Environmental Impact Assessment Report

Coolglass Wind Farm Vol 1 – Non-Technical Summary

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1.0 Introduction

1.1 Overview

SLR Environmental Consulting (Ireland) Ltd (SLR) has prepared this Environmental Impact Assessment Report (EIAR) on behalf of Coolglass Windfarm Ltd (the 'Applicant'). Coolglass Windfarm Ltd intends to apply to An Bord Pleanála for permission to construct the Proposed Development (See Sections 3.5 and 3.8.12 in this EIAR), located in County Laois.

The Proposed Development consists of the following which are assessed throughout this EIAR:

- A two-cluster wind farm comprised of 13 turbines in total;
- A Turbine Delivery Route (TDR) to deliver the wind turbine and substation components to the Site;
- Two potential Cable Routes; and
- A Recreational Amenity Trail.

Only two of these are the subject of this planning permission: the wind farm itself, and the TDR. The cable routes and trail will be subject to a separate planning permission.

The Proposed Development consists of 13 no. turbines, 1 no. substation, 1 no. borrow pit, 2 no. temporary construction compounds (TCC's) and the related civil and electrical infrastructure. **Figure 1-1** in Chapter 1 of the EIAR shows the site layout and location for reference.

The proposed wind turbines that have been assessed in this EIAR are the Siemens Gamesa 155 and the Vestas 162, however, to allow the Applicant some flexibility in procuring turbines for the site, these two turbines have been utilised as candidate turbines to set out the range of dimensions which define the flexibility required.

The range of dimensions that have been assessed in this EIAR comprise a 180m tip height (from ground level to top of blade), a rotor diameter in circumference from tip to tip of the blades between 155m and 163m, and hub height (where the turbine blades are mounted) of 99m to 102.5m from ground level.

The Proposed Development is located across two prominent hills- Fossy Mountain and Wolfhill in County Laois, which are referred to as the Northern and Southern clusters. The locations of these clusters and the proposed infrastructure to be located in each cluster are as follows:

- The northern cluster (Fossy Mountain) of the Proposed Development is comprised of a geographical area defined by Fossy Lower Road at the northernmost extent, the R426 at the westernmost extent, Luggacurren Road at its easternmost extend, and Knocklead Road to its southernmost extent. Elements of the Proposed Development which will be located in the northern cluster, if consented, comprise;
    - 7 no. turbines (turbine no's 1-7) and their associated access tracks, hardstandings, cables and foundations;
    - 1 no. 110 kV on-site substation;
    - 1 no. temporary construction compound (TCC1);

- 1 no permanent 102.5m meteorological mast;
- 1 no. site access point (AP1);
- A recreational amenity trail (part of a future separate planning application);
- The origin of 2 no. cable routes from the proposed on-site substation (part of a future separate planning application);
- A 33kV collector cable which connects both clusters to the proposed on-site substation.

- The southern cluster of the Proposed Development is comprised of a geographical area defined by Knocklead Road at its southernmost extent, Crissard Road at its easternmost extent, Knocklead/Moyadd Road at its westernmost extent and Slatt Lower Road at its southernmost extent. Elements of the Proposed Development which will be located in the southern cluster, if consented, comprise:
  - 6 no. turbines (turbine no's 8-13) and their associated access tracks, hardstandings and foundations;
  - 1 no. Borrow pit;
  - 1 no. temporary construction compound (TCC2);
  - 1 no. site access point (AP2).

1.2 Site Locations

The Site is elongated in shape (approximately 6km roughly north – south), encompassing both clusters. The site is located approximately 1km from the village of Luggacurren and 1km from the village of Swan and approximately 2.4km from Timahoe which are located in County Laois. Combined, this is considered to be "the Site".

The proposed turbines, substation, construction compound and other infrastructure are located within the following townlands: Fossy Upper, Aghoney, Gorreelagh, Fallowbeg Upper, Brennanshill, Scotland, Coolglass, Crissard, Kylenabehy, Co. Laois.

Temporary accommodation works to facilitate turbine deliveries along the public roads are proposed at lands contained with the following townlands: Monamanry, Brennanshill, Knocklead, Aghoney, Timahoe, Carrigeen, Ballygormill South, Money Upper, Hophall, Rathleague, Ballymooney, Rathbrennan, Co. Laois Figure 1 in the EIAR shows the areas where works are to be undertaken.

The Applicant has identified two options to construct the cable route connecting the Proposed Development to the national grid. The options traverse the following townlands:

- Option 1: Knocklead, Baunogemeely, Knockagrin, Cleanagh, Knockbaun, Garrintaggart, Gragiguehawn, Boleybeg, Knockardagur
- Option 2: Aghoney, Fossy Upper, Ballintlea Lower, Fossy Lower, Timahoe, Coolnabacky, Esker, Cremorgan, Carrigeen

Both of the proposed cable routes to the national grid have been assessed in this EIAR but do not form part of Proposed Development and are not part of this planning application.

A 33kV collector circuit cable will run between the Northern and Southern Clusters of the Proposed Development. The purpose of this cable is to connect the Southern Cluster to

the Northern Cluster at the on-site substation. This internal cable route has been assessed and forms part of the Proposed Development.

1.3 The Application and EIAR Requirement

Given the size of project being of large scale, the Proposed Development meets the mandatory requirements for EIA. Therefore, an EIAR has been prepared in accordance with the Planning and Development Regulations 2001 (as amended) and the European Union Directive 2011/92/EU (the EIA Directive) as amended by Directive 2014/52/EU.

The Planning and Development Act 2000 was amended in 2006 to require certain applications for permission for major infrastructure projects to be made directly to An Bord Pleanála, rather than to the local planning authority, as would have previously been the case.

This is known as Strategic Infrastructure Development (SID). As the Proposed Development will exceed 50 megawatts (MW) of power output, the project qualifies as SID. Pre-application consultation was completed with An Bord Pleanála under case reference No. ABP-313375-22. An Bord Pleanála issued a decision on 11th May 2023 indicating that the Proposed Development is considered SID.

As well as an EIAR, an Appropriate Assessment Screening and Natura Impact Statement has been prepared in compliance with Article 6 of the Habitats Directive. This report considers potential impacts on nearby nature conservation areas known as Special Protected Areas (SPAs) and Special Areas of Conservation (SACs).

1.4 EIAR Structure

The format of this EIAR is designed to ensure that standard methods are used to describe all sections of the EIAR. There is a separate chapter for each topic, e.g. biodiversity, water, etc. The description of the existing environment, the Proposed Development and the potential impacts, mitigation measures and residual impacts are grouped in each chapter. The grouped format makes it easy to investigate topics of interest and facilitates cross reference to specialist studies. Additionally, there is a need to ensure that the EIAR is readily accessible to the general public, as well as statutory authorities. The EIAR is structured as follows:

- Chapter 1 Introduction
- Chapter 2 Scoping, Consultation and Key Issues
- Chapter 3 Description of the Development
- Chapter 4 Planning Policy
- Chapter 5 Population and Human Health
- Chapter 6 Air and Climate
- Chapter 7 Landscape and Visual
- Chapter 8 Land, Soils and Geology
- Chapter 9 Water
- Chapter 10 Noise and Vibration
- Chapter 11 Cultural Heritage

- Chapter 12 Traffic and Transportation
- Chapter 13 Telecommunications and Aviation
- Chapter 14 Shadow Flicker
- Chapter 15 Biodiversity
- Chapter 16 Major Accidents and Disasters
- Chapter 17 Site Selection and Alternatives
- Chapter 18 Interactions

The structure of this EIAR is as follows:

- Volume 1 – Non-Technical Summary (NTS)
- Volume II – Main EIAR
- Volume III – Appendices to the Main EIAR
- Volume IV –Photomontages

A Natura Impact Statement (NIS) has also been submitted with the planning application. The planning application is also supported by a Planning Statement and planning drawings.

The Figures, Tables and Appendices that have been prepared within this EIAR are numbered with the chapter number first followed by the figure / table / appendix number for easy reference.

1.5 Permission Period

The applicant respectfully requests that its 10-year construction and 35-year operational period are granted planning permission.

1.6 Difficulties Encountered

There were no difficulties encountered during the preparation of the EIAR.

2.0 The Need for the Development and Alternatives

The Proposed Development is necessary to produce renewable energy for the Irish national grid in order to transition Ireland to a low carbon economy. If permitted and once constructed, the Proposed Development has an estimated minimum export capacity of approximately 85.8MW, therefore playing a critical role in providing renewable electricity in the Republic of Ireland.

At a strategic level, the need for the Proposed Development is supported by International, European, and National environmental and energy commitments and policies. In Chapter 4 of this EIAR and in the accompanying planning statement, a detailed analysis of these commitments and policies is outlined.

Additionally, recent geopolitical tensions in Ukraine in tandem with decarbonisation goals in recent months have brought into sharp focus the importance of the divestment of fossil fuels and the strengthening of national and European energy security and local supply.

Recent REPowerEU legislation from Europe notes that the rollout of renewable energy projects to be a matter of "*overriding public interest*"[1].

The EU is lagging on decarbonisation targets, with a requirement to scale up projects that can contribute to them. As the REPowerEU framework rolls out, the role of national policy will be to adapt the ambitious decarbonisation and security of supply requirements and roll them out through policy and legislation, while speeding up the permitting of renewable energy projects. Ireland has already anticipated this with the release of the Climate Action Plan of 2023 (CAP23):

> *"Since 2021, there have been significant increases in prices in the international oil and gas markets, due to increased demand as the post-COVID 19 recovery continues and the disruption to traditional energy supplies following the Russian invasion of Ukraine. The resultant sharp increase in energy prices underlines the importance for Ireland to eliminate our dependency on fossil fuels and that an increase in renewable energy generation, along with supporting flexibility and demand management measures, is necessary for our future energy security."*

CAP23 follows the Climate Act 2021, which commits Ireland to a legally binding target of net-zero greenhouse gas emissions no later than 2050, and a reduction of 51% by 2030. These targets are a key pillar of the Programme for Government. Among the most important measures in the plan is to increase the proportion of renewable electricity to up to 80% by 2030. Notably Section 11 Electricity of the Plan provides a Key Performance Indicator (KPI) of providing 9 GW Onshore wind by 2030.

2.1 Alternatives

There are a number of renewable energy technologies available for use in Ireland, most notably bio energy, wind, solar PV, hydrogen, offshore wind, tidal and wave energies. Ultimately, onshore wind was chosen as the most viable technology option for the Irish energy market due to the high power output.

At the macro level, a number of considerations were factored in the identification of a broad area for wind energy development, such as:

- Environmental designations which have been identified across the country;
- The location of existing built wind farms in Ireland;
- Areas where grid capacity and electricity infrastructure to ascertain if there are any areas where sufficient capacity to accept new renewable energy sources; and
- Areas where national and regional policies are supportive of renewable developments.

Once a study area has been identified, a micro level search is undertaken.

At a micro level, search criteria focuses on a number of key issues arising from wind development, allowing for a comparison across identified study areas to identify suitable wind energy development sites. The micro level search process takes into consideration the following criteria:

[1] https://ec.europa.eu/commission/presscorner/detail/en/IP_22_3131 (date accessed 29/6/2023)

- County development plan policies and designations;
- Natura 2000 sites;
- Access to major transportation routes and networks;
- Population density;
- Proximity to the National grid;
- Wind speeds in the study area
- Land that is available for the development of renewable technology; and
- A desktop assessment of environmental sensitivities across the study area.

This Site was selected for a number of key factors:

1) It has a strong wind resource;
2) The population density is lower than in other areas within Ireland; and
3) It is located in close proximity to two new substations which are currently post planning and under construction, thereby providing some capacity for electricity generation. This is a key consideration in any renewable energy project as capacity on the grid is constrained across Ireland.

Alternative project layouts were developed in order to avoid environmental sensitivities, minimise potential environmental impacts both on and off site and to maximise the wind potential on site. The design has been carried out in accordance with industry guidelines and best practice, namely the Department of Environment, Heritage and Local Government's (DoEHLG) Wind Energy Development Guidelines (2006), The Department of Housing, Planning and Local Government's (DoHPLG) Draft Revised Wind Energy Development Guidelines (2019), and the Irish Wind Energy Association Best Practice Guidelines (2012). The layout and design was an iterative process which took account of such criteria as:

- Set back from houses;
- Set back from designated sites;
- Set back from other constraints such as watercourses and power lines;
- Suitable wind speeds;
- Landscape and visual sensitivity;
- Ecology;
- Ornithology;
- Soils and Geology;
- Hydrology;
- Noise; and
- Cultural Heritage.

Constraints and environmental sensitivities were first identified, and buffers applied in order to determine appropriate areas within the Site to accommodate development. Initially, as part of the design process several different turbine heights were considered.

The relationship between the turbine height and density required to achieve a particular output was a key design consideration.

It was considered that the slightly increased sense of visual dominance imparted is preferable to the reduced level of permeability and increased visual clutter associated with a greater number of shorter turbines required to achieve the same output. Moreover, the perceived visual dominance of taller turbines is further offset by increased setback distances from residential receptors. In this regard, alternative turbine outputs were considered correlating to alternative turbine heights.

Seven alternative design options were considered during the project design stage. These were developed into 3 design iterations. The design iterations were influenced by potential environmental effects identified throughout the assessment, leading to the evolution of the project and the establishment of alternative design iterations

Initially, a layout of the maximum number of turbines was considered based on wind speed and wind wake analysis. This consisted of up to 23 turbines across three clusters at the Site. A preliminary feasibility assessment was then conducted to identify potential constraints. This included identification of ecological sensitivities, identification of residential properties, noise assessment and landscape visual impact assessment.

The layout was eventually reduced down to a 13-turbine layout after the constraints were considered. Turbines were removed due to setback distances from dwellings, setback distance from watercourses and to protect the amenity of the surrounding area.

The third design iteration has been assessed in this EIAR, along with two potential cable routes from the Site to two under construction substations within the study area. A final cable route will be assessed, and planning permission will be sought once technical and environmental considerations are evaluated and once discussions with Eirgrid are undertaken at a future date.

