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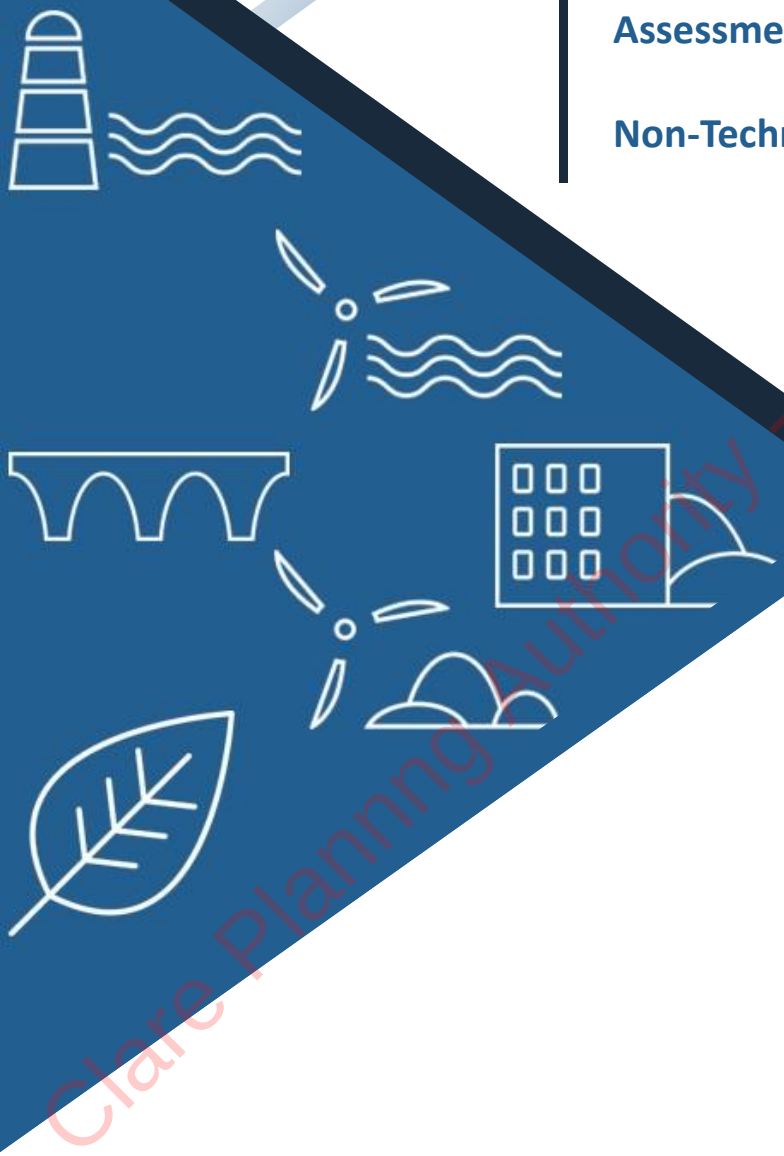
GEOSOLUTIONS

Illaunbaun Wind Farm - Environmental Impact Assessment Report (Volume I)

Non-Technical Summary



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ACRONYMS

ABP	An Bord Pleanála
AOD	Above Ordnance Datum
ATC	Automatic Traffic Count
BS	British Standard
BRE	Building Research Establishment
CA	Competent Authority
CEMP	Construction Environmental Management Plan
CTMP	Construction Traffic Management Plan
DCC	Dublin City Council
DECC	Department of the Environment, Climate and Communications
EC	European Commission
EIAR	Environmental Impact Assessment Report
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ESB	Electricity Supply Board
EU	European Union
GSI	Geological Survey of Ireland
GWDTE	Groundwater Dependent Terrestrial Ecosystem
HGV	Heavy Goods Vehicle
HIA	Health Impact Assessment
IAQM	Institute of Air Quality Management
IBA	Important Bird Area
IEMA	Institute of Environmental Management and Assessment
mOD	Metres above Ordnance Datum
NHA	Natural Heritage Area
NIS	Natura Impact Statement
NRA	National Roads Authority
OPR	Office of the Planning Regulator
pNHA	Proposed Natural Heritage Area
PSMP	Peat and Spoil Management Plan
PSRA	Peat Stability Risk Assessment
PWS	Public Water Supply

SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SHMP	Species and Habitats Management Plan
SID	Strategic Infrastructure Development
SPA	Special Protection Area
TDR	Turbine Delivery Route
TII	Transport Infrastructure Ireland
UNECE	United Nations Economic Commission for Europe
USEPA	United States Environmental Protection Agency
ZoI	Zone of Influence

GLOSSARY OF TERMS

Term	Definition
Baseline scenario	The current state of the environment, including evident trends in status, against which changes are assessed.
Borrow pit	An excavation created to provide material (e.g. stone or gravel) for construction works.
Competent Authority (CA)	The body responsible for making decisions on a development consent application (in Ireland, An Bord Pleanála for SIDs).
Cumulative effects	Combined effects from multiple projects or multiple minor effects that together become significant.
Do-nothing scenario	The future state of the environment if the proposed project is not developed.
Effect	The consequence of an impact on a receptor (e.g., health effect from increased noise).
Espoo Convention	The UNECE Convention on Environmental Impact Assessment in a Transboundary Context (1991).
Impact	A change resulting from an action of the project (e.g., noise generation).
Imperceptible effect	A change capable of measurement but without meaningful environmental consequence.
Interactive effects	The combined impact of multiple project effects acting on a single receptor, with spatial or temporal overlap.
Mitigation hierarchy	A framework of measures to avoid, minimise, restore, and, if necessary, offset environmental impacts.
Natura 2000 sites	A European ecological network of SACs and SPAs designated under EU legislation.
Receptor	An environmental or social feature that can be affected by project impacts (e.g., watercourse, human population).
Residual effects	Environmental effects that remain after mitigation has been implemented.
Sensitivity (of receptor)	The potential of a receptor to be significantly affected, considering factors like legal protection and resilience.
Significance (of effect)	The importance of an environmental effect, determined by combining the magnitude of the impact with receptor sensitivity.
Source-pathway-receptor model	Conceptual model describing how an activity (source) can cause an impact via a pathway to a receptor.

Strategic Infrastructure Development (SID)	Developments considered of strategic importance, assessed directly by An Bord Pleanála under Section 37E.
Transboundary effects	Environmental impacts that extend across national borders.
Zone of Influence (ZoI)	The spatial area within which potential effects of a project may occur.

1 INTRODUCTION

This Environmental Impact Assessment Report (EIAR), along with supporting documentation, has been prepared by Gavin and Doherty Geosolutions Ltd. on behalf of JC Mont-Fort Holding SA. It supports an application for planning permission and associated consent for the construction and operation of the Illaunbaun Wind Farm Project (hereinafter referred to as the Proposed Development). The EIAR forms part of the development consent application submitted to Clare County Council for approval.

The Proposed Development comprises:

- Construction of six wind turbines with a maximum overall blade tip height of 150 m.
- Construction of associated turbine foundations, crane pad hardstand and assembly areas.
- Construction of one permanent 38 kV electrical on-site substation with one control building with welfare facilities, all associated electrical switchgear, security fencing, underground cabling, drainage infrastructure, and all ancillary works.
- All associated internal underground electrical and communications cabling connecting the wind turbines to the on-site Substation.
- Upgrade of existing tracks, roads and provision of new site access roads to facilitate construction & operation of the wind farm.
- Two borrow pits.
- Three peat repository areas for peat & spoil management.
- Construction of one temporary construction compound.
- Development of internal site drainage.
- Permanent & Temporary tree felling to accommodate the construction & operation.
- Signages and
- All associated site development works.

The planning application for the Proposed Development will be made to An Bord Pleanála under Section 37E of the Planning and Development Act 2000 (as amended).

This document is a non-technical summary of the information contained within the EIAR.

1.1 SITE LOCATION

The Proposed Development is situated approximately 4.2 km northeast of Milltown Malbay in County Clare, within an area characterised by coniferous forestry and open peatland (Figure 1-1). The proposed planning boundary encompasses approximately 37 hectares, with surrounding landscape comprises a mix of agricultural land, low-density residential development and commercial forestry.

The site lies approximately 2.9 km from the west coast of County Clare and 5.2 km southeast of Lahinch, encompassing the townlands of Tooreen, Slievenalicka, Illaunbaun, Lackamore, and Drumbaun.

Topographically, the site elevation ranges from 115 m above Ordnance Datum (mOD) in the east, rising to just over 200 mOD in the west and north, where two distinct hills are present. Lough Keagh, located in the southern portion of the site, lies between 180 mOD and 185 mOD.

The Proposed Development is drained by four watercourses, identified by the Environmental Protection Agency (EPA) as Illaunduff, Ballinphonta, Drumbaun, and Derrymore. Additionally, historical mapping indicates the presence of Lough Abullaunduff, which is no longer apparent in the current landscape as observed in satellite imagery. It is likely that this waterbody was drained in the past.

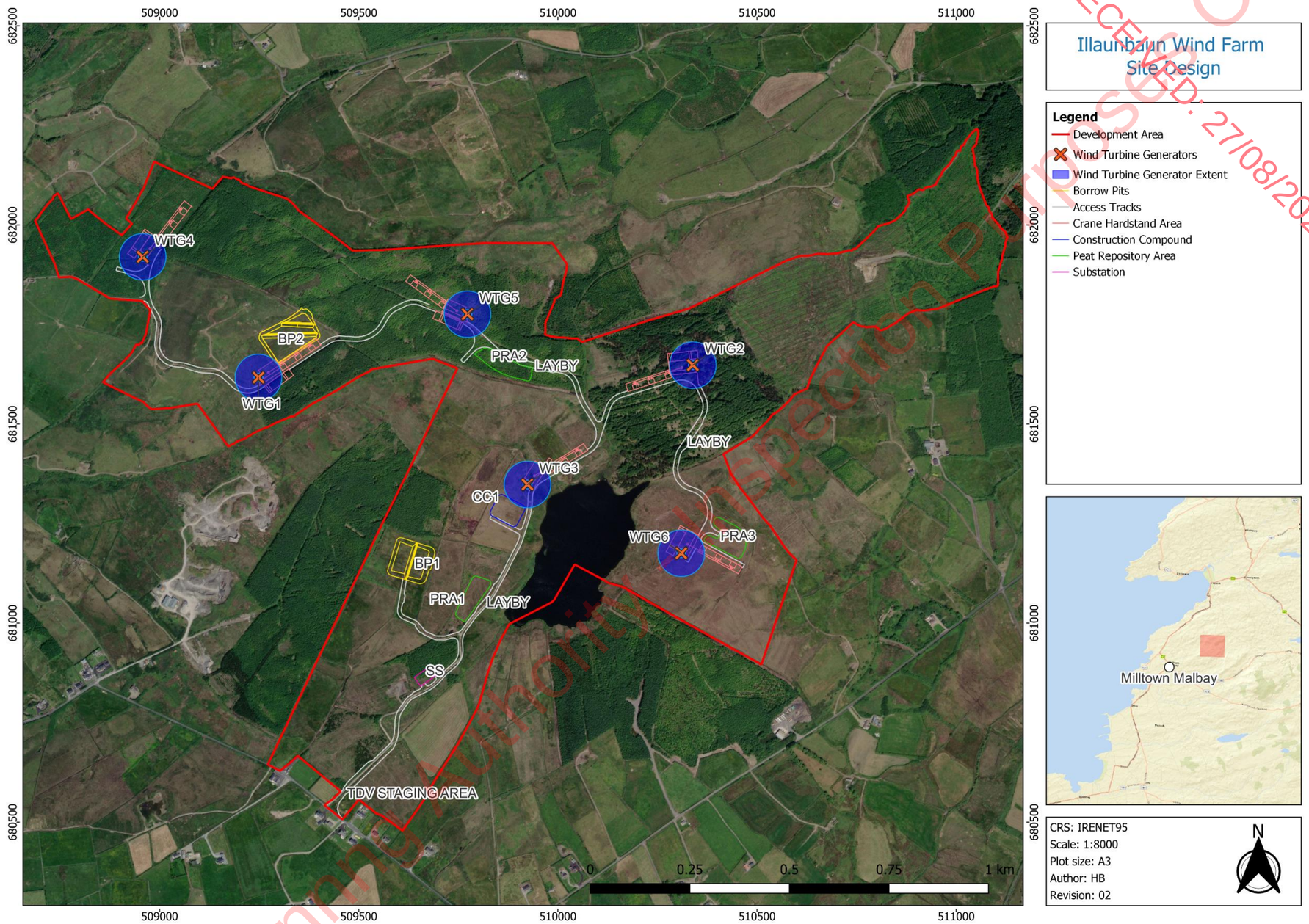

Figure 1-1: Site Layout Plan

1.2 THE REQUIREMENT FOR AN EIAR

As the Proposed Development exceeds the relevant EIA threshold outlined in the Planning and Development Regulations, 2001 (as amended), Schedule 5, Part 2, Class 3(I), which is "*Installations for the harnessing of wind power for energy production (wind farms) with more than 5 turbines or having a total output greater than 5 megawatts*", the undertaking of an Environmental Impact Assessment is required.

