance Category	Description
Neutral	<p>Material assets:</p> <p>1) project achieves >99% overall material recovery / recycling (by weight) of non-hazardous Construction Demolition Waste (CDW) to substitute use of primary materials; and</p> <p>2) aggregates required to be imported to site comprise >99% re-used /recycled content.</p> <p>Waste</p> <p>1) no reduction or alteration in the capacity of waste infrastructure within the region.</p>

Table 14.5 Significance Criteria

Significance	Description
Significant (one or more criteria met)	<p>Material assets:</p> <p>1) category description met for moderate or large effect.</p> <p>Waste:</p> <p>1) category description met for moderate, large or very large effect.</p>
Not significant	<p>Material assets:</p> <p>1) category description met for neutral or slight effect.</p> <p>Waste:</p> <p>1) category description met for neutral or slight effect.</p>

14.6 Potential Effects of the proposed Project

14.6.1 Resource Use and Waste Arisings Overview

Resource use considered in this assessment includes the materials to be used in construction and ongoing resources required for the future repair and maintenance. Consideration is given at each site to the potential to reuse materials, especially excavated material (cut) for use as fill in the construction of the bridges especially.

As such, both resource use and waste are considered together for each site. It should be noted that any quantities of materials presented in this Chapter are estimates based on the outline design and subject to change during detailed design, however the volumes presented are considered to be a reasonable worst-case estimate based on the current designs.

Table 14.6 summarises the types of waste which could be generated during the Construction Phase of the proposed Project with the associated List of Waste (LoW) code, formerly referred to as European Waste Catalogue (EWC).

Table 14.6 Likely Construction Waste Types

Waste Type	LoW Code
Drilling muds and other drilling wastes	01 05
Waste hydraulic oils	13 01
Waste engine, gear and lubricating oils	13 02
Wastes of liquid fuels	13 07
Packaging (including separately collected municipal Packaging Waste)	15 01

Waste Type	LoW Code
Concrete, bricks, tiles and ceramics	17 01
Wood, glass and plastic	17 02
Bituminous mixtures, coal tar and tarred products	17 03
Metals (including their alloys)	17 04
Soil (including excavated soil from contaminated sites), stones and dredging spoil	17 05
Gypsum-based construction material	17 08
Other construction and demolition wastes	17 09

14.6.2 Potential effects During Construction

All Sites: Do Nothing

To maintain the status quo, will require the continued use of the dwelling nearby and include resource use and waste arisings as would be expected from a single, domestic dwelling. In addition, there will be an ongoing requirement for the repair and maintenance of the public road level crossings and the gates. These would be small in magnitude compared to resource use and waste arisings for the county and region and so would be Not Significant.

All Sites: Construction

Materials Used

Table 14.7 presents a summary of the materials proposed to be used for the construction of all sites. A detailed breakdown for each site is presented in Appendix 14A. The figures are indicative only at this stage; however, they provide a useful overview of the nature and quantities likely to be consumed during the construction of the proposed Project. The table does not include figures for Cut and Fill. These are presented separately in Table 14.7.

Table 14.7 Summary of Materials Proposed to be Used Combined for All sites

Material	Quantities*
Fencing	4,478m Timber post and tension mesh stud fence 10 No. Field Gates
Safety Barriers	3,926m Safety Barriers 510m Pedestrian Guard Rail
Drains and Service Ducts	1,390m 300mm pipe; PCV; 1-2m deep 30 road gullies 3,147m filter drains 70 manholes
Pavement Carriageways	2,693 m ³ Sub-base 2,693 m ² Base 2,693 m ² Binder course 2,693 m ² Surface course

Material	Quantities*
Pavement Local Access Road	2,828 m ³ Sub-base 18,758 m ² Base 18,758 m ² Binder course 18,761 m ² Surface course
Pavement Local Field Access road	260 m ³ sub-base 1,471 m ² Surface course
Footways and Paved Areas	2,412 m ² concrete footway 10 m ² paved areas
Kerbs, Channels, Edgings, Combined Drainage and Kerb Blocks and Linear Drainage Channel Systems	9,492 m precast concrete kerb 4 No. Precast concrete drop kerb
Traffic Signs	56 Permanent retroreflective traffic sign
Road bridge & Special Structures	39 Concrete pre-cast beams 1 No. Box culvert for river 2 No. box culverts for ditches 832 m ² retaining wall
Lighting	30 No. 10m nominal height steel road lighting column 300 m lighting duct and cable
Blockwork	80 m ² Blockwork wall

*Quantities are indicative, based upon indicative design.