2.2 Do Nothing Scenario

Under the "Do-Nothing" scenario, the Proposed Development would not go ahead, the development of wind turbines would not be pursued, and the Site would remain in use as commercial forestry. In the "Do-Nothing" scenario, the prospect of creating sustainable energy through County Laois's wind energy resource would be lost at this Site. The nation's ability to produce sustainable energy and add to the decarbonisation requirements under EU targets and National targets, as set out above, would be limited This may result in the nation incurring significant financial penalties from the EU if targets are not achieved. Foreign fossil fuels would continue to be sourced, imported and burned during a period of time where security of supply is a top concern for countries across Europe.

If permitted and once constructed, the Proposed Development will save between 1,678,740 to 1,831,375 tonnes of CO_2 within its 35-year lifetime which would otherwise be released to the atmosphere through the burning of fossil fuels in the "Do Nothing" scenario. Import of fossil fuels would continue and Ireland's energy security would remain vulnerable.

According to the EirGrid Group's All-island Generation Capacity Statement 2022 – 2031[2] (Eirgrid, 2022), the growth of energy demand is forecasted to increase 37% by 2031, from

[2] https://www.soni.ltd.uk/media/documents/EirGrid_SONI_2022_Generation_Capacity_Statement_2022-2031.pdf p. 21. Date Accessed 25.6.2023

2021 levels. A "Do-nothing" scenario would contribute to strain on existing energy infrastructure and may impact on economic growth if energy demand cannot be met.

3.0 Description of Proposed Development

3.1 Site Context

As stated in the introduction, the proposed wind farm is located approximately 11km southeast of Portlaoise, 14km northwest of Carlow and 11km east of Abbeyleix. The Proposed Development ncludes lands contained within the following townlands: Fossy Upper, Aghoney, Gorreelagh, Knocklead, Scotland, Brennanshill, Monamantry, Coolglass, Crissard, Kylenabehy, County Laois.

The Site spans Fossy Mountain and Wolfhill, north of Swan and south of Timahoe. These hills are the most prominent landscape features within the central study area and its wider surrounds with Fossy Hill reaching a height of approximately 325m AOD.

The Site is located in a predominantly agricultural area, with elevations within the site ranging from 210m to 325m OD. The land cover is classified in Corine Landcover 2018 as predominately Coniferous and Mixed Forest and Transitional Areas interspersed with Agricultural Areas. This is illustrated in Figure 1-1 in Volume 2, Chapter 1 of this EIAR.

The Proposed Development is located within two hydrometric areas (river catchment areas): the northern cluster is located in the Barrow catchment, while the southern cluster is located in the Nore catchment. The Site is situated in the South Eastern River Basin District. The main hydrology features are the Stradbally River and Crooked River in the northern cluster, and tributaries of the River Clough and Owveg River in the southern cluster.

The geology present within the development site and wider study area comprise of carboniferous shales, siltstones and thin coals, with clay beds. The majority of the proposed cable routes are underlain by carboniferous shales, siltstones and thin coals, with clay beds along each of the proposed routes.

There are 56 residential properties located within 1km of the Proposed Development site. There are 105 residences within 500m of the cable routes. The nearest residential property is located 722m from a wind turbine.

3.2 Proposed Development

The Proposed Development, (the subject of this planning permission) comprises the following elements:

- Construction of 13 No. wind turbines within two clusters with an overall ground to blade tip height of 180m. The wind turbines will have a rotor diameter ranging from 155m to 162m inclusive and a hub height ranging from 99m to 102.5m inclusive.
- Construction of permanent turbine hardstands and turbine foundations.
- Construction of 1 no. permanent 110kV electrical substation including 2 no. control buildings with welfare facilities, all associated electrical plant and equipment, security fencing and gates, all associated underground cabling, wastewater holding tank, and all ancillary structures and works.

- Construction of a 33kV collector cable circuit connecting the wind farm two clusters along the L3851/Knocklead Road.
- Construction of two temporary construction compounds with associated temporary site offices, parking areas and security fencing.
- Development of one on-Site borrow pit.
- Construction of new permanent internal site access roads, upgrade of existing internal site access roads, including passing bays and all associated drainage infrastructure.
- Development of an internal Site drainage network and sediment control systems.
- All associated underground electrical and communications cabling connecting the wind turbines to the wind farm substation.
- Ancillary forestry felling to facilitate construction of the development.
- All associated Site development works including berms, landscaping, and soil excavation.
- Improvement of a Site entrance to an existing access off the L3851/Knocklead local road to include localised widening of the road and creation of a splayed entrance to facilitate the delivery of abnormal loads and turbine component deliveries. Improvements include removal of existing vegetation for visibility splays to facilitate the use of the access for the delivery of construction materials to the site.
- A new Site entrance slip road from the L3851 / Knocklead local road to facilitate the delivery of abnormal loads and turbine component deliveries. Works at this location require the removal of existing forestry to facilitate the use of the access for the delivery of construction materials to the site and for use during the operational phase.
- Construction related temporary upgrade works on the turbine delivery route to facilitate the delivery of turbine components to include the use of temporary road surfaces at a roundabout at the southern exit of Junction 16 of the M7, the R425/N80 roundabout and the R426 – L3851 junction.

A Natura Impact Statement (NIS) will also be submitted to the planning authority with the planning application.

A cable route will be sought as part of a separate planning process and does not form part of this planning application.

3.3 Cable Routes

Two cable routes are to be assessed as part of this EIAR. The preferred underground cable route connecting the proposed wind farm to the national grid will be part of a separate planning application. The two cable routes to be assessed in this EIAR traverse the following townlands:

- Option 1 comprises a cable route between the proposed onsite substation and the Pinewoods substation. This route is 9.9km in length.
- Option 2 comprises a cable route between the proposed onsite substation and Coolnabacky substation. This route is 10.1km in length.

After consultation with Eirgrid takes place in the future, the preferred option from a technical and environmental level will be the subject of a separate pkanning permission. Once permitted, the works to facilitate its construction are expected to be conducted over a 12-month period of time.

The proposed cable route to be assessed is shown in **Figure 3-2** of Chapter 3 of this EIAR.

3.4 Wind Turbines

The proposed wind turbines will have two candidate turbines each with a tip height of up to 180m from the top of the foundation (at ground level) to blade tip height.

Detailed drawings, which accompany the planning application, show the turbines that may be used for the Proposed Development. The exact make and model of the turbine will be dictated by competitive tender process but will remain within the envelope size set out below. The candidate turbines assessed for the purposes of this EIAR are set out in **Table 1**.

Table 1 Candidate Turbines to be Assessed

Turbine Type	Tip Height (m)	Hub Height (m)	Rotor Diameter (m)
Siemens Gamesa V155	180	102.5	155
Vestas 162	180	99	162

3.5 Turbine Transport

The proposed turbine delivery route is presented in Figure 1 of Chapter 3 of this EIAR. A turbine delivery route selection and assessment was carried out to identify the optimum delivery route to the Site, based upon the specific requirements to facilitate delivery of large components such as the proposed wind turbines themselves and elements of the proposed substation.

Turbine delivery will be from Dublin port and delivered along one distinctive route. The turbine delivery route will leave Dublin port and join with the M50 motorway via the Dublin Port Tunnel. The roots will continue along the M50, exiting the N7 National Road / M7 Motorway heading west before exiting at Junction 16. The route then exits the motorway and travel south on the R445 Regional Road before descending further south towards Rathleague. Once the turbine delivery route crosses the M7 motorway, the route will continue in a southern and easterly direction on Portlaoise Road/R426 Regional Road, through the town of Timahoe. The group will continue along the R426 Regional Road before heading east on Knocklead Road before accessing either the southern or northern clusters via existing forestry tracks.

Further discussion on this route selection assessment is found in Chapter 12 and Technical Appendix 12.1 found in Volume III of this EIAR.

3.6 Drainage

The proposed drainage system will be based on two key methods. The first method will involve keeping clean water clean by avoiding disturbance to natural drainage features, minimising any works in or around drainage features, and diverting clean surface runoff around excavations and construction areas. The second method will involve collecting any drainage water from works area that might carry silts or sediments, and to route them

towards settlement ponds prior to controlled diffuse release over vegetated natural surfaces.

Further details on the hydrology and drainage are contained in Chapter 09 Water and in the accompanying planning drawings.

3.7 Construction Phase

3.7.1 Wind Farm

For the wind farm element of the Proposed Development, the construction sequence will be as follows:

- tree felling;
- upgrading of existing site tracks and the provision of new site tracks;
- construction of drainage infrastructure in parallel with access track construction;
- construction of the turbine foundations; and
- the provision of the hardstanding areas.

3.7.2 Electrical Works and Cable Route

Construction of the substation and internal cable network in conjunction with off-site connection works to the national grid will be carried out at the same time as the wind farm element of the Proposed Development in sequenced activities. A description of construction techniques is contained within the CEMP in Technical Appendix 3.2 found in Volume III of this EIAR.

3.7.3 Site Access Tracks and Drainage

In order to provide access to each of the turbines within the Proposed Development, access tracks are required. Drainage infrastructure therefore will be constructed in parallel with access track construction.

The Proposed Development will incorporate the upgrading of 5km of existing forest tracks. In addition, the Proposed Development will also require the construction of 10.55km of new Site access tracks and associated drainage infrastructure. Existing drainage infrastructure will be retained where possible and improved as necessary While new drainage infrastructure will be required on all new access tracks. Further detail is shown in the planning drawings which accompany this planning application.

3.7.4 Cable Trenches

Cable ducts running alongside the Site access tracks will be laid when the track is being constructed and will follow the edge of the site access tracks. Cable ducts within the public roadway will be laid within the verge of the roadway where possible. A separation distance of at least 600mm from existing services will be preserved. The contractor will excavate cable trenches and then lay high density polyethylene (HDPE) ducting in the trench in a surround of cement bound material (CBM). A rope will be inserted into the ducts to facilitate cable-pulling later. The trenches within these locations will be backfilled using the excavated material.

The as-constructed detail of the cable duct locations will be carefully recorded. Cable marker strips will be placed above the ducts and the two communication ducts will also be laid. An additional layer of cable marker strips will be laid above the communication ducts and the trench backfilled. Back-filling and reinstatement in public roads will be to a specification to be agreed with the road authority and at least as good as the existing.

During the construction stage of the Proposed Development, records of services such as water mains, sewers, gas mains and other power cables will be obtained from the relevant service providers ahead of construction works to ensure that all new developments between the period of assessment and pre–construction are captured.

Where required, cable detection tools, ground penetrating radar, and slit trenches will be used as appropriate to find the exact locations of existing services. The final locations of the cable routes within the public roads and on the verge along the public road will be selected following these investigatory works to minimise conflicts with other services. A minimum separation distance of 600mm will be maintained with existing services.

3.7.5 Turbine Foundations and Erection

The bases of the foundations will be excavated to a competent bearing strata. The proposed foundations will consist of a reinforced concrete base 25m in diameter. Based on site investigations carried out to date, it is proposed that all turbine foundations will be shallow gravity base types and founded on either rock or glacial till. This will be confirmed with confirmatory site investigations prior to construction.

Excavated soil will be placed in the temporary storage areas adjacent to the turbines. Formwork and reinforcement are placed, and the concrete poured. Once the concrete is set the earthing system is put in place and the foundation is backfilled with suitable material. There is no peat on the site.

Each turbine will take approximately 3-4 days to erect, weather dependent and will require two cranes in the assembly process. The turbines will then be commissioned and tested.

3.7.6 Construction Waste

Any waste that is generated during the development's construction phase will be collected, separated and stored in dedicated receptacles at the temporary construction compounds during construction works.

The contractor for the main construction works will nominate a suitable site representative such as a Project Manager, Site Manager or Site Engineer as the Waste Manager who will have overall responsibility for the management of waste. The Waste Manager will have overall responsibility to instruct all site personnel including subcontractors to comply with on-site requirements. This will ensure that at an operational level, each crew foreman is assigned direct responsibility.

3.8 Operation, Maintenance and Decommissioning / Reinstatement

3.8.1 Project Operation and Lifespan

During the construction phase of the Proposed Development, turbines will operate automatically on a day-to-day basis. The turbines will respond to changes in wind speed and direction by means of anemometry equipment and control systems.

Twice a year each turbine will undergo a scheduled service. The operation of the wind turbines will be monitored remotely, and a caretaker will oversee the day-to-day running of the Proposed Development.

The expected physical lifetime of the turbine is 35 years, and permission is sought for a 35-year operation period commencing from full operational commissioning of the wind farm.

However, it should be noted that following the end of their useful life, wind turbines may, subject to planning permission, be replaced with a new set of wind turbines or the Site may be decommissioned.

3.8.2 Project Decommissioning

During the decommissioning phase of the Proposed Development, cranes will disassemble the above ground turbine components which will be removed off-Site for recycling.

The foundations will be covered over and allowed to re-vegetate naturally. Leaving turbine foundations in situ is considered a more environmentally sensible option, as to remove the reinforced concrete associated with each turbine would result in environmental nuisances such as noise and vibration and dust. It is proposed that the internal Site access tracks will be left in situ, subject to agreement with Laois County Council and the relevant landowners.

The proposed on-Site substation will be taken in charge by ESBN /EirGrid upon completion and should be left in place forming part of the national electricity network. Underground cabling will be cut back and left in situ.

A detailed decommissioning plan will be agreed in advance of construction with Laois County Council if required. A decommissioning plan is contained within the CEMP in Technical Appendix 3.2 found in Volume III of this EIAR and will contain the same mitigation measures as the CEMP unless otherwise agreed with the Laois County Council.

4.0 Review of Policy and Legislation

This section of the NTS sets out the relevant European, national, regional, and local policy, with respect to the Proposed Development.

Relevant international policies in relation to renewable energy and the need to prevent climate change include:

- UN Framework Convention on Climate Change;
- Kyoto Protocol;
- COP 21 Paris Agreement;
- COP25 Madrid; and
- COP26 Glasgow.

With respect to EU Directives and Policies include:

- RECAST Renewable Energy Directive (RED II);
- European Green Deal (2019);
- RePowerEU;
- European Commission Recommendation on Speeding Up Permitting Renewables;

- Council Regulation (EU) 2022/2577 of 22 December 2022 Laying Down A Framework To Accelerate The Deployment Of Renewable Energy;
- European Climate Law Regulation (EU) 2021/1119 (European Climate Law); and
- Fit for 55.

