

14.0 WASTE MANAGEMENT

14.1 INTRODUCTION

This chapter has been prepared to address the issues associated with waste management during the construction and operational phase of the proposed development.

A site specific Construction & Demolition Waste Management Plan (C&D WMP) has been prepared to deal with waste generation during the construction phase of the proposed development and is included as Appendix 14.1. The C&D WMP has been prepared in accordance with the '*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects*' document produced by the National Construction and Demolition Waste Council (NCDWC) in conjunction with the Department of the Environment, Heritage and Local Government in July 2006.

14.2 METHODOLOGY

The assessment of the impacts of the proposed development arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports. A summary of the documents reviewed and the relevant legislation is provided in Appendix 14.1 C&D WMP.

This chapter is based on the proposed development, as described in Chapter 2 and considers the following aspects:

- Legislative context;
- Construction phase (including site preparation, excavation and levelling);
- Operational phase.

A desk study was carried out which included the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the construction phase; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the construction phase of the proposed development have been calculated by the project engineers Clifton Scannell Emerson Associates (CSEA).

There will be no waste generated during the operation phase.

Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction phase, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 14.6.

A review of the existing ground conditions on a regional, local and site specific scale are presented in Chapter 6 Land, Soils, Geology and Hydrogeology.

14.2.1 Legislation and Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended).

In addition, the Irish government issues regular policy documents which outline measures aimed to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document *A Resource Opportunity – Waste Management Policy in Ireland* was published in 2012 and stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention.

The strategy for the management of waste from the construction phase is in line with the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* published in 2006. The guidance document *Construction and Demolition Waste Management: A handbook for Contractors and Site Managers* was also consulted in the preparation of this assessment.

14.3 RECEIVING ENVIRONMENT

The proposed development is located within both the Local Authority areas of Dublin City Council (DCC) and Fingal County Council (FCC).

In terms of waste management, the receiving environment is largely defined by both DCC and FCC as the local authorities responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the *Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021*. The waste management plan sets the following targets for waste management in the region:

- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

The Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of “70% preparing for reuse, recycling and other recovery of construction and demolition waste” (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

The National Waste Statistics update published by the EPA in December 2017 identifies that Ireland’s current progress against this C&D waste target is at 68% and our progress against ‘Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)’ is at 45%. Both of these targets are required to be met by 12 December 2020 in accordance with the requirements of the Waste Framework Directive.

Both the Dublin City Development Plan 2016 – 2022 and the Fingal Development Plan 2017 - 2023 sets policies and objectives for their local areas which reflect those set out in the regional waste management plan.

In terms of physical waste infrastructure, DCC and FCC no longer operate any municipal waste landfill in their respective areas. There are numerous waste permitted and licensed facilities located in the Eastern-Midlands Waste Region for management of waste from the construction industry as well as municipal sources. These include soil recovery facilities, inert C&D waste facilities, hazardous waste treatment facilities, municipal waste landfills, material recovery facilities, waste transfer stations and waste-to-energy facilities.

14.4 CHARACTERISTICS OF THE DEVELOPMENT

The proposed development is described in detail in Chapter 2 Description of the Development. The aspects relevant to this chapter are described in the following sections.

14.4.1 Construction Phase

The installation of the ducting for the transmission cable will require the excavation of two trenches. The optimum depth of excavation required to facilitate installation of the ducting in each trench is c. 1.25m below ground level (bgl) but may increase to up to c. 3m. The optimum width of each trench is c. 0.6m, however this may vary depending on ground conditions and existing services. CSEA have estimated that c. 50,840m³ of excavated material will be generated, i.e. c. 48,840m³ of soils/stones and c. 2,000m³ of tarmacadam (refer to Table 14.1). Suitable soils and stones will be reused on site as backfill in the grassed areas, where possible. However, it is currently envisaged that majority of this material will require removal offsite.

The surplus excavated material will be removed off-site either as a waste or, where appropriate, as a by-product. Where the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27 of the *European Communities (Waste Directive) Regulations 2011*. A formal documented EPA approval will be obtained before re-using the material as a by-product.

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

As noted in Section 6.3.12 of Chapter 6, the made ground along the R139 is assumed to have some contamination due to road run-off. No contamination is anticipated in the greenfield areas. There was no visual or olfactory evidence of ground contamination noted during the site walkover along the greenfield sections of the route and it is considered unlikely that any contamination will be identified during the excavation works in these areas.

In order to establish the appropriate reuse, recovery and/or disposal route for the surplus soils and stones to be removed off-site, it will first need to be classified. The

material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous*. Environmental soil analysis will be carried out on a number of representative soil samples for a range of parameters to allow the soil to be accurately classified as hazardous or non-hazardous. In addition, soil analysis will also be carried out in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values for acceptance of waste at landfills based on properties of the waste including potential pollutant concentrations and leachability. (Note: Clean inert soils and stones excavated from greenfield sections of the route would generally not require classification/testing but would require a letter of suitability to be provided to the receiving facility.)

The surplus soils and stones may be suitable for acceptance at either inert or non-hazardous soil recovery facilities/landfills in Ireland or, in the event of hazardous material being encountered, be transported for treatment/recovery or exported abroad for disposal in suitable facilities.

Other than excavated material, it is estimated that c. 1,500m³ of trees/shrubbery will require removal offsite as a waste.