As required, JC Mont-Fort Holdings SA Ltd. have commissioned the preparation of an EIAR to accompany the planning application for the Proposed Development.

1.3 SCOPING AND CONSULTATIONS

The scoping stage of the EIA process is a crucial step as this determines the contents and extent of information contained in the EIAR. The scoping stage of the EIA process involves consultation with the relevant authorities and stakeholders to ensure the EIAR contains an appropriate level of detail. As part of the scoping stage of the EIAR, GDG prepared a Scoping Consultation Document which provided an overview of the Proposed Development, the project scope, and an overview of the baseline environment for each environmental factor as listed in the EIA Directive, in addition to the proposed assessment methodology and potential significant effects. The Scoping Consultation Document and a covering letter was sent to the following list of consultees in December 2024:

- An Taisce – The National Trust for Ireland
- Bat Conservation Ireland
- Birdwatch Ireland
- Botanical Society of Britain & Ireland
- Chambers Ireland and Local Chambers of Commerce
- Clare County Council
- Commission for Railway Regulation
- Commission for Regulation of Utilities
- Community Groups and Associations
- Construction Industry Federation
- Dublin Airport Authority
- Department of Agriculture, Food and The Marine
- Department of Defence
- Department of Environment, Climate and Communications
- Department of Housing, Local Government and Heritage
- Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media

- Department of Transport
- Eastern and Midland Regional Assembly
- Eastern and Midlands Climate Action Regional Offices
- EirGrid
- Enterprise – Translink Rail
- Enterprise Ireland
- Environmental Interest Groups
- Environmental Protection Agency
- ESB Networks
- Fáilte Ireland
- Gas Networks Ireland
- General Public
- Geological Survey of Ireland
- Health and Safety Authority
- Health Service Executive
- IDA Ireland
- Irish Air Corps
- Irish Aviation Authority
- Irish Business and Employers Confederation
- Iarnród Éireann
- Irish Tourist Industry Confederation
- Arts Council
- Minister for Agriculture, Food and The Marine
- Minister for Defence
- Minister for Enterprise, Trade and Employment
- Minister for Environment, Climate and Communications
- Minister for Heritage and Electoral Reform
- Minister for Housing, Local Government and Heritage
- Minister for Local Government and Planning
- Minister for Rural and Community Development

- Minister for Transport
- National Monuments Service
- National Parks and Wildlife Service
- National Roads Authority
- National Transport Authority
- Office of Public Works
- Sustainable Energy Authority Ireland
- The Heritage Council
- Transport Infrastructure Ireland
- Uisce Éireann / Irish Water
- Waterways Ireland

Chapter 6 of the EIAR includes a summary of the comments received and how they were considered whilst preparing the EIAR.

1.4 PURPOSE OF THE EIAR

An EIAR is defined in the Planning and Development Act (2010) as 'a report of the effects, if any, which proposed development, if carried out, would have on the environment'. An EIAR 'shall include the information specified in Annex IV of the Environmental Impact Assessment Directive'.

An EIAR is prepared by the developer and is submitted to the Competent Authority (CA) as part of the consent process.

This EIAR presents the results of a systematic analysis and assessment of the significant effects of the proposed Illaunbaun Wind Farm Project on the receiving environment. The focus and scope of the EIAR and all supporting technical studies has been developed in full consultation with statutory and non-statutory stakeholders undertaken throughout the EIA process (as described in Chapter 6 of the EIAR).

1.5 EIA APPROACH

All works have been assessed under a single EIA process which is presented below. This EIAR has been prepared to inform the process illustrated in Figure 1-2 below.

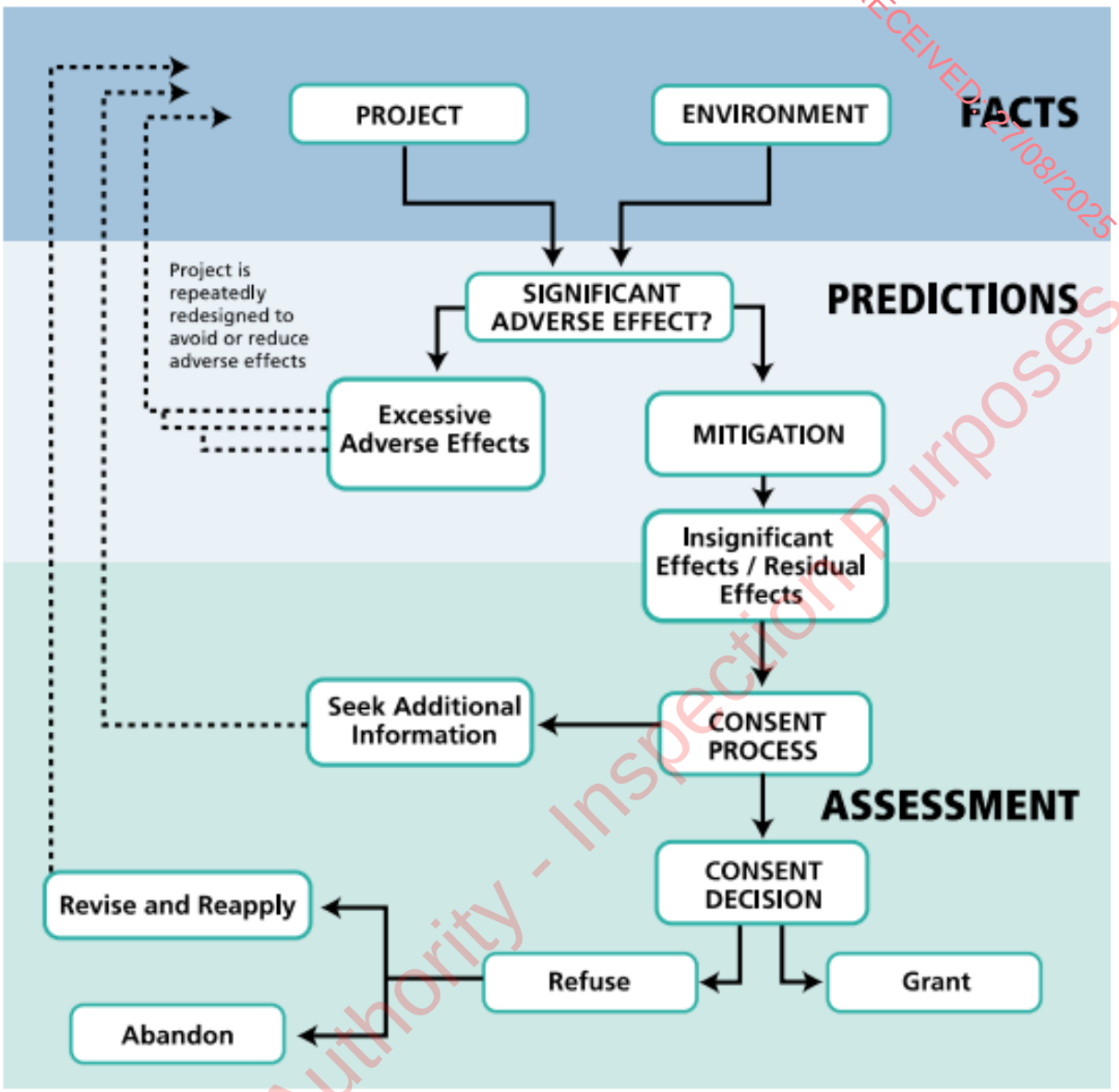

Figure 1-2: EIA Process flow chart (EPA, 2022)

The starting point for the EIAR is assessing the current state of the environment to determine the 'baseline scenario'.

1.5.1 BASELINE ENVIRONMENT

"The 'baseline scenario' is the current state of environmental characteristics, including any evident trends in status" (EPA, 2022).

Baseline studies have been completed for each of the EIA topic areas that were required to be considered as part of this assessment. The following sources of information have been utilised in the compilation of baseline data:

- Desk based studies, making use of publicly available reports and scientific data;

- Stakeholder engagement and consultation, to identify additional data sources and information (see Chapter 6: Project Scoping and Consultation for full details of scoping and consultation undertaken and how this has informed the EIAR); and
- Site surveys and monitoring.

Full details of the data sources utilised, and survey and monitoring methods employed for each topic are provided within the topic-specific sections of this report.

The baseline information obtained has been used to provide an understanding of the value of each environmental receptor, and its sensitivity to the potential impacts associated with the construction of the Proposed Development. This information has been used to assess the significance of the effects predicted to be caused by the proposed construction and operation activities.

1.5.2 DO-NOTHING SCENARIO

The baseline scenario has been determined with due consideration of the 'do nothing' scenario.

"The 'do nothing' scenario is the environment which would exist if the proposed project were not developed" (EPA, 2022).

The 'do nothing' scenario takes account of the continuation or change of current management regimes, as well as the continuation or change of trends currently evident in the environment. While some aspects of the baseline are unlikely to change under the 'do nothing' scenario (e.g., archaeology), others will (e.g., water quality), even without the introduction of the Proposed Development. Therefore, the effects of different stages of the proposed project are assessed against the likely future receiving environment, including where changes are likely in the absence of the project.

1.5.3 IMPACTS, EFFECTS, RECEPTORS AND RESOURCES

"Impacts and effects are changes resulting from the implementation of a project" (EPA, 2022).

Although the terms 'effect' and 'impact' are often used interchangeably, the definitions of both terms vary depending on which literary source is referenced and may vary depending on the individual receptor or parameter assessed.

For this EIAR, 'impacts' are defined as *the changes resulting from an action*, and 'effects' are defined as *the consequences of impacts*.

A receptor is any environmental or other defined feature (e.g., human beings) that is sensitive to, or has the potential to be, affected by an impact.