Relevant National Policies considered include:

- Section 28 Guidelines;
- Project Ireland 2040: National Planning Framework;
- Project Ireland 2040: National Development Plan;
- Planning and Development Bill 2023;
- Climate Action and Low Carbon Development (Amendment) Act 2021;
- Climate Action Plan 2023;
- Ireland's Greenhouse Gas Emissions Projections (2021-2040); and
- Regional Spatial & Economic Strategy for the Eastern and Midlands Region.

Relevant Local Policies include:

- Laois County Development Plan 2021-2027;
- Ministerial Direction on the Laois County Development Plan 2021 – 2027; and
- Kilkenny County Development Plan 2021-2027.

Other relevant Policies and guidelines include:

- The Planning and Development, Maritime, and Valuation (Amendment) Act 2022;
- DoEHLG – Wind Energy Development Planning Guidelines 2006;
- Draft Revised Wind Energy Development Guidelines (December 2019);
- Irish Wind Energy Association – Best Practice Guidelines for the Irish Wind Energy Industry;
- IWEA Best Practice Principles in Community Engagement and Community Commitment 2013;
- Code of Practice for Wind Energy Development in Ireland - Guidelines for Community Engagement;
- Commission for Regulation of Utilities: Enduring Connection Policy; and
- Renewable Electricity Support Scheme (RESS)

Regional and Local plans have been considered including the Laois County Development Plan 2021 to 2027 which sets out the wind energy strategy for the county. Portions of the Proposed Development are located within areas 'Open to consideration' and 'Not open to consideration' for wind energy development.

From a review of relevant policies, there is significant international, European, national and local policy support for a move to renewable energy technologies. 2020 and 2030 EU renewable energy targets have been supported by the national Climate Action Plan (CAP) (2023) which aims to steer the country towards clean energy and reduce emissions with a target of 80% renewable electricity by 2030. The CAP sets out an objective to more than

double Ireland's onshore wind energy capacity to 9GW by 2030, greatly reducing the nation's dependency on fossil fuels.

Therefore, the policy context for the Proposed Development and surrounding area is considered favourable for the Proposed Development, both from a national policy perspective with regard to renewable energy provision, and at a local level with respect to designations and the ability for the Site to accommodate the Proposed Development.

5.0 Scoping and Key Issues

This section of the EIAR describes the EIA scoping process and the stakeholder consultation that was conducted throughout the Proposed Development. The purpose of the EIA scoping process is to identify the key points and issues which are likely to be important during the environmental impact assessment (EIA) and to eliminate those that are not. This is conducted by preparing a report detailing the Proposed Development and sending it to a list of consultees such as various governmental departments, non-governmental organisations, environmental bodies, interested parties and key stakeholders, including telecommunication companies and aviation authorities which operate in the proposed site area of the Proposed Development.

A scoping request letter which included a description of the Proposed Development, a draft of the preliminary site boundary and preliminary table of contents was forwarded to consultees on the 17th of June 2022. The recipients included the Local Authority, Government Departments, non-governmental organisations (NGOs), interested parties and key stakeholders. Responses from the consultees identified a range of observations which have been taken into consideration in the preparation of the respective chapters of the EIAR.

Stakeholder consultation took place with a range of groups and individuals. 2 no. meetings were held with Laois County Council (LCC). A pre planning style meeting was held on 26th May 2022 to inform the authority of the project and to receive observations regarding the existing road network, ecology, environment and planning issues. The meeting was held between local councillors within the planning department in county Laois. A second meeting was held with LCC roads department on 18th January 2023 and a follow up site visit on 17th February 2023 to examine the turbine delivery route proposed for the Proposed Development.

Two pre-application meetings were also held with An Bord Pleanála (ABP). In the first meeting on 16th June 2022, the applicants presented the development of the project to ABP. This included the processes of preliminary design work; the ongoing environmental impact assessment and the cable route options. Along with this, the benefits arising from the Proposed Development regarding sustainable energy targets and local employment opportunities were also provided. In the second meeting which was held on 16th November 2022, the applicants presented progress made on the proposal since the initial meeting. This was focused on scoping responses, evolution of the Proposed Development, and further recent and significant legislative updates including the project's design envelope.

Community consultation was conducted in line with the Code of Practice for Wind Energy Development in Ireland. The first round of consultation occurred from the 10th of January to the 7th of February, while the second round of consultation began in May of 2023 and concluded on 30th June 2023. A Community Liaison Officer (CLO) was appointed to be the main point of contact for the local community. The CLO's role included door to door consultation with community members within 2km of the Proposed Development,

distribution of project materials to community members, follow up meetings with community members where requested, liaison between local residents and the project team, communication of any project updates and circulation of information regarding upcoming public events.

Project information was distributed by leaflet drop to houses within a 1.6km radius of the Proposed Development. A dedicated project website was set up which presented updates on the project and hosted a platform for the downloading of project information. The project website also included an email address to relay any queries and the phone number of the CLO.

Observations and issues that arose during the scoping and consultation process have informed the design, assessment and mitigation measures proposed as part of this project.

6.0 Population and Human Health

6.1 Population

The study area considered for this assessment includes the Electoral Divisions which the Proposed Development is located in including the cable route works. The population statistics of the study area are compared to the statistics of County Laois and the State in order to determine population trends.

The population of the study area is 2,678 and the population of the population of the Cable Route Area is 105 (2016 Census). The population density of the study area is far less than the state or county-wide average indicating a low population in the immediate area of the Proposed Development.

The construction stage will bring short-term/temporary population growth in the study area during working hours where a potential increase of between 104-274 workers will attend the site. This growth is associated with daily construction work and therefore the population of the study area will increase daily during construction hours and return back to normal outside of working hours. It is unlikely that the construction stage will permanently impact population trends of the study area or cable route area.

The operational phase of the Proposed Development will potentially provide between 8 and 10 long term jobs. Although only a small proportion of these jobs are likely to be based in the study area, the operational phase will give rise to temporary, slight population increase in the study area during working hours as a result of operations and maintenance. This impact is expected to be imperceptible.

The potential impacts associated with the decommissioning phase in relation to population and demographics will be similar to those associated with construction phase but of a reduced magnitude. It is not likely that the decommissioning phase will result in any permanent impact to population in terms of changes to population trends, density, household size, or age structure.

As there will be no significant impact on population trends, density, household size or age structure, no mitigation measures are required.

The residual effects of the Proposed Development with respect to population are associated with operation and maintenance jobs during the operational phase of the Proposed Development. This is likely to result in a temporary slight population increase in the study area during working hours. As per the assessment of operational impacts, any

impact to the population of the study area in terms of changes to population trends, density, household size, or age structure will be imperceptible. It is therefore unlikely that long term residual impacts will occur to population and demographic trends as a result of the Proposed Development.

6.2 Socio-Economics

It is estimated that between approximately 104-274 jobs will be created during the construction stage of the project which is expected to last for 12 months. This will cause a direct short-term, positive impact on the local economy, bringing significant benefits to local service providers and businesses with a direct and indirect financial benefit to the local community. It is likely that there will be direct employment for people living in the area who may be qualified for construction related roles. Materials will also be sourced in the locality where possible. This is likely to cause a short-term, positive impact on the employment profile of the area.

The operation phase of the Proposed Development has potential to provide between 8-10 long term direct and indirect jobs. Only a small proportion of these jobs are likely to be directly based in the local area. It is therefore considered that the operational phase of the Proposed Development has potential for a slight positive indirect impact on employment in the study area. Rates and development contributions paid by the developer will contribute significant funds to Laois County Council which will be used to improve the services available to the people of the County. Business rates will also contribute significantly.

A Community Benefit Scheme will also be put in place to provide funding for community-led and community owned projects. Assuming that the Proposed Development will produce at a minimum approximately 85.8 MW to 93.6MW and is contracted under the forthcoming Renewable Energy Support Scheme, it is anticipated that the community benefit fund could deliver over € 470,000 per year for the first 15 years following the commissioning of the Proposed Development. This will provide a significant long-term economic benefit to the community in the area.

The potential impacts associated with the decommissioning phase in relation to socio-economics, employment and economic activity will be similar to those associated with the construction phase but of a reduced magnitude. There will be a slight, positive temporary impact to socio-economics, employment and economic activity in the study area associated with the employment of construction workers within the vicinity of the development during the decommissioning phase.

Given that the potential impacts of the Proposed Development at construction, operation and decommissioning phases are predominantly positive in respect of socio-economics, employment and economic activity, no other mitigation measures are considered necessary.

The residual impact of the Proposed Development with respect to socio-economics is considered to be slight positive impact with respect to employment. This is as a result of the employment opportunities associated with the operation of the development.

The community benefit fund will provide a long-term significant positive impact to the study area and greater community, providing for social infrastructure, amenities and services, benefiting the community long after the decommissioning of the project. Long-term positive impact is also envisaged in that wind energy decreases the cost of electricity to the consumer.

6.3 Land Use

The Site comprises predominantly agricultural lands and forestry. The Proposed Development covers an area of approximately 731ha. Temporary disruption to agricultural and forestry lands is likely to occur during the construction phase. Slight, temporary impact to agricultural lands will occur during construction due to the small extent of infrastructure located on these lands. 54.36 hectares of coniferous forest is required to be felled to provide for the infrastructure of the Proposed Development. This will result in a moderate, permanent impact to forestry in the area, if unmitigated.

Temporary effects on land use will arise as a result of the installation of either of the 110kV underground cable route which will be constructed partially on forestry lands, with the majority to be installed within the public road corridor. This may temporarily affect access to forestry and agricultural lands. This impact is likely to be slight, temporary.

The operational phase will result in the change of land use in areas where access tracks, wind turbine bases, hardstanding areas, substations, and associated drainage works are required. The areas of the Proposed Development occupying agricultural land will have an insignificant impact on land use due to the small extent of development located on these lands. Farming practices can continue as usual during the operational phase. The 54.36 hectares of forestry that will be removed will be replanted at alternative sites. This will result in an imperceptible impact on forestry land use overall.

The potential impacts associated with the decommissioning phase in relation to land use will be similar to those associated with construction phase but of a reduced magnitude. Temporary disruption to surrounding land uses are likely during decommissioning due to the presence of a construction crew. Removal of infrastructure from the site may temporarily impact on forestry practices during the decommissioning works, however the impact is considered less than the construction element of the Proposed Development as only the wind turbines will be removed from the Site.

The design of the project has provided for mitigation to avoid impact on land uses in the area. Construction and decommissioning works will be controlled by a detailed construction and environmental management plan. This will set out best practice methods to avoid impact on land uses in the area during these works. Replant lands are proposed to mitigate against the loss of forestry associated with the project but are subject to a separate consenting process.

6.4 Recreation, Amenity and Tourism

Only one of the listed 'top attractions' in County Laois can be considered somewhat proximate to the Site. The Round Tower of Timahoe is approximately 2.4km away at its closest point.

There are no significant tourist attractions in the immediate area of the Site. It is considered that the main tourism and recreation potential for the area is trail walking and hiking. Proximate to the Proposed Development include the Swan Loop, Fossy Mountain, The Esker Walk and Timahoe to Clopoock public right of way.

During the construction phase of the Proposed Development, construction works have potential to cause impacts on recreation, amenity and tourism activities within the vicinity of the Site. This is likely to occur within 500m of the construction site and has potential to impact on:

- The Swan Loop – passes directly through the Site; and
- Fossy Mountain – passes directly through the Site.

It is therefore likely that the construction phase of the Proposed Development will directly impact on the above recreation trails.

The construction works associated with the cable route will be undertaken on a rolling basis with short sections of road closed for short periods before moving onto the next section. It is expected that these works will be conducted over a 12-month period. This is expected to have an insignificant and temporary effect on Recreation, Amenity and Tourism, by way of traffic disruption.

The effects to population in the Study Area will be beneficial in terms of the provision of the recreational amenity trail, but slight and long term, in terms of changes to Recreation, Amenity and Tourism as a result of the construction phase.

During the early design stages of the Proposed Development, key landscape and visual constraints were identified including tourist attractions as detailed in Section 5.6.1 of Chapter 5 of Volume 2 in this EIAR. The most sensitive of these were deemed to be the Timahoe Round Tower, for reasons of both landscape character and its tourism, heritage and amenity value to Timahoe Town. Following an initial high level visual impact assessment, the design of the Proposed Development was altered to minimise the number of turbines from view and limit the visual exposure of those remaining turbines so as to minimise landscape and visual impacts on the tower.

As the cable route is located underground, there are no potential impacts envisaged during the operational period.

The potential effects associated with the decommissioning phase in relation to recreation, amenity and tourism will be similar to those associated with construction phase but of a reduced magnitude. The residual impacts are likely to be associated with the increased level of construction traffic. As with the overall decommissioning it is expected to have a moderate temporary impact on recreational trail walking and hiking at the Proposed Development.

The design of the Proposed Development has provided for mitigation to avoid impact on land uses in the area. Construction and decommissioning works will be controlled by a detailed Construction and Environmental Management Plan. This will set out best practice methods to avoid impact on land uses in the area during these works. Replant lands are proposed to mitigate against the loss of forestry associated with the Proposed Development.

6.5 Human Health

2016 Census Data indicates that the population of the Study Area is generally in good health with 90% of respondents stating they have good or very good health.

The construction works associated with the Proposed Development have potential to create health and safety hazards for both construction workers and the general public. Hazards may occur on Site due to a range of construction activities. Potential health and safety hazards may occur on public roads and adjacent land uses including agricultural lands and forestry lands and associated recreation uses (forestry racks) due to construction activities. If unmitigated, hazards may be caused by the presence of a construction crew,

increased traffic, presence of heavy goods vehicles and machinery, potential obstructions on the public road and potential obstruction to recreation and amenity trails.

No significant impacts on air quality have been identified with regard to the emissions of construction related traffic. The impact on air quality due to emissions from construction works (construction machinery) has been identified as negligible.

The potential impacts from noise during the construction phase are expected to have a slight and temporary impact on nearby residential receptors.

A flood risk assessment has been carried out and a drainage design has been incorporated into the Proposed Development. As a result, the Proposed Development is expected to have a minimal impact on flood risk in the surrounding area.

