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# 11 MATERIAL ASSETS

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## 11.1 Introduction

This chapter of the EIAR assesses the impacts of “The Proposed Project” on material assets (*i.e.*, waste, utilities, telecommunications and aviation, traffic and transport). This chapter will consider the likely significant effects during the following phases of the Proposed Development:

- Construction of the Proposed Development;
- Operation of the Proposed Development; and
- Decommissioning of the Proposed Development.

This chapter of the EIAR is supported by the following Appendix documents provided in Volume III of this EIAR:

- Appendix 11.1 Ai Bridges Telecommunications Impact Study; and
- Appendix 11.2 Ai Bridges Aviation Review Statement.

### 11.1.1 Statement of Authority

This chapter was prepared by Paddy Kavanagh with specialist inputs on Telecommunications and Aviation from Kevin Hayes of Ai Bridges.

Paddy Kavanagh – RSK Ireland: Paddy holds an Honours Degree and a PhD in Chemistry and is a Lead Environmental Consultant with RSK Ireland working on delivery of renewable energy projects. He has over 40 years of experience in the environmental sector, both in Ireland and internationally, managing the delivery of and providing technical input to a wide range of projects since 1981. Prior to joining RSK Group in October 2022, Paddy was a lead consultant of the Generation Renewable Projects Delivery Team in ESB’s Engineering and Major Projects (EMP), providing environmental and planning due diligence, risk assessment and guidance on acquisitions of renewable generation projects with inputs to submissions on environmental and planning policy documents, both onshore and offshore (ScotWind e.g.), and on guidance issued by national governments on behalf of ESB.

Prior to this Paddy managed the Planning and Environmental Consenting and Assessment teams of EMP, managing planning, environmental consenting, IE Licencing and environmental construction management for energy infrastructure including renewable generation (wind, battery, solar and wave energy and transmission and distribution systems). With ESB Engineering and Major Projects, Paddy managed and input to the delivery of EIARs for renewable wind (SID and Non-SID) and solar, 38kV, 110kV and 400kV Overhead lines, underground cables, substations and thermal generation plants. This included Expert Witness roles at Oral Hearings and Witness statements for Judicial Review cases.



Paddy was also member of the ESB Environmental and Sustainability Leadership Group which sets the goals and direction for the sustainable development of ESB and its transition to a low carbon and subsequent net zero future.

Kevin Hayes - AI Bridges: Kevin has a B.Eng Hons Electronic Engineering – Communications & Industrial Automation – U.L. 1991, an M.Eng Hons Electronic Engineering – Communications & Communications Engineering – U.L. 2003. He holds the following certifications; ▪ Harris Radio Design Certification 2008, ▪ WiMAX Certified Engineer 2005, ▪ Redline Communications Certified Engineer – 2004, ▪ Celplan Suite training – 2009 / 2010, and PM Certified Professional 1999.

Kevin is a software design Engineer and Founding Director Ai Bridges (2000 – present). He has more than 15 years of Telecommunications Network Design & Project Management and is experienced analysing and troubleshooting RF issues. He is currently researching software interference prediction model for Air Traffic Control System (MOD, NATS).

Kevin has worked on a wide range of wind energy projects including Hunters Hill, Crockagarron - Slieve Kirk – Carrickatheane – Curryfree, Clydagh, Glenora, Woodhouse, Grouselodge, Bruckana and Mount Lucas Wind Farm Wireless Signal Interference Field Surveys Project.

Kevin has also managed the ESB Wireless Wind Farm Wireless Signal Interference Framework for 5 years and managed and designed the software prediction model for the TVI & Broadband EMI Interference Studies for Woodhouse Grousemount, Cappahwite, Oweninny, Raheenlagh Wind Farm.

## 11.2 Consultations

Consultations were undertaken with Telecommunications Operators (2RN, Eir, Enet and Vodaphone) with signals potentially crossing the proposed development and with the Irish Aviation Authority and Shannon Airport. Details of these consultations are discussed in detail in Appendix 11.1. and Appendix 11.2.

Consultations with Clare County Council (CCC) Roads Department were also undertaken with respect to traffic and transport and proposed development area access points to agree the site access arrangements and determine the scope of the traffic analysis required to accompany the planning application, see Chapter 16, Section 16.3.

## 11.3 Methodology

The Directive 2011/92/EU as amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 (the "EIA Directive") requires Material Assets to be assessed (Article 3). Material Assets are defined as 'resources that are valued and that are intrinsic to specific places; they may be of either human or natural origin' this originally included architectural and archaeological heritage. The Directive 2014/52/EU, amending 2011/92/EU, included architectural and archaeological heritage as components of cultural heritage and not as material assets to be considered here. This EIAR includes architectural and archaeological heritage in the Archaeology & Cultural Heritage Chapter (**Chapter 15**).

The EPA Guidelines (2022)<sup>1</sup> state that material assets are taken to mean “built services and infrastructure, roads and traffic and waste management”. The European Commission Guidance (2017)<sup>2</sup> refers to several examples of material assets including buildings, other structures, mineral resources, and water resources.

In this EIAR, the impacts on some of the material assets described in the above guidance have already been considered in the following chapters and therefore these aspects will generally not be addressed in specific detail within this chapter:

- Chapter 6: Population and Human Health;
- Chapter 7: Biodiversity
- Chapter 9: Hydrology & Hydrogeology;
- Chapter 10: Land, Soils & Geology;
- Chapter 15: Archaeology & Cultural Heritage;
- Chapter 16: Traffic & Transport; and
- Chapter 17: Air Quality; and
- Chapter 18: Climate.

The material assets considered in this chapter, thus include waste management and built services that include:

- Utilities (gas, water, waste);
- Telecommunications; and
- Aviation.

The Zone of Influence comprises the area where the Proposed Development will be constructed and Operated, which includes the wind farm proposed development areas and Cable route |Corridors and Loop-in locations to the existing 110kV Overhead electricity lines, (refer to **Figure 1.1, Chapter 1**), It includes the area covered by Telecommunication signals that cross the Proposed Development Area, (refer to the Oatfield Wind Farm EMI Impact Assessment Report, Appendix 11.1)). It also includes the Shannon Airport Obstacle Limitation Surfaces (OLS), Annex 15- Aerodrome Surfaces'- Building Restricted Areas (BRA), Minimum Sector Altitudes (MSA), Communications and Navigation Systems, Radar Surveillance Systems, Flight Inspection and Calibration areas, Irish Air Corps / Department of Defence Safeguarding areas and the Garda Air Support Unit (GASU) and Emergency Aeromedical Service (EAS) (refer to Oatfield Wind Farm Aviation Review Statement, Appendix 11.2).

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<sup>1</sup> [https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR\\_Guidelines\\_2022\\_Web.pdf](https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf)

<sup>2</sup> Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report, (Directive 2011/92/EU as amended by 2014/52/EU), [http://publications.europa.eu/resource/cellar/2b399830-cb4b-11e7-a5d5-01aa75ed71a1.0001.03/DOC\\_1](http://publications.europa.eu/resource/cellar/2b399830-cb4b-11e7-a5d5-01aa75ed71a1.0001.03/DOC_1)

### 11.3.1 Range of parameters considered

Three wind turbine models are proposed as part of the Proposed Development as described in Chapter 2 Description of the Proposed Development. These are set out in Table 11.1 below

**Table 11.1: Proposed wind turbines considered for the Proposed Development**

Turbine Type	Output (MW)	Hub Height (m)	Rotor Diameter (m)	Tip Height (m)	Ground Clearance (m)
Nordex N149	5.7	105	149	179.5	30.5
Vestas V150	6.0-6.6	105	150	180.0	30.0
Nordex N133	4.8	110	133	176.5	43.5

The construction methodology of the proposed development is the same for each turbine model in terms of excavation, turbine foundations, hardstand areas access track requirements, substation requirements, meteorological mast and grid connection route.