There are different types of effects, as described in the EIAR Guidelines (EPA, 2022) including:

- Indirect effects – *Effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway*.
- Cumulative effects – *The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.*

- 'Do-nothing' effects – *The environment as it would be in the future should the subject project not be carried out.*
- 'Worst-case' effects – *The effects arising from a project in the case where mitigation measures substantially fail.*
- Indeterminable effects – *When the full consequences of a change in the environment cannot be described.*
- Irreversible effects – *When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.*
- Residual effects – *The degree of environmental change that will occur after the proposed mitigation measures have taken effect.*
- Synergistic effects – *Where the resultant effect is of greater significance than the sum of its constituents (e.g., combination of SOx and NOx to produce smog).*

1.5.4 IDENTIFICATION OF IMPACTS & EFFECTS

The potential environmental impacts have been identified and evaluated for the Proposed Development and in combination with other plans and projects throughout construction and operation.

The conceptual 'source-pathway-receptor' model has been used to identify likely significant effects resulting from the proposed project activities on the environment and sensitive receptors within it. The purpose of the 'source-pathway-receptor' model is to establish the relationship between the impacts generated during each phase of the Project and the receptor considered at risk.

Within the 'source-pathway-receptor' model the source represents the activity or place from which an impact originates (e.g., piling); the pathway represents the route by which an impact is conveyed between a source and a receptor (e.g., noise propagation); and the receptors are components of the environment – physical/biological/cultural – that experiences the impact, resulting in an effect (e.g., marine mammals). If no 'pathway' to a receptor exists, then the potential for any impact can be screened out.

A range of 'sources' and 'pathways' can result in direct impacts on individual receptors, but also either indirectly or in conjunction with other impacts. An example of such is the potential impacts on marine mammals caused by underwater noise produced during the construction of a marine development, as noise and vibrations in the water may cause marine mammals to temporarily leave the area during these works. These indirect and inter-relationship effects can occur due to the complexity of the marine ecosystem.

For each of the environmental topics assessed, the appropriate professional guidelines for EIA have been applied and followed when considered necessary, along with any other relevant guidance documents and best practice techniques. As a result, where the standard assessment criteria and terminology set out below are not followed for a specific environmental factor, the preferred

assessment criteria that has been applied and utilised, in line with factor-specific assessment guidelines, are identified within the relevant chapter of this EIAR.

1.5.5 SENSITIVITY OF RECEPTORS AND MAGNITUDE OF IMPACTS

"Sensitivity is the potential of a receptor to be significantly affected" (EPA, 2022).

The sensitivity of a receptor is characterised by the receptor's ability to tolerate, adapt to and recover from changes in the environment. Consideration has also been given to its importance, for example, protected status.

The following sensitivity value categories have been used for this EIAR:

- Negligible
- Low
- Medium
- High
- Very High

Magnitude of an impact provides an indication of the scale of change in the environment as a result of the impact.

The following magnitude value categories have been used for this EIAR:

- Negligible
- Low
- Medium
- High

1.5.6 INTERACTIVE EFFECTS

In accordance with the EIA Directive, the EIAR has considered the potential for intra-project interactions, that is, linkages between environmental factors within the Proposed Development. A review was undertaken to determine whether effects from the project could combine to create different or more significant outcomes than those identified in the individual topic chapters. No additional significant interactive effects were identified. A summary matrix demonstrating that these potential intra-project interactions have been considered is provided in Chapter 21 of the main EIAR.

1.5.7 CUMULATIVE EFFECTS

Cumulative effects arise where the Proposed Development may interact with other existing, permitted or proposed projects to create combined impacts on a resource or receptor. In line with EPA (2022) guidance, cumulative effects have been considered for each environmental factor assessed in the EIAR. The findings are compiled in Chapter 21 of the main EIAR.

1.5.8 TRANSBOUNDARY EFFECTS

Transboundary effects relate to the likelihood of significant effects on resources and receptors which are outside of the project's national boundaries.

The need to consider transboundary impacts has been embodied by the United Nations Economic Commission for Europe (UNECE) Convention on Environmental Impact Assessment in a Transboundary Context, (referred to as the 'Espoo Convention') adopted in 1991.

The Espoo Convention requires that assessments are extended across borders between Parties of the Convention when a planned activity may cause significant adverse transboundary impacts. The Espoo Convention has been ratified by the European Union, Ireland and the United Kingdom of Great Britain and Northern Ireland.

Transboundary effects have been considered for each resource and receptor assessed.

1.5.9 NATURE OF EFFECTS

- A *positive* change improves the quality of the environment (for example, by increasing species diversity).
- A *neutral* change has no effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
- A *negative* change reduces the quality of the environment (for example, lessening species diversity).

1.5.10 SIGNIFICANCE

Significance is a core concept of the EIA Directive. Significance of an effect is, generally, determined by considering the magnitude of a predicted impact and the sensitivity of a receptor to the impact. Overall significance of an effect helps to inform the decision-maker to consider whether a project's impact can be determined to be unacceptable in its environmental and social contexts.

Significance criteria are developed based on the consideration of the sensitivity of the receptor and the magnitude of the impact. EIA focuses on the likely significant effects on the environment. Effects which fall outside of this description need not be assessed as part of the EIA process. Likely significant effects should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project.

The determination of the significance of effect incorporates and describes any uncertainty inherent within the assessment. This may arise from the data used within the assessment, the identification of activities and impacts, the confidence in determining impact magnitude and receptor sensitivity and ultimately in assigning significance levels of predicted resulting effects.

The assessment of the effect(s) on a particular resource or receptor, as a result of construction or operational activities, has been made by suitably qualified and experienced practitioner(s). Where possible, quantitative analyses were undertaken to support the assessments. Where the subject did not lend itself to quantitative analysis, qualitative analyses based on the relevant literature and

similar studies and expert judgement were utilised to provide a robust assessment. This was determined for each environmental topic, depending on the nature of the receptor.

Significance of effects has been categorised as outlined in the EPA (2022) guidance:

- *Imperceptible* – An effect capable of measurement but without significant consequences.
- *Not Significant* – An effect which causes noticeable changes in the character of the environment but without significant consequences.
- *Slight* – An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
- *Moderate* – An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
- *Significant effects* – An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
- *Very Significant* – An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
- *Profound Effects* – An effect which obliterates sensitive characteristics.

Extent and Context of Effects

- *Extent* includes the size of the area, the number of sites and the proportion of a population affected by an impact.
- *Context* can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.

Duration and Frequency of Effects

- *Duration* has been categorised as follows for this EIAR, as described in the EPA (2022) Guidelines:
    - Momentary effects – Effects lasting from seconds to minutes.
    - Brief effects – Effects lasting less than a day.
    - Temporary effects – Effects lasting less than a year.
    - Short-term effects – Effects lasting one to seven years.
    - Medium-term effects – Effects lasting seven to fifteen years.
    - Long-term effects – Effects lasting fifteen to sixty years.
    - Permanent effects – Effects lasting over sixty years.
    - Reversible effects – Effects that can be undone, for example through remediation or restoration.
- *Frequency* has been categorised as follows for this EIAR (note hourly, daily, weekly, monthly and annually are also used, where relevant):
    - Once
    - Rarely
    - Occasionally

- Frequently
- Constantly

1.5.11 ASSESSMENT OF SIGNIFICANCE OF EFFECTS

Each potential impact has been assessed in terms of its magnitude and in the context of the receptor's sensitivity or value, resulting in a prediction of the level of significance of the resulting effect. Thus, a determination of whether significant effects will result was made.

Effects determined as moderate or lower will be considered to have no likely significant effect, unless they are determined to have likely significant effects when combined with other effects.

As illustrated in Table 1-1 and Figure 1-3, the environmental assessment undertaken characterises the magnitude of the impacts identified in the context of the sensitivity of the receptors to then determine the level of significance of the effects.

Table 1-1: Illaunbaun Wind Farm Project EIAR Effect Significance Matrix, according to (EPA, 2022)

		Magnitude			
		High	**Medium**	**Low**	**Negligable**
Sensitivity	**Very High**	Profound	Very Significant	Significant	Moderate
	High	Very Significant	Significant	Moderate	Slight
	Medium	Significant	Moderate	Slight	Not Significant
	Low	Moderate	Slight	Slight	Imperceptible
	Negligable	Slight	Not Significant	Imperceptible	Imperceptible

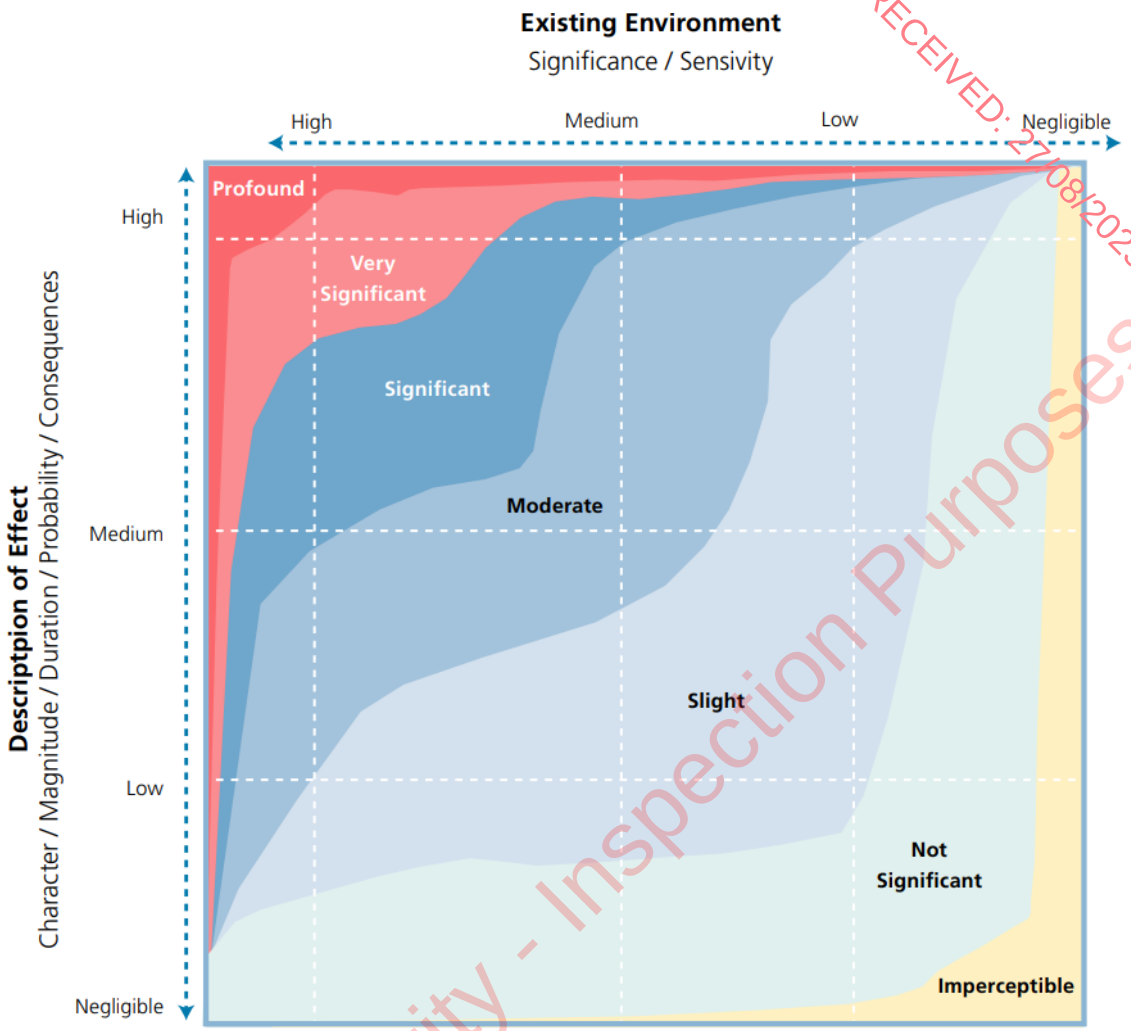

Figure 1-3: Determining the significance of the effect by comparing the character of the predicted effect to the sensitivity of the receiving environment (EPA, 2022)

1.5.12 MITIGATIONS AND RESIDUAL EFFECTS

Annex IV (7) of the Amended Directive states that an EIAR should include 'a description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example, the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.'