It is expected that wastes generated (other than excavated material and trees/shrubbery) from other construction activities will be negligible and will generally comprise waste generated from construction workers. These wastes would generally be organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided at the site compound during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices. The welfare facilities and site office(s) for the proposed development will be located in a site compound on an existing data storage facility site to the south of the proposed development where construction works are currently ongoing.

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific C&D WMP included as Appendix 14.1. The C&D WMP provides an estimate of the main waste types likely to be generated during the construction phase of the proposed development and these are summarised in Table 14.1. Waste volumes are based on estimates by the project engineers CSEA

Waste Type	m ³
Soil & Stones	48,840
Tarmacadam	2,000
Trees & Shrubbery	1,500

Table 14.1 Estimates for construction waste.

It should be noted that until final materials and detailed construction methodologies have been confirmed it is difficult to predict with a high level of accuracy the construction waste that will be generated from the construction of the proposed development as the exact materials and quantities may be subject to some degree of change and variation during the detailed design and construction process. However, the above estimates are considered to be the worst case scenario.

The appointed contractor(s) will be required to prepare a detailed Construction Environmental Management Plan (CEMP) prior to commencement of construction which may refine the above waste estimates.

14.4.2 Operational Phase

There will be no waste generated from the development, once operational.

14.5 POTENTIAL IMPACTS OF THE DEVELOPMENT

This section details the potential waste impacts associated with the proposed development.

14.5.1 Construction Phase

As detailed in Section 14.4.1, the proposed development will generate surplus excavated material and trees/shrubbery as well as waste from the welfare facilities and site office(s) at the site compound.

Surplus excavated material and trees/shrubbery classified as wastes (as opposed to by-products) will be segregated at source and transferred directly from site by a suitably permitted waste contractor(s) to suitably authorised receiving facilities.

Waste materials generated at the site compound from the welfare facilities and site office(s) will be temporarily stored in dedicated receptacles at the site compound pending collection by a suitably permitted waste contractor(s). The waste storage area will need to be easily accessible to waste collection vehicles.

If waste material is not managed and stored correctly on the site or at the site compound, it is likely to lead to litter or pollution issues at site, site compound and/or on adjacent properties. The knock-on effect of litter issues is the presence of vermin on the site, site compound and the surrounding areas.

The use of non-permitted waste contractors for transportation or unauthorised receiving facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices.

Wastes should be collected by a suitably permitted contractor(s) and be transferred to suitably registered/permitted/licenced waste facilities for processing and segregation, reuse, recycling, recovery and/or disposal. There are numerous authorised waste facilities in the Leinster region which can accept non-hazardous and hazardous waste materials and acceptance of waste from the proposed development would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the predicted construction waste materials at facilities in the region.

Where offsite reuse of the wastes generated is not feasible, recycling and/or recovery of the waste will be carried where possible. Recovery and recycling of construction waste has a positive impact on sustainable resource consumption, for example where waste trees/shrubbery is mulched into a landscaping product or

waste asphalt is recycled for use in new pavements. The use of recycled materials, where suitable, reduces the consumption of natural resources.

There is a quantity of material (soils and stones and tarmac) which will need to be excavated to facilitate the proposed development. Clean inert soils and stones excavated in the greenfield sections of the route, will be reused on site as backfill, where practical. However, the majority of the soils and stones generated from the proposed development will require removal from the site. As noted in Section 14.4.1, made ground along the R139 is assumed to have some contamination due to road run-off. No contamination is anticipated in the greenfield areas. In the event that potentially contaminated material is encountered, correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on the health and safety of workers as well as on the receiving environment, both on and off-site. Contaminated material will need to be removed off-site for appropriate treatment and/or disposal.

Reuse of suitable clean inert excavated material onsite, where practical, will reduce consumption of natural quarry resources.

The potential effect of construction waste generated from the proposed development is considered to be **short-term**, and **not significant**.

14.5.2 Operational Phase

No waste will be generated during operation and therefore there will be no potential impacts from the development, once operational.

14.5.3 Do Nothing Scenario

If the proposed development was not to proceed there would be no additional construction waste generation.

14.6 REMEDIAL AND MITIGATION MEASURES

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

14.6.1 Construction Phase

A project specific C&D WMP has been prepared in line with the requirements of the guidance document issued by the Department of Environment Heritage and Local Government (DoEHLG). Adherence to the high level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the construction phase of the proposed development. Prior to commencement of construction, the contractor(s) will be required to refine/update this document to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

The project engineers have estimated that 48,840m³ of excavated soils/stones will be generated. Suitable soils and stones will be reused on site as backfill in the grassed areas, where possible. However, it is currently envisaged that majority of

this material will require removal offsite. It will be reused offsite where practical and where it cannot be reused, it will be recycled/recovered.

In addition the following mitigation measures will be implemented:

- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated:
 - Soils and stones
 - Tarmacadam
 - Trees/shrubbery
 - In addition, the following wastes will be segregated at the site compound:
 - Organic (food) waste
 - Packaging (paper/card/plastic)
 - Mixed dry recyclables
 - Mixed non-recyclable waste
- All excavations will be carefully monitored by a suitably qualified person to ensure that potentially contaminated soil is identified and segregated, if encountered. In the event that any potentially contaminated material is encountered, it will be segregated from clean/inert material, tested and classified as either non-hazardous or hazardous and further classified as clean, inert, non-hazardous or hazardous in accordance with the EC Council Decision 2003/33/EC, which establishes the criteria for the acceptance of waste at landfills.
- Waste materials generated at the site compound will be stored in suitable receptacles in designated areas of the site compound;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A waste manager will be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

As surplus soils and stones will require removal from site, any nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, which requires removal off-site. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the *EC (Waste Directive) Regulations (2011)* as previously referred to Section 14.4 and detailed in the C&D WMP (Appendix 14.1).