In terms of significance of the effect of this material use, very little of this material would result in waste as the quantities are in accordance with design requirements and so there would be no significant impact on waste. For resource use, DMRB guidance focuses on the import of aggregates and the level of recycled content within them; materials such as those listed above, at these quantities, are not identified in the appraisal method for the determination of significance (See Table 14.4) and as such are not significant on a project of this scale. Notwithstanding, the resources used for drainage have been substantially reduced through the use of Sustainable Drainage Systems (SuDS) in the form of swales at all sites, with the exception of XC187 Fantstown and XC209 Ballyhay.

Hazardous Substances

There may be small quantities of what are defined as hazardous substances used on site; these are most likely to be used in plant maintenance activities and include hydraulic and fuel oils; a small number of waste items arise as a result of this use, including, waste oil, oil drums, oil-contaminated filters and brake fluids and other such materials, as well as contaminated soils and stones as discussed with respect to excavated material. These substances and associated wastes will comprise a relatively small proportion of the total construction resource use and waste footprint. The majority will be used in the proposed temporary Construction Compounds where materials, plant and equipment will be stored during the Construction Phase. The management of these types of materials is set out in Section 14.7 Mitigation. The nature and quantities of these materials is Not Significant in terms of resource use or waste.

Demolition

The Old Stationhouse (two storeys into the roof) and a one-storey storage building, at XC212 Ballycoskery, will be demolished as part of the proposed Project. Waste materials from this demolition are likely to include bricks, tiles, glass and window frames. There may also be some timber present in the building, although it has not been accessed to determine this. The quantities of waste arisings are considered to be small in magnitude and so

are not significant, notwithstanding, the materials will be handled according to the waste hierarchy and standards, as set out in Section 14.7 of this chapter.

In addition, the road surface at XC209 Ballyhay will be scraped and removed to allow for the installation of electrical cables and associated infrastructure for the CCTV. An area of approximately 405m of tarmac will be removed and then resurfaced following completion of the works. The quantities of waste arisings are considered to be small in magnitude and so are not significant, notwithstanding, the materials will be handled according to the waste hierarchy and standards, as set out in Section 14.7 of this chapter.

Cut and Fill

For the most part, the greatest amount of resource use and potential for waste will be in the construction of the road-over-rail bridges at XC201 Thomastown, XC212 Ballycoskery and XC219 Buttevant. There will be large quantities of materials needed for the bridges; the imported fill, materials required for the bulk earth ramps and special structures for the bridges. Estimated amounts of 'cut' or excavated material and the 'fill' required to construct the bridges and roads and ancillary infrastructure are provided in Table 14.8.