Mitigation measures that are incorporated into the design (i.e., primary mitigation) are intended to prevent, reduce and where possible offset any significant adverse impacts on the environment. These are effectively 'built in' to the impact assessment and as such, this assessment includes consideration of these measures irrespective of their significance, to assist in reducing all effects.

Where potentially significant adverse effects have not been eliminated by project design or embedded mitigation, further mitigation measures may be required (i.e., secondary mitigation).

These measures have been informed by stakeholder engagement and determined by the relevant technical experts.

For each significant effect identified, appropriate secondary mitigation measures are prescribed. Where relevant, residual effects have been determined for each significant effect, considering all proposed mitigation.

1.5.13 MONITORING

Where potential residual effects are uncertain, or the success of implemented mitigation measures requires validation, monitoring programmes may be necessary.

1.6 THE EIAR TEAM

Article 5(3)(a) of the 2014 EIA amended Directive requires that "the developer shall ensure that the environmental impact assessment report is prepared by competent experts" to ensure the completeness and quality of the EIAR.

GDG, with support from external consultants, has carried out the Environmental Impact Assessment (EIA) and prepared this EIAR on behalf of JC Mont-Fort Holding SA for the Illaunbaun Wind Farm. GDG has applied the most up-to-date and appropriate scientific methods and assessment procedures to ensure the accurate interpretation of environmental data Table 1-2 shows the contributors to the production of the EIAR, including providers of supporting studies.

Table 1-2 List of external consultants that have contributed to the EIAR

Chapter Number	Chapter	Specialist Company
8	Biodiversity & Ornithology	Inis Environmental Consultants Ltd
11	Air Quality	AWN
12	Climate	AWN
13	Noise and Vibration	Irwin Carr Consulting
14	Shadow Flicker	Macro Works
15	Landscape and Visual Impact	Macro Works
16	Archaeological and Cultural Heritage	Courtney Deery Heritage Consultancy Ltd.
19	Traffic and Transport	Systra
20	Forestry	Veon Ltd

2 THE PROPOSED DEVELOPMENT

2.1 BACKGROUND TO THE PROPOSED DEVELOPMENT

The Proposed Development is proposed with the intention to support Ireland Nationally, and Clare locally in achieving the goals outlined in the European and National policy on climate change and reduction in carbon emissions.

The County Clare Council Wind Energy Strategy (2023), is a component of the Clare County Development Plan 2023 – 2029, and has designated areas in County Clare for the purpose of wind energy development. The Proposed Development lies within the designated areas outlined in the County Clare Council Wind Energy Strategy (2023) and supports the objectives of Wind Energy Strategy One (WES One) of this report, which are:

- *"It is the objective of the Council to support, in principle and in appropriate scales and locations, the development of wind energy resources in County Clare."*
- *"It is an objective of the Council to ensure the security of energy supply by accommodating the development of wind energy resources in appropriate areas and at appropriate scales within the County."*

Support for onshore renewable energy was clearly set out in the Climate Action Plan 2023 (DECC, 2022) with ambitious targets of at least 9GW of onshore renewable wind in operation by 2030.

The planning application for the Proposed Development will be made to Clare County Council under Section 37E of the Planning and Development Act 2000 (as amended). The application is for a 10-year duration planning permission and a 35-year operational life from the date of commissioning of the entire wind farm.

2.2 PROJECT DESCRIPTION

The Proposed Development includes the construction, operation and decommissioning of a wind energy development consisting of six wind turbine generators with foundations and crane pad hardstanding areas an on-site 38kV substation and associated underground cabling.

2.2.1 PROJECT ELEMENTS

The Proposed Development is comprised of:

- Six, three-blade wind turbines with a tip height of 150 m and a hub height of 91.5 m. Within this height range, various configurations of rotor diameter, and ground-to-blade-tip height may be utilised. The specific make and model of the turbine will be determined through a competitive tender process, but the tip height will not exceed 150 metres.
- Each turbine will have a reinforced concrete foundation installed below the finished ground level. The size and shape of the foundation will be determined by the turbine manufacturer based on the site's geotechnical conditions, with the final turbine selection being subject to a competitive tender process.

- Hard-standing areas, consisting of levelled and compacted hardcore, around each turbine base to support access, turbine assembly and erection. These areas are typically used for crane operations involved in the assembly and erection of the turbine, as well as for the offloading and storage of turbine components, providing a safe and level working environment around each turbine location.
- To provide access within the site of the Proposed Development and to connect the wind turbines and associated infrastructure existing tracks will need to be upgraded and new access roads will need to be constructed. Due to the ground conditions, new access tracks proposed on site are proposed to be founded. The typical make-up of the founded access tracks is a minimum stone thickness of 500mm. The requirement for a layer of geotextile and geogrid and the necessary stone thickness will be confirmed during site engineering.
- Two borrow pits, the first, Borrow Pit 1 (BP1) is located approximately 280 m to the southwest of turbine 3 (T03), measuring approximately 10,263 m^2 in area and is intended to supply hardcore materials for the construction of access roads, the grid connection, temporary construction compound and the handstand. Borrow Pit 2 (BP2) located approximately 72 metres to the north of T01, measures approximately 7,848 m^2 in area and is intended to supply hardcore materials for the construction of access roads there, the grid connection, temporary construction compound and the hardstand.
- A 38kV substation located adjacent to an existing access road. The substation compound will occupy 1,483 m^2. The substation will be enclosed by a 2.4-metre-high steel palisade fence, following standard ESB guidelines. Internal fencing will also be used to segregate different areas within the compound.
- A wind farm control building will be situated within the substation compound. The wind farm control building will cover an area of 101m^2.
- Each turbine will be connected to the on-site electrical substation via underground cables with a voltage level at 38 kV. In addition to these, fibre-optic cables will link each wind turbine to the wind farm control building within the substation compound. These cables will be installed in ducts approximately 1.3 m below the ground surface, running along the edges of the roadways. The cable ducts will follow the access tracks to each turbine location.
- The Proposed Development includes a single temporary construction compound, located south of Turbine 3 (T03). The compound will measure 80 m by 50 m, with a total area of 4,000 m^2. The compound will include temporary site offices, staff facilities, and car parking areas for staff and visitors.

2.2.2 ALTERNATIVES

During the initial design of the Proposed Development, consideration was given to potential alternative locations, alternative site designs and site access routes. These alternatives included consideration of the do-nothing scenario. The assessment of alternatives can be found in Chapter 4 of this EIAR.

2.2.3 CONSTRUCTION PHASE

To accompany this EIAR, an outline Construction Environmental Management Plan (oCEMP) has been prepared as an appendix to this EIAR. The oCEMP describes the key environmental management measures which should be implement during the construction, operation and decommissioning of the Proposed Development.

The oCEMP acts as a guide for the final CEMP which will be developed by the lead contractor(s) once they have been assigned to the Proposed Development.

Construction of the Proposed Development is estimated to take 12 months. General working hours are expected to be between 07:00 and 19:00 on weekdays and 07:00 and 12:00 on Saturdays which means that staff will predominantly arrive and depart outside the peak hours associated with the surrounding road network.

2.2.4 OPERATIONAL PHASE

The Proposed Development is expected to have an operational lifetime of 35 years. Maintenance of all turbines and onsite infrastructure will be undertaken throughout the operational phase of the Proposed Development. During regular operation, the turbines will operate automatically, responding by means of anemometry equipment and control systems to changes in wind speed and direction. The turbines and on-site infrastructure will be routinely maintained according to the manufacturers guidance manual for each component.

3 ENVIRONMENTAL FACTORS SUMMARY

3.1 POPULATION AND HUMAN HELATH

This chapter of the Environmental Impact Assessment (EIA) Report presents the assessment of the likely significant effects (as per the "EIA Regulations") of the Proposed Development on Population and Human Health arising from the construction and operation of the Proposed Development, both alone and cumulatively with other plans and projects. This chapter was informed by the Proposed Development EIA Scoping Report, which was issued to the several topic-relevant stakeholders listed in Section 1.2 of Chapter 5 (Project Scoping & Consultation).

The assessment presented in this chapter has been informed by the following chapters:

- Chapter 11: Air Quality
- Chapter 12: Climate
- Chapter 13: Noise and Vibration
- Chapter 15: Landscape and Visual Impact
- Chapter 17: Material Assets
- Chapter 19: Traffic and Road Transport

This chapter provides a summary of topic-relevant guidance and outlines the data sources used to characterise the Population and Human Health baseline. Building on the general EIAR methodology outlined in Chapter 1 of the EIAR, the topic-specific methodology followed in assessing the impacts of the Proposed Development on topic-specific environmental receptors is set out, as is the assessment of likely effects on the topic-specific receptors arising from the construction and operation of the Proposed Development. Relevant mitigation measures, following the 'mitigation hierarchy' of avoidance, minimisation, restoration and offsets, and/or monitoring requirements, are proposed in respect of any significant effects, and a summary of residual impacts is provided.

3.1.1 BASELINE ENVIRONMENT

Population, Land Use, and Employment

- **Population Growth**: County Clare's population grew by 8.1% between 2016 and 2022, reaching 127,419 people. Locally, the small communities of Ballyvaskin and Moy also experienced modest population increases.
- **Demographics**: The average age in Clare rose to 40.1 years, and the number of people over 65 increased by 23%, reflecting a national trend of an aging population.
- **Employment**: Clare saw a 13% rise in employment between 2016 and 2022, slightly below the national increase. Key sectors include education, healthcare, agriculture, construction, and public services.

- **Settlement Patterns**: The proposed wind farm will be located across private and forestry land in a rural area with scattered housing and some farmland.

Human Health and Wellbeing

- **Self-Reported Health**: In 2022, 83% of Clare's residents rated their health as good or very good, down slightly from 87% in 2016.
- **Health Profile**: The most recent health data from 2015 indicated that Clare had the highest national rate of female breast cancer, but lower than average rates for overall cancer mortality and teenage birth rates.
- **Noise and Air Quality**: Background noise levels were measured at several local locations and were found to be within acceptable limits. Air quality in the area is good and well below national pollutant limits.

Amenities and Cultural Heritage

- **Visual and Recreational Access**: There will be no direct impact on major tourist or recreational sites like those in Miltown Malbay, which is nearby but outside the development area.
- **Cultural Sites**: There are no national monuments or protected structures within the development boundary. A small number of archaeological sites are nearby but not within the direct footprint of the development.

Socio-Economic and Community Infrastructure

- **Socio-Economic Status**: The study area has mixed affluence levels—Ballyvaskin slightly above average, Moy slightly below.
- **Education**: There are three schools within the local area.
- **Transport**: The site is accessible via regional and local roads, mainly the N85 and R460. Construction traffic will follow designated routes to minimize disruption.
- **Infrastructure**: There is limited existing infrastructure in the area. One electrical mast is nearby, but no gas lines or water/wastewater systems are located within 1 km of the site.