These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

14.6.2 Operational Phase

As stated above, no waste will be generated during the operational phase hence no operational remedial measures will be required.

14.7 PREDICTED IMPACTS OF THE DEVELOPMENT

The implementation of the mitigation measures outlined in Section 14.6.1 will ensure that a high rate of reuse, recovery and recycling is achieved at the development during the construction phase of the project. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

14.7.1 Construction Phase

A carefully planned approach to waste management as set out in Section 15.6.1 and adherence to the C&DWMP during the construction and demolition phase will ensure that the impact on the environment will be **short-term, neutral** and **imperceptible**.

14.7.2 Operational Phase

No waste will be generated during operation and therefore there will be no predicted impacts from the development, once operational.

14.8 RESIDUAL IMPACTS

Adherence to the mitigation measures outlined in Section 14.6.1 will ensure that there are no significant impacts on resource or waste management from the proposed development. The management of waste during the construction phase in accordance with the Construction & Demolition Waste Management Plan (C&DWMP) will meet the requirements of regional and national waste legislation and promote the management of waste in line with the priorities of the waste hierarchy. The residual impact will be **neutral** and **imperceptible**.

The cumulative impact assessment is addressed Chapter 15 of this EIA Report.

Interactions are addressed in Chapter 16 of this EIA Report.

14.9 REFERENCES

- European Communities Council Decision 2003/33/EC establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC

APPENDIX 14.1
CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN
PREPARED BY AWN CONSULTING LIMITED

CONSTRUCTION & DEMOLITION WASTE MANAGEMENT PLAN FOR A PROPOSED TRANSMISSION CABLE INSTALLATION

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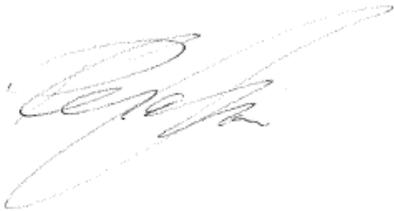
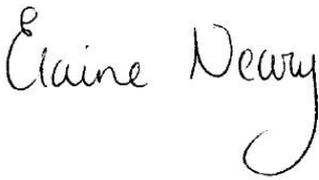
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1.0 INTRODUCTION

AWN Consulting Ltd. (AWN) has prepared this Construction & Demolition Waste Management Plan (C&D WMP) for a proposed development comprising underground double circuit 110kV transmission cable installation which will run from an existing data storage facility site in Clonshaugh Business Park, to the south of the R139, across the R139 and connect to the existing Belcamp 110kV and 220kV Substation. The development will traverse Dublin City Council (DCC) land and into Fingal County Council (FCC) lands.

The purpose of this plan is to provide information necessary to ensure that the management of construction and demolition (C&D) waste at the site is undertaken in accordance with current legal and industry standards including the *Waste Management Acts 1996 - 2011* and associated Regulations ¹, *Protection of the Environment Act 2003* as amended ², *Litter Pollution Act 1997* as amended ³ and the *Eastern-Midlands Region Waste Management Plan 2015 – 2021* ⁴. In particular, this Plan aims to ensure maximum recycling, reuse and recovery of waste with diversion from landfill, wherever possible. It also seeks to provide guidance on the appropriate collection and transport of waste from the site to prevent issues associated with litter or more serious environmental pollution (e.g. contamination of soil and/or water).

This C&D WMP includes information on the legal and policy framework for C&D waste management in Ireland, estimates of the type and quantity of C&D waste to be generated by the proposed development and makes recommendations for management of different waste streams.

2.0 CONSTRUCTION & DEMOLITION WASTE MANAGEMENT IN IRELAND

2.1 National Level

The Irish Government issued a policy statement in September 1998 known as '*Changing Our Ways*' ⁵, which identified objectives for the prevention, minimisation, reuse, recycling, recovery and disposal of waste in Ireland. The target for C&D waste in this report was to recycle at least 50% of C&D waste within a five year period (by 2003), with a progressive increase to at least 85% over fifteen years (i.e. 2013).

In response to the *Changing Our Ways* report, a task force (Task Force B4) representing the waste sector of the already established Forum for the Construction Industry, released a report entitled '*Recycling of Construction and Demolition Waste*' ⁶ concerning the development and implementation of a voluntary construction industry programme to meet the Government's objectives for the recovery of C&D waste.

The most recent national policy document was published in July 2012, entitled '*A Resource Opportunity - Waste Management Policy in Ireland*' ⁷. This document stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention. The document sets out a number of actions in relation to C&D waste and commits to undertake a review of specific producer responsibility requirements for C&D projects over a certain threshold.

The National Construction and Demolition Waste Council (NCDWC) was launched in June 2002, as one of the recommendations of the Forum for the Construction Industry, in the Task Force B4 final report. The NCDWC subsequently produced '*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects*' ⁸ in July 2006 in conjunction with the then Department of the Environment, Heritage and Local Government (DoEHLG). The guidelines outline the issues that need to be addressed at the pre-planning stage of a development all the

way through to its completion. These guidelines have been followed in the preparation of this document and include the following elements:

- Predicted C&D wastes and procedures to prevent, minimise, recycle and reuse wastes;
- Waste disposal/recycling of C&D wastes at the site;
- Provision of training for waste manager and site crew;
- Details of proposed record keeping system;
- Details of waste audit procedures and plan; and
- Details of consultation with relevant bodies i.e. waste recycling companies, Dublin City Council, Fingal County Council etc.