Similarly, the variation in tip height and rotor diameter are considered to be small in terms of potential telecommunications impact and aviation impact and hence the worst-case scenario is considered to cover all the wind turbines proposed.

The assessment of material assets in this chapter covers all three wind turbine models proposed in terms of effects and mitigation measures proposed. Materials and Waste

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 EPA guidance (Guidelines on the information to be contained in , Environmental Impact Assessment Reports 2022, reference to the EPA website on construction and demolition waste <sup>3</sup> and in the EPA updated guidance document on resource and waste management for construction and demolition projects, (Best practice guidelines for the preparation of resource & waste management plans for construction & demolition projects, 2021<sup>4</sup>),. These were used to assist in identifying current and future requirements for waste management; including national and regional waste policy<sup>5</sup>, waste strategies, management plans, legislative requirements, and relevant reports. These included the following documents:

- A Waste Action Plan for a Circular Economy | Ireland’s National Waste Policy 2020-2025
- BEST PRACTICE GUIDELINES for the preparation of resource & waste management plans for construction & demolition projects, EPA 2021
- EU Waste Framework Directive (Directive 2008/98/EC) set the basic concepts and definitions related to waste management, such as definitions of waste, recycling and recovery.

<sup>3</sup> (<https://www.epa.ie/our-services/monitoring--assessment/circular-economy/construction--demolition/>)

<sup>4</sup> <https://www.epa.ie/publications/circular-economy/resources/CDWasteGuidelines.pdf>

<sup>5</sup> Including the draft National Waste Management Plan for A Circular Economy

- EU Waste Directive Regulations 2011 (S.I. No. 126 of 2011)
- Directive (EU) 2018/851)
- European Union
- (Waste Directive) Regulations 2020 (S.I. No. 323 of 2020).
- Waste Management Act 1996, as amended
- European Union (Waste Directive) Regulations 2011–2020

This Chapter is based on the proposed development, as described in Chapter 5 Proposed Description and considers the following aspects:

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

A desktop study was carried out which included the following:

Review of applicable policy (A Waste Action Plan for a Circular Economy | Ireland's National Waste Policy 2020-2025, and EPA Dest Practice Guide as listed above together with the legislation which creates the legal framework for resource and waste management in Ireland, these include

Waste Management Act 1996 (Act No. 10 of 1996) as amended 2001 (Act No. 36 of 2001), 2003 (Act No. 27 of 2003) and 2011 (S.I. No 20 of 2011). Subordinate and associated legislation includes:

- European Communities (Waste Directive) Regulations 2011 (SI 126 of 2011) as amended 2011 (S.I. No. 323 of 2011)
- Waste Management (Collection Permit) Regulations 2007 (S.I No. 820 of 2007 as amended 2008 (S.I No 87 of 2008) and 2016 (S.I No. 24 of 2016)
- Waste Management (Facility Permit and Registration) Regulations, (S.I No. 821 of 2007) as amended 2008 (S.I No. 86 of 2008), 2014 (S.I No. 320 and No. 546 of 2014) and 2015 (S.I. No. 198 of 2015)
- Waste Management (Licensing) Regulations 2000 (S.I No. 185 of 2000) as amended 2004 (S.I. No. 395 of 2004) and 2010 (S.I. No. 350 of 2010)
- European Union (Packaging) Regulations 2014 (S.I. 282 of 2014) as amended 2015 (SI No. 542 of 2015).
- Waste Management (Planning) Regulations 1997 (S.I. No. 137 of 1997)
- Waste Management (Landfill Levy) Regulations 2015 (S.I. No. 189 of 2015)  
o European Communities (Waste Electrical and Electronic Equipment) Regulations 2014 (S.I. No. 149 of 2014)

- Waste Management (Batteries and Accumulators) Regulations 2014 (S.I. No. 283 of 2014) as amended 2014 (S.I. No. 349 of 2014) and 2015 (S.I. No. 347 of 2015)
  - Waste Management (Food Waste) Regulations 2009 (S.I. 508 of 2009) as amended 2015 (S.I. 190 of 2015) and 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 2000 (S.I. No. 73 of 2000)
  - Waste Management (Shipments of Waste) Regulations 2007 (S.I. No. 419 of 2007) as amended by European Communities (Shipments of Hazardous Waste exclusively within Ireland) Regulations 2011 (S.I. No. 324 of 2011)
  - European Communities (Transfrontier Shipment of Waste) Regulations 1994 (S.I. No. 121 of 1994)
  - European Union (Properties of Waste which Render it Hazardous) Regulations 2015 (S.I. No. 233 of 2015)
  - Planning and Development Act 2000 as amended 2010 (Act No. 30 of 2010) and 2015 (S.I. No. 264 of 2015, S.I. 310 of 2015).
  - Protection of Environment Act 1992 as amended (Act. No. 27 and S.I. 413 of 2003) as amended by the Planning and Development Act 2000 (Act No. 30 of 2000).
  - Litter Pollution Act 1997 (Act No. 12 of 1997) as amended by the Litter Pollution Regulations 1999 (S.I. No. 359 of 1999) and Protection of the Environment Act 2003.
- Description of the typical waste materials that are predicted to arise during the construction, operational and decommissioning phases; and
  - Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy, and to include the potential treatment of any relevant material as a by-product in accordance with the objectives of the Circular Economy<sup>6</sup>.

Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction, operational and decommissioning phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 11.5 of this chapter.

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

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<sup>6</sup> Noting the distinction between a by-product and a waste. Circular Economy requirements state that as much as possible of materials removed off site will be reused in accordance with Article 27 (of the European Communities (Waste Directive) Regulations 2011) notification procedure.



of Irish waste legislation is the Waste Management Act 1996 (as amended). European and national waste management policy is based on the concept of the 'waste hierarchy', which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal).

EU and Irish National waste policy also aims to contribute to the circular economy by extracting high-quality resources from waste as much as possible. The Circular Economy (CE) is a sustainable alternative to the traditional linear (take-make-dispose) economic model, reducing waste to a minimum by reusing, repairing, refurbishing, and recycling existing materials and products.

The Irish government issues policy documents which outline measures to improve waste management practices in Ireland and help the country achieve EU targets in respect of recycling and disposal of waste. The most recent policy document, Waste Action Plan for a Circular Economy (WAPCE) – Waste Management Policy in Ireland, was published in 2020 and shifts focus away from waste disposal and moves it back up the production chain. The move away from national waste targets is due to the Irish and international waste context changing in the years since the launch of the previous waste management plan, A Resource Opportunity – Waste Management Policy in Ireland, in 2015.

One of the first actions to be taken from the WAPCE was the development of the Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less' (2021) to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021.

The strategy for the management of waste from the construction phase is in line with the requirements of the EPA's 'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021). The guidance documents, Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects and Construction and Demolition Waste Management: A Handbook for Contractors and Site Managers (FÁS & Construction Industry Federation, 2002), were also consulted in the preparation of this assessment.