Potential effects on human health associated with land, soils and geology during the construction phase relate to potential contamination of ground water which can be caused by hydrocarbon spills, siltation and landslide/slope failure.

Considering the mitigation measures proposed, the impact on human health during construction works is expected to be negligible.

The construction phase for either of the cable routes has potential to create health and safety hazards for both construction workers and the general public. This is as a result of construction activities and the associated impacts including increased traffic, transport of heavy or bulky materials, noise emissions, dust emissions, construction on public roads, excavation and general site-safety.

Overall, if unmitigated, the construction phase of the Proposed Development has potential for significant impact to human health and safety for construction workers and members of the public in proximity to the Site, if proper construction safety protocols and traffic management are not applied. This applies to all permutations with the range considered within the EIAR.

A Safety and Health Management Plan covering all aspects of the construction and decommissioning process will control site safety and other related issues. This plan will be prepared prior to construction and decommissioning and will include a traffic management plan. Best practice construction methods will be followed at all times. Public safety will be addressed by restricting access to the public in the vicinity of the site works during the construction and decommissioning stage. Appropriate signage will be utilised to raise awareness.

The Proposed Development is designed to last a minimum of 35 years. During the operational period, there is potential impacts to human health and safety if appropriate mitigation measures are not put in place.

Appropriate site safety measures will be utilised during the operational phase by all permitted employees. High visibility clothing, hard hats and safety boots will be always worn to avoid potential injury. Access to the turbines inner structure will be always locked and only accessed by licenced employees for maintenance. Rigorous statutory and engineering safety checks imposed on the turbines during design, construction, commissioning and operation will ensure the risks posed to humans are negligible.

Access to electrical infrastructure will be prohibited during the operational phase. All personnel working on the site will be appropriately trained and will be equipped with the necessary protective equipment. Lightning conductors will be installed on each turbine and lights will be installed on each turbine as an aircraft safety precaution. Ice detection

systems will be installed in each turbine to prevent turbines from rotating while ice is forming on a blade. A shadow flicker detection system will be installed on all turbines which will prevent shadow flicker from occurring at nearby homes. Noise control measures will be used in times of high winds to prevent excessive noise at nearby homes. Fire safety measures and equipment throughout the site will be kept in effective working order. Routine maintenance will take place.

Following a review of literature regarding the potential impact of operational wind farms on human health, it is concluded that there is no scientific consensus to support an association between negative health impacts and responsible wind turbine development. Therefore, if mitigation measures are implemented, the operation of the wind farm is expected to have a negligible impact on human health and safety.

Once the recreational amenity trail is completed, the local population and modest visitors will utilise the trail, resulting in a positive slight, and permanent impact on health.

The potential impacts associated with decommissioning phase in relation to human health will be similar to those associated with construction phase. Potential impacts to human health and safety on-site will be prevented through best practice methods. If unmitigated, hazards to the public may be caused by the presence of a construction crew, increased traffic, presence of heavy goods vehicles and machinery, potential obstructions on the public road and potential obstruction to recreation and amenity trails. Once mitigation measures and health and safety measures are followed, the potential for impact on human health for members of the public during construction and decommissioning of the Proposed Development is expected to be not significant and temporary.

Once good practice is followed, the potential for impact on public health and safety is expected to be temporary and non-significant in relation to the construction, operational and decommissioning phases of the wind farm and TDR elements of the Proposed Development.

The recreational amenity trail will remain in situ following the decommissioning of the Proposed Development. There are no expected negative impacts on human health.

6.6 Renewable Resources, Non-Renewable Resources and Utility Infrastructure

It is proposed to haul construction materials from batching plants, quarries and pits within the vicinity of the Proposed Development in addition to utilising existing materials within the proposed borrow pit. The quarries and pits within the vicinity of the Proposed Development provide sources of aggregates, hardcore, fill materials, washed sand and gravel, pebble sand aggregates and mortar. Ready mix concrete will be sourced from batching plants.

Renewable resources at the site include extensive commercial forestry at both the northern and southern turbine clusters. Wind resource is above average at the site location and is approximately 9 metres/second at 100m above ground level (SEAI Wind Atlas, 2013).

The construction of the Proposed Development will impact on natural resources such as aggregates which will be sourced from quarries and pits within the local area. While there is a borrow pit on the site, the assessment assumed that all material would be imported to the site, resulting in an estimated total of 68,448m^3 of imported material. This material will be required for the roads, hardstands and compound/substations and the temporary upgrade areas associated with the TDR. Concrete will also need to be imported to the site

as there will not be a batching plant. The use of site-won and imported material will have a slight, permanent impact on non-renewable resources of the area. This is not considered to be significant.

The Proposed Development is intended to capture the renewable wind resource at the site. There will be no negative effects on the renewable energy resource of the receiving environment. It is considered that the Proposed Development will have an overall positive impact in terms of carbon reduction and climate change. It will assist Ireland in meeting its target of reducing 80% carbon emissions from the electricity sector by 2030, and will further support a net-zero greenhouse gas emissions no later than 2050, as set out in the Climate Action Plan 2023.

The delivery of turbines may result in the temporary relocation of telephone poles due to oversail. This has the potential to cause a non-significant temporary impact on nearby dwellings and commercial/industrial activities. The construction of the cable trenches along public roads will have a slight, negative temporary impact on the roads concerned during construction, with some roads likely to require re-surfacing.

Once the Proposed Development is operational, the potential for negative effects on material assets is minimal. Maintenance of access tracks and infrastructure may require small amounts of imported fill, however, the impact of this is likely to be imperceptible.

The direct effect of electricity generated by the Proposed Development will give rise to a reduction in the quantity of fossil fuels required for electricity generation across the State. This will give rise to a long-term positive impact on renewable energy resource and will contribute to reducing Ireland's dependency on imported fuel resources.

The potential impacts associated with decommissioning will be similar to those associated with construction but of a reduced magnitude. There will be no significant negative impact on renewable and non-renewable sources during the decommissioning phase. No likely negative impacts on utility infrastructure are expected during the decommissioning phase.

The underground cable will remain in situ and will become a part of the national grid resulting in slight positive impact.

The amenity trail will remain in situ and will become part of the existing trails in the area resulting in slight positive impact.

7.0 Air Quality and Climate

7.1 Air Quality

To predict potential air impacts the Proposed Development was assessed. The principal sources of potential air emissions during the construction of the Proposed Development will be from:

- the wind farm and turbine delivery route elements of the Proposed Development;
- dust arising from earthworks, tree felling activities and movement of vehicles on the Site;
- construction of the new access tracks;
- the temporary storage of excavated materials;
- the construction of the proposed substation;

- the movement and use of construction vehicles and cranes;
- loading and unloading of aggregates/materials /movement of material around the site; and
- delivery of the wind turbines.

Dust emissions arise when particulate matter becomes airborne making it available to be carried downwind from the source and may cause dust soiling in the surrounding area. Following the implementation of the above mitigation measures, the construction of the proposed wind farm, proposed cable route and proposed substation might result in slight residual impacts arising from fugitive dust emissions during particular construction activities. These will be localised in nature and as they will be associated with particular elements of the construction phase and meteorological conditions, they will be temporary in nature and will not result in any permanent residual impacts.

The potential impact of traffic emissions was not considered further when predicting air quality for the Proposed Development during construction phase as it is not predicted that an air quality impact will occur due to traffic at the proposed wind farm. This is due to the impacts falling below the screening criteria set out in the UK DMRB guidance.

Maintenance vehicles will access the Proposed Development and access the joint bays for period maintenance and carry out point works along the proposed cable route during the operational period. However, given the low and infrequent traffic movements involved, the impact will be imperceptible.

Impacts related to vehicle emissions will practically cease following construction and no significant impacts are anticipated. There will be a low level of maintenance traffic during the operational period, which will have an imperceptible impact.

Cumulative impacts may arise if the construction, operational and maintenance period of these projects occurs simultaneously with the construction of the proposed wind farm, cable route and substation development. This could result in slight increased traffic emissions, however, provided the mitigation measures are implemented and the mitigation measures proposed for other developments are implemented, there will be no significant cumulative effects on air quality.

Once the proposed wind farm, cable corridor and substation are constructed there will be no significant direct emissions to atmosphere. A diesel generator will be located at the proposed wind farm substation; however, this will only be operated as a back-up/emergency power supply.

In terms of TDR, there will be truck movements associated with delivering the wind turbines resulting in vehicular emissions and also dust, however it will be done over paved surfaces thus dust soiling potential is very low along the route, once all wind turbines are delivered the truck movements will cease.

In terms of cumulative impacts, negative cumulative impacts in relation to air quality would only occur if a large development was located in the vicinity of the Proposed Development or cable route and was being constructed at the same time. Following a review of developments, it is considered that this is not likely to act cumulatively in terms of dust during construction. Cumulative impacts may arise if the construction period of other projects occurs simultaneously with the construction of the Proposed Development and cable route.

There will be no net carbon dioxide (CO_2) emissions from operation of the Proposed Development. Emissions of carbon dioxide (CO_2), oxides of nitrogen (NOx), sulphur dioxide (SO_2) or dust emissions during the operational phase of the Proposed Development will be minimal, relating to the use of operation and maintenance vehicles onsite, and therefore there will be no measurable negative cumulative effect with other developments on air quality and climate.

Mitigation measures have been outlined for dust during the construction phase of the Proposed Development. A Construction Environmental Management Plan (CEMP) has been prepared and is included in Appendix 3.2 of the EIAR. The developer in association with the contractor will be required to implement a dust control plan as part of the CEMP. As the operation of the Proposed Development will have positive impacts on air quality, mitigation measures for the operational phase are considered unnecessary. Measures for the decommissioning phase will be similar to those laid out for the construction phase.

7.2 Climate Change

Carbon dioxide is a greenhouse gas which, if released in excessive amounts, can lead to increases in global temperatures known as 'global warming' or the 'greenhouse effect' which can influence climate change. Under the Kyoto Protocol and the Doha Amendment, Ireland has committed to reduce greenhouse gas emissions by at least 18 percent below 1990 levels in the eight-year period from 2013 to 2020. At the Paris climate conference which Ireland has adopted and is legally binding. The agreement sets out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C (degrees Celsius) above pre-industrial levels and to limit the increase to 1.5°C. Under the agreement, Governments also agreed on the need for global emissions to peak as soon as possible, recognising that this will take longer for developing countries and to undertake rapid reductions thereafter in accordance with the best available science.

A desk-top assessment of available climatic information from Met Éireann[3] (see Section 6.4.2 of the EIAR) was undertaken for the Proposed Development to characterise the existing environment. In terms of climatic impact, the appraisal considered the net impact that operating the Proposed Development will have in terms of CO_2 and its displacement of CO_2 from other energy sources over the carbon losses caused by its manufacturing, transportation, construction, and decommissioning using the 'Carbon calculator for wind farms on Scottish peatlands'[4] tool.

The impact assessment considered the positive impacts the Proposed Development will have on contributing to national targets for the reduction of greenhouse gas emissions.

The Proposed Development will result in the production of energy from a renewable source which, once fed into the National Grid, will avoid between 47,964 and 52,325[5] tonnes of carbon dioxide (CO_2) annually that would have been released had the energy been generated by the average Irish power generation mix.

In terms of climate, the Proposed Development will act cumulatively with other renewable energy projects in reducing carbon dioxide emissions by displacing fossil fuel in the

[3] Met Éireann Climate data: https://www.met.ie/climate/available-data/monthly-data. Date Accessed 16/6/2023

[4] Scottish Government. https://informatics.sepa.org.uk/CarbonCalculator/ Date Accessed 6/6/23

[5] Dependent on which turbine model is chosen

production of electricity, resulting in a slight-moderate positive impact on climate. There will be residual positive impacts from the operation of the Proposed Development in terms of the displacement of fossil fuel energy generation with renewable energy.

7.3 Carbon Balance

CO2 emissions occur naturally in addition to being released with the burning of fossil fuels. All organic material is composed of carbon, which is released as CO_2 when the material decomposes. Organic material acts as a store of carbon. Peatland habitats are significant stores of organic carbon. The vegetation on a peat bog slowly absorbs CO_2 from the atmosphere when it is alive and converts it to organic carbon. When the vegetation dies, in the acidic waterlogged conditions of bogs and peatlands, the organic material does not decompose fully, and the organic carbon is retained in the ground.

The Proposed Development is situated in an area which has limited peat habitats. The site is not located on acid bog or fen habitats. Peat is not present throughout the site. Most of the site has been cultivated and forestry dominates the site. The Proposed Development has been sensitively situated within an upland environment of limited habitat value.

Emissions per capita increased from an historic low of 11.8 tonnes CO_2eq/person in 2020 to 12.3 tonnes CO_2eq/person in 2021. Ireland's average tonnes of GHG/capita over the last ten years were 12.8 tonnes. With recent CSO preliminary 2022 census data showing a population of 5.12 million people and with population projected to increase to 5.5 million in 2030, 5.9 million in 2040 and 6.2 million by 2050, per capita emissions need to reduce significantly. At current per capita emission levels, each addition 500,000 people would contribute an additional 6 million tonnes of CO_2eq annually.

Potential impacts arising as a result of the Proposed Development include a displacement of 1,678,740 – 1,831,375 tonnes of CO_2eq over the operational lifetime of the wind farm (35 years). When run through the Scottish Wind Farm Calculator, the payback time to achieve carbon neutrality as a result of the construction and decommissioning works involved in the project lifecycle has been calculated to be 1.8 years of operation.

Given the positive impact of displacement of CO_2eq over the lifetime of the Proposed, no mitigation measures are proposed.

There are no residual impacts on climate as a result of the construction of the Proposed Development.

8.0 Landscape and Visual

Chapter 7 of the EIAR considers the likely significant landscape and visual effects associated with the construction and operation of the Proposed Development.

8.1 Methodology

The LVIA uses methodology as prescribed in the following guidance documents:

- Environmental Protection Agency (EPA) publication 'Guidelines on the Information to be contained in Environmental Impact Statements (2022) and the accompanying Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (2003).