Section 3 of the Guidelines identifies thresholds above which there is a requirement for the preparation of a C&D Waste Management Plan for developments. This development requires a C&D WMP under the following criterion:

- Civil Engineering products producing in excess of 500m³ of waste materials used for development works on the site.

Other guidelines followed in the preparation of this report include '*Construction and Demolition Waste Management – a handbook for Contractors and Site Managers*'⁹ published by FÁS and the Construction Industry Federation in 2002.

These guidance documents are considered to define best practice for C&D projects in Ireland and describe how C&D projects are to be undertaken such that environmental impacts and risks are minimised and maximum levels of waste recycling are achieved.

2.2 Regional Level

The proposed development is located in both the Local Authority areas of Dublin City Council (DCC) and Fingal County Council (FCC).

The *Eastern-Midlands Region Waste Management Plan 2015 – 2021* is the regional waste management plan for the DCC & FCC areas published in May 2015. This Plan replaces the previous Dublin region plan due to changing National policy as set out in *A Resource Opportunity: Waste Management Policy in Ireland* and changes being enacted by the *Waste Framework Directive (WFD) (2008/98/EC)*¹⁰.

The Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of "70% preparing for reuse, recycling and other recovery of construction and demolition waste" (excluding natural soils and stones and hazardous wastes) to be achieved by 2020.

Municipal landfill charges in Ireland are based on the weight of waste disposed. In the Leinster Region, charges are approximately €120 per tonne of waste which includes a €75 per tonne landfill levy introduced under the *Waste Management (Landfill Levy) (Amendment) Regulations 2012*.

The *Dublin City Development Plan 2016 – 2022*¹¹ sets out a number of policies and objectives for Dublin City in line with the objectives of the regional waste management plan. The plan identifies the development of recycling in order to minimise the use of landfill as the main objective of the City Council. Waste policies and objectives with a particular relevance to the proposed development are:

Policies:

- *SI19: To support the principles of good waste management and the implementation of best international practice in relation to waste management in order for Dublin City and the region to become self-reliant in terms of waste management.*

- *SI20: To prevent and minimise waste and to encourage and support material sorting and recycling.*
- *SI21: To minimise the amount of waste which cannot be prevented and ensure it is managed and treated without causing environmental pollution.*

Objectives:

- *SIO17: To promote the re-use of building materials, recycling of demolition material and the use of materials from renewable sources. In all developments in excess of 10 housing units and commercial developments in excess of 1000 sqm, a materials source and management plan showing type of materials/proportion of re-use/recycled materials to be used shall be implemented by the developer.*
- *SIO18: To implement the current Litter Management Plan through enforcement of the litter laws, street cleaning and education and awareness campaigns.*
- *SIO19: To implement the Eastern-Midlands Waste Management Plan 2015-2021 and achieve the plan targets and objectives.*

The *Fingal Development Plan 2017– 2023*¹¹ came into effect on March 2017 and sets out a number of objectives for the Fingal region in line with the objectives of the regional waste management plan.

Objectives:

- Objective WM03 - Implement the provisions of the Eastern Midlands Region Waste Management Plan 2015 -2021 or any subsequent Waste Management Plan applicable within the lifetime of the Development Plan. All prospective developments in the County will be expected to take account of the provisions of the Regional Waste Management Plan and adhere to the requirements of that Plan.
- Objective WM07 - Promote the increased re-use of waste in accordance with the Eastern Midlands Region Waste Management Plan 2015 -2021 (or any subsequent plan).
- Objective WM18 - Ensure that construction and demolition Waste Management Plans meet the relevant recycling / recovery targets for such waste in accordance with the national legislation and regional waste management policy.

With regard to C&D waste specifically the Development Plan requires that the 'Construction and Demolition Waste Management Plan, as a minimum, should include provision for the management of all construction and demolition waste arising on site, and make provision for the reuse of said material and / or the recovery or disposal of this waste to authorised facilities by authorised collectors.' It also requires that where appropriate, excavated material from development sites should be reused on the subject site.

2.3 Legislative Requirements

The primary legislative instruments that govern waste management in Ireland and applicable to the project are:

- Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate legislation includes:
 - European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended
 - Waste Management (Collection Permit) Regulations (S.I No. 820 of 2007) as amended
 - Waste Management (Facility Permit and Registration) Regulations 2007, (S.I No. 821 of 2007) as amended

- Waste Management (Licensing) Regulations 2004 (S.I. No. 395 of 2004) as amended
- Waste Management (Packaging) Regulations 2014 (S.I. 282 of 2014) as amended
- Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
- Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
- European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
- European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended
- Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009), as amended
- European Union (Household Food Waste and Bio-waste) Regulation 2015 (S.I. No. 191 of 2015)
- Waste Management (Hazardous Waste) Regulations, 1998 (S.I. No. 163 of 1998) as amended
- Waste Management (Shipments of Waste) Regulations, 2007 (S.I. No. 419 of 2007) as amended
- Waste Management (Movement of Hazardous Waste) Regulations, 1998 (S.I. No. 147 of 1998)
- European Communities (Transfrontier Shipment of Waste) Regulations 1994 (SI 121 of 1994)
- European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015)
- Environmental Protection Act 1992 (No. 7 of 1992) as amended
- Litter Pollution Act 1997 (No. 12 of 1997) as amended
- Planning and Development Act 2000 (No. 30 of 2000) as amended ¹²