There are currently no Irish guidelines on the assessment of operational waste generation, and guidance is taken from industry guidelines, plans and reports including the Southern Region Waste Management Plan 2015-2021<sup>7</sup>, BS 5906:2005 Waste Management in Buildings – Code of Practice, Storage and Presentation of Household and Commercial Waste By-Laws 2020, the EPA National Waste Database Reports 1998 – 2020, the EPA National Waste Statistics Web Resource and the Irish Wind Energy best Practice Guidelines<sup>8</sup>.

### 11.3.2 Utilities

To assess the potential for impacts to electricity, power, water infrastructure and waste services, a scoping exercise was carried out with a number of key consultees, including

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<sup>7</sup> The Regional Waste Management Plans are to be replaced by the National Waste Management for a Circular Economy which is currently in draft form and out for public consultation.

<sup>8</sup> Best Practice Guidelines for the Irish Wind Energy Industry' (Irish Wind Energy Association, 2012)



ESB, Uisce Éireann and Clare County Council. Full details of the scoping exercise that was carried out is provided in **Chapter 3: Scoping**.

In order to assess the potential for significant effects on utilities (gas, water and waste management infrastructure) in the vicinity of the proposed development, an engineering assessment was undertaken on the proposed grid connection route and two loop-in locations displayed in **Figure 1.4**. This included field survey and engagement with the Clare County Roads Authority, Transport Infrastructure Ireland and Iarnród Éireann to determine the best engineering solution for crossings of National Roads, bridges and watercourses. Refer to **Chapter 5: Description of the Proposed development** for a summary of the grid connection crossing points solutions, see Table 5.8 in Chapter 5

As part of the detailed engineering design, site investigation works will be undertaken to confirm the ground conditions, the extent of any underground features and depth of cover compared to that predicted to inform detailed design of the grid connection. Further consultations with utility providers such as Uisce Éireann, Gas Networks Ireland, and the Clare County Roads Authority will be undertaken as part of detailed design to confirm that the proposed methods for the grid connection are the most appropriate according to the ground conditions.

### 11.3.3 Telecommunication

AI Bridges were commissioned to undertake a telecommunications impact assessment of the operation phase of the Proposed Development, which is attached as **Appendix 11.1**.

There are four primary stages in preparing and compiling a communication impact study:

- Telecom Operator Consultations;
- Field Surveys;
- Desktop Survey Network Modelling and Analysis; and
- Report Generation.

Four Telecom Operators with networks in the vicinity of the proposed development were identified in the study area:

- 2RN Network -one Point-to-Point (PTP) microwave radio link and one DTT off air (UHF) radio link
- Eir Network - one Point-to-Point (PTP) microwave radio link
- Enet Network - three Point-to-Point (PTP) microwave radio links
- Vodafone Ireland Network A - two Point-to-Point (PTP) microwave radio links

AI Bridges assessed the impact of the Development on the eight number communication links, using radio 3D network modelling.

A review of relevant planning and policy documents was undertaken to identify relevant objectives in relation to telecommunication. The following documents have been reviewed:

- Clare County Development Plan 2023-2029;

- ‘Best Practice Guidelines for the Irish Wind Energy Industry’, published by the Irish Wind Energy Association (2012);
- Information on Electric and Magnetic Fields, published by EirGrid (2014); and
- Wind Energy Development Guidelines, Department of Environment, Heritage and Local Government (2006).

#### 11.3.4 Aviation

Following scoping (refer to **Chapter 3: Scoping** for aviation scoping responses), AI Bridges were commissioned to undertake an Aviation Review Statement of the operation phase of the Proposed Development, which is attached as **Appendix 11.2**. As part of the review, the following subjects were considered:

- Annex 14 - Obstacle Limitation Surfaces (OLS)
- Annex 15 – Aerodrome Surfaces
- Building Restricted Areas (BRA)
- Minimum Sector Altitudes (MSA)
- Instrument Flight Procedures
- Permitted Wind Farms in vicinity of Proposed Development
- Communications, Navigation
- Radar Surveillance Systems
- Flight Inspection and Calibration
- Aeronautical Obstacle Warning Light Scheme
- Irish Air Corps / Department of Defence Safeguarding
- Garda Air Support Unit (GASU) and Emergency Aeromedical Service (EAS)

#### 11.3.5 Description and Significance of Effects

Effects are described in accordance with the EPA Guidance (2022) as presented in **Chapter 2**.

The significance criteria are summarised in **Table 11.1**.

**Table 11.1: Significance criteria**

Significance level	Criteria
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.

Significance level	Criteria
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration, or intensity significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.

Based on the defined criteria, where an effect has been classified as Moderate, Significant, Very Significant, or Profound, it can be considered significant as referred to in the S.I. No. 296/2018 - European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

## 11.4 The Baseline Environment

### 11.4.1 Waste

Clare County Council is the Local Authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the Southern Region Waste Management Plan 2015 – 2021<sup>9</sup> and the WAPCE.

The Southern Region Waste Management Plan sets out the strategic targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- 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 EC (Waste Directive) Regulations 2011 set a 70% target for the reuse, recycling and recovery of Construction and Demolition (C&D) waste in Ireland by December 2020. The

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<sup>9</sup> The Regional Waste Management Plans are to be replaced by the National Waste Management for a Circular Economy which is currently in draft form and out for public consultation.

EPA reported in the National Waste Report 2012, that Ireland surpassed this target, with a recovery rate of 97%. As mentioned in the Plan, there is significant potential for recycling C&D waste given its characteristics. Articles 27 and 28 of the EC (Waste Directive) Regulations 2011 set out the grounds by which a material can be deemed to be a by-product rather than a waste (Article 27) and the grounds for deeming a material to no longer be a waste (Article 28). The National Waste Statistics report published by the EPA in November 2021 identifies that Ireland's current target of "Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)" was met for 2020 at 51%; however, they are currently not in line with the 2025 target (55%).

The EPA Circular Economy and Waste Statistics Highlights Report for 2021<sup>10</sup> indicates that Ireland is on course to miss EU waste recycling targets for municipal, total packaging and plastic packaging wastes for 2025. The Report highlights the need to focus on waste generation reduction and improvement in segregation at source to support recycling.

The EPA Circular Economy and Waste Statistics Highlights Report also indicated that the Construction and demolition (C&D) sector in Ireland generated an estimated 9 million tonnes of waste in 2021. The C&D waste comprises a wide variety of materials such as concrete, bricks, wood, glass, metals and plastics and is the largest waste stream in Ireland in terms of both volume and weight and accounts for more than a third of all waste generated in the EU. With Soil and stones made up the vast majority (85%) of this. Most C&D waste treated in Ireland was recovered by backfilling (85%), while 7% went for disposal and only 8% was recycled.

A desktop study was undertaken to review the licensed waste facilities in proximity of the Proposed Development. Facilities in Ireland carrying out waste activities are required to obtain authorisation in accordance with the Waste Management Act 1996, as amended. Depending on the type of waste activities carried out at the facility these may be exempt or require either a waste licence, waste facility permit (WFP) or a certificate of registration (COR).

The EPA database and the National Waste Collection Permit Office (NWCPO) were reviewed on the 15<sup>th</sup> of November 2023<sup>11</sup> for licensed waste facilities in proximity to the proposed works.

**Table 11.2** presents the licensed waste facilities in County Clare, where the proposed development is situated, which could be potentially utilised by a construction, operation or decommissioning contractor based on the likely waste type to be generated. The Table indicates the type of waste they accept. **Table 11.3** presents the EPA licensed waste facilities in County Clare also that could potentially be utilised for construction, operation, and decommissioning ([Environmental Protection Agency \(epa.ie\)](http://environmentalprotectionagency.ie) as of the 15<sup>th</sup> of November 2023).