- Landscape Institute and the Institute of Environmental Management and Assessment publication entitled Guidelines for Landscape and Visual Impact Assessment – Third Edition (2013).
- Scottish Natural Heritage (SNH) Guidance Note: Cumulative Effect of Windfarms (2012).
- Department of the Environment, Heritage and Local Government Wind Energy Development Guidelines (2006 - current) and Wind Energy Development Guidelines (2019 - draft revised
- Scottish Natural Heritage (SNH) Visual representation of wind farms: Best Practice Guidelines (version 2.2 - 2017).

8.2 Baseline

Landscape impacts have been assessed on the basis of landscape sensitivity weighed against the magnitude of physical landscape effects within the Proposed Development and effects on landscape character within the wider landscape setting. This wider setting is considered in respect of the immediately surrounding landscape (<5km) as well as the broader scale of the Study Area (5-20km).

The Wind Energy Development Guidelines (2006/ and Draft 2019 revision) provide guidance on wind farm siting and design criteria for a number of different landscape types. As described in the landform/drainage and landcover/land use section of both documents, the Site of the Proposed Development is located within the rolling upland landscape at the northern periphery of the Castlecomer Plateaux, specifically Fossy Mountain/Wolf hill, with the rolling farmland and in particular the Barrow River Valley transitioning into open level landscapes to the wider study area. With this in mind, the site is most consistent with the 'Transitional Marginal' type from the Wind Energy Development Guidelines, but also with some characteristics of the 'Hilly and Flat Farmland' landscape type.

27 representative viewpoints have been selected to inform the assessment of effects on visual receptors,

8.3 Visual Impact Summary

With regards to overall patterns of how the Proposed Development is experienced, this is generally based on proximity to either cluster of turbines, as there are few instances where both are clearly visible, and the two clusters differ in their relationship with the surrounding landscape and visual receptors. The northern cluster is located in the more prominent location, both physically in relative elevation, and contextually, placed across the highest section of the Fossy ridgeline overlooking the surrounding landscape from above the steeper slopes to the north, west, and east. In contrast, the southern cluster, despite being located across the same upland area, is located more centrally within a forested basin of the upland area and with more consistent surroundings in terms of land form and land cover. This is reflected in the type of views which are experienced.

The northern cluster features a higher proportion of full turbines clearly visible from the surrounding lowlands, while the southern cluster is more often partially screened, introducing a degree of ambiguity in terms of location and context to the viewer. The northern array clearly relates to Fossy Mountain, separated (often) from the viewer by the steep transitions between the pastural and upland landscape character areas. The southern cluster is generally viewed (VPs 16, 18, 19, 22, 24, 23, 26) from within similar landscape to

the array, while the northern cluster is viewed from outside of the upland landscape context (VP 1,2,3,4,5,6,7,8,9,12).

The highest magnitude of impact is experienced from local receptors located between the two clusters; however, these do not exceed a visual impact significance of Moderate. Moderate-slight is the highest Visual Impact Significance experience across the remainder of the views, occurring through a combination of Medium to Medium-low sensitivities and medium impacts at VP9 and VP11. Moderate-slight significance occurs at two views in the north of the study area due to scenic designations increasing the sensitivity of the view as well as at two viewpoints located between the two clusters. Slight and Slight-imperceptible impacts tend to occur across the wider study area, as do a number of Imperceptible significance judgements.

8.4 Cumulative Impacts

Existing (permitted) development is clustered over two sections of the study area, one to the northwest and west of the Proposed Development, and a second to the south, tracing the edge of the Castlecomer plateaux. In both instances the cumulative wind farms are separated from the Proposed Development by a dip in the landform, combined with a key transport corridor. For the northern cumulative group the dividing road is the R426 and the N78 is the key transport receptor for the southern cluster.

Overall, the study area does not contain a high number of turbines and these are divided between a modest number of mid and small sized developments. The nearest and most likely to generate cumulative effects in conjunction with the Proposed Development are the Cullenagh and Pinewoods developments located between 5-10km to the west. This does not generate a strong sense of wind energy proliferation within the study area or a sense of being surrounded by turbines. Instead, the terrain and forestry landcover of the Castlecomer Plateau tend to absorb and restrict intervisibility of the combined development from all but elevated areas. For these reasons, the contribution to cumulative impacts by the Proposed Development is deemed to be **Medium-low** in the context of the cumulative impact criteria provided in **Table 7.5** in Chapter 7.

8.5 Summary

Based on the landscape, visual and cumulative assessment contained herein, it is considered that there will not be any significant effects arising from the Proposed Development.

9.0 Land, Soils and Geology

Chapter 08 of the EIAR assesses the potential effects of the Proposed Development on Land, Soils and Geology. The baseline of the Site has been established through desk study and survey work.

The Quaternary Geology underlying the Proposed Development, found on Geological Survey of Ireland mapping, comprises of underlain Namurian shale and sandstone till or bedrock being at or the near surface. Within the wider study area are the following subsoils: an undifferentiated alluvium to the west and north of the study area, associated with drainage networks; esker sands and gravels of basic parent material (BasEsk) in the northern study area; and limestone till from the carboniferous (TLs) in the northern study area.

The Irish Soil Information System has identified a number of Soil Associations across Ireland, which are each comprised of a range of soil types. The soil association classified beneath the site is the Crosstown Association, which is a fine loamy drift with siliceous stones.

Site Investigations confirm that soil in the area consists primarily of sandy gravelly clay with small pockets of silt/clay and clayey silty sand/gravel at or close to the surface. Soil thickness ranges from 0.9mbgl c. 18m south of T8 to 6.8 – 8.8m c. 27m north and 21 east of T8. Underlying this material, the survey indicates possible mudstone/siltstone and sandstone rock. There is no peat across the Site.

Bedrock mapping published by the GSI (GSI, 2023) 1:100,000 mapping, indicates that the sequence is comprised predominantly of various sandstone, siltstone and shale formations. Mapping by the GSI (GSI, 2023) indicates that three of the proposed turbine locations are underlain by the Killeshin Siltstone; four by the Bregaun Sandstone; one by the Moyadd Coal; two by the Clay Gall Sandstone; and three by the Coolbaun Formation.

The bedrock within the site is part of the Leinster Coalfield, however, there is no large disturbance as part of the Proposed Development. Consideration will be given further in the assessment to the potential impact to bedrock (e.g. leaks and spills seeping into the bedrock).

There are nine geological heritage sites within the study area, however, none of these occur at the site. The most proximally located occurs 400m south of the Site. The most proximally located geological heritage site to the proposed cable route (within the study area) is c. 80m south.

No historical evidence of landslides is recorded within the area and the proposed turbine locations are located on glacial tills or shallow bedrock rather than peat. Slopes are gently to moderately sloping. Slope stability is scoped out in this context and is not considered in the assessment.

Some areas such as Fossy Mountain are noted as moderately low to moderately high landslide susceptibility and these are associated within steep elevation increases around the mountain. The Proposed Development is located on gently to moderately sloping ground. There are no recorded landslide events within the study area.

During construction potential impacts include forestry removal, material excavation, Fuel and oil leaks and spills and the presence of historical coal shafts. The overall magnitude of the potential direct impacts associated with the construction phase of the Proposed Development, prior to mitigation, is considered to be negligible to low impact and the potential significance of effect is considered to be Slight.

During the operational phase of the Proposed Development, there will be no new direct effects to land, soils, subsoils and bedrock due to the Proposed Development. The magnitude of these potential impacts, prior to mitigation, is considered to be Imperceptible.

Mitigation measures during construction include site operations being managed in accordance with relevant health and Safety legislation, maintained fencing, evaluated stockpiles, permission being sought from the Forestry Service to replant lands to compensate the loss of forestry, the area of bare or exposed soils and rock will be kept to a minimum, all aspects of the proposed backfilling / construction phase works to be undertaken in accordance with relevant best practice environmental guidance published by the Environmental Protection Agency and other regulatory agencies and various measures

to deal with potential fuel / oil spills. these are set out in detail in section 8.10 of Volume II, Chapter 8 of this EIAR.

Mitigation measures applied during decommissioning and operational activities will be similar to those applied during construction where relevant.

With respect to residual impacts, the implementation of the proposed mitigation measures, it is considered that the potential effects of fuel spill on soils and bedrock, will reduce to Imperceptible. Residual effects for land from land use change will remain at Slight as land use will remain changed in the locality. The residual effects for soils and subsoils through the loss of material in excavation is considered to be unchanged at Slight, given the loss of in situ material cannot be offset. The residual effect of the coal mine shafts will reduce to Imperceptible.

10.0 Water

Chapter 09 of the EIAR assesses the potential effects of the Proposed Development on the water environment.

10.1 Baseline

The surface runoff from the western area of the northern cluster of the Site flows towards the Honey and Orchard_Lower Stream. The Orchard Lower joins the Honey Stream which runs in the northerly direction where it joins the River Crooked approximately 3.7km north of the site.

The surface runoff from the eastern area of the northern cluster of the site flows towards the Fallowbeg Upper Stream which runs in north-eastern direction where it flows into the River Crooked.

The surface runoff at the southern cluster of the wind farm flows towards the Clogh Stream, Brennanshill, and Moyadd Streams. The Brennanshill and Moyadd streams are tributaries of the Clogh Stream. The Clogh Stream flows in the southern direction for approximately 5.8 km where it joins the River Dinin which is a tributary of the River Nore.

The Proposed Development is not located within any significant flood zones. According to the available flood mapping all the proposed turbines, hardstanding areas and on-site substation are situated within 'Flood Zone C', -Low risk of flooding (less than 0.1%).

With respect to the most recent Biological Water Quality Ratings, the surface water quality within the Stradbally, Crooked and Owveg watercourses is of 'unpolluted' status.

The Proposed Development and cable route does not traverse any ecologically designated areas. The Proposed Development is indirectly connected via surface water to the River Barrow and River Nore SAC (002162), through the tributaries of the River Barrow and River Nore. The development does not traverse any Special Protection Area (SPA).

10.2 Potential Impacts

Various construction impacts include tree felling, approximately 75.97Ha, upgrading of existing site tracks and the provision of new site tracks, drainage infrastructure to be constructed in parallel with access track construction, construction of the turbine foundations and the provision of the hardstanding areas.

The hydrological environment of the Proposed Development is considered to be of 'high' sensitivity for receptors draining to the Orchard Spring Public Water Supply. It is also considered to be of 'high' sensitivity for receptors River Barrow and River Nore SAC, Ballyprior Grassland SAC, Timahoe Esker pNHA and Clopook Wood pNHA. Surface water control measures are incorporated into the design of the Proposed Development along with stormwater management system to mitigate the increase of run-off.

During construction, the relatively low increase in runoff has however, the potential to cause soil erosion and consequent sediment release into the receiving watercourses. Possible potential indirect impacts on surface water quality during tree felling and construction activities include increased sediment in watercourses, increase in nutrients from tree felling, blockages in cross drains could lead to flooding, suspended solids could affect aquatic fauna and habitats, fuel leaks or spills could affect watercourses, wet concrete could affect receiving waters.

Operation of the Proposed Development requires limited activities relative to the construction phase. The presence of access tracks and hardstanding, as opposed to their construction, may affect the potential infiltration and groundwater conditions as well as the sub-surface flow paths around the infrastructure. In addition, cabling and crane hardstanding would also remain in situ to serve the Proposed Development.

In the event of decommissioning of the development, activities would take place in a similar fashion to the construction phase. Potential impacts would be similar to the construction phase but to a lesser degree.

10.3 Mitigation

No significant effects are predicted as a result of the Proposed Development during the construction, operation or decommissioning stages. Nonetheless, in order to further mitigate against any potential impacts during the construction phase, best practice construction methods will be implemented in order to prevent water (surface water and groundwater) pollution. A Construction Environmental Management Plan (CEMP) was developed for the Proposed Development to ensure adequate protection of the water environment. All works associated with the construction of the wind farm will be undertaken in accordance with the guidance contained within CIRIA Document 'Environmental Good Practice on Site'.

11.0 Noise and Vibration

Chapter 10 of the EIAR considers noise and vibration associated with the construction, operation and decommissioning of the Proposed Development.

Baseline noise monitoring was carried out at six locations surrounding the Proposed Development to establish existing levels of background noise in the vicinity and to then enable appropriate noise limits for the site to be derived. The standard approach to derivation of noise limits is to carry out baseline measurements at several noise sensitive locations (NSL) around the proposed site. Noise limits are then derived for the properties at which the measurements were carried out based on the results of these measurements. As it is not usually possible to carry out measurements at every NSL, NSLs near to the measurement property are then assigned the same limits as the measurement location. The operational impact at each of the measurement locations was appraised in accordance with the Institute of Acoustic's Good Practice Guidelines.

The chosen noise monitoring locations were representative of the different noise environments in the vicinity of the Proposed Development in addition to being located at some of the closest dwellings to the proposed wind farm development. The baseline noise monitoring was used to derive appropriate noise limits according to the Department of the Environment, Heritage and Local Government DoEHLG Wind Energy Planning Guidelines.

Potential noise and vibration impact during the construction, operational and decommissioning phases were assessed.

On-site construction noise is generated from the construction of the turbine foundations, the erection of the turbines, the excavation of trenches for cables, and the construction of associated hard standings and access tracks, and construction of the substation. Noise from vehicles on local roads and access tracks is also generated from the delivery of the turbine components, substation components and construction materials, notably aggregates, concrete and steel reinforcement. There is potential for temporary elevated noise levels due to the cable route works, access track construction and borrow pit quarrying but these will only occur for only short periods of time at a very limited number of dwellings. Figure 5-1 of this EIAR identifies the residential receptors within the vicinity of both cable routes. The construction noise assessment has determined that associated levels are expected to be audible at various times throughout the construction programme but remain within acceptable limits and that their temporary effects are not significant. Standard construction mitigation measures will be implemented to minimise temporary noise impacts.

The nearest noise sensitive locations are sufficiently distant (the nearest is over 500m distant) that vibration will not be perceivable by residents at their dwellings and building damage will not occur from construction incurred vibration. As such, construction vibration will not be considered further.

Specific criteria have been set out within the EIAR to identify potential proposed or existing wind farms that could have cumulative contribution to noise effects with the proposed development. No such developments have been identified.