One of the guiding principles of European waste legislation, which has in turn been incorporated into the *Waste Management Act 1996 - 2001* and subsequent Irish legislation, is the principle of “*Duty of Care*”. This implies that the waste producer is responsible for waste from the time it is generated through until its legal recycling, recovery or disposal (including its method of disposal). As it is not practical in most cases for the waste producer to physically transfer all waste from where it is produced to the final destination, waste contractors will be employed to physically transport waste to the final destination. Following on from this is the concept of “*Polluter Pays*” whereby the waste producer is liable to be prosecuted for pollution incidents, which may arise from the incorrect management of waste produced, including the actions of any contractors engaged (e.g. for transportation and disposal/recovery/recycling of waste).

It is therefore imperative that the Operator of the proposed development ensures that the waste contractors engaged by construction contractors are legally compliant with respect to waste transportation, recycling, recovery and disposal. This includes the requirement that a contractor handle, transport and recycle/recover/dispose of waste in a manner that ensures that no adverse environmental impacts occur as a result of any of these activities.

A collection permit to transport waste must be held by each waste contractor which is issued by the National Waste Collection Permit Office (NWCPO). Waste receiving facilities must also be appropriately permitted or licensed. Operators of such facilities cannot receive any waste, unless in possession of a Certificate of Registration (COR) or waste permit granted by the relevant Local Authority under the *Waste Management (Facility Permit & Registration) Regulations 2007 and Amendments* or a waste or IED licence granted by the EPA. The COR/permit/licence held will specify the type and quantity of waste able to be received, stored, sorted, recycled, recovered and/or disposed of at the specified site.

3.0 DESCRIPTION OF THE PROJECT

3.1 Location, Size and Scale of the Development

The proposed project is for an underground double circuit 110kV transmission cable installation and will require the excavation of two trenches along the chosen route, one trench for circuit Belcamp 1 and one trench for circuit Belcamp 2. The trenches will typically run parallel to each other along the full length of the route at a minimum centre to centre distance of c. 2.6m. Typically five separate ducts will be installed in each trench. The transmission cable will run from the existing data storage facility site to the existing Belcamp 110kV and 220kV Substation.

A detailed description of the development is provided in the Chapter 2 of the EIA Report.

3.2 Details of the Non-Hazardous Wastes to be produced

In order to install the ducting for the route two trenches will need to be excavated to a typical depth of 1.25m bgl but may increase up to approximately 3m in places. Clifton Scannell Emerson Associates (CSEA) have estimated that c. 50,840m³ of excavated material will be generated, i.e. c. 48,840m³ of soils/stones and c. 2,000m³ of tarmacadam. Suitable soils and stones will be reused on site as backfill in the grassed areas, where possible. However, it is currently envisaged that majority of this material will require removal offsite.

Other than excavated material, it is estimated that c. 1,500m³ of trees/shrubbery will require removal offsite as a waste.

It is expected that wastes generated (other than excavated material and trees/shrubbery) from other construction activities will be negligible and will generally comprise waste generated from construction workers. These wastes would generally be organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided at the site compound during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices. The welfare facilities and site office(s) for the proposed development will be located in a site compound on an existing data storage facility site to the south of the proposed development where construction works are currently ongoing.

The contractor will be required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

3.3 Potential Hazardous Wastes to be produced

3.3.1 Contaminated Soil

As noted in Section 6.3.12 of Chapter 6, the made ground along the R139 is assumed to have some contamination due to road run-off.

No contamination is anticipated in the greenfield areas. There was no visual or olfactory evidence of ground contamination noted during the site walkover along the greenfield sections of the route and it is considered unlikely that any contamination will be identified during the excavation works in these areas.

Excavation works will be carefully monitored by a suitably qualified person to ensure any potentially contaminated soil is identified and segregated from clean/inert soil. Any potentially contaminated soils should be tested and classified as hazardous or non-

hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous*¹³ publication, HazWasteOnline tool or similar approved method. The material will then need to be classified as inert, non-hazardous, stable non-reactive hazardous or hazardous in accordance with *EC Decision 2003/33/EC*¹⁴. It should then be removed from site by a suitably permitted waste contractor to an authorised waste facility.

3.3.2 Fuel/Oils

As fuels and oils are classed as hazardous materials, any on-site storage of fuel/oil, all storage tanks and all draw-off points will be bunded (or will be stored in double-skinned tanks) and located in a dedicated, secure area of the site compound. Provided that these requirements are adhered to and site crew are trained in the appropriate refuelling techniques, it is not expected that there will be any fuel/oil wastage at the site. The site compound will be located on the existing data storage facility to the south.

In addition, WEEE (containing hazardous components), printer toner/cartridges, batteries (Lead, Ni-Cd or Mercury) and/or fluorescent tubes and other mercury containing waste may be generated from during C&D activities or temporary site offices. These wastes (if generated) will be stored in appropriate receptacles in designated areas of the site pending collection by an authorised waste contractor.

3.3.3 Other known Hazardous Substances

Paints, glues, adhesives and other known hazardous substances, if generated, will be stored in designated areas of the site compound. They will generally be present in small volumes only and associated waste volumes generated will be kept to a minimum. Wastes will be stored in appropriate receptacles pending collection by an authorised waste contractor.

Fuel oils and other hazardous substances are to be stored at the site compound located to the south of the proposed development at an existing data storage facility site.