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<sup>10</sup> <https://www.epa.ie/publications/monitoring--assessment/waste/national-waste-statistics/EPA-Circular-Economy-and-Waste-Statistics-Highlights-Report-2021.pdf>

<sup>11</sup> Website link at <http://facilityregister.nwcpo.ie/>

**Table 11.2: Licensed Waste Facilities in proximity to the Proposed Development**

Authorisation Reference	Name	Address	Description
COR-CE-14-0005-02	Bobby O'Connell & Sons Ltd, (O'Connell Quarries)	Ballycar South Kilmoculla Ardnacrusha Co Clare V94 XK85	concrete, bricks, tiles and ceramics, mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06
WFP-CE-22-0003-01	Clare Drains Environmental Ltd.	Unit 10 Abbey Business Park Quin Road Business Park Quin Road Ennis Co. Clare	mixtures of wastes from grit chambers and oil/water separators, sludge from treatment of urban wastewater, grease and oil mixture from oil/water separation containing only edible oil and fats, solid waste from primary filtration and screenings, sludges from water clarification, edible oil and fat, street-cleaning residues, septic tank sludge
WFP-CE-08-0002-04	Clare Waste & Recycling Co Ltd	Raheen Tuamgraney Co Clare V94 WY67	waste bark and cork, sawdust, shavings, cuttings, wood, particle board and veneer other than those mentioned in 03 01 04, ferrous metal filings and turnings, ferrous metal dust and particles, non-ferrous metal filings and turnings, paper and cardboard packaging, plastic packaging, wooden packaging, metallic packaging, composite packaging
COR-CE-20-0003-01	Clare Waste & Recycling Co. Ltd	Ballyvannan Tuamgraney Co. Clare	concrete, bricks, tiles and ceramics, mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06, soil and stones other than those mentioned in 17 05 03
COR-CE-21-0011-01	Donal Ward	Coolderry Td. Ardnacrusha Co. Clare	soil and stones other than those mentioned in 17 05 03
COR-CE-21-0007-01	Gerard Burke	Danganelly West Danganelly Cooraclare Co. Clare	mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06, soil and stones other than those mentioned in 17 05 03

Authorisation Reference	Name	Address	Description
COR-CE-21-0014-01	Gerard Ryan	Aharinaghmore Clonlara Co. Clare	concrete, bricks, tiles and ceramics, mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06, bituminous mixtures containing other than those mentioned in 17 03 01, soil and stones other than those mentioned in 17 05 03, dredging spoil other than those mentioned 17 05 5, soil and stones
COR-CE-21-0015-01	Gerard Ryan	Ballybrach Clonlara Co. Clare	concrete, bricks, tiles and ceramics, mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06, bituminous mixtures containing other than those mentioned in 17 03 01, soil and stones other than those mentioned in 17 05 03, dredging spoil other than those mentioned 17 05 5, soil and stones
COR-CE-19-0002-01	Gerard Ryan	Ballybrack Clonlara Co Clare	soil and stones other than those mentioned in 17 05 03
COR-CE-20-0001-01	James Lynch	Cappa Lodge Td Sixmilebridge Co. Clare 086 8069385	mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06, soil and stones other than those mentioned in 17 05 03
WFP-CE-19-0001-01	Jim Bolton Sand and Gravel Ltd	Faheymore O'Briens Bridge Co Clare V94 F635	mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06, soil and stones other than those mentioned in 17 05 03
COR-CE-20-0002-01	Justin O'Grady	Ballyliddane West Sixmilebridge Co. Clare	concrete, bricks, tiles and ceramics, mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06, bituminous mixtures containing other than those mentioned in 17 03 01, soil and stones other than those mentioned in 17 05 03, dredging spoil other than those mentioned 17 05 5, soil and stones

Authorisation Reference	Name	Address	Description
WFP-CE-11-0003-02	Kevin Marsh	Barbane Broadford Co. Clare V94 D9EV	end-of-life vehicles
WFP-CE-19-0002-01	Kieran Kelly Haulage Ltd	Ballynacragga Newmarket-on- Fergus Co Clare	concrete, bricks, tiles and ceramics, mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06 , bituminous mixtures containing other than those mentioned in 17 03 01 , soil and stones other than those mentioned in 17 05 03, dredging spoil other than those mentioned 17 05 5, soil and stones
COR-CE-23-0001-01	Kieran Kelly Haulage Ltd	Knocklisheen Co. Clare	concrete, bituminous mixtures containing other than those mentioned in 17 03 01, soil and stones other than those mentioned in 17 05 03, soil and stones
COR-CE-21-0008-01	Kieran Kelly Haulage Ltd.	Mayfield Wood Road Cratloe Co. Clare	concrete, bricks, tiles and ceramics, mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06 , bituminous mixtures containing other than those mentioned in 17 03 01, soil and stones other than those mentioned in 17 05 03, dredging spoil other than those mentioned 17 05 5, soil and stones
COR-CE-21-0013-01	Kieran Kelly Haulage Ltd.	Ballynacragga Newmarket-on- Fergus Co. Clare	concrete, bricks, tiles and ceramics, mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06 , bituminous mixtures containing other than those mentioned in 17 03 01, soil and stones other than those mentioned in 17 05 03, dredging spoil other than those mentioned 17 05 5, soil and stones



Authorisation Reference	Name	Address	Description
COR-CE-22-0001-01	Kieran Kelly Haulage Ltd.	Cratloekeel Cratloe Co. Clare	concrete, bricks, tiles and ceramics, mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06 , bituminous mixtures containing other than those mentioned in 17 03 01, soil and stones other than those mentioned in 17 05 03, dredging spoil other than those mentioned 17 05 5, soil and stones
COR-CE-21-0016-01	Michael Begley	Trough Kilmore Co. Clare	mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06, soil and stones other than those mentioned in 17 05 03
COR-CE-18-0004-01	Michael Johnston	Muingboy Broadford Co Clare	mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06, soil and stones other than those mentioned in 17 05 03
WFP-CE-18-0002-01	Roadstone Ltd	Ballyquin More O'Brien's Bridge Co Clare V94 E0E7	soil and stones other than those mentioned in 17 05 03
WFP-CE-15-0002-02	Roadstone Ltd.	Bunratty Newmarket on Fergus Co. Clare V95 D735	concrete, bricks, tiles and ceramics, mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06, bituminous mixtures containing other than those mentioned in 17 03 01
WFP-CE-19-0003-01	Shannon Abrasives Ltd	Unit 10B Knockbeg Point Shannon Co Clare V14 X050	waste metal, metallic oxides other than those mentioned in 06 03 15, copper, bronze, brass, aluminium, lead, zinc, iron and steel, tin, mixed metals cables other than those mentioned in 17 04 10
COR-CE-19-0006-01	Thomas Crowley Plant and Stone Limited)	Drumline Newmarket-on-Fergus Co. Clare Td	mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06, soil and stones other than those mentioned in 17 05 03

Authorisation Reference	Name	Address	Description
COR-CE-19-0001-01	Tom Marsh	Ballyquin Beg Kilbane Broadford Co Clare	mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06, soil and stones other than those mentioned in 17 05 03
COR-CE-23-0002-01	Ward & Ward Haulage	Sallybank TD, Traugh Kilmore Co. Clare	concrete, mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06, bituminous mixtures containing other than those mentioned in 17 03 01, soil and stones other than those mentioned in 17 05 03

**Table 11.3: EPA Licensed Waste Facilities in proximity to the Proposed Development**

Reg No.	Name	Location
<a href="#">W0041-01 (IED)</a>	Enva Ireland Limited	Enva Ireland Limited (Shannon), Smithstown Industrial Estate, Shannon, Clare.
<a href="#">W0109-02 (IED)</a>	Clare County Council	Inagh Landfill, Ballyduff Beg, Inagh, Clare.
<a href="#">W0253-01 (IED)</a>	Clean (Irl) Refuse & Recycling Co	Clean (Irl) Refuse & Recycling Co., Ballinagun West, Cree, County Clare, Clare.