Draft Revised Wind Energy Development Guidelines (December 2019) published by the Department of Housing, Planning and Local Government proposes amendments to the Wind Energy Development Guidelines 2006 and '2019 Draft Guidelines' were out to public consultation until the 19th February 2020 and may be subject to further revision. The Wind Energy Development Guidelines (2006) are current. For completeness, the Proposed Development has been assessed against the 2006 Guidelines and the '2019 Draft Guidelines'.

Operational noise from the proposed turbines confirms that the predicted wind farm noise emission levels do not exceed the daytime or night-time noise limits derived in accordance with the 2006 Guidelines under all wind speeds and at all locations. The assessment demonstrates that the wind farm can operate without constraint or the need for mitigation and comply with noise limits derived from the 2006 Guidelines.

It has been demonstrated that both the daytime and night-time noise limits derived under the 2006 Guidelines can be satisfied at all properties across all wind speeds without any constraint. This assessment has been based on the use of the manufacturer's sound power data for the Siemens Gamesa SG 6.6 MW 155 wind turbine which is typical of the type and size of turbine which may be considered for this site, and assuming worst case downwind propagation. These operation effects are not significant.

The noise and vibration levels generated during the decommissioning of a wind farm are considered to be similar to those during the construction phase. Therefore, the noise and vibration impacts assessed for the construction phase will equally apply to the decommissioning phase.

12.0 Archaeology, Architectural and Cultural Heritage

Chapter 11 of the EIAR assesses the impacts of the Proposed Development, cable route and turbine delivery routes on the known and potential cultural heritage resource within their environs. The term 'Cultural Heritage' encompasses heritage assets relevant to both the tangible resource (archaeology, architecture heritage); and non-tangible resources (history, folklore, tradition, language, place names etc.).

12.1 Baseline

A study area consisting of a buffer zone of 1km from the Proposed Development site was reviewed in order to assess the potential for direct impacts on the cultural heritage resource. The wider landscape surrounding the proposed wind farm was also reviewed to assess the potential for indirect impacts on National Monuments and other extant recorded monuments with potential visual alignments across the landscape, including megalithic tombs, stone circles and stone rows. The cable route and turbine delivery routes along the existing public road network were also assessed as were the locations of proposed tree replant areas.

There are no known cultural heritage assets or National Monuments located within this study area.

There are ten known prehistoric cultural heritage assets within 1km of the Proposed Development boundary.

- There are two prehistoric cultural heritage assets located alongside each other to the east of the Proposed Development.
    - **LA025-013** is a megalithic structure, comprised of a sub-circular mound with a small kerb, set stones, and a hollow with an embedded slab. The asset is located 1km east of the Proposed Development boundary and 0.25km northeast of the access track.
    - **LA025-014**, a potential fulacht fiadh (burnt mound), is also present at this location.
- Two barrows **LA031-020** and **LA031-019** are located adjacent to one another 1km west of the Proposed Development boundary.
- The rest of the prehistoric cultural heritage assets consist of a series of fulachtaí fiadh (burnt mounds) are located to the west of the development.

There are two early medieval cultural heritage assets identified as raths, a type of early-medieval ringfort, located to the northeast of the Proposed Development.

- **LA025-002** is located 0.4km north of the Proposed Development and
- **LA025-006** is located 0.75km northeast of the Proposed Development.

There are no known medieval cultural heritage assets within the Proposed Development boundary, nor are there any within the 1km search area.

There are six post-medieval cultural heritage assets within the 1km search area.

- LA031-027 is located c.0.8km southeast of Turbine 8 and is described as a 'standing stone'.
- Saint Mary's Catholic Church (1280250) is in Wolfhill, .0.4km east of the Proposed Development.
- LA019-016001, a graveyard, and
- LA019-016, a church, are located 0.5km north of the Proposed Development.All visible memorials within the graveyard post-date 1700 AD.
- An early Christian cross-slab (**LA019-016002**) is located within the graveyard.
- **LA025-003** is located 0.9km northeast of the Proposed Development.

There are five undated cultural heritage assets within the 1km search area.

- LA019-018 is located 0.9km north of the Proposed Development site. The asset is a moated site, consisting of a sub-rectangular area with a shallow fosse overlooking the surrounding countryside.
- Additionally, there are four undated enclosures within 1km of the Proposed Development site.

Historic mapping from 1841 to 1908 shows few landscape changes between these dates within the 1km buffer zone. The majority of the land comprised occupied by farmsteads and agricultural fields. Some cultural heritage assets are named on the maps, including Saint Mary's Catholic Church in Wolfhill (**1280250**), the Dun of Luggacurren (**LA025-006**), and the Druid's Altar (**LA025-013**).

12.2 Potential Impacts

There are currently no predicted direct construction impacts on known archaeological remains associated with the construction stage of the Proposed Development.

The construction of the Option 1 cable route may have a direct impact on the following assets: enclosure LA024-038; and the cultural heritage town of Timahoe. In addition, this cable route may have an impact on the cultural heritage town of Timahoe.

The Option 2 cable route passes within the zone of notification for the enclosure (LA024-038) – this asset comprises an ovular crop mark, visible on aerial photographs. The cropmark is of local cultural heritage sensitivity. The magnitude of impact upon its cultural heritage significance is anticipated to be Low Adverse.

Within the Laois County Development Plan 2021-2027, Timahoe is a candidate for being an Architectural Conservation Area (ACA). Whilst the Option 1 cable route is not anticipated to directly impact the buildings within an ACA, the road through the ACA is expected to be impacted directly. Due to the nature of an ACA, work is not restricted or prohibited, but any works are required to respect the special character of the area. There are no anticipated Operational Effects on any cultural heritage assets as a result of the Option 1 cable route. Therefore, no harm or benefits are envisioned.

The potential impacts of the operational phase on any cultural heritage assets are anticipated to range from Very Low Adverse to Neutral and as such the significance of effects is moderate to imperceptible.

With respect to the decommissioning phase, the potential impacts assume both the wind farm and the cable route would cause no additional ground disturbance to that which occurred during construction and as a result, no additional direct or indirect impacts to the buried archaeological resource are anticipated.

13.0 Traffic and Transport

Chapter 12 of the EIAR examines the vehicle movements to facilitate the construction, operation and decommissioning of the Proposed Development, including the movement of abnormal loads to facilitate turbine delivery. The chapter also examines the number of trips to be utilised for the delivery of materials such as aggregate and concrete for the construction of the Proposed Development.

13.1 Turbine Delivery Route and Works Required

The Proposed Development is located near to the M7 Motorway south of Portlaoise, with good road links to both the major Port at Dublin (M50/M7) and the major Port at Cork (M8,M7).

Wind farm developments can generate traffic impacts associated with the vehicles removing and delivering materials during preparation and construction of the wind farm. In addition to general construction traffic the wind turbine components need to be delivered to site and these bring about impacts beyond that the general construction traffic create as these vehicles tend to be longer, wider and heavier. An Garda Síochána permits and Local Authority permits are also required.

The movement of abnormal load transport configurations will need to be timed to avoid periods of heavy traffic flow to minimise disruption to the public and therefore are usually done in the overnight hours

Port of Dublin to Portlaoise is the most likely port to be used as it is around half the distance than the Port at Cork is to the Proposed Development. The route follows the motorway network (M50, M7) from the port all the way to Portlaoise where it leaves the motorway network to join the R445 southbound. From here, the proposed turbine delivery route will head south along the R425 and the R426. It will pass through Timahoe before turning east at L3851/Knocklead Road where it can enter both the Northern and Southern Clusters of the Proposed Development at each access point.

A swept path analysis has been undertaken, concerned with the delivery of the turbine blades. Swept paths for the delivery of other components, including tower sections and nacelles, has not been undertaken. The purpose of this analysis is to identify what temporary roadworks will be required to facilitate the delivery of the large components.

Swept path analysis has been undertaken using AutoTrack Software with multiple vehicle configurations, both carrying a 75m length turbine blade. The vehicles have been modelled from standard vehicles within the software vehicle library which have simply had their wheelbase extended to match the length of known trailers and a load added, the length of the wind turbine blade.

- At the turn off the M7 Motorway at Portlaoise, two roundabouts will need to be passed before the vehicle enters the R445. This path requires a small amount of tree clearance on the second roundabout and some temporary road construction (removal of street furniture and signage) to facilitate the movement.

- The second place where work may be required is the entry onto the R425 from the R445 which will consist of the temporary removal of street furniture.
- Along the R425 at a roundabout junction between the R425 and the N80 there is a roundabout with central landscape planting. Some temporary works will be required at this roundabout, including the potential to remove this landscaping, street furniture and signage with temporary hardstand material to facilitate the turbine delivery.
- The turbine delivery route crosses the R427 at a slightly staggered crossroads which would not create an issue for the long transport configurations, though the traffic island may need to be overrun.
- The turbine delivery route will pass through the settlement of Timahoe, and no works are required to facilitate passage through the settlement.
- The route reaches a crossroads with the L3851/Knocklead Road where it turns left to reach the wind farm access points. Due to the narrow widths of the two roads, a turn at the crossroads itself will require the provision of a temporary roadway to facilitate the turn will be necessary.
- From the L3851/Knocklead Road, the turbines will be delivered to either the Northern and Southern Cluster- and the access routes into both clusters have been designed to facilitate the delivery of these components.

All works will be reinstated following the completion of the delivery of turbines and other oversized infrastructure.

13.2 Traffic movements

13.2.1 Construction

The Proposed Development would require the transportation of a range of construction materials to the site. The aggregate material required on Site will be sourced locally, with a number of existing quarries being available. These are all located in various locations around the site and include Carroll Quarries Ltd to the northwest, Roadstone Ballyadams to the north east and Dan Morrisey and Company to the south east. While there is a borrow pit proposed on the Proposed Development Site in the Southern Cluster, the assessment assumes that all material will need to be imported to the site. It is therefore considered that 68,448 tonnes of material will be imported to facilitate the construction phase of the Proposed Development, resulting in 6,844 trips over the construction period. Table 12-14 of Chapter 12 sets out the number of vehicle movements required for each element of the Proposed Development.

13.2.2 Operational Traffic

The operational phase has the potential for 8-10 long term jobs to be created. Maintenance vehicles will attend the site monthly, but the numbers of traffic these generate are minimal. No significant effects are predicted.

13.2.3 Decommissioning traffic

The only components to be removed from the site are the turbine components themselves, while all other elements such as the hardstandings, foundations, substation

and cabling will remain in place. This will result in a far lesser number of vehicle movements than the construction stage of the Proposed Development. Special permits will be required to transport these components, and the CTMP will set out the movements of these components for the overnight hours.

13.3 Mitigation

Embedded mitigation measures such as a Construction Traffic Management Plan will be put in place to apply measures to reduce the effects of the construction of the Proposed Development on the local communities. It will provide details on any of the road widening or improvement measures, swept paths, loadings, structural assessments (where required), temporary street furniture removal details, dust and dirt management, and community engagement.

Construction work will also be limited to the working hours of 07:00 to 19:00 Monday to Friday and 07:00 to 16:00 at weekends, other than in exceptional circumstances, such as the delivery of the turbine components which will occur in the overnight hours where possible.

14.0 Telecoms and Aviation

Chapter 13 of the EIAR considers the potential effects of the Proposed Development on Telecoms and Aviation interests.

14.1 Telecommunications

Consultation regarding the potential for electromagnetic interference from the Proposed Development was carried out with the relevant national and regional broadcasters, fixed line and mobile telephone operators and other operators.

The nearest telecommunication masts are located in the townland of Crissard where 1 no. mast, with 4 no. receivers are located, approximately 450m to the west of turbines 8 and 9, and 2.6km southeast of turbine 7. There are no other masts located in within 5km of the Proposed Development.

There have been no negative responses from all telecommunications or broadcasting operators in the area. It is considered that there will be no significant effect on telecommunication operations due to the Proposed Development. Mitigation measures will be put in place to ensure broadband service is not interrupted.

Two rounds of scoping consultation were undertaken. During the scoping period, 2RN, the broadcasting arm of RTE noted that two turbines were of concern which might impact the DTT path between their sites at Mt Leinster and Arklow and might impact the broadcasting signal to the northeast area of the turbines within the service area of Mt. Leinster by way of interference. Micrositing was undertaken and the new turbine locations were provided to 2RN in March 2023. 2RN noted in this instance that no turbines were of concern; however, a 2RN Protocol agreement was requested to be signed between the developer and 2RN should the development go ahead.

14.2 Potential Impacts on Aviation Interests

The potential effects of wind turbines on aviation interests have been widely publicised. There are two dominant scenarios:

- **Physical Obstruction:** turbines can present a physical obstruction at, or close to, an aerodrome or other aviation activity site; and
- **Radar/Air Traffic Services:** turbine induced clutter appearing on a radar display can affect the safe provision of air traffic services as it can mask an unidentified aircraft from the air traffic controller and /or prevent the controller from accurately identifying aircraft under his control. In some cases, radar reflections can affect the performance of the radar itself.

There is potential for aviation impacts during the late construction phase of the Proposed Development and prior to the commissioning of the Proposed Development as the wind turbines are constructed and placed. The turbines could be an obstacle to a low flying craft. No scoping response was received by the IAA or DAA citing any concerns with the Proposed Development, the closest airport to the proposed wind farm is Kilkenny Airport, c. 30.1km south, followed by the Naas Airfield c. 42.5 km northeast. Birr Airfield is c. 49.4km northwest. Waterford Airport is located c. 55.6km southwest.

Noting the presence of existing turbines within proximity to the Proposed Development and the distances to existing airports in tandem with no significant concerns raised by the IAA or Department of Defence, it is considered therefore that there will be no significant effect on aviation from the Proposed Development during the construction phase. Special lighting will be facilitated on each of the turbines as requested by Aircorps during the scoping phase. In addition, exact coordinates and heights will be provided to all aviation interests such as Aircorps.

During the decommissioning phase, the turbines will be dismantled and removed from the site, thereby removing all potential obstacles to aviation interests as a result, there will be no significant effects on aviation.

No mitigation measures are required. In line with standard practice with wind farm developments, the coordinates and elevations for turbines will be supplied to the IAA and DAA at the end of the construction phase. If aviation lighting is required by IAA or DAA to affix to the turbines, the developer commits to installing same. No residual effects are expected.