Sensitive Receptors

- **Local Residents**: Nearly 100 nearby homes and community sites were considered in noise and air quality assessments.
- **Traffic Users**: Local pedestrians, cyclists, and motorists are considered sensitive to increased traffic during construction.

Air Quality: While current air quality is good, local residents are considered sensitive to any potential deterioration, particularly during construction activities.

3.1.2 ASSESSMENT METHODOLOGY

As recommended by the EPA (2022), the assessment of the impacts on population and human health has been informed by assessments of the factors under which human health effects might occur as addressed elsewhere in the EIAR. This chapter of the EIAR therefore draws on information presented in the following chapters:

- Chapter 11: Air Quality
- Chapter 12: Climate
- Chapter 13: Noise and Vibration
- Chapter 15: Landscape and Visual Impact
- Chapter 17: Material Assets
- Chapter 19: Traffic and Road Transport

The assessment of effects on human health described below has been provided to satisfy the EIA Directive and does not constitute an HIA.

The assessment of significance of effects is a professional judgement based on the sensitivity of the receptor and the magnitude of any change.

The methods used for assessment of effects on population is based on the EPA Guidelines (2022), as set out in Chapter 1: Introduction and Methodology of the EIAR, the IEMA (2022) EIA guidance, and expert judgement.

3.1.3 MITIGATION MEASURES AND RESIDUAL EFFECTS (POST-MITIGATION)

3.1.3.1 CONSTRUCTION PHASE

Transport Nature and Flow Rates

In accordance with the EIA Regulations mitigation is required to address the potential effects that have been identified in the EIAR. It is therefore proposed to prepare and implement a comprehensive Construction Traffic Management (CTMP) which is intended to mitigate the identified effects by ensuring that they are minimised as far as possible within the Study Area to a level which is considered to be not significant. The CTMP will be finalised once the Main Contractor has been decided, the Main Contractor has confirmed their suppliers, and consultations have been undertaken with the Clare County Council and An Garda Síochána as necessary.

Visual Amenity

Outside of those landscape and visual mitigation measures that formed part of the iterative design process of this Development over a number of years, and which are embedded in the assessed Project, other specific landscape and visual mitigation measures are not considered necessary / likely to be effective. Thus, the impacts assessed in Section 13.4 of the EIAR are the equivalent of residual impacts in this instance.

Local Air Quality

The following dust mitigation measures shall be implemented during the construction phase of the proposed development. These measures are appropriate for sites with a medium risk of dust impacts and aim to ensure that no significant nuisance occurs at nearby sensitive receptors. The mitigation measures draw on best practice guidance from Ireland (DCC, 2018), the UK (IAQM (2024), BRE (2003), The Scottish Office (1996), UK ODPM (2002)) and the USA (USEPA, 1997). These measures will be incorporated into the overall Construction Environmental Management Plan (CEMP) prepared for the site. The measures are divided into different categories for different activities:

- Communications
- Site Management
- Preparing and Maintaining the Site
- Operating Vehicles / Machinery and Sustainable Travel
- Operations
- Waste Management
- Measures Specific to Earthworks
- Measures Specific to Construction
- Measures Specific to Trackout
- Monitoring

When the dust mitigation measures detailed in the mitigation section of this report are implemented, the residual effect of fugitive emissions of dust and particulate matter from the site will be short-term, direct, localised, negative and not significant in nature and will pose no nuisance at nearby receptors.

Best practice mitigation measures are proposed for the construction phase of the proposed development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The proposed development has been assessed as having a low risk of dust-related human health effects. The mitigation measures that will be put in place during construction of the proposed development will further ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the residual effect of construction of the proposed development will be short-term, direct, negative and not significant with respect to human health.

Noise and Vibration

No significant construction noise effects have been identified. Therefore, no specific mitigation measures are required. However, general guidance for controlling construction noise through the use of good practice given in BS 5228 will be followed. Construction and Decommissioning of the

Proposed Development shall be limited to working times given and any controls incorporated in any planning permission.

3.1.3.2 OPERATIONAL PHASE

Air Quality

During the operational phase of the proposed development, the works onsite will be limited to maintenance associated with the wind farm components. Although the intensity of activity will be only a small fraction of the construction phase, all employees and contractors that are on site will ensure that machinery used is properly maintained and is switched off when not in use to avoid unnecessary exhaust emissions from maintenance traffic.

There are no predicted direct impacts to air quality during the operational phase of the proposed development. Emissions from infrequent maintenance vehicles have been assessed as having a long-term, direct, localised, neutral and imperceptible effect on air quality.

There will be indirect beneficial impacts to air quality from the generation of renewable electricity from the proposed development. There will be NOX emission savings which may otherwise have been generated from fossil fuels. The generation of a minimum of 80 GWh of renewable electricity will result in a decrease in annual NOX emission levels by 0.1% of the 2030 National Air Emissions Target of 40.6kt. This is an indirect, long-term, imperceptible, positive effect on air quality.

Noise and Vibration

As no significant noise and vibration effects have been identified during the operational phase of the Proposed Development, no mitigation measures are necessary to be implemented.

Shadow Flicker

It is proposed that a shadow control system be installed to eliminate the potential for shadow flicker from the Proposed Development. Such systems are common in many wind farm developments and the technology has been well established. A case study in Scotland found that the use of turbine shut-down control modules for turbines which were causing shadow flicker at nearby offices was successful (Parsons Brinckerhoff, 2011).

3.2 BIODIVERSITY & ORNITHOLOGY

The Biodiversity chapter for the Proposed Development addresses potential effects on biodiversity features; specifically on habitats and species within and adjacent to the Proposed Development, and on relevant qualifying and supporting interests of nearby designated sites for nature conservation importance. Effects on these biodiversity features, which together form the 'ecological baseline' of the Proposed Development, are assessed with regard to impacts considered likely to arise during the construction and operation of the Proposed Development, both in isolation and in combination with other projects.

3.2.1 BASELINE ENVIRONMENT

The Proposed Development and adjacent land contains a range of habitats including conifer plantation, wet heath, upland blanket bog, wet grassland, lakes, buildings and artificial surfaces, and

hedgerows. Based on detailed field surveys and desk-based reviews of available information undertaken for the Proposed Development and surrounding landscape, conducted in accordance with relevant good practice guidance, the following habitats and species are identified as Important Ecological Features (IEFs) (i.e., ecological features of particular importance, requiring detailed assessment of potential effects in connection with the Proposed Development):

- Habitats: specifically wet grassland, wet heath, upland blanket bog and cutover bog;
- Linear Habitats: treelines and habitats present within the windfarm and along the TDR nodes;
- Waterbodies: rivers, streams and one small Lake;
- Raptors: specifically hen harrier, kestrel, merlin and peregrine;
- Waders and waterfowl: including golden plover and snipe;
- Gulls: including herring gull and lesser black-backed gull;
- Invertebrates: specifically marsh fritillary;
- Amphibians and reptiles: specifically common frog, smooth newt and common lizard;
- Bats: specifically lesser horseshoe bat, common pipistrelle, soprano pipistrelle, Leisler's bat, *Myotis* species and brown long-eared bat;
- Other mammals: specifically otter, badger, pine marten, red squirrel and Irish hare;
- Invasive alien plant species: including Himalayan balsam and Himalayan knotweed; and
- Aquatic species: specifically Atlantic salmon, brown trout and European eel.

Designated sites for nature conservation importance are identified as being potentially relevant to the Proposed Development. These include:

- Mid-Clare Coast Special Protection Area (SPA);
- Cliffs of Moher SPA;
- Inagh River Estuary Special Area of Conservation (SAC);
- Carrowmore Point to Spanish Point and Islands SAC;
- Slievecallan Mountain Bog Natural Heritage Area (NHA);
- Inagh River Estuary Proposed Natural Heritage Area (pNHA);
- Cragnashingaun Bogs pNHA;
- Carrowmore Point to Spanish Point and Islands pNHA; and
- West Clare Uplands Important Bird Area (IBA).

3.2.2 ASSESSMENT METHODOLOGY

The assessment methodology adopted to determine magnitude and significance of effects followed guidance from the Environmental Protection Agency (EPA) (2022), the Chartered Institute of Ecology

and Environmental Management (CIEEM) (2024), and Percival (2007). Assessment of species' sensitivities was informed by use of National Roads Authority (NRA) (2009) guidance. Relevant receptors were determined following the Office of the Planning Regulator (OPR) guidance note (2021) on applying the Source-Pathway-Receptor model.

3.2.3 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

3.2.3.1 DESIGNATED SITES

The Proposed Development, including the Turbine Delivery Route, does not overlap with any European sites (e.g., SPAs, SACs). Following analysis of potential connectivity between the Proposed Development and European sites considered to fall within the ZoI of the scheme, none were considered relevant to the wind farm element of the Proposed Development.

Whilst not a designated European site, West Clare Uplands IBA is also identified as being relevant to the wind farm element of the Proposed Development. This site is located c.3.5 km south of the Proposed Development and is designated for hen harrier. Since hen harrier activity was identified within and adjacent to the Proposed Development, detailed consideration of potential effects on hen harrier is required to avoid adversely affecting the integrity of West Clare Uplands IBA.

No NHAs or pNHAs are located in sufficiently close proximity and/or have connectivity to the Proposed Development for there to be potential for significant adverse effects.

3.2.3.2 CONSTRUCTION PHASE

Potential effects on ecological features identified during the construction phase of the Proposed Development are as follows:

- **Direct habitat loss and fragmentation**: permanent and temporary reductions to the extent, quality, and connectivity of the habitats present;
- **Disturbance and displacement**: disturbance from additional noise, dust, light, vibration, and human activity, with the potential to cause displacement;
- **Direct mortality of individuals**: fatalities or injuries to sensitive species; and
- **Pollution of habitats**: through sedimentation, and chemical and fuel spills.

Following detailed assessment of effects, taking into consideration embedded mitigation within the design of the Proposed Development, the following potentially significant effects on ecological features were identified during the construction phase:

- Direct loss and fragmentation of habitats, including habitats used (or potentially used) by hen harrier, bats and marsh fritillary, including cumulative effects (i.e., effects from the Proposed Development in-combination with other projects) on hen harrier;
- Disturbance and displacement of hen harrier, including cumulative effects.

3.2.3.3 OPERATIONAL PHASE

Potential effects on ecological features identified during the operational phase of the Proposed Development are as follows:

- **Direct habitat loss and fragmentation**: permanent and temporary reductions to the extent, quality, and connectivity of the habitats present;
- **Disturbance and displacement**: disturbance from additional noise, dust, light, vibration, and human activity, with the potential to cause displacement; notably from the presence of operational turbines;
- **Direct mortality of individuals**: fatalities or injuries to sensitive species caused by operational activities; notably potential collisions and (for bats) barotrauma effects associated with operational turbines; and
- **Pollution of habitats**: through chemical and fuel spills, especially in relation to aquatic habitats and species.

Following detailed assessment of effects, taking into consideration embedded mitigation measures within the design of the Proposed Development, the following potentially significant effects on ecological features were identified during the operational phase:

- Disturbance and displacement of hen harrier and kestrel, including cumulative effects on hen harrier;
- Kestrel collision fatalities.