#### 11.4.2 Utilities

There are no utilities located within the Proposed Development. The engineering assessment undertaken for the proposed cable route options identified several points where existing services such as gas and water mains intersect the Cable Route Corridor. Confirmatory surveys will be undertaken during the detailed design stage to ensure the correct avoidance method is adopted at these locations. Refer to **Chapter 5: Description of the Proposed Development**.

#### 11.4.3 Telecommunications

As part of the Telecommunications Impact Study (**Appendix 11.1**), Ai Bridges identified eight telecommunications mast-sites as sites with network infrastructure that could potentially be impacted by the Proposed Development and a field survey of each of these mast-sites was carried out. During the field surveys, radio antennas with bearings in the direction of the Proposed Development were recorded. Details of the eight telecommunications mast-sites assessed are detailed below in **Table 11.4**

**Table 11.4: Radio links potentially impacted by Proposed Development**

Operator	Link Description
2RN	Licensed PTP microwave radio link from Maghera to Woodcock Hill.
2RN	PTP DTT off-air (UHF) radio link from Maghera to Woodcock Hill.
Eir	Licensed PTP microwave radio link from Oatfield to Woodcock Hill.
Enet	Licensed PTP microwave radio link from Kilseily to ESB Killonan
Enet	Licensed PTP microwave radio link from Kilseily to Westpark, Shannon.

Operator	Link Description
Enet	Licensed PTP microwave radio link from Kilseily to KN, Shannon
Vodafone Ireland	Licensed PTP microwave radio link from Oatfield to Mausnarylaan.
Vodafone Ireland	Licensed PTP microwave radio link from Maghera to Woodcock Hill.

#### 11.4.4 Aviation

As part of the Aviation Review Statement (**Appendix 11.2**), Ai Bridges identified Shannon international airport as the closest to Proposed Development (located ca. 16.6km from the nearest Airport Reference Point (ARP) to the west).

## 11.5 Potential Impact of The Proposed Development

### 11.5.1 “Do-nothing” Scenario

#### 11.5.1.1 Waste

If the Proposed Development were not to proceed, there would be no effect on waste infrastructure in the area other than that normally arising from the existing agricultural activity, forestry operations, road maintenance activities and industrial activities in the general area or as would arise from any new consented developments in the area.

#### 11.5.1.2 Utilities

If the Proposed Development were not to proceed, there would be no effect on existing utilities in the area other than that normally arising from the existing agricultural activity, forestry operations, road maintenance activities and industrial activities in the general area or as would arise from any new consented developments in the area.

#### 11.5.1.3 Telecommunications & Aviation

If the Proposed Development were not to proceed, there would be no effect on existing telecommunications and aviation operations in the area other than that normally arising from the existing agricultural activity, forestry operations, road maintenance activities and industrial activities in the general area or as would arise from any new consented developments in the area. This ‘do-nothing’ scenario would result in no interference in electromagnetic signals or aviation.

### 11.5.2 Construction Phase

#### 11.5.2.1 Waste

There will be no demolition associated with the proposed development.

During the construction phase, waste will be produced from materials such as packaging materials, canteen and domestic waste. The appointed Contractor will be required to

ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

Significant groundworks are required for the excavation of access tracks, underground cabling, the substation area and turbine foundations. It is currently estimated that the quantity of excavated material due to site clearance and preparation of foundations, access tracks and substation will be approximately **100,744m<sup>3</sup>** of topsoil, **72,769m<sup>3</sup>** of subsoil and **15,363m<sup>3</sup>** of rock inclusive of Option A grid connection and **101,091m<sup>3</sup>** of topsoil, **74,390m<sup>3</sup>** of subsoil and 15,363m<sup>3</sup> of rock inclusive of Option B grid connection.

It is envisaged that all excavated material (excluding the proposed grid connection route) will be reused within the Proposed Development. For the proposed grid connection route, the cable ducting will be laid in excavated trenches in the public road network, in the access track corridor in the Western DA and in third party lands in Ballycar North. The excavated trenches will have a base layer of fill material and sand and will be backfilled. The surface layer will be reinstated. Ten cable joint bays will also be constructed along the cable route corridor, 5 on each circuit, which will require the excavation of these locations, the construction of the joint bay and communication boxes and the backfilling and reinstatement of the surface finish as per the design drawings. Where feasible excavated material will be used to reinstate the cable trench and cable joint bay locations and the road surface will be reinstated. The excess material from the excavation will be taken off site by a licensed waste contractor to a licensed waste facility.

If the material that requires removal from the Proposed Development 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 for the receiving facility. Alternatively, the material may be classed as by-product under Regulation 15 (By-products) (Previously Article 27 of the European Communities (Waste Directive) Regulations 2011) of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2020.

To establish the appropriate reuse, recovery and / or disposal route for the excavated material to be removed off-site, it will first need to be classified. Waste 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 (2019).

Waste will also be generated from construction phase workers, which is municipal waste, e.g., organic / food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and, potentially, sewage sludge from temporary welfare facilities provided on-site during the construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated in small volumes from site offices.

The proposed development will generate a range of non-hazardous and hazardous waste materials during site excavation and construction. As mentioned, general housekeeping

and packaging will also generate waste materials, as well as likely municipal wastes generated by construction employees, including food waste. Waste materials will be required to be temporarily stored in the construction site compound or adjacent to it, on-site, pending collection by a waste contractor. If waste material is not managed, by proper segregation and stored correctly in accordance with legislation, it is likely to lead to litter or pollution issues at the Proposed Development and in adjacent areas. The indirect effect of litter issues is the presence of vermin in areas affected. In the absence of mitigation, the effect on the local and regional environment is likely to be **short-term, significant** and **adverse**.

Wastes arising will need to be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. There are numerous licensed waste facilities in the area which can accept hazardous and non-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 likely C&D waste arisings at facilities in the region. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation to reduce waste generated and ensure waste management as high up the hierarchy as possible, the effect on the local and regional environment is likely to be **short-term, significant** and **adverse**. This would arise as disposal of waste is at the bottom end of waste hierarchy and impacts natural resource depletion, can potentially lead to methane production reduce existing landfill capacity for wastes for which there is currently no alternative treatment option that can be used to recover material resources and/or energy

#### 11.5.2.2 Utilities

During construction, contractors will require power for onsite offices, and construction equipment/plant. A construction compound and temporary power supply will be established via generators. The power requirements for the construction phase will be minor.

Welfare facilities will be provided for the construction work force at the Contractor's construction compound. All waste waters will be collected in an enclosed holding tank within the compound and removed from site on a regular basis for final wastewater treatment by a licensed contractor. The source of a water supply will be non-potable water for the site office and service area which will be delivered and stored on site for use in the welfare facilities. Potable water will be supplied by bottled water or water cooler.

The locations of existing utility services along the grid connection route and turbine delivery route will be confirmed prior to the commencement of on-site works.