Table 14.8 Estimated Cut and Fill Quantities

Material	Cut and Fill Quantities (tonnes)							Totals
	XC187	XC201	XC209	XC211	XC212	XC215	XC219	Tonnes
CUT								
Total Cut m ³	-	241.0	50.0	8,007.0	2,715.0	2,665.0	552.0	
Total Cut tonnes	-	409.7	85.0	13,611.9	4,615.5	4,530.5	938.4	24,191.0
Excavation of Acceptable Material	-	327.8	68.0	8,167.1	3,692.4	3,624.4	750.7	16,630.4
Excavation of Unacceptable Material	-	81.9	17.0	2,722.4	923.1	906.1	187.7	4,838.2
Fill using Excavated Material	-	327.8	68.0	8,167.1	3,692.4	3,624.4	750.7	16,630.4
Disposal of Unused Cut	-	-	-	-	-	-	-	-
% Reuse possible	-	80.0	-	75.0	80.0	80.0	80.0	77.5
FILL								
Fill Required		40,290.0	200.0	4,719.2	68,491.3	59,574.8	71,571.7	244,847.0
Imported Fill	-	39,962.2	132.0	-	64,798.9	55,950.4	70,821.0	228,216.6
%age Import Fill Required		99.2	66.0	-	94.6	93.9	99.0	93.2
WASTE								
Weight of Cut disposed (tonnes)	-	81.9	17.0	2,772.4	923.1	906.1	187.7	4,838.2
Landfill capacity for C&D waste	664,437.5	664,437.5	664,437.5	664,437.5	664,437.5	664,437.5	664,437.5	664,437.5
Weight of waste to be exported	-	-	-	-	-	-	-	-
%age weight of project waste to be exported	-	-	-	-	-	-	-	-
SIGNIFICANCE								

Material	Cut and Fill Quantities (tonnes)							Totals
	Neutral	Slight	Neutral	Slight	Slight	Slight	Slight	Slight
Significant or Not Significant?	Not significant	Not significant	Not significant	Not significant	Not significant	Not significant	Not significant	Not significant

It is anticipated that, at least 70% of all excavated material will be able to be reused for the construction of the bridge embankments and general landscaping on site. This includes moving excavated materials between sites to increase the reuse ratio wherever possible. For the unacceptable material excavated, there is sufficient capacity in the region’s landfill sites for this to be accepted; notwithstanding it will be handled in accordance with the measures set out in Section 14.7 and will be recovered or recycled if it cannot be reused. Landfill will be a last resort. As a result, all sites are considered to have a slight impact and as such are not significant.

A large amount of material will require to be imported to the sites where bridge works are proposed. There are no regional or national targets for the use of recycled or secondary aggregates in Ireland. As a result, a level of significance associated with the imported material cannot be determined. However, it is recognised that the percentage import is high, and it is proposed that the significance of this will be minimised through mitigation measures outlined in Section 14.7.

14.6.3 Potential Effects During Operation

All Sites: Do Nothing

In the absence of the proposed Project, a continuation of existing resource use and waste will continue. This will take the form of domestic resource use and waste from the dwelling associated with the manning of the public road level crossing and continued repair and maintenance for the crossing itself. These effects would be Imperceptible and Not significant.

All Sites: Operation

The operation of all sites would require similar types of resource use and generate similar types and quantities of waste. General repair and maintenance of the roads and bridges, fences and landscaping will occur. It is impossible to quantify these amounts; however, it is anticipated that they would be negligible in magnitude and so any effects would be imperceptible and therefore Not significant.

The types of resources used, and waste generated at each site are shown in Table 14.9.

Table 14.9 Resources used and Waste Generated During Operation

Resource/Waste Type	XC187	XC201	XC209	XC211	XC212	XC215	XC219
Concrete, bricks, tiles and ceramics	None	Use possible for repairs to kerbing and bridge. Waste very small as precast.	None	Use for kerbing repairs. Waste minimal as precast.	Use possible for repairs to kerbing and bridge. Waste very small as precast.	Yes - possible for kerbing. Waste very small as precast.	Use for kerbing repairs. Waste minimal as precast.
Wood, glass and plastic	None	Wood for repairs to fencing posts	None	Wood for repairs to fencing posts	Wood for repairs to fencing posts	Wood for repairs to fencing posts	Wood for repairs to fencing posts

Resource/Waste Type	XC187	XC201	XC209	XC211	XC212	XC215	XC219
Bituminous mixtures, coal tar and tarred products	None	tarmac for repairs of road surfaces; may be some waste	tarmac for repairs of road surfaces; may be some waste	tarmac of road surfaces – quantities tbc; may be some waste	tarmac of road surfaces and car park – quantities tbc; may be some waste	tarmac of road surfaces – quantities tbc; may be some waste	tarmac of road surfaces – quantities tbc; may be some waste