3.2.4 MITIGATION MEASURES AND RESIDUAL EFFECTS (POST-MITIGATION)

3.2.4.1 CONSTRUCTION PHASE

In addition to the embedded mitigation measures taken into consideration when assessing effects during the construction phase, secondary mitigation measures are required to avoid any significant residual effects on hen harrier, bats and marsh fritillary. A detailed bespoke Species and Habitats Management Plan (SHMP) has therefore been produced to accompany this application. This provides a framework for the conservation of ecological features, specifying habitat creation and management suitable for hen harrier, bats and marsh fritillary (which will therefore also benefit other species). These measures will avoid a decrease in the extent and connectivity of suitable habitat for these IEFs. No residual effects on hen harrier, bats and marsh fritillary are therefore anticipated.

3.2.4.2 OPERATIONAL PHASE

In addition to the embedded mitigation measures taken into consideration when assessing effects during the operational phase, secondary mitigation measures are required to avoid any significant residual effects on hen harrier and kestrel. Habitat creation and management measures specified in the bespoke SHMP will ensure suitable habitat is available for hen harriers and kestrels potentially displaced by the presence of operational turbines. This habitat creation and management will provide sufficient suitable habitat for kestrel such that the resultant anticipated increase in the kestrel population this land supports will account for (or indeed exceed) any potential collision fatalities. No

residual effects on hen harrier and kestrel are therefore anticipated. The SHMP also specifies long-term monitoring to ensure the mitigation and enhancement measures specified in this EIAR chapter are satisfying their aims, and to inform any required changes to mitigation and enhancement approaches.

3.3 LANDS, SOILS, GEOLOGY AND HYDROGEOLOGY

The likely significant effects of the Proposed Development on Land, Soils, Geology and Hydrogeology are discussed in detail in Chapter 9 of this EIAR.

3.3.1 BASELINE ENVIRONMENT

Baseline conditions were summarised to establish a comprehensive understanding of the receiving environment prior to Proposed Development activities. The baseline was established through a review of a wide range of information sources, to consider the potential value of the resource through a number of different measures.

Most of the Proposed Development exhibits a mixture of topsoil, blanket peat and bedrock outcrop at topographic highs. The glacial till typically comprises a heterogenous mix of sand, gravel, cobbles, and boulders, held in an over consolidated clay matrix. The thickness of peat encountered during intrusive investigations ranges from 0m to a maximum of 4.80m with the distribution of peat depth across the site ranging from 82.7% <1m and 96.2% <2m.

Bedrock comprises sequences of Carboniferous mudstone, siltstone, and sandstone associated with the Clare Central Group, which is classified as a Locally Important 'Ll' aquifer and is contemporaneous with the Miltown Malbay GWB. Subsoil permeability across the Proposed Development is categorised as 'N/A' due to thin superficial deposits and thus groundwater vulnerability is generally categorised as a mixture of 'Extreme' and 'X – Extreme' at all turbine locations and access tracks. Vertical groundwater migration is likely to occur via diffuse and direct recharge, and groundwater flowpaths will follow typically follow topographic orientation, for example directed towards Lough Keagh in the south of the site. Groundwater recharge is limited within the aquifer, to between 150 – 200mm/yr. It is considered unlikely that there are any sensitive Groundwater Dependent Terrestrial Ecosystems (GWDTEs) within the vicinity of the Proposed Development. There are private groundwater abstractions within proximity to the site, although these are of very low yield and more than 500m from the site.

There are no recorded geological heritage sites in the site, and no karst features are present. There is high potential for crushed rock aggregate extraction on-site, and a small active quarry borders the southwest of the site boundary. The presence of peat on site may limit extraction in some areas.

The primary potential sources of contamination identified are associated with agricultural and Coillte forestry activities, although these would be expected to be small-scale and localised. In general, contamination risk at the Proposed Development is judged to be low.

3.3.2 ASSESSMENT METHODOLOGY

This chapter addresses the potential effects of the Proposed Development on land, soils, geology, hydrogeology, and potential ground contamination during the construction, operational and

decommissioning phases. The assessment follows the Environmental Protection Agency's (EPA) *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (2022).

The baseline information gathered has been used to assess the value of each receptor relevant to this study (the 'baseline scenario') and its sensitivity to potential effects from the construction, operation and decommissioning of the Proposed Development. The sensitivity of the receiving environment, the magnitude of the potential impact and consideration of its likelihood of occurring, helps to evaluate the significance of the effect predicted prior to and after application of mitigation measures. The significance of effect has been defined using professional judgement, following a clearly defined assessment process

Ground conditions were characterised through desk-based research, detailed site walkovers, peat probing, trial pits, boreholes, and laboratory testing. A Ground Investigation Report (GIR), Peat Stability Risk Assessment (PSRA), and Peat and Spoil Management Plan (PSMP) were prepared to inform the assessment.

3.3.3 POTENTIAL EFFECTS OF THE PROPOSED DEVELOPMENT

Construction activities such as excavation, ground disturbance, and drainage modifications may temporarily affect soil structure, increase erosion potential, and alter local hydrogeological conditions. Areas where thicker peat deposits sit on a gradient present a higher risk of instability, which will be actively managed. In areas underlain by glacial till or bedrock, impacts may include minor alteration of soil permeability and compaction. Impacts on groundwater are expected to be minimal, with no public water supplies (PWSs) or groundwater-dependent ecosystems (GWDTEs) identified in the area and only a small number of private wells present locally.

No significant geological resources or features of heritage interest are present at the site. Localised ground contamination risk is considered low, based on a review of historical land use and site investigations, however, there is potential for contamination events during construction, operation and decommissioning of the Proposed Development from fuel leakages and chemical spillages associated with plant machinery during works.

During the operational phase, ground disturbance will be minimal. Potential long-term effects are limited to minor soil settlement in isolated peat areas and small-scale changes to local drainage patterns. The assessment of effects identifies potential risks to subsoils, groundwater and peat stability during the operational and decommissioning phase prior to implementation of mitigation measures.

3.3.4 MITIGATION MEASURES AND RESIDUAL EFFECTS (POST-MITIGATION)

Mitigation will be implemented through the Construction Environmental Management Plan (CEMP), which includes erosion control, peat handling protocols, restricted excavation zones, and pollution prevention measures such as bunding, spill kits, and controlled storage areas. Movement monitoring posts will be used in areas of deep peat to detect early signs of displacement.

Construction practices will aim to avoid unnecessary disturbance of sensitive soils or aquifer zones. If contamination is encountered, it will be managed in line with current EPA guidance.

With these measures in place, residual impacts on land, soils, geology, and hydrogeology are expected to be slight adverse or less during the construction and operational phases, with continued monitoring in place to ensure stability and environmental protection.

In conclusion, no significant adverse residual impacts are predicted in relation to land, soils, geology, and hydrogeology, following implementation of the mitigation measures.

3.4 HYDROLOGY, WATER QUALITY AND FLOOD RISK

3.4.1 BASELINE ENVIRONMENT

The proposed development is located across the townlands of Illaunbaun, Tooreen, Slievenalicka, Lackamore and Drumbaun, in west Co. Clare. The site is approximately 3km inland from the Atlantic Ocean, 5km south of the town of Lahinch and 3km northeast of the town of Miltown Malbay. Several watercourses, including the Cleedagh River, the Inagh River, the Glendine River and the Clooneyogan North Stream, and Lough Keagh, are located in the vicinity of the site.

3.4.2 ASSESSMENT METHODOLOGY

The potential effects on hydrology and water quality during the construction and operational phases of the proposed development are assessed in this chapter. The assessment methodology adheres to the EPA's 2022 Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.

The proposed development is located across the townlands of Illaunbaun, Tooreen, Slievenalicka, Lackamore and Drumbaun, in west Co. Clare. The site is approximately 3km inland from the Atlantic Ocean, 5km south of the town of Lahinch and 3km northeast of the town of Miltown Malbay. Several watercourses, including the Cleedagh River, the Inagh River, the Glendine River and the Clooneyogan North Stream, and Lough Keagh, are located in the vicinity of the site.

3.4.3 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

Construction activities have the potential to negatively affect surface waterbodies via fine sediment pollution, drainage works and accidental spills and leaks from chemicals such as hydrocarbons and lubricants. These pollutants could reach the surrounding surface waterbodies via overland drainage or surface water drainage. Impacts to hydromorphology are expected to be temporary as the river will adjust once the works are completed and the pressure is removed.

The water environment may be impacted during operation due to both the ongoing function of the wind farm and required maintenance. Operational drainage may impact surface waterbodies, however, it is expected to follow existing overland flow routes, minimizing changes to drainage patterns. As a result, any effects on surface water will be minor and largely neutral. Maintenance activities, including vehicle use, turbine upkeep and fuel storage, could introduce pollutants such as fine sediment or hydrocarbons into surface water through overland or surface water drainage. These impacts are expected to be short-term, with moderate adverse effects that subside once maintenance activities conclude.

3.4.4 MITIGATION MEASURES AND RESIDUAL EFFECTS (POST-MITIGATION)

Construction works will be carried out in accordance with the CEMP. The CEMP will include standard best practice guidance for the protection of water quality, and specific mitigation measures such as the control, treatment and monitoring of surface water runoff, and pollution prevention measures, such as bunding, spill management and inspection procedures.

During construction, with the proposed mitigation measures in place, the residual impact to surface water will be reduced to slight, temporary, adverse and not significant.

During the operation phase of the project, the residual impact will be slight, long-term, adverse and not significant. This is due to the maintenance requirements of the wind farm.

3.5 AIR QUALITY

The assessment of Air Quality is contained within Chapter 11 of the EIAR. The air quality assessment has focussed on:

- Potential construction dust emissions and impacts to nearby sensitive receptors such as residential properties, schools, hospitals, etc.
- Potential vehicle emissions from traffic accessing the site for construction works and for operational phase maintenance activities.
- Potential beneficial, indirect air quality impacts from the generation of renewable electricity and the displacement of fossil fuel electricity and its associated air emissions.

3.5.1 BASELINE ENVIRONMENT

Baseline data and data available from similar environments indicates that levels of particulate matter less than 10 microns (PM_{10}) and particulate matter less than 2.5 microns ($PM_{2.5}$) and are generally well below the National and European Union (EU) ambient air quality standards.

3.5.2 ASSESSMENT METHODOLOGY

An assessment of the potential dust impacts as a result of the construction phase of the proposed development was carried out based on the UK Institute for Air Quality Management (IAQM) 2024 guidance document *'Guidance on the Assessment of Dust from Demolition and Construction'*. This established the sensitivity of the area to impacts from construction dust in terms of dust soiling of property, and human health effects.

Construction and operational phase traffic emissions have the potential to impact air quality. The traffic generated as a result of the Proposed Development was reviewed in line with the requirements of the Transport Infrastructure Ireland's 2022 guidance document *'Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106'.*

3.5.3 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

3.5.3.1 CONSTRUCTION PHASE

The surrounding area was assessed as being of medium sensitivity to dust soiling and of low sensitivity to dust-related human health effects.

The sensitivity of the area was combined with the dust emission magnitude for the site under four distinct categories: demolition, earthworks, construction and trackout (movement of vehicles) to determine the mitigation measures necessary to avoid significant dust impacts. It was determined that there is at most a medium risk of dust related impacts associated with the proposed development. In the absence of mitigation there is the potential for ***direct, short-term, negative,*** and ***slight*** impacts to air quality.

In addition, construction phase traffic emissions have the potential to impact air quality, particularly due to the increase in the number of Heavy Goods Vehicles (HGVs) accessing the site. Construction stage traffic did not meet the scoping criteria for a detailed modelling assessment outlined in Transport Infrastructure Ireland's 2022 guidance document *'Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106.'* As a result a detailed air assessment of construction stage traffic emissions has been scoped out from any further assessment and the construction stage traffic emissions will have a ***direct, short-term, neutral*** and ***imperceptible*** impact on air quality.