Refuelling will be carried out in accordance with the relevant mitigation measures specified in Chapter 6.

3.4 Main C&D Waste Categories

The main non-hazardous and hazardous waste streams that will be generated by the construction activities at a typical site are shown in Table 3.1. The List of Waste (LoW) code (as effected from 1 June 2015) (also referred to as the European Waste Code or EWC) for each waste stream is also shown.

Main Waste Material Types	LoW Code
Soil and stones	17 05 03* and 04
Biodegradable/Green waste	20 02 01
Bituminous mixtures, coal tar and tarred products	17 03 02
Other Waste Materials that may be Generated	
Mixed municipal waste	20 03 01
Paper and cardboard	20 01 01
Mixed C&D waste	17 09 04
Electrical and electronic components	20 01 35 & 36
Batteries and accumulators	20 01 33 & 34
Liquid fuels	13 07 01-03

Table 3.1 Main waste types generated and EWCs individual waste types may contain hazardous substances)

4.0 WASTE MANAGEMENT

4.1 Demolition Waste Generation

No demolition will be required to facilitate construction of the proposed development.

4.2 Construction Waste Generation

The quantity of soil that will be generated has been estimated by the project engineers, CSEA, to be c. 48,840m³. It anticipated that the majority of the material will be removed off site for reuse and recycle/recovery, with some being reused as backfill at in the grassed areas. In addition, it is estimated by CSEA that c. 2,000m³ of tarmacadam and c. 1,500m³ of trees/shrubbery (green) waste will be produced.

It is expected that wastes generated (other than excavated material and trees/shrubbery) from other construction activities will be negligible and will generally comprise waste generated from construction workers. These wastes would generally be organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided at the site compound during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices.

The welfare facilities and site office(s) for the proposed development will be located in a site compound on an existing data storage facility site to the south of the proposed development where construction works are currently ongoing.

It should be noted that until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

The appointed contractor(s) will be required to prepare a detailed Construction Environmental Management Plan (CEMP) prior to commencement of construction which may refine the above waste estimates.

4.3 Proposed Waste Management Options

Waste materials generated will be segregated on site, where it is practical. Where the on-site segregation of certain wastes types is not practical, off-site segregation will be carried out. There will be skips and receptacles provided to facilitate segregation at source. All waste receptacles leaving site will be covered or enclosed. The appointed waste contractor will collect and transfer the wastes as receptacles are filled. There are numerous waste contractors in the Dublin Region that provide this service.

All waste arising's will be transported offsite by an approved waste contractor holding a valid waste collection permit and will be brought to an authorised facility holding the appropriate registration, permit or licence, as required.

Some of the sub-contractors on site will generate waste in relatively low quantities. The transportation of non-hazardous waste by persons who are not directly involved with the waste business, at weights less than or equal to 2 tonnes, and in vehicles not designed for the carriage of waste, are exempt from the requirement to have a waste collection permit (Ref. Article 30 (1) (b) of the Waste Collection Permit Regulations 2007 as amended). Any sub-contractors engaged that do not generate more than 2 tonnes of waste at any one time can transport this waste offsite in their work vehicles (which are not design for the carriage of waste). However, they are required to ensure that the receiving facility has the appropriate COR / permit / licence

Written records will be maintained by the contractor(s) detailing the waste arising throughout the construction phase, the classification of each waste type, waste collection permits for all waste contactors who collect waste from the site and COR/permit and/or licence for the receiving waste facility for all waste removed off site for appropriate reuse, recycling, recovery and/or disposal.

Dedicated banded storage containers will be provided for hazardous wastes which may arise such as batteries, paints, oils, chemicals etc, if required.

The management of the main waste streams is outlined as follows:

Soil and Stone

The Waste Management Hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling/recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal. The volume of soil and stone to be excavated is believed to be 48,840m³. It is currently anticipated that majority of the excavated material will be require removal off site, with some being used as backfill in the grassed areas.

The majority of soil & stone will need to be removed off-site either as a waste or, where appropriate, as a by-product. Where the material is to be reused on another site as a by-product (and not as a waste), this will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011. EPA agreement will be obtained before re-using the spoil as a by-product.

The next option (beneficial reuse) may be appropriate for the excavated material, subject to environmental testing to classify the material as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication. Clean material may be used as fill material in other construction projects or engineering fill for waste licensed sites. Beneficial reuse of surplus excavation material as engineering fill may be subject to further testing to determine if materials meet the specific engineering standards for their proposed end-use.

Any nearby sites requiring clean fill/capping material could be contacted to investigate reuse opportunities for clean and inert material. If any soils/stones are imported onto

the site from another construction site as a by-product (and not as a waste), this will also be done in accordance with Article 27. However, it is not expected that this will be necessary.

If the material is deemed to be a waste, then removal and reuse/recycling/recovery/disposal of the material will be carried out in accordance with the *Waste Management Acts 1996 – 2011* as amended, the *Waste Management (Collection Permit) Regulations 2007* as amended and the *Waste Management (Facility Permit & Registration) Regulations 2007* as amended. The volume of waste removed will dictate whether a COR, permit or licence is required by the receiving facility. Once all available beneficial reuse options have been exhausted, the options of recycling and recovery at waste permitted and licensed sites will be considered.

In the unlikely event that contaminated material is encountered and subsequently classified as hazardous, this material will be stored separately to any inert/non-hazardous material. It will require off-site treatment at a suitable facility or disposal abroad via Transfrontier Shipment of Wastes (TFS).