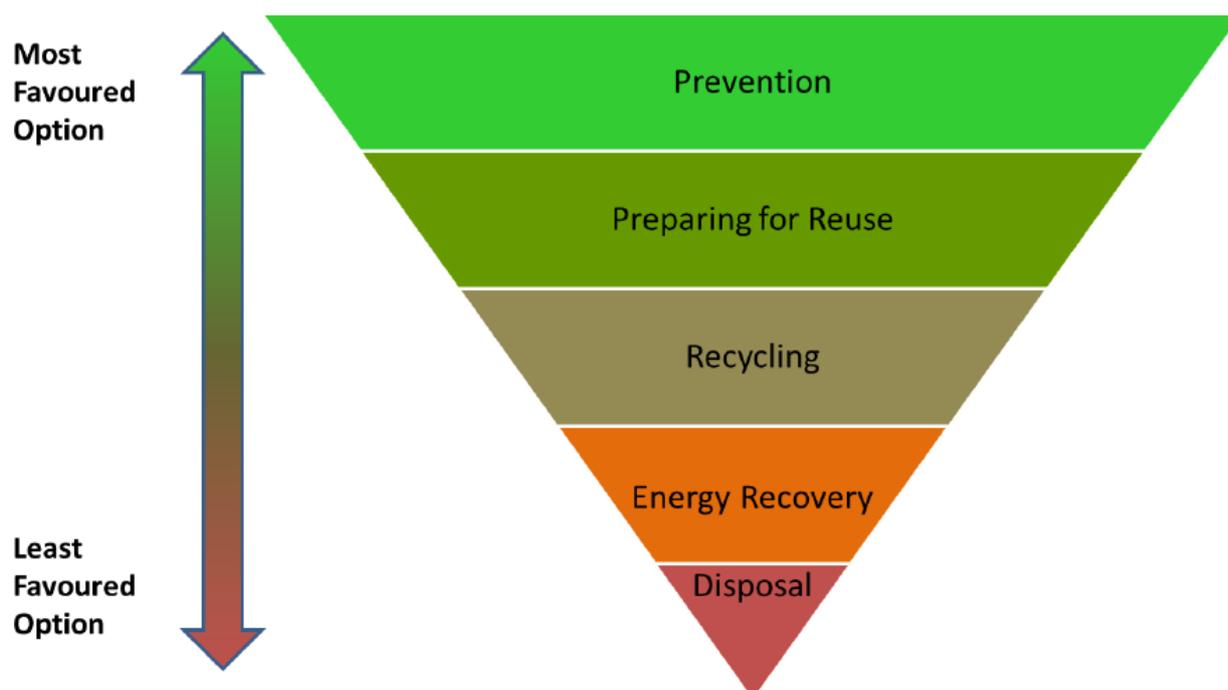
14.7 Mitigation Measures

14.7.1 Sustainable Waste Management Principles

In the case of resource use and waste management, mitigation measures aim to reduce overall quantities of materials to be used and waste arising.

The design of the proposed Project will seek to maximise resource efficiency, reducing the amount of waste generated, minimising water consumption and making the most efficient use of energy. This will be adhered to also in the development of the Site Waste Management Plans (SWMPs) that will be produced for each site by the contractor prior to commencement but post consent, in accordance with local planning policy objectives. For further details on the content of SWMPs, see Section 14.5.4. The approach to resource use and waste management for the proposed Project will follow sustainable waste management principles which incorporates the European Union ‘waste hierarchy’ – see Inset Figure 14.3.

Inset Figure 14.3 Waste Hierarchy



Measures to reduce resource use include:

Prevent

By reducing resources used, or increasing the efficiency in the use of resources, the amount of waste produced can be decreased. Excessive resources can be used in construction projects as a result of over-ordering, poor on-site waste segregation, a requirement for a high standard of finishing and a lack of space for storage of unused and waste materials.