15.0 Shadow Flicker

Chapter 14 of the EIAR considers the potential impacts of the Proposed Development with regards to Shadow Flicker.

15.1 Baseline

Under certain combinations of geographical position, wind direction, weather conditions and times of day and year, the sun may pass behind the rotors of a wind turbine and cast a shadow over the windows of nearby buildings. When the blades rotate and the shadow passes a window, to a person within that room the shadow appears to 'flick' on and off; this effect is known as 'shadow flicker'. The phenomenon occurs only within buildings where shadows are cast across a window opening, and the effects are typically considered up to a maximum distance of 10 times the rotor diameter from each wind turbine. At greater distances the effects are generally considered to be negligible.

Two scenarios have been considered for the shadow flicker assessment, which consider the two permutations of the turbines proposed for the Site; one with a 155m rotor, and one with a 162m rotor.

The assessments for scenario 1 and 2 both consider all identified potential shadow flicker sensitive receptors within the study area. For this assessment, inhabited residential buildings have been considered sensitive receptors (no other property types were identified within the study area), in line with the guidance in the Wind Energy Development Guidelines (2006).

A study area of 1,550 m from each of the wind turbines has been used for the Scenario 1 assessment. This is based upon ten times the maximum rotor diameter (155 m) that would be used within the Proposed Development in accordance with current guidelines.

A study area of 1,620 m from each of the wind turbines has been used for the Scenario 2 assessment. This is based upon ten times the maximum rotor diameter (162 m) that would be used within the Proposed Development in accordance with current guidelines.

For Scenario 1, 143 residential properties have been identified which fall within the 1,550m study area. These properties could theoretically be affected by shadow flicker from the Proposed Development. For Scenario 2, an additional 26 properties compared to Scenario 1 fall into the larger study area associated with Scenario 2. These properties could theoretically be affected by shadow flicker from the Proposed Development.

15.2 Potential Impacts

For Scenario 1, based on the predictive modelling technique, there is predicted to be shadow flicker effects of up to 134.3 hours per year at receptor 70, assuming the worst-case scenario. Of the 143 receptors in the study area for Scenario 1, 44 would not experience any shadow flicker effects arising as a result of the operational phase of the wind farm.

In regard to annual impacts for Scenario 2, based on the predictive modelling technique, there is predicted to be shadow flicker effects of up to 139.4 hours per year at receptor 70, assuming the worst-case scenario. Of the 169 receptors in the study area for Scenario 2, 61 would not experience any shadow flicker effects arising as a result of the operational phase of the wind farm.

For Scenario 1, there are no turbines located within 500 m of the proposed turbines. Based on the theoretical worst-case results, 50 receptors would experience shadow flicker effects in excess of 30 hours per year, with the property experiencing the highest annual hours being receptor 70, experiencing 134.3 hrs per annum on a worst-case model basis.

Applying the average sunshine hours to the model results in 5 properties exceeding the 30 hours per annum guidance, the property experiencing the highest annual hours again receptor 70 which would experience 38.4 hrs of shadow flicker per annum.

For Scenario 2, There are no turbines located within 500 m of the proposed turbines. Based on the theoretical worst-case results 50 receptors would experience shadow flicker effects in excess of 30 hours per year, with the property experiencing the highest annual hours being receptor 70, experiencing 139.4 hrs per annum on a worst-case model basis.

Applying the average sunshine hours to the model results in 6 properties exceeding the 30 hours per annum guidance, the property experiencing the highest annual hours again receptor 70 which would experience 139.9 hrs of shadow flicker per annum.

In regard to daily impacts for Scenario 1, based on the theoretical worst-case results above, 20 receptors would experience average shadow flicker effects in excess of 30 minutes per day, with the property experiencing the highest daily exposure being receptor 24,

experiencing 53.4 minutes per day on a worst-case basis, although it is noted that all the properties are in excess of 500m from the nearest turbine.

Applying the average sunshine hours to the model would mean no property is likely to experience more than 15.3 minutes per day of shadow flicker.

For Scenario 2, based on the theoretical worst-case results above, 22 receptors would experience average shadow flicker effects in excess of 30 minutes per day, with the property experiencing the highest daily exposure being receptor 24, experiencing 54.6 minutes per day on a worst-case basis, although it is noted that all the properties are in excess of 500m from the nearest turbine.

Applying the average sunshine hours to the model would mean no property is likely to experience more than 15.6 minutes per day of shadow flicker.

15.3 Mitigation

Shadow flicker control modules, consisting of light sensors and specialised software, will be installed on the turbines, irrespective of which turbine in the range is installed, that can prevent operation during periods when shadow flicker can be experienced at nearby properties.

The installation of a programmable shadow flicker module will allow the control of turbines in order to eliminate shadow flicker, irrespective of which turbine in the range is installed. The correct operation of the installed shadow flicker control measures will ensure that there will be no impact from shadow flicker. The operation and performance of the shadow flicker control measures will be monitored on an ongoing basis.

Under this approach there would be no shadow flicker experienced at any property, and therefore no impacts on any receptors.

As the Shadow Flicker Control Measures will ensure no shadow flicker effects from Coolglass Wind Farm, there will be no cumulative impacts with any nearby wind farms.

16.0 Biodiversity

Chapter 15 of the EIAR assesses the potential for the construction, operation and decommissioning phases of Coolglass Wind Farm to result in significant effects on Biodiversity.

16.1 Baseline

Comprehensive desk and field studies were conducted to identify important Biodiversity Features on the Site and within the potential zone of influence of the project. Desk and field studies commenced in 2017 and were ongoing to 2022 to inform this assessment. Studies included a thorough review of available information and consultation with Inland Fisheries Ireland, Kilkenny County Council, Laois County Council. The field surveys and desk studies were undertaken by highly experienced ecologists from within SLR Consulting. The surveys conducted included multiyear bird surveys based on best practice methods (SNH 2017), habitat surveys, various habitats, rare flora, invasive plants, avifauna, terrestrial mammals, bats, other protected fauna, fisheries and aquatic ecology.

The Project does not lie within any SAC or SPA. Neither the main wind farm or Cable route option B are adjacent to any SAC or SPA; however, Cable route option A runs adjacent to the River Barrow and River Nore SAC near Chapel Cross Roads along the R430 road. There

are six SACs within 20 km of the Project. Of these, the River Barrow and River Nore SAC is the only one with any connection to the Project, with downstream hydrological connections between riparian habitats and species to both northern and southern clusters and both Cable route (GCR) options. Key species considered in the assessment include freshwater and Nore pearl mussel, white-clawed crayfish, lamprey spp, twaite shad, salmon and otter.

There are no habitats present either within the main wind farm or along GCR A or B, or at any TDR node. There are also no previously mapped ancient woodland habitats immediately adjacent to the Project. No rare or protected plants were recorded during field surveys and during desktop studies at the main wind farm, consisting almost entirely of heavily modified conifer plantation and agricultural habitats. Similarly, no rare or protected plants were recorded alongside either GCR option.

There is the potential for invasive non-native plants to be present within the main wind farm. Japanese knotweed and Canadian pondweed are the only species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011-2021 (S.I. 477/2011).

Bird species identified on Coolglass Windfarm site as important ecological features and subject to detailed surveys include Hen harrier however, there was no evidence to suggest that this species was using the area for roosting. There were very few 'at risk' flight events for any primary target species; this was the case for species that often fly in flocks, such as European golden plover. Other common bird species use the site such as common buzzard and common kestrel.

Eight species of mammals were recorded within the site which include badger, pine marten, red squirrel, Irish hare, greater white-toothed shrew, otter, fallow deer, sika deer and red fox. There are no buildings, underground features or trees that could be used by roosting bats within the project site boundary for the northern cluster. At the southern cluster, there was only one tree that was classed as having any roosting potential above 'low potential'. There were also two other potential roosts in the southern cluster. The first was an old gable wall covered with ivy. It was determined that this structure was of low suitability. The second consisted of two abandoned farm sheds, both with corrugated roofs and covered with ivy.

16.2 Potential Impacts

None of the NHAs or pNHAs that overlap with SACs or SPAs are partially located outside those sites and so therefore can be fully considered within the NIS. The impact assessment is therefore restricted to NHAs or pNHAs that do not overlap with SACs or SPAs.

The overwhelming majority of habitats within the main wind farm occur as large, contiguous areas that are also part of the wider landscape. Therefore, the Project is not likely to significantly affect any habitats which could be acting as ecological stepping-stones or corridors for mobile species, given their widespread abundance both inside and outside the development footprint. The exceptions are linear hedgerows, treelines and watercourses, all of which act as ecological corridors.

Effects on Avifauna associated with habitat loss, disturbance or displacement and collision were assessed in detail. Unmitigated disturbance/displacement effects during construction are unlikely to be significant for all IEF bird species.

With respect to decommission phase impacts some effects are predicted to be similar to the effects described for the construction e.g. disturbance via increased noise levels, ground clearance works and reinstatement. Surface water quality could also be affected via ground disturbance, refuelling and accidental release of hazardous materials stored onsite.

A review of other plans and projects in the surrounding area was undertaken, exploring the possibility of cumulative impacts with other projects and plans on relevant Important Ecological Features. No indirect or direct cumulative impacts were identified.

16.3 Mitigation

Detailed mitigation measures are provided within the main body of the EIAR to be put in place to protect downstream water quality, birds, bats, habitats and prevent spread of invasive species. Following identified detailed mitigation to reduce possible impacts to important ecological features outlined above, the following conclusions were determined.

The NIS considered that with mitigation measures, the Project would not give rise to any appreciable effects on Natura 2000 sites.

If mitigation measures are fully applied within Coolglass Windfarm, there are not likely to be any residual significant effects on important ecological features, beyond those on kestrel and peregrine populations of very low significance, due to collision risk.

17.0 Major Accidents and Disasters

Chapter 16 of the EIAR describes the likely significant effects of the Proposed Development on the environment arising from the vulnerability to major accidents and natural disasters, potential adverse impacts on human health and the environment, the magnitude of potential impacts, the likelihood of potential impacts and considers the preparedness of the Proposed Development in case of accident, disaster or emergency.

The objective of the assessment is to ensure that appropriate precautionary actions are taken for those projects, *"because of their vulnerability to major accidents and/or natural disasters, are likely to have significant adverse effects on the environment".*

17.1 Baseline

Major accidents or natural disasters are hazards which have the potential to affect the Proposed Development and consequently have potential impacts on the environment. These include accidents during construction and operation caused by operational failure and/or natural hazards. The assessment of the risk of major accidents and/or disaster considers all factors defined in the EIA Directive that have been considered in the EIAR, i.e., population and human health, biodiversity, land, soil (peat stability), water, air and climate and material assets, cultural heritage and the landscape.

In order to assess the baseline environment, the following was carried out:

- A desk-study;
- A site visit; and
- Follow up site visit.

17.2 Potential Impacts

The assessment focused on an understanding that the Proposed Development will be designed, built and operated in line with the methodologies and measures prescribed in the EIAR. Therefore, the overall vulnerability of the Proposed Development to risks of major accidents and natural disasters is considered low.

A site-specific risk assessment identifies and quantifies risks focusing on unplanned, but possible and plausible events occurring during the construction and operation of the Proposed Development.

Risks were reviewed through the identification of reasonably foreseeable risks in consultation with relevant contributors to this EIAR (refer to Statements of Authority in Chapters 5 to 14 of the EIAR). The identification of risks has focused on non-standard but plausible incidents that could occur at or as a result of the Proposed Development during construction and operation.

After identifying the potential risks, the likelihood of occurrence of each risk has been assessed. An analysis of safety procedures and proposed environmental controls was considered when estimating likelihood of identified potential risks occurring.

Should a major accident or natural disaster occur, the potential sources of pollution onsite during the construction and operational phases of the Proposed Development are limited. The primary sources with the potential to cause significant environmental pollution and associated negative effects on human health and the environment include the bulk storage of hydrocarbons, chemicals and wastes. In the case of the Proposed Development, the storage of chemicals of this kind are very limited.

There is limited potential for significant natural disasters to occur at the Proposed Development as Ireland does not suffer from extreme temperatures like that of many countries at a similar latitude due to the dominant influence of the Gulf Stream. This provides Ireland with a mild temperate climate. Potential natural disasters that may occur are therefore limited to:

Flooding: In the event of extreme weather conditions there is potential for the Proposed Development to impact on human health in the surrounding environment due to increased surface water runoff as a result of additional impermeable surfaces. This has potential to add to flood risk which may impact on human safety (including traffic), water quality, biodiversity, soil stability, material assets and archaeological or architectural heritage. If unmitigated, the magnitude of these consequences has potential to be significant resulting in potential injury or fatality, property damage, infrastructure damage and damage to ecosystems. The risk of flooding is addressed in Chapter 9: Hydrology and Water Quality, which concludes that the Proposed Development has a minimal impact on flooding risk in the surrounding area and therefore the increased risk of flooding as a result of the Proposed Development is negligible. In the event of extreme weather conditions, the proposed surface water drainage will manage storm water avoiding significant impact on the Proposed Development's infrastructure.

Fire: In respect of fire, in May 2017 a major gorse/ground vegetation fire incident took place in proximity to the 169MW Galway Wind Park. This incident highlights fire as a potential impact for the Proposed Development, in particular, given that the majority of the site is adjacent to forestry. It should be noted that a significant number of wind farms are built within forestry in Ireland. In order to avoid impact from potential forest fires, a security management plan is in place to control the potential spread of forest fires. This is achieved

through the implementation of fire breaks within the lands and the training of staff in firefighting. Fire plans are reviewed and updated where necessary and firefighting is checked annually. Furthermore, the proposed infrastructure including turbines, substations, battery storage and met masts will be appropriately set back from the surrounding treelines.

Major incidents involving dangerous substances: Major industrial accidents involving dangerous substances pose a significant risk to human health and to the environment both on and off the site of the accident. The Health and Safety Authority (HSA) of Ireland list all upper and lower tier SEVESO establishments throughout Ireland. The Proposed Development site is not close to any site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations i.e. SEVESO site, that would fall within the consultation radius distance from a SEVESO site as per Development Plan policy.