Tarmacadam

Tarmacadam excavated will be segregated and transferred off site for appropriate reuse and recycling/recovery.

Biodegradable/Green Waste

Trees and shrubbery removed will be transferred off site for appropriate reuse and/or recovery.

Waste Electrical and Electronic Equipment (WEEE)

Any WEEE generated in the site offices will be stored in a dedicated container in the site office pending collection for recycling.

Batteries

Any waste batteries generated in the site offices will be stored in a dedicated container in the site office pending collection for recycling.

Other Recyclables

Where any other recyclable wastes such as cardboard and soft plastic are generated at the site compound, these will be segregated at source into dedicated receptacles and removed off-site.

Non-Recyclable Waste

C&D waste which is not suitable for reuse or recovery, such as polystyrene, some plastics and some cardboards, will be placed in separate receptacles in the site compound. Prior to removal from site, the non-recyclable waste receptacle will be examined by a member of the waste team (see Section 7.0) to determine if recyclable materials have been placed in there by mistake. If this is the case, efforts will be made to determine the cause of the waste not being segregated correctly and recyclable waste will be removed and placed into the appropriate receptacle.

Other Hazardous Wastes

On-site storage of any hazardous wastes produced e.g. contaminated soil during excavations or waste fuels at the site compound will be kept to a minimum, with removal off-site organised on a regular basis. Storage of all hazardous wastes will be undertaken so as to minimise exposure to on-site personnel and the public and to also minimise potential for environmental impacts. Hazardous wastes will be recovered, wherever possible, and failing this, disposed of appropriately.

It should be noted that it is not possible to provide information on the specific destinations of each waste stream at this stage of the project. Prior to commencement

of construction and removal of any construction waste offsite, details of the proposed destination of each waste stream will be provided to DCC and FCC for approval.

4.4 Tracking and Documentation Procedures for Off-Site Waste

All waste will be documented prior to leaving the site. Waste will be weighed by the contractor, either by weighing mechanism on the truck or at the receiving facility. These waste records will be maintained on site by the nominated project Waste Manager (see Section 6.0).

All movement of waste and the use of waste contractors will be undertaken in accordance with the *Waste Management Acts 1996 - 2011*, *Waste Management (Collection Permit) Regulations 2007* as amended and *Waste Management (Facility Permit & Registration) Regulations 2007* and amended. This includes the requirement for all waste contractors to have a waste collection permit issued by the NWCPO. The nominated project waste manager (see Section 6.0) will maintain a copy of all waste collection permits on-site.

If the waste is being transported to another site, a copy of the Local Authority waste COR/permit or EPA Waste/IED Licence for that site will be provided to the nominated project waste manager (see Section 6.0). If the waste is being shipped abroad, a copy of the Transfrontier Shipping (TFS) notification document will be obtained from DCC (as the relevant authority on behalf of all local authorities in Ireland) and kept on-site along with details of the final destination (COR, permits, licences etc.). A receipt from the final destination of the material will be kept as part of the on-site waste management records.

All information will be entered in a waste management recording system to be maintained on site.

5.0 ESTIMATED COST OF WASTE MANAGEMENT

An outline of the costs associated with different aspects of waste management is provided below.

The total cost of C&D waste management will be measured and will take into account handling costs, storage costs, transportation costs, revenue from rebates and disposal costs.

5.1 Reuse

By reusing materials on site, there will be a reduction in the transport and recycle/recovery/disposal costs associated with the requirement for a waste contractor to take the material off-site.

5.2 Recycling

Salvageable metals will earn a rebate which can be offset against the costs of collection and transportation of the skips.

Clean uncontaminated cardboard and certain plastics can also be recycled. Waste contractors will charge considerably less to take segregated wastes, such as recyclable waste, from a site than mixed waste.

5.3 Disposal

Landfill charges in the Leinster region are currently at around €120 per tonne which includes a €75 per tonne landfill levy specified in the *Waste Management (Landfill*

Levy) Regulations 2015. In addition to disposal costs, waste contractors will also charge a collection fee for skips.

Collection of segregated C&D waste usually costs less than municipal waste. Specific C&D waste contractors take the waste off-site to a licensed or permitted facility and, where possible, remove salvageable items from the waste stream before disposing of the remainder to landfill. Clean soil, rubble, etc. is also used as fill/capping material, wherever possible.

6.0 TRAINING PROVISIONS

A member of the construction team will be appointed as the project waste manager to ensure commitment, operational efficiency and accountability during the construction of the project.

6.1 Waste Manager Training and Responsibilities

The nominated waste manager will be given responsibility and authority to select a waste team if required, i.e. members of the site crew that will aid him/her in the organisation, operation and recording of the waste management system implemented on site. The waste manager will have overall responsibility to oversee, record and provide feedback to the client on everyday waste management at the site. Authority will be given to the waste manager to delegate responsibility to sub-contractors, where necessary, and to coordinate with suppliers, service providers and sub-contractors to prioritise waste prevention and material salvage.

The waste manager will be trained in how to set up and maintain a record keeping system, how to perform an audit and how to establish targets for waste management on site. The waste manager will also be trained in the best methods for segregation and storage of recyclable materials, have information on the materials that can be reused on site and be knowledgeable in how to implement this C&D WMP.

6.2 Site Crew Training

Training of site crew is the responsibility of the waste manager and, as such, a waste training program should be organised. A basic awareness course will be held for all site crew to outline the C&D WMP and to detail the segregation of waste materials at source. This may be incorporated with other site training needs such as general site induction, health and safety awareness and manual handling.