The consumption of raw materials and waste will be minimised, through sound design and good practice in procurement. In particular, the implementation of a 'just in time' materials procurement policy. There are increasing numbers of soil recovery sites across the country and these will be used as source of materials wherever possible. Where other large construction projects, for example a new road, are occurring nearby and at the same time, it is possible these will be another source of materials. Frequently road projects have to use borrow pits to dispose of excess excavated material; it may be acceptable for it to be reused elsewhere, with the appropriate licenses and transfer permits in place. This will be determined during detailed design and in the construction phase of the proposed Project.

The SWMPs will consider the application of solutions and guidelines for designing out waste for civil engineering projects to reduce materials use as well as waste arisings. Both will be monitored as part of the SWMPs' review process.

Reuse

Opportunities for reusing 'waste' before recycling, recovery or disposal will be considered. For example, one of the principle waste materials generated by the proposed Project would be excavated soils and substrate. Where possible, and appropriate, such materials will be re-used on site.

Site set up will involve stripping vegetation and topsoil for some of the construction areas. Surface vegetation, topsoil and subsoils will be stored separately for re-use and handled in accordance with good practice methods.

Recycle

If materials cannot be appropriately reused on site, they shall be assessed for their potential for recycling. General construction waste may be produced, such as wood, plastics and cardboard packaging. These will be segregated and stored for short periods on site in secure designated areas prior to removal from site to a recycling facility.

Recover

Stripped vegetation and removed trees (with landowner agreement except where this is identified for re-use or recycling) and general food waste will be taken to a composting, anaerobic digestion or biomass plant.

Disposal

The disposal of waste from the proposed Project to landfill will be regarded as a last resort. All other options, as described above, will be considered prior to considering disposing of waste to landfill. If required, disposal will be undertaken in a safe and responsible manner ensuring that all waste carriers and management facilities are appropriately licensed, in accordance with the procedures outlined in this document.

14.7.2 Standards

A set of standard measures will be employed for the management of waste and are listed below:

- the treatment of recyclable waste materials from the proposed Project will be undertaken off-site at an appropriate facility. Waste materials will be recovered and sorted on site for transportation and taken from site to the recycling facility;

- material will be stored for short periods on site in secure designated places in the identified construction working areas until taken away for recycling;
- all waste materials shall be stored securely on site in order to prevent their escape and protect them against vandalism, vermin or outside interference;
- hazardous waste (e.g. paints, solvents, sealants) will be segregated on-site to avoid contaminating other material and waste streams;
- all waste management contractors carrying waste shall be authorised to do so and all sites that receive the waste shall be authorised to do so;
- a sample of waste management routes will be subject to an annual audit to confirm that waste is being managed correctly;
- quantities of waste generated will be recorded and monitored. Records will be kept for a minimum of three years;
- an authorised waste management contractor will deal with the disposal of any fly-tipped materials discovered. Any fly-tipping will be reported as an environmental incident and notified to the local authority and/or EPA to enable them to investigate the incident;
- all employees and contractors involved with the handling and managing of waste will have the relevant training and be assessed as competent and training records retained;
- all waste containers shall be labelled to indicate the types of waste that may be deposited in them;
- all staff and contractors working on the project shall understand which waste should be deposited where, and that they are not allowed to use the facilities for the disposal of domestic waste. This will be delivered by toolbox talks; and
- a SWMP shall be produced for all sites.

14.7.3 Storage of Waste

Waste may be stored at construction compounds for a limited amount of time to help to limit the number of vehicle movements to and from site as far as possible to minimise effects on the local roads.

- waste will be stored in secure designated areas, in enclosures or containers to prevent material being dispersed by the wind;
- designated areas will be sited at least 10m away from drains and watercourses to limit risk of escape and contamination of water courses;
- waste storage containers will be labelled with their waste type and their LoW code; any labelling will be consistent with Industry Best Practice at the time construction commences and reviewed annually;
- waste containers will be covered to prevent dust emissions and potential nuisances;
- the burning of any waste is prohibited;
- liquid wastes will be stored in containers within bunded zones with secondary containment of at least 110% capacity of the largest container or at least 25% of the total tank capacity inside the bunded zone (whichever is the greatest); and
- incompatible or hazardous wastes will be stored and handled in accordance with Hazardous Wastes Regulations.