3.5.3.2 OPERATIONAL PHASE

Operational phase traffic has the potential to impact air quality due to vehicle exhaust emissions as a result of the increased number of vehicles accessing the site. The change in traffic associated with the operational phase of the proposed development did not meet the PE-ENV-01106 criteria requiring a detailed air dispersion modelling assessment, and a detailed assessment was scoped out. Therefore, it can be determined that during the operational phase, the proposed development will have a ***direct, long-term, localised, neutral*** and ***imperceptible*** impact on air quality.

3.5.3.3 CUMULATIVE IMPACT

There is the potential for cumulative impacts to air quality should the construction phase of the proposed development coincide with that of other large-scale developments within 500m of the site.

There is at most a medium risk of dust impacts associated with the proposed development. The dust mitigation measures outlined in Section 11.6.1 of Chapter 11 of the EIAR will be applied during the construction phase which will avoid significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality associated with the construction phase of the proposed development and the permitted cumulative developments are deemed ***direct, short-term, localised, negative*** and ***not significant.***

The direct impacts of the operational phase on air quality associated with the proposed development are predicted to be imperceptible. Cumulative impacts are considered ***direct, long-term, neutral*** and ***imperceptible.***

Overall, no significant impacts to air quality are predicted during the construction or operational phases of the proposed development.

3.5.4 MITIGATION MEASURES AND RESIDUAL EFFECTS (POST-MITIGATION)

3.5.4.1 CONSTRUCTION PHASE

Detailed dust mitigation measures are outlined within Section 11.6.1 of Chapter 11 of the EIAR and are also included in the Construction Environmental Management Plan to ensure that no significant nuisance as a result of construction dust emissions from earthworks, construction and trackout (movement of vehicles) occurs at nearby sensitive receptors. Once these best practice mitigation measures, derived from the Institute for Air Quality Management 2024 guidance '*Guidance on the Assessment of Dust from Demolition and Construction*' as well as other relevant dust management guidance, are implemented, the impacts to air quality during the construction of the proposed development are considered ***direct, short-term, localised, negative*** and ***not significant***, posing no nuisance at nearby sensitive receptors (such as local residences).

3.5.4.2 OPERATIONAL PHASE

As the predicted concentrations of pollutants will be imperceptible no mitigation is required. The impact to air quality has been assessed as ***direct, long-term, localised, neutral*** and ***imperceptible.***

3.5.4.3 RESIDUAL IMPACT ASSESSMENT

When the dust mitigation measures detailed in the mitigation section (Section 11.6.1 of Chapter 11) are implemented, the residual effect of fugitive emissions of dust and particulate matter from the site will be ***short-term, direct, localised, negative*** and ***not significant*** in nature and will pose no nuisance at nearby receptors.

There are no predicted direct impacts to air quality during the operational phase of the proposed development. Emissions from infrequent maintenance vehicles have been assessed as having a ***long-term, direct, localised, neutral*** and ***imperceptible*** effect on air quality.

There will be indirect beneficial impacts to air quality from the generation of renewable electricity from the proposed development. There will be NO_X emission savings which may otherwise have been generated from fossil fuels. The generation of 80 GWh of renewable electricity will result in a decrease in annual NO_X emission levels by 0.1% of the 2030 National Air Emissions Target of 40.6kt. This is an ***indirect, long-term, imperceptible*** and ***positive*** effect on air quality.

3.6 CLIMATE

The assessment of Climate is contained within Chapter 12 of the EIAR. The climate assessment has focussed on:

- The potential greenhouse gas emissions during the construction and operational phases of the development.
- The offsetting of GHG emissions through renewable electricity generation, which will contribute to reducing Ireland's reliance on fossil fuels.

- The vulnerability of the project to climate change, including considerations for increased rainfall and other projected climate impacts.
- The long-term benefits of the development in helping Ireland achieve its Climate Action Plan targets and the National Climate Objective of Net Zero by 2050.

3.6.1 BASELINE ENVIRONMENT

The existing climate baseline can be determined by reference to data from the EPA on Ireland's total greenhouse gas (GHG) emissions and compliance with European Union's Effort Sharing Decision "EU 2020 Strategy" (Decision 406/2009/EC). The EPA state that Ireland had total GHG emissions of 60.6 Mt CO_2e (Mega tonnes carbon dioxide equivalent) in 2023. This is 2.27 Mt CO_2e higher than Ireland's annual target for emissions in 2023. EPA projections indicate that Ireland has used 63.9% of the 295 Mt CO_2e Carbon Budget for the five-year period 2021-2025. Further reduction measures are required in order to stay within the budget requirements.

3.6.2 ASSESSMENT METHODOLOGY

The potential impacts on climate have been assessed in two distinct ways; a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA). The GHGA quantifies the GHG emissions from a project over its lifetime and compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude. The CCRA considers a projects vulnerability to climate change and identifies adaptation measures to increase project resilience.

The GHG emissions associated with the construction of the Proposed Development were calculated using the online Transport Infrastructure Ireland (TII) Carbon Assessment Tool and by reviewing the wind turbine life cycle assessment.

During the operational phase the Proposed Development will result in the displacement of electricity which otherwise would have been produced from fossil fuels, there will be a net benefit in terms of greenhouse gas emissions. The savings were calculated using data from the Sustainable Energy Authority of Ireland (SEAI) on the carbon intensity of the national grid and the savings were compared to Ireland's 2030 sectoral emissions ceilings.

3.6.3 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

3.6.3.1 GREENHOUSE GAS ASSESSMENT

The impact of the construction, operation and decommissioning of the Proposed Development on Ireland's total national greenhouse gas emission has been compared to Ireland's 2023 total greenhouse gas emissions and the relevant 2030 carbon budgets.

3.6.3.2 CONSTRUCTION PHASE

GHG emissions associated with the Proposed Development are predicted to be a small fraction of Ireland's Industry, Electricity and Transport sector 2030 emissions ceilings of 4 Mt CO_2e, 3 MtCO_2e and 6 Mt CO_2e, respectively. The Proposed Development will incorporate some mitigation measures which will aim to reduce climate impacts during construction.

3.6.3.3 OPERATIONAL PHASE

Once operational, the Proposed Development will generate approx. 80 GWh of renewable electricity annually for export to the national grid. This renewable electricity generation will offset the greenhouse gas (GHG) emissions from the construction phase, making the development a net positive contributor in terms of GHG emissions. Additionally, it will support Ireland in meeting its Climate Action Plan 2025 (CAP25) targets. The proposed wind farm will also contribute to achieving the National Climate Objective of Net Zero by 2050, while aiding the phased elimination of coal and peat in electricity generation by 2030.

Impacts to climate are deemed direct, long-term, positive and slight, which is considered not significant with regard to the construction and operational phase.

3.6.3.4 CLIMATE CHANGE RISK ASSESSMENT

A CCRA was conducted to consider the vulnerability of the Proposed Development to climate change, as per the TII 2022 PE-ENV-01104 guidance. This involves an analysis of the sensitivity and exposure of the development to future climate hazards which together provide a measure of vulnerability. The hazards assessed included flooding (coastal, pluvial, fluvial); extreme heat; extreme cold; drought; extreme wind; lightning; hail; fog; wildfire and landslides. The Proposed Development is predicted to have at most low vulnerabilities to the various climate hazards and therefore climate change risk is considered direct, long-term, negative and imperceptible, which is considered overall not significant with regard to the construction and operational phase.

Overall, no significant impacts to climate are predicted during the construction or operational phases of the Proposed Development.

3.6.3.5 CUMULATIVE IMPACT

The GHG impact of the Proposed Development has been considered in the context of its alignment to Ireland's trajectory of net zero and any sectoral carbon budgets, and how it affects Ireland's ability to meet its national carbon reduction target. Therefore, the assessment approach is considered to be inherently cumulative.

The cumulative impact of all wind farms across Ireland will significantly contribute to meeting the CAP25 targets. The proposed wind farm development will also play a key role in helping Ireland achieve the National Climate Objective of Net Zero by 2050 and assist in phasing out the use of coal and peat in electricity generation by 2030.

The cumulative impact of the Proposed Development in relation to GHG emissions is considered direct, long-term, positive and slight, which is overall not significant in EIA terms.

3.6.4 MITIGATION MEASURES AND RESIDUAL EFFECTS

3.6.4.1 CONSTRUCTION PHASE

A number of best practice mitigation measures are proposed for the construction phase of the Proposed Development to ensure that impacts to climate are minimised. These mitigation measures include a demolition and construction program, determine material reuse and waste recycling

opportunities (in compliance with the EU Taxonomy Regulation 2020/852) and identifying and implementing lower carbon material choices and quantities during detailed design.

3.6.4.2 OPERATIONAL PHASE

During the operational phase, emissions will be minimal. The primary focus will be on renewable electricity generation, which will contribute significantly to reducing Ireland's reliance on fossil fuels. To address future climate change risks, the design includes mitigation measures such as adequate drainage systems to manage an increase in rainfall in future years.

3.6.4.3 RESIDUAL IMPACT

The Proposed Development will result in some impacts to climate through the release of GHGs, however the Proposed Development aims to minimise it's impacts through design and management measures. The purpose of the Proposed Development is to assist with the development of renewable wind energy in Ireland. Renewable energy is a key component of the National Climate goal of achieving net zero by 2050. In terms of EPA Guidance, the impact to climate can be described as direct, long-term, beneficial and slight, which is not significant in EIA terms.

The Proposed Development is predicted to have at most low vulnerabilities to the various climate hazards and therefore climate change risk is considered direct, long-term, negative and imperceptible, which is considered overall not significant with regard to the construction and operational phase.

Overall, no significant impacts to climate are predicted during the construction or operational phases of the Proposed Development.

3.7 NOISE AND VIBRATION

3.7.1 BASELINE ENVIRONMENT

Four baseline noise survey locations were selected to represent clusters of dwellings, based on their locations relative to the Proposed Development layout. Monitoring was undertaken between 7th November and 1st December 2023 over a representative range of wind speeds.

Measurements were taken using industry standard Type 1 sound level meters in accordance with ETSU-R-97 (ETSU, 1996) and the IOA Good Practice Guide (IOA, 2013). Noise levels ($L_{A90,10min}$ and $L_{Aeq,10min}$) were recorded at 10-minute intervals at heights of 1.2 - 1.5 m above ground and more than 5 m away from reflective surfaces. Rain gauges were installed at two sites, and rain-affected data were removed before analysis. Wind speed was measured using an on-site LiDAR device and correlated with noise data. The relationship between standardised 10 m wind speed and background noise was established using statistical analysis.

The main background noise sources in the locality are low road traffic noise from the surrounding road network, some low intensity agriculture activity in the surrounding farms and vegetation wind induced noise.

3.7.2 ASSESSMENT METHODOLOGY

3.7.2.1 CONSTRUCTION AND DECOMMISSIONING PHASE

There is no published national guidance relating to the maximum permissible noise level that may be generated during the construction or decommissioning phase of a project. However National Roads Authority (NRA) give limit values which are acceptable (NRA, 2004). Guidance to predict and control noise is also given in BS 5228:2009-1+A12014, Code of Practice for Noise and Vibration Control on Construction and Open Sites (two parts), where Part 1 considers Noise (BSI, 2014).