This basic course will describe the materials to be segregated, the storage methods and the location of the Waste Storage Areas (WSAs). A sub-section on hazardous wastes will be incorporated into the training program and the particular dangers of each hazardous waste will be explained.

7.0 RECORD KEEPING

Records will be kept for all waste material which leaves the site, either for reuse on another site, recycling or disposal. A recording system will be put in place to record the construction waste arising's on site. A copy of the Waste Collection Permits, CORs, Waste Facility Permits and Waste Licences will be maintained on site.

The waste manager or delegate will record the following;

1. Waste taken for reuse off-site;
2. Waste taken for recycling;
3. Waste taken for recovery;
4. Waste taken for disposal; and

5. Reclaimed waste materials brought on-site for reuse.

For each movement of waste off-site, a signed docket will be obtained by the Waste Manager from the contractor, detailing the weight and type of the material and the source and destination of the material. This will be carried out for each material type.

The system will allow the comparison of these figures with the national targets established for the recovery, reuse and recycling of C&D waste and to highlight the successes or failures against these targets.

8.0 OUTLINE WASTE AUDIT PROCEDURE

8.1 Responsibility for Waste Audit

The appointed waste manager will be responsible for conducting a waste audit at the site during the C&D phase of the development.

8.2 Review of Records and Identification of Corrective Actions

It is recommended that a review of all the records for the waste generated and transported off-site should be undertaken mid-way through the construction phase. If waste movements are not accounted for, the reasons for this should be established in order to see if and why the record keeping system has not been maintained. The waste records will be compared with the established recovery/reuse/recycling targets for the site.

Each material type will be examined, in order to see where the largest percentage waste generation is occurring. The waste management methods for each material type will be reviewed in order to highlight how the targets can be achieved.

Waste management costs will also be reviewed.

Upon completion of the C & D phase, a final report will be prepared, summarising the outcomes of waste management processes adopted and the total recycling/reuse/recovery figures for the development.

9.0 CONSULTATION WITH RELEVANT BODIES

9.1 Local Authority

Once a construction contractor has been appointed and prior to removal of any construction waste materials offsite, details of the proposed destination of each waste stream will be provided to DCC and FCC for approval.

DCC and FCC will also be consulted, as required, throughout the excavation and construction phases in order to ensure that all available waste reduction, reuse and recycling opportunities are identified and utilised and that compliant waste management practices are carried out.

9.2 Recycling/Salvage Companies

Companies that specialise in construction waste management will be contacted to determine their suitability for engagement. Where a waste contractor is engaged, each company will be audited in order to ensure that relevant and up-to-date waste collection permits and facility COR/permits/licences are held.

In addition, information regarding individual construction materials will be obtained, including the feasibility of recycling each material, the costs of recycling/reclamation and the means by which the wastes will be collected and transported off-site, and the recycling/reclamation process each material will undergo off site.

It should be noted that AWN's remit only extends to preparation of the plan, the implementation of the plan and consultation with relevant bodies will be required to be the responsibility of the nominated demolition and construction contractors.

10.0 REFERENCES

1. Waste Management Act 1996 (No. 10 of 1996) as amended. Sub-ordinate and associated legislation includes:
 - European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) as amended.
 - Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) as amended.
 - Waste Management (Facility Permit and Registration) Regulations 2007 (S.I. No. 821 of 2007) as amended.
 - Waste Management (Licensing) Regulations 2000 (S.I. No. 185 of 2000) as amended.
 - European Union (Packaging) Regulations 2014 (S.I. No. 282 of 2014) as amended.
 - Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997) as amended.
 - Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)
 - European Union (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)
 - European Union (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended.
 - Waste Management (Food Waste) Regulations 2009 (S.I. No. 508 of 2009) as amended.
 - European Union (Household Food Waste and Bio-waste) Regulations 2015 (S.I. No. 191 of 2015)
 - Waste Management (Hazardous Waste) Regulations 1998 (S.I. No. 163 of 1998) as amended.
 - Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended.
 - European Communities (Transfrontier Shipment of Waste) Regulations 1994 (S.I. No. 121 of 1994)
 - European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011)
 - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015)
2. Protection of the Environment Act 2003, (No. 27 of 2003) as amended.
3. Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended
4. Eastern-Midlands Region Waste Management Plan 2015 – 2021 (2015).
5. Department of Environment and Local Government (DoELG) *Waste Management – Changing Our Ways, A Policy Statement* (1998).
6. Forum for the Construction Industry – *Recycling of Construction and Demolition Waste*.
7. Department of Environment, Communities and Local Government (DoECLG), *A Resource Opportunity - Waste Management Policy in Ireland* (2012).
8. Department of Environment, Heritage and Local Government, *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects* (2006).
9. FÁS and the Construction Industry Federation (CIF), *Construction and Demolition Waste Management – a handbook for Contractors and Site Managers* (2002).
10. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives.
11. Dublin City Council (DCC), *Dublin City Development plan 2016-2022* (2015)
12. Planning and Development Act 2000 (S.I. No. 30 of 2000) as amended.

13. EPA, *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2015)
14. Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.
15. Environmental Protection Agency (EPA), *National Waste Database Reports 1998 – 2012*.
16. EPA and Galway-Mayo Institute of Technology (GMIT), *EPA Research Report 146 – A Review of Design and Construction Waste Management Practices in Selected Case Studies – Lessons Learned* (2015).