The potential effect on utility infrastructure for the construction phase is **neutral, imperceptible** and **short-term**, as the confirmed methods of construction will be chosen to ensure identified utilities are not impacted.

#### 11.5.2.3 Telecommunications

The potential effects that may arise during the construction phase are likely due to be caused by cranes used to assemble the turbines. These cranes will be temporarily

located beside the proposed turbines. Any interference effects are likely to be similar to those arising during the operational phase of the proposed development, which can include reflection, diffraction, blocking and radio frequency interference. It should be noted that these effects are temporary in nature and will completely disappear once the cranes are removed from the site. The potential effect on telecommunications for the construction phase is **negative, not significant** and **short-term**.

#### 11.5.2.4 Aviation

During the later stages of construction and prior to commissioning, the constructed turbines could be an obstacle to low flying aircraft. The closest airport to the Proposed Development is Shannon Airport, located ca. 16.6km west of the Proposed Development Areas.

The Aviation Review Statement prepared by Ai Bridges (Appendix 11.2) indicates the following:

- Annex 14 - Obstacles Limitation Surfaces (OLS): The Proposed Development will be located outside the Outer Horizontal Surface of the Shannon Airport Runways Obstacle Limitation Surfaces, as defined in ICAO (International Civil Aviation Organization) Annex 14. As there is no penetration of the aerodrome OLS surfaces, it is unlikely that there will be any Annex 14 OLS impacts due to the proposed development. The effect of the proposed development will therefore be **neutral, imperceptible and long-term**.
- Annex 15 - Aerodrome Surfaces: A review of "Terrain and obstacle requirements Area 1" as defined in ICAO Annex 15 indicates that wind turbines need to be registered if they are more than 100 meters above terrain. The area from the centre point (ARP – Airport Reference Point) of Shannon Airport to the boundary of the Area 1 of the Annex 15 Aerodrome Surface is 45km and encloses the Total Manoeuvring Area (TMA) used for circling and manoeuvring by aircraft. Should the proposed wind farm be permitted, the turbines will be within 45km of Shannon Airport's ARP and will be greater than 100m in height. Therefore, the turbines will be required to be included in the IAA Electronic Air Navigation Obstacle Dataset. The proposed Development will provide the turbine coordinates to the Irish Aviation Authority if planning permission is granted. The effect of the proposed development will therefore be **neutral, not significant and long-term**.
- Building Restricted Areas (BRA): The proposed development is over 9 km from the Building Restricted Areas (BRAs), which is the safeguarded airspace area surrounding an aviation facility that needs to be clear from physical intrusions, at Shannon Airport. At this distance there will be no impacts to the BRAs due to the proposed development. The effect of the proposed development will therefore be **neutral, imperceptible and long-term**.
- Minimum Sector Altitudes (MSA): The Minimum Sector Altitudes (MSA) is the lowest altitude which may be used that will provide a minimum obstacle clearance of 1000ft above all obstacles within a sector of 25 nautical miles (46km) from the VOR/DME at Shannon Airport. The maximum turbine tip-height at the proposed wind farm site will be 1407 ft above mean sea level (AMSL). There is over 1000



ft from the maximum height of the proposed development to the MSA altitude and therefore there will be no impact on the published MSA altitudes for Shannon Airport. The effect of the proposed development will therefore be **neutral, imperceptible and long-term.**

- Instrument Flight Procedures: Of the nine published Instrument Flight Procedures (IFP) for flights to/from Shannon Airport two IFPs are potentially impacted. These are
  - Instrument Approach Chart ILS CAT I & II or LOC 24. The procedures for this IFP do specify a flight route over the proposed development. In addition, three of the proposed turbines (T01, T02 and T03) at the proposed development will be located in the Secondary Approach Area of flights arriving into Runway RWY24,
  - Instrument Approach Chart VOR RWY 24. The procedures for this IFP do specify a flight route over the proposed development. Three of the proposed turbines (T01, T02 and T03) at the proposed development will also be located in the Secondary Approach Area of flights arriving into Runway RWY24 (In addition, a 3D model of the VOR Constraints Surface indicates that these three turbines also penetrate the VOR Surface.

In addition, the ATC-SMAC (which is used by Air Traffic Controllers to vector flights for landing into Shannon Airport) is penetrated by two of the proposed turbines. The effect of the proposed development, in the absence of mitigation will therefore be **adverse, significant and long-term.**

- Communications and Navigation System: As the proposed development is approximately 15 km from the Localizer and transmitting antennas at Shannon Airport, it is very unlikely that wind turbines at the proposed development will have any impact on these ATS communications and radio navigational aids. The effect of the proposed development will therefore be **neutral, imperceptible and long-term.**
- Radar Surveillance Sensors: Turbines in the Proposed Development Areas will be located at a distance of 17 km from the radar station at Shannon and in Assessment Zone 4 of the EUROCONTROL Guidelines for Radar Surveillance Systems, which require a 16 km safe distance from the surveillance radar system (SSR). A detailed impact assessment on Radar Surveillance Systems will not be required for the Radar Station at Shannon Airport. The effect of the proposed development will therefore be **neutral, imperceptible and long-term.** However, Turbines at the proposed development are within 10 km from the radar station at Woodcock Hill and potential impacts may arise at this location, see Appendix 11.2. The effect of the proposed development, in the absence of mitigation will therefore be **adverse, significant, and long-term.**
- Flight Inspection and Calibration: Analysis demonstrated that the Flight Inspection and Calibration procedures will not be impacted by the proposed development. The effect of the proposed development will therefore be **neutral, imperceptible, and long-term.**

- Aeronautical Obstacle Warning Light Scheme: In the event of a grant of planning consent the IAA are likely to request lighting of the proposed wind turbines in the interest of aviation safe-guarding as the proposed development will be considered as an en-route obstacle. The effect of the proposed development will therefore be **neutral, not significant, and long-term**.
- Irish Air Corps / Department of Defence (DoD) Safeguarding; The proposed development is 7.9 km from the nearest Irish Air Corps (IAC) restricted zone and is located in a largely rural area. The Proposed Development is not located in an Irish Air Corps restricted area (as mapped in “Air Corps Wind Farm/ Tall Structures Position Paper” and will have no impacts on the Irish Air Corps activities. The effect of the proposed development will therefore be **neutral, imperceptible, and long-term**.
- Garda Air Support Unit (GASU) and Emergency Aeromedical Service (EAS): The terrain at the proposed development is forested / mountainous. For these reasons, it is highly unlikely that the proposed development will have any impacts on GASU fixed-wing aircraft or helicopter flights / operations. Any potential Emergency Aeromedical Service (EAS) operations in the area are also unlikely to be impacted, as helicopter landings will not occur at the proposed development due to its forested/mountainous terrain. The effect of the proposed development will therefore be **neutral, imperceptible, and long-term**.

### 11.5.3 Operational Phase

#### 11.5.3.1 Waste

Once operational, it is anticipated that very small amounts of waste will be generated from staff during inspections and maintenance works. These wastes may include organic/food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins, and Tetra Pak cartons) and non-recyclable waste. Waste fuels/oils, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently. All such waste will be stored appropriately and safely from wind, rain and wild animals that often tear apart rubbish bags.

Wastewater from the staff welfare facilities will be collected in a sealed storage tank. All wastewaters will be transported off-site by an authorised waste collector to a wastewater treatment plant.

The potential effect on waste infrastructure for the operational phase is **neutral, imperceptible, and long-term**.

#### 11.5.3.2 Utilities

No significant impacts are anticipated on utilities for the operational phase of the proposed development.