Part 1 of BS 5228 provides noise prediction methods, control measures and example significance criteria. Noise levels generated by construction activities are considered significant if:

- The L_{eq}, period level of construction noise exceeds lower threshold values of 65 dB(A) during daytime, 55 dB(A) during evenings and weekends or 45 dB(A) at night.
- The total noise level (pre-construction ambient noise plus construction noise) exceeds the pre-construction noise level by 5 dB(A) or more for a period of one month or more.

The construction times for the Proposed Development are:

- Monday to Friday: 07.00 to 19.00 hrs
- Saturday 08.00 to 13.00 hrs
- No work on Sunday, or Bank Holidays.

3.7.2.2 OPERATIONAL PHASE

The noise assessment was carried out in accordance with the Wind Energy Development Guidelines 2006 (DoEHLG, 2006), ETSU-R-97 (ETSU, 1996) definitions of quiet daytime/night-time, and relevant An Bord Pleanála decisions (ABP, 2022). Predictions used the selected turbine model (Vestas V117-4.2MW with serrated trailing edges) under a worst-case omni-directional assumption.

The 2006 Guidelines do not specify daytime or night-time hours. However, it is considered good practice to follow the framework given in ETSU-R-97 and IOA Good Practice Guide where daytime and night-time hours are specified. The limits are based on the prevailing background noise level for 'quiet daytime' periods, defined in ETSU-R-97 as:

- Quiet waking hours or quiet day-time periods are defined as:
  - All evenings from 18:00 to 23:00 hrs
  - Saturday afternoon from 13:00 to 18.00 hrs and all-day Sunday 07:00 to 18:00 hrs
- Night-time is defined as 23:00 to 07:00 hrs

A recent decision by An Bord Pleanála (ABP, 2022) clarified limits in accordance with the 2006 Guidelines (DoEHLG, 2006) and were as follows:

"(a) between 7am and 11pm:

(i) the greater of 5 dB(A) $L_{90,10min}$ above background noise levels, or 45 dB(A) $L_{90,10min}$, at wind speeds of 5m/s (metres per second) or greater,

(ii) 40 dB(A) $L_{90,10min}$, at all other wind speeds.

(b) 43 dB(A) $L_{90,10min}$ at all other times

where wind speeds are standardised at 10m (metres) above ground level".

3.7.3 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

3.7.3.1 CONSTRUCTION AND DECOMMISSIONING PHASE

The potential impacts of construction are evaluated by comparing the predicted noise levels against the guideline limits in the NRA guidelines (NRA, 2004), and sample criteria in Part 1 of BS 5228 (BSI, 2014).

The construction process associated with wind farms is not considered intensive and is temporary works, most of which is carried out a considerable distance from receptors. The main noise sources will be associated with the construction of the Turbine Foundations, Turbine Hardstands, Grid Connection and compound, with lesser sources being the construction of the on Site38kV Electrical Substation. The main construction traffic to the Site will be during a very short period where ready-mix trucks deliver concrete for the turbine bases. While delivery of material from local quarries for upgrade of Site Access Tracks, Turbine Hardstands, Temporary Storage Compound and 38 kV Electrical Substation will be for longer periods but will be of less intensity, generating lower levels of noise along the routes. During delivery of materials, trucks will access the site from a different route than leaving the Site, thereby reducing traffic noise at receptors along the local road network. The delivery of turbines by large trucks travelling at very low speed will generate very low levels of noise at receptors along the Turbine Delivery Route.

It is not possible to specify the precise noise levels of emissions from the construction equipment until such time as a contractor is chosen and construction plant has been selected. However, typical construction noise levels for a range of construction activities have been relied upon (levels from author's database and BS 5228 (BSI, 2014)). Predictions are made for receptors nearest to the turbine bases / hardstands activity, compound development and for receptors at varying distance from the Grid Connection route.

The higher levels predicted are from the Grid Connection and delivery of concrete for Turbine Foundations. These maximum noise levels will persist for no more than 10 hours at any receptor. All predicted noise levels are well within NRA guidelines (NRA, 2004) given as acceptable and are considered slight. Construction noise is a temporary activity.

All activity is predicted without additional mufflers, or without topographic screening. The maximum road traffic noise, which is generated by ready-mix trucks delivering concrete for Turbine Foundations, will be short term and of 6 days duration. The predicted noise levels are well within the NRA guidelines (NRA, 2004) given as acceptable and are therefore considered as not significant.

Ground vibration from any rock breaking will be below the threshold of sensitivity to humans of 0.2 mm/s peak particle velocity at all receptors.

3.7.3.2 OPERATIONAL PHASE

Further to background noise level monitoring, relative noise limits as dictated by the Wind Energy Development Guidelines 2006 (DoEHLG, 2006) were set for all dwellings within 2 km of the nearest turbine from the Proposed Development.

The predicted noise levels assume that all receptors are directly downwind of all turbines at all times (omni-directional), which is a physical impossibility but served to provide a worst-case assessment.

The predicted noise levels are lower than the noise limits at all receptors, at all wind speeds, and are therefore compliant with the noise limits and are not significant in terms of EIA.

The only other wind farm either constructed, permitted or proposed, located within 2 km of the Proposed Development is Slieveacurry Wind Farm – 9no. turbines - Vestas V150 4.2 MW, 100 m hub height. Comparison was made of the predicted cumulative operational noise levels from the Proposed Development and Slieveacurry Wind Farm based on the limits described in Wind Energy Development Guidelines 2006 (DoEHLG, 2006) taking into consideration the recent An Bord Pleanála decision.

The cumulative predicted noise levels are marginally higher than the noise limit of 43 dB(A) at six receptors at wind speeds from 7 to 12 m/s. The predicted noise levels assume that all receptors are directly downwind of all turbines from both wind farms at all times (omin-directional), which is a physical impossibility, but serves to provide a worst-case assessment. Further predictions were undertaken taking into consideration the full range of wind directions, as for those receptors between the two wind farms it is not possible to be downwind of both wind farms at the same time.

Further to consideration of directivity effects, there are no exceedances of the Wind Energy Development Guidelines 2006 (DoEHLG, 2006) and noise limits attached as conditions to recent An Bord Pleanála decisions (ABP, 2022).

3.7.4 MITIGATION MEASURES AND RESIDUAL EFFECTS (POST-MITIGATION)

3.7.4.1 CONSTRUCTION AND DECOMMISSIONING PHASE

Given that there are no exceedances of the NRA Noise Guidelines (NRA, 2004) and BS 5228 (BSI, 2014) thresholds, mitigation of construction noise from the Proposed Development would not be deemed necessary, though best practice will be applied.

The effects of noise and vibration from onsite construction activities are therefore considered ‘not significant’, with no residual effects.

3.7.4.2 OPERATIONAL PHASE

Given that there are no exceedances of the Wind Energy Development Guidelines 2006 (DoEHLG, 2006) and noise limits attached as conditions to recent An Bord Pleanála decisions (ABP, 2022), mitigation of the operational noise from the Proposed Development would not be deemed necessary, though serrated trailing edges will be used to reduce noise impacts.

The effects of operational noise from the Proposed Development would be considered 'not significant', though noise from the Proposed Development has the potential to be audible at certain receptors depending on wind speed and direction, hence a minor residual impact.

3.8 SHADOW FLICKER

Shadow flicker is the term used to describe a repeating pattern of light and shade that can occur when the rotating blades of a wind turbine pass between the sun and a building, such as a home. This effect only happens under certain weather and sunlight conditions, such as clear skies and strong, direct sunlight, and only at certain times of the year and day, such as early mornings or late afternoons in spring and autumn, when the sun is low in the sky.

Chapter 14: Shadow Flicker assesses the potential for shadow flicker from the Proposed Development to affect nearby homes and other sensitive locations. It explains the existing situation, how the effect has been measured and predicted, and the measures that will be put in place to prevent or reduce any disturbance.

3.8.1 BASELINE ENVIRONMENT

The area around the Proposed Development includes residential properties and other occupied buildings within approximately 2 kilometres of the proposed turbine locations. These buildings are considered sensitive to shadow flicker because they are regularly used by people and may have windows facing the proposed turbines.

At present, no shadow flicker occurs from the Proposed Development site, as no turbines are in operation there. The surrounding landscape includes a mix of rural housing, farmland, and natural features. Local topography, vegetation, and existing structures influence how sunlight reaches individual properties.

3.8.2 ASSESSMENT METHODOLOGY

The assessment followed the Wind Energy Development Guidelines for Planning Authorities (DEHLG, 2006) and the Draft Revised Wind Energy Development Guidelines (DHPLG, 2019). The 2006 Guidelines (DEHLG, 2006) specify that shadow flicker at a house or other sensitive building should not exceed 30 hours per year or 30 minutes on any one day, while the Draft Revised Guidelines (DHPLG, 2019) provide for zero shadow flicker at any existing relevant receptors.

For the purposes of the assessment, a Study Area was defined as all land within a 2 kilometre radius of each proposed wind turbine location. Within this area, all residential and other occupied buildings were identified as potential receptors.

A specialised computer model (*WindPRO* Shadow Flicker module, EMD International (2023)) was used to predict where and when shadow flicker could occur. The model calculated the position of the sun throughout the year, the angle of the sun at different times of day, and the position, height, and rotor diameter of the proposed turbines. It also accounted for the distance and orientation of each receptor in relation to the turbines, as well as the local topography, which can block or allow sunlight to pass.

Two scenarios were assessed:

- Worst-case scenario: assumes that the sun is shining whenever the geometry makes shadow flicker possible, that there is no cloud cover, and that all turbines are operating during daylight hours. This provides the most conservative prediction of potential effects.
- Realistic scenario: applies local sunshine probability data, based on long-term weather records, to represent actual daylight and weather conditions. This produces a more accurate prediction of the number of hours in which shadow flicker could realistically occur at each receptor.

By comparing the results from both scenarios, the assessment identified which receptors could potentially experience shadow flicker above the guideline thresholds if no mitigation measures were in place.

3.8.3 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

Each turbine will be equipped with an automatic shadow detection and control system designed to prevent shadow flicker. Using pre-programmed locations for all identified receptors, the system continuously monitors sunlight intensity, wind speed, and wind direction to determine whether a shadow could fall on a property. If such conditions occur, the relevant turbine will shut down automatically and restart once the potential for shadow flicker has ended. These measures, which include a safe turbine shut-down period of approximately 60 seconds, are intended to fully eliminate the potential for shadow flicker to affect any property within the study area.

If a complaint is received by the Developer or Clare County Council, it will be investigated by reviewing the timing and duration of the reported effect and confirming it using specialist modelling software. If necessary, a light measurement survey will be undertaken at the property, and the turbine control system will be adjusted, for example, by shutting down turbines at certain times to prevent further impacts.

With this system in place, the assessment concludes that no property will experience shadow flicker above the guideline limits. The system, which includes a safe shut-down time of approximately 60 seconds, is intended to fully eliminate the potential for shadow flicker, and no significant residual effects are anticipated.

3.8.4 MITIGATION MEASURES AND RESIDUAL EFFECTS (POST-MITIGATION)

In line with guidance as outlined in Section 14.2 of Chapter 14 of the EIAR, it is proposed that each turbine is fitted with an automatic shadow detection system during turbine manufacturing. This is an embedded mitigation measure that will see that the turbines shut down during periods where shadow flicker is predicted at any of the identified receptors, until the potential for shadow flicker ceases. The control system will calculate, in real-time:

- Whether shadow flicker has the potential to affect nearby properties, based on pre-programmed co-ordinates for the properties and turbines;
- Wind speed, which can affect how fast the turbine will turn and how quickly the flicker will occur;

- Wind direction; and
- The intensity of the sunlight.

When the control system detects that the sunlight is strong enough to