Catastrophic events: Potential catastrophic events associated with operational wind turbines include:

- Wind turbine toppling (due to foundation or tower failure);
- Wind turbine rotational failure in extreme wind conditions (due to control system or rotor break failure); and Fire.

The primary mitigation against a catastrophic event that may endanger the health and safety of the public implemented at design stage through adequate siting of wind turbines which provide sufficient set back distances from occupied buildings and other infrastructure to avoid the risk of impact in the event of wind turbine collapse.

Landslides: Landslides pose a risk to a range of environmental receptors including human safety (including traffic), hydrology and water quality, biodiversity, land, soil, geology and hydrogeology, material assets and archaeological and cultural heritage. These impacts can have a significant to profound impact on environmental sensitivities, depending on the scale of the landslide and the receiving environment. Mitigation by design has been incorporated into the Proposed Development to avoid potential effects from landslides.

It is also envisaged that if the Proposed Development does not proceed, there will be no employment opportunities relating to the construction, operation and decommissioning of the Proposed Development, resulting in a net loss of economic activity in County Laois. No rates or development contributions will be made payable to Laois County Council by the developer and no Community Benefit Fund Scheme will be put in place in the locality.

Potential risks associated with the construction phase of the Proposed Development include:

- Severe weather;
- Flooding;
- Peat stability;
- Traffic incidents;
- Contamination;
- Discharge or spillage of fuel, chemical solvents into watercourse or percolated to groundwater; and
- Industrial accident fire, gas explosion

Potential risks associated with the operation phase of the Proposed Development include:

- Contamination;
- Industrial accident – fire / gas explosion;
- Collapse/ damage to structures;
- Traffic incident;
- industrial accident – fire/gas explosion; and
- Loss of critical infrastructure

Potential risks associated with the decommissioning phase of the Proposed Development include:

- Severe weather;
- Flooding of site;
- Traffic incident;
- Contamination
- industrial accident – fire/gas explosion; and
- Loss of critical infrastructure

The highest-risk scenario regarding the occurrence of major accidents or disasters in the construction, operation, and decommissioning phases of the Proposed Development is identified as 'Contamination' of the site and the risk of an 'Industrial Accident - Fire/Gas Explosion'.

17.3 Mitigation

The design and construction of the Proposed Development adhere to the best practices outlined in the EIAR, incorporating mitigation measures to address the risk of major accidents or disasters. The application for the Proposed Development includes a comprehensive Construction Environmental Management Plan (CEMP), which outlines the environmental controls to be implemented on-site. Within the CEMP, an Emergency Response Plan (ERP) is included, which outlines the procedures to be followed in the event of emergencies related to health and safety or environmental protection.

The likelihood of a significant accident or disaster occurring during the construction of the Proposed Development is deemed to be minimal. It is anticipated that the implementation and strict adherence to the mitigation and monitoring measures outlined in the Construction Environmental Management Plan (CEMP) will effectively eliminate any significant residual impacts related to the construction, operation, and decommissioning of the Proposed Development.

18.0 Site Selection and Alternatives

Accordingly, this EIAR is for the development of a wind farm. Part of the selection process is the proximity of the Proposed Development to a suitable substation point. Once the Site was identified, a number of potential cable routes are analysed through a number of factors such as substations with sufficient capacity, length, population centres and terrain before the best route is selected.

This chapter has particular regard to the environmental considerations which influenced the selection of alternatives for the Proposed Development and details the evolution of the development through alternatives considered, indicating the main reasons for selecting the chosen option taking into account the effects of the Proposed Development on the environment.

The alternatives considered have been described in line with the draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Published May 2022).

The section also details non-environmental factors of the development process that are relevant to the evolution of the Proposed Development.

The reasonable alternatives considered in undertaking this EIAR were therefore as follows:

- 'Do Nothing' alternative.
- Alternative locations;
- Alternative technologies;
- Alternative design and layouts;
- Alternative cable routes;
- Alternative haul routes; and
- Alternative forestry replant lands.

Each of these alternatives were considered relevant to the Proposed Development and its specific characteristics and are discussed in further detail below, including an assessment and comparison of likely significant environmental effects, and indicating the main reasons for choosing the Proposed Development Site. The primary macro level considerations in the identification of a broad area for wind energy development included the following considerations:

1 Identification of environmental designations on a National Scale;
2 Identification of areas of built Wind Farms in Ireland;
3 Identification of Grid Capacity and Electricity Infrastructure;
4 Assessment of National Transmission Loss Adjustment Factor and Generator Transmission Uses or System Change;
5 Population Density; and
6 Relevant International, National and Regional Policies.

The final site selection of the Proposed Development was influenced by a number of factors including landscape / land use, access and infrastructure, environmental considerations, population density and constructability.

- Landscape / land use: The receiving environment for the Proposed Development is an upland area which is common through the midlands of Ireland. The subject site lies within upland areas with topography varying c. 100m across the site. It is characterised by commercial forestry plantation and areas of agricultural land and naturalising scrub. The site and its immediate environs are located within a landscape typical of the midlands area.

- Access and Infrastructure: It is preferred to use sites with good access and existing infrastructure in the form of internal roads. The subject site is easily accessible by the M7, M9 and the regional and local road network. A detailed study of the turbine delivery route has been carried out for the permitted wind farm and is contained in Volume III of this EIAR. Existing internal site access tracks have been used where possible, however; some new site access tracks have been added.
- Environmental Considerations: Prior to the grant of planning permission, two no. years of bird surveys and ecological site walkovers were undertaken in the vicinity of and within the confines of the Proposed Development site. The proposed site layout avoids direct impacts on designated archaeological sites and contains no peat across the site.
- Population Density: the receiving environment for the Proposed Development is considered low to medium density in comparison to Counties Carlow and Kildare. The subject site is located in a pocket of low to medium density south of population centres such as Portlaoise, northwest of population centres such as Carlow and west of higher density commuter counties such as Kildare.
- Constructability: Due to the proximity to the national road network and absence of peat, the site is considered feasible from a constructability point of view. Based on the above and the proximity of the site to both the permitted Pinewoods and Coolnabacky Substations (approximately 10km each from the site), the applicant arrived within the environs of the now permitted site.

18.1 Alternatives

There are a number of renewable energy technologies available for use in Ireland, most notably bio energy, wind, solar PV, hydrogen, offshore wind, tidal and wave energies. However, very few of these technologies are efficient at the subject site.

Strategic site selection to avoid intrinsic environmental sensitivity is the principal mitigation option for onshore wind energy projects. Some locations have more inherent environmental sensitivities than others and an assessment of alternative locations can avoid such locations in favour of locations which have fewer constraints and more capacity to sustainably assimilate the project.

There is a well-established and widely used methodology for the selection of wind energy development locations used by developers. The methodology is based on a screening process and applying key sieve analysis criteria (not listed in order of importance), as follows:

- Available wind resource
- Land use context
- Electricity grid availability and capacity
- Residential amenity and community
- Environmental constraints (including natural and archaeological heritage)
- Landscape and visual capacity
- Accessibility
- Energy and land-use planning policies; and

- Other Factors.

In assessing alternative locations, the Developer has been particularly cognisant of the policies and objectives of the Laois County Development Plan 2021-2027 and their respective predecessor plans including the Strategic Environmental Assessment (SEA) prepared for the plan in accordance with Directive 2001/42/EC. SEA is a form of environmental assessment decided upon at a higher administrative level and adopted by the Planning Authority.

With regard to the suitability of the site location, it should be noted that the subject site, was assessed as the most suitable location for a number of reasons. Including high wind speeds, low population density and available grid capacity in the surrounding network. With respect to the receiving environment, the developer noted that there are no residential receptors within 720 metres of any proposed turbine. They also noted that after considerable assessment there would be no significant impacts in terms of matters such as visual amenities, waterbodies/watercourses, Natura 2000 sites or national monuments.

Following the identification of Coolglass as the preferred location, an iterative process was undertaken to determine the precise siting, design and layout of the wind turbines and associated infrastructure. Several alternative layouts were evaluated to consider how different elements of the project could be arranged such that there would be no likely significant effects on the environment.

The site layout was designed to minimise potential environmental impacts and to maximise the wind potential on site. The design was carried out in accordance with industry guidelines and best practice, namely the Wind Energy Development Guidelines (2006) / Draft Planning Guidelines (2019) and Irish Wind Energy Association Best Practice Guidelines (2012). The layout and design of the Proposed Development was prepared as a result of an iterative process which took account of such criteria as:

- Setback to existing/permitted residential dwellings
- Set back from village and town cores, designated sites
- Landscape and visual sensitivity
- Inter-visibility/visual clutter
- Avoidance of telecommunications links present at the general location
- Set back from other constraints such as watercourses and power lines
- Suitable wind speeds
- Ecology and Ornithology
- Soils and Geology
- Hydrology
- Noise
- Cultural Heritage

19.0 Interactions

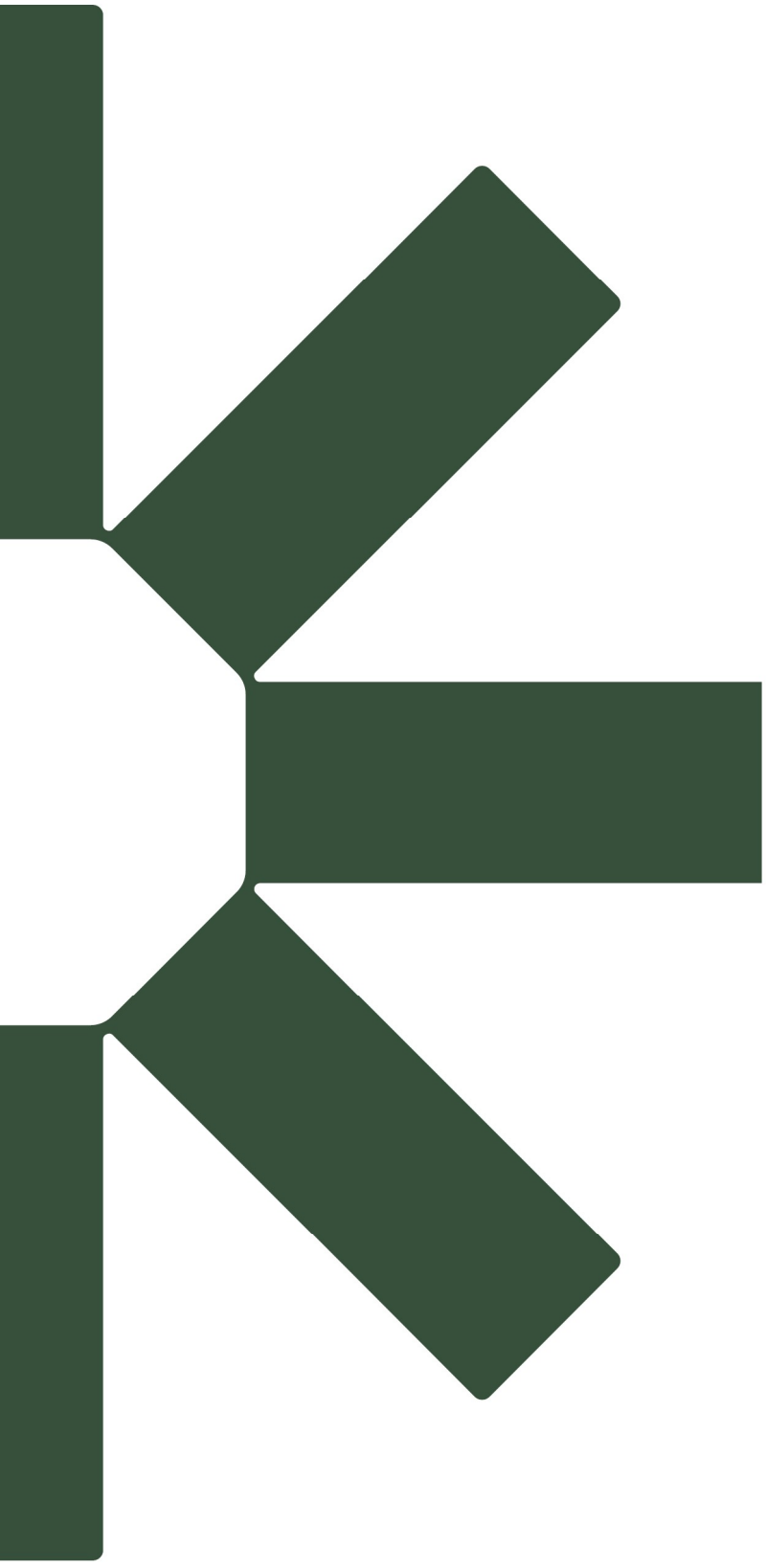
This section of the NTS considers the potential for interactions and inter-relationships between one aspect of the environment and another which can result in an impact being either positive or negative, as well as having varying levels of significance. The chapter

considers potential significant environmental effects that may occur in terms of Air Quality & Climate, Noise & Vibration, Biodiversity, Land, Soils & Geology, Hydrology & Water Quality, Population & Human Health, Material Assets, Shadow Flicker, Traffic & Transportation, Archaeology, Architectural & Cultural heritage, Landscape & Visuals and Telecommunications & Aviation, as a result of the Proposed Development as described in Chapter 3 of this EIAR.

Direct, indirect, cumulative, and interactive impacts were considered during the siting of the proposed turbines and associated infrastructure in order to minimise impacts on the environmental aspects mentioned above. The interactions and inter-relationships of the potential impacts as set out throughout this EIAR are detailed in this Chapter.

Each individual chapter of the EIAR has had regard to interactions between different potential impacts. For example, Hydrology & Water Quality has had regard to potential impacts on Biodiversity; and Land, Soils and Geology has had regard to potential impacts on both Biodiversity, Hydrology & Water Quality and Traffic & Transportation.

The Proposed Development has potential to impact on various environmental aspects as detailed throughout the EIAR. There are interactions and inter-relationships between these aspects. The EIAR has considered these interactions and inter-relationships throughout the assessment, firstly through the design wind farm site, grid route and turbine delivery route, to avoid impacts where possible and also in the definition of suitable mitigation measures to minimise potential impacts. It is therefore considered that the significant impacts associated with the interactions of environmental effects outlined in this chapter will be avoided due to the implementation of mitigation measures as detailed throughout the EIAR.



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