#### 11.5.3.3 Telecommunications

Radio waves and microwaves are used for a wide variety of communication purposes. The rotating blades of wind turbines can occasionally scatter electromagnetic signals

causing interference to a range of communication systems. Impacts can include reflection, diffraction, blocking and radio frequency interference. The types of communication, which may be affected, include the following:

- Satellite communications;
- RADAR;
- Cellular radio communications;
- Aircraft instrument landing systems;
- Air traffic control;
- Terrestrial telecommunication links; and
- Television broadcasts.

Consultation with the Telecommunication Operators (2RN, Eir, Enet and Vodafone) raised concerns regarding potential effects of the proposed development on their telecommunications networks operating in the licence-exempt frequency bands. A detailed assessment carried out by Ai Bridges demonstrated that no impacts are predicted to occur and hence no effect will occur to any telecommunications line with the exception of the Enet PTP link Kilselly to ESB Kilonan which will be impacted in the absence of mitigation by wind turbines T8 and T11.

There are no anticipated impacts to the other links assessed. In the absence of mitigation, the effect on telecommunications is likely to be **long-term, imperceptible, and neutral** for all telecommunication links except for the Enet link Kilselly to ESB Kilonan. The effect on this telecommunication link will be **long-term, significant, and adverse**.

#### 11.5.3.4 Aviation

Operating wind farms have the potential to cause a variety of adverse effects on aviation. Rotating wind turbine blades may have an impact on certain aviation operations, particularly those involving radar.

The siting and physical height of wind turbines can also cause an obstruction to aviation and the overall performance of communications, navigation, and surveillance equipment. All structures over 150m in height are required to have lighting to warn aviation traffic. The maximum ground to blade tip height of the wind turbines will be 175m and the minimum will be 176.5 m during operation.

The potential for aviation impacts during the operational phase arising from the Proposed Development are similar to those as set out in for the construction phase which indicates that adverse potential impacts are predicted to occur as follows:

- Instrument Flight Procedures: Of the nine published Instrument Flight Procedures (IFP) for flights to/from Shannon Airport two IFPs are potentially impacted. In addition, the ATC-SMAC (which is used by Air Traffic Controllers to vector flights for landing into Shannon Airport) is penetrated by two of the proposed turbines. The effect of the proposed development, in the absence of mitigation will therefore be adverse, significant and long-term.

- Radar Surveillance Sensors: Turbines in the Proposed Development Areas will be located within 10 km from the radar station at Woodcock Hill and potential impacts may arise at this location. The effect of the proposed development, in the absence of mitigation will therefore be adverse, significant and long-term.

All other potential impacts on aviation have been assessed as **neutral, imperceptible and long-term**.

Furthermore, should planning consent be granted for the Proposed Development, the Developer will liaise with the Irish Aviation Authority (as noted in the scoping response) to ensure all aviation requirements, such as a warning lighting scheme, are implemented.

There will be a potential significant effect on aviation from the Proposed Development during the operational phase in the absence of mitigation related to Instrument Flight Procedures and the SSR Radar at Woodcock Hill. Therefore, the potential effect on aviation for the operational phase in the absence of mitigation is **adverse, significant and long-term**.

#### 11.5.3.5 Traffic and Transport

Once the Proposed Development is operational it is estimated that there will be approximately 6 - 8 staff members employed occasionally on site with a similar number of vehicle trips.

During the operational phase the effect on the surrounding local highway network will be **negative and long term but will be imperceptible** based on a projected maximum of 16 trips to and from the site per day generated by maintenance staff.

### 11.5.4 Decommissioning Phase

#### 11.5.4.1 Waste

During decommissioning of the Proposed Development, effects will be similar to those assessed for the construction phase. It is proposed that concrete turbine foundations, with the plinth removed, will be covered by soils typical of the surrounding environment and then reseeded or left to re-vegetate over time. This is the least impactful process of decommissioning.

All infrastructure including turbine components will be separated and removed off-site for re-use and recycling where practicable or disposed of in accordance with waste legislation at the time of decommissioning.

The decommissioning will be managed on a phased basis to minimise the disruption to the amenity use of the site. The effects of decommissioning will be **negative and short term** but will be **imperceptible**.

#### 11.5.4.2 Utilities

No significant impacts are anticipated on utilities for the decommissioning phase of the proposed development.

#### 11.5.4.3 Telecommunications

During decommissioning of the Proposed Development above, effects will be similar to those assessed for the construction phase.

#### 11.5.4.4 Aviation

During decommissioning of the Proposed Development effects will be similar to those assessed for the construction phase.

## 11.6 Mitigation Measures

### 11.6.1 Waste

As outlined in Chapter 5: Description of the Proposed Development, a Waste Management Plan (WMP) has been prepared and included as an Appendix to the Construction Environmental Management Plan (CEMP) which has been submitted as part of this planning application. The WMP will be implemented by the Contractor and will be updated by the Contractor to reflect any planning requirements issued as part on any planning permission granted for the Proposed Development. This WMP will cover all aspects of waste management during the construction phase and includes the following mitigation measures:

- The objective will be to maximise the reuse of construction materials either onsite or offsite;
- All waste generated during the construction phase will be managed in accordance with the relevant waste management regulations;
- Waste generation during construction works will be properly supervised with designated waste storage and segregation areas;
- Materials required will be ordered only as needed to reduce excess materials leading to waste;
- Where excess materials do arise, these will be returned to the supplier where possible; and,
- In the unlikely occurrence of hazardous waste during construction, such as waste oils and lubricants, it will be segregated, contained, classified, transported and disposed of by appropriately permitted waste contractors in accordance with all relevant national and international waste legislation.

The mitigation measures presented in the WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the excavation and construction phases of the proposed development.

### 11.6.2 Utilities

Ongoing consultation with Uisce Éireann, Bord Gáis EirGrid, ESB Networks and other relevant service providers within the locality, and compliance with any requirements or guidelines they may have, will ensure a smooth construction schedule without disruption to the local residential and business community. The works contractor will be obliged to

put best practice mitigation measures in place to ensure there are no interruptions to these utilities, unless this has been agreed in advance. These include measures outlined in the following codes of practice.

- EirGrid, Document Reference: CDS-GFS-00-001-R0, 110 kV, 220 kV and 400 kV Underground Cable Functional Specification, General Requirements<sup>12</sup>
- Health and Safety Authority, Code of Practice for Avoiding Danger from Underground Services, May 2016<sup>13</sup>
- Code of Practice for Water Infrastructure Connections and Developer Services (Design and Construction Requirements for Self-Lay Developments July 2020 (Revision 2))<sup>14</sup>
- Gas Networks Ireland, Code of Practice for Working in the Vicinity of the Transmission Network, May 2021<sup>15</sup>
- Guide ESB Networks Code of Practice for Avoiding Danger from Overhead Electricity Lines, May 2019
- ESB Networks, Safe Construction with Electricity<sup>16</sup>
- ESB Networks, Safe Construction and the Electricity Network<sup>17</sup>
- ESB Networks, How You Can Avoid Hitting Electrical Cables When Digging and Drilling<sup>18</sup>
- NRA, Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes<sup>19</sup>

Coordination and consultation will be had between the project team and ESB and Uisce Éireann, and other relevant service providers within the locality, as the design of the proposed development progresses.