14.7.4 Site Waste Management Plan

SWMPs will be produced for each site. The SWMPs shall record the following information:

- proposals for managing the waste following the Waste Hierarchy to ensure that waste arisings are minimised, including 'designing out waste' and waste prevention measures;
- details of any decisions taken before the SWMP was drafted to minimise the quantity of waste produced on site;
- a description of each type of waste expected to be produced in the course of the project;
- an estimate of the quantity of each waste type that will be produced;
- identification of the waste management action proposed for each waste type, including reusing, recycling, recovery and disposal;
- a detailed action plan for the management of the waste, including roles and responsibilities, data collection and reporting procedures;
- details of any site waste storage facilities including the requirements of environmental permits and pollution control measures; and
- a declaration that material will be handled efficiently, and waste managed appropriately.

14.7.5 Outline Construction Environmental Management Plan (CEMP)

Along with the other mitigation measures outlined within this Chapter the production of a Construction Environmental Management Plan (CEMP) will offer additional protection in relation to potential impacts associated with resource use and waste,

14.8 Residual Effects

The mitigation measures proposed will result in a reduction in resources consumed and waste generated thereby reducing the impact of the proposed Project. The mitigation and control measures will be implemented and as a result of the mitigation measures, the residual impacts associated with the construction of the proposed Project will be not Significant.

No significant effects are predicted during the operation of the proposed Project.

14.9 Interactions

The use of significant volumes of fill have an impact on the embodied carbon associated with the project, as does the use of concrete in the bridges and kerb sides. These will be considered in Volume 3, Chapter 16: Cross Cutting Themes.

The creation and storage of waste materials has the potential to impact on surface and ground water. Mitigation measures in this chapter, in Volume 3, Chapter 8: Soils, Geology and Hydrogeology, and Volume 3, Chapter 9: Water address these potential risks.

14.10 Cumulative Effects

The only project of significance in the vicinity of the proposed Project is the upgrading of the N20 to a motorway (M20). This would be helpful to the proposed Project as it would be a possible source of material for the construction of embankments. However, the programmes for the two projects mean that their construction phases are unlikely to coincide.

14.11 Difficulties Encountered in Compiling Information

The baseline statistics for resource use in Ireland is limited; there is very little information at a local level. In terms of waste, the data is only available up to 2017 and there is limited information on the current capacity of landfill sites to receive C&D waste.

The quantities for the proposed Project are estimates only and will be finalised during detailed design.

14.12 References

A Resource Opportunity – Waste Management Policy in Ireland (DoCELG2 2012)

Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Waste Projects (Department of Environment Heritage and Local Government 1 July 2006)

CIRIA document 133 Waste Minimisation in Construction (CIRIA 1997)

Construction & Demolition Waste: Soil and Stone Recovery / Disposal Capacity (RPS on behalf of DCC 2016)

Cork County Development Plan

European Commission (Waste Directive) Regulations 2011

EU Construction & Demolition Waste Management Protocol (EC 2016)

European Union 7th Environmental Action Programme to 2020

European Waste Catalogue (EWC)

Guidance on Soil and Stone By-products in the context of Article 27 of the European Communities (Waste Directive) Regulations 2011 (EPA 2019)

Guidelines for the Management of Waste from National Road Construction Projects Revision 1 (TII 2014)

Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA August 2017 Draft)

Limerick County Development Plan

Southern Region Waste Management Plan 2015-2021

Southern Waste Region Annual Statistics

The European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011)

The EU Waste Framework Directive (2008/98/EC)

The Waste Management Act 1996 (as amended)

Waste Classification – List of Waste and Determining if Waste is Hazardous or Non-Hazardous (EPA 2015)

www.cso.ie

Eurostat (2020), [Development of resource productivity in comparison with GDP and DMC, EU-27, 2000-2019](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Material_flow_accounts_and_resource_productivity&oldid=491968). Accessed at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Material_flow_accounts_and_resource_productivity&oldid=491968