### 11.6.3 Telecommunications

Extensive field survey and software modelling analysis was carried out to determine viable mitigation measures to offset the impact of the proposed turbine layout on the Enet

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<sup>12</sup> <https://www.eirgridgroup.com/site-files/library/EirGrid/10-110-kV-Underground-Cable-Functional-Specifications.pdf>

<sup>13</sup>

[https://www.hsa.ie/eng/publications\\_and\\_forms/publications/construction/cop\\_avoiding\\_danger\\_from\\_underground\\_services\\_.pdf](https://www.hsa.ie/eng/publications_and_forms/publications/construction/cop_avoiding_danger_from_underground_services_.pdf)

<sup>14</sup> <https://www.water.ie/docs/connections/faqs/Water-Code-of-Practice.pdf>

<sup>15</sup> <https://www.gasnetworks.ie/docs/business/safety-in-the-business/GNI-Code-of-Practice-for-Working-in-Vicinity-of-Tx-Network-2021.pdf>

<sup>16</sup> <https://www.esbnetworks.ie/docs/default-source/publications-ga/safe-construction-with-electricity.pdf?sfvrsn=0>

<sup>17</sup> [https://www.esbnetworks.ie/docs/default-source/publications/safe-construction-with-electricity-new.pdf?sfvrsn=2541b6cd\\_19](https://www.esbnetworks.ie/docs/default-source/publications/safe-construction-with-electricity-new.pdf?sfvrsn=2541b6cd_19)

<sup>18</sup> <https://www.esbnetworks.ie/docs/default-source/publications/how-you-can-avoid-hitting-electrical-cables-when-digging-and-drilling-v2.0.pdf>

<sup>19</sup> <https://www.tii.ie/tii-library/environment/construction-guidelines/Guidelines-for-the-Crossing-of-Watercourses-during-the-Construction-of-National-Road-Schemes.pdf>



radio link between Kilseily and Kilonan. A mitigation measure of re-routing the service into ESB Killonan from an alternative Feeder Site has been identified as a feasible mitigation option. The mitigation proposed is as follows:

- The alternative radio link (currently existing) from Drumline POP Site to Kilseily (O'Callaghans Mills) Telecoms Mast will be upgraded to a protected\dual link for redundancy. The developer would agree to cover the costs of the radio link upgrade. Upon successful planning it will be agreed that the Developer will engage with Enet six months in advance of the construction of the impacting turbines and agree commencement \ plan of works of the upgrade.

Enet were consulted on the proposed mitigation and agreed in principle with the mitigation proposal.

Refer to **Appendix 11.1**: Telecommunications Impact Study.

#### 11.6.4 Aviation

Instrument Flight Procedures: In agreement with the IAA and Shannon Airport, confirmatory studies of the potential for impact of the proposed turbines on the IFPs and ATCSMAC will be carried out by an Aviation Design Specialist (approved by the IAA). The Design Specialist will undertake an IFP and ATC SMAC Safeguarding Assessment and specify the required changes to the IFP to be implemented by Shannon Airport if required. A number of design options to reduce the impact of the proposed development to allow Shannon Airport to continue with safe and efficient vectoring operations may include subject to discussion and review with the IAA:

- Raising the Minimum Vectoring Altitude
- Creating a new sector to address any issues attributable to the proposed wind turbines.

Once the required changes are agreed and implemented by Shannon Airport the potential for impact will be mitigated.

Radar Surveillance Sensor at Woodcock Hill:

There are a number of evidence-based precedents for mitigation measures that have been adopted in UK\Scotland and other EU states over the last decade most notably the case of Newcastle Airport in UK where the existing Thales STAR 200 Radar was upgraded and also the Marshall Project in the UK which involved upgrades and optimizations of over forty Ministry of Defence(MoD) Thales Radar Surveillance Sensors to mitigate for wind farm. There have been considerable advancements in Radar Surveillance Data Processing and Thales have been to the forefront in developing Windfarm Filter algorithms to minimize degradation and clutter impacts of wind farm.

It should be noted that the radar systems, Thales RSM970 (MSSR) and Thales STAR 2000 (PSR)), used by the IAA at Woodcock Hill and Shannon Airport have sophisticated capabilities to process and handle impacts due to ground obstacles, including wind turbines. It is likely that a conditions survey would be required by the manufacturer to assess what level of upgrades are required to the Radar data processing on both radars to mitigate the effects of wind farm impacts but such upgrades are possible.



In addition, the radar systems have been designed to work in areas with wind farms, and the manufacturer undertakes a continual development cycle to ensure the systems performance is not impacted by wind turbines. Thales have also developed a “Windfarm Filter” which can be integrated into existing ATC systems. The Thales wind farm filter is a dedicated algorithm designed to minimize track loss and reduce false alarms above and around wind farms. The radar systems can also be optimized to adjust the radar beams to an appropriate sensitivity to minimize degradation and clutter. Any shadowing from the proposed turbines is likely to be below the published ATC surveillance minimum altitudes and therefore should be operationally tolerable.

In agreement with the IAA and Shannon Airport a confirmatory study of the potential for impact of the proposed turbines on the Woodcock Hill Radar Surveillance Sensor will be carried out by an Aviation Design Specialist (approved by the IAA). Where upgrades are required, the Design Specialist will specify the required changes to the Woodcock Hill software and hardware to be implemented by Shannon Airport if required. A detailed conditions survey by the manufacturer will be undertaken to assist in assessing the requirements. Once the Radar upgrade has been implemented the risk will be fully mitigated. As noted in Section 11.4.3.4, should planning consent be granted for the Proposed Development, the Developer will liaise with the Irish Aviation Authority (as noted in the scoping response) to ensure all aviation requirements, such as a warning lighting scheme, are implemented.

## 11.7 Potential Cumulative Impacts

All known existing and proposed projects within the study area that could potentially generate a cumulative impact with the project during construction, operation and decommissioning were identified and examined as part of this assessment. The full list of projects is contained in **Chapter 2** of this EIAR. Potential cumulative impacts with these projects have been assessed.

In terms of telecommunications potential impacts with the other wind farm developments listed in Chapter 2 of this EIAR could potentially occur in the absence of mitigation implementation of the proposed mitigation measure for the Enet radio link from Kilseily to ESB Killona will ensure that no cumulative impacts will occur with these developments et potential does exist for cumulative impact with the proposed Knockshanvo,

Cumulative impacts on aviation from other wind farm developments listed in Chapter 2 could potentially occur in the absence of mitigation. However, with the implementation of the proposed mitigation measures no cumulative aviation impacts will likely arise.

With the implementation of proposed mitigation there will be no cumulative impacts on waste or utilities such as water mains, gas mains or electricity network.

It should be noted that potential cumulative impacts associated with transport and cultural heritage are addressed separately in the respective Chapters covering these topics (Chapter 15 Archaeology and Cultural heritage and Chapter 16 Traffic and Trasport)

there will be no cumulative impacts relating to the proposed project and surrounding projects in relation to material assets.

Each Developer is responsible for engaging with all relevant parties to ensure their proposals will not result in cumulative effects. In the event of any potential impact, the Developer for each individual project is responsible for ensuring that the necessary mitigation measures are in place. Therefore, as each project is designed and built to avoid impacts arising, a cumulative impact is unlikely to arise.

## 11.8 Residual Impacts

The implementation of the mitigation measures outlined in Section 11.5 will ensure that the residual effects on the material assets during the construction phase will be **neutral**, **imperceptible**, and **short-term**.

The implementation of the mitigation measures within each chapter, and detailed above, will ensure that the residual effects on material assets during the operational phase will be **neutral**, **imperceptible** and **long-term**.

## 11.9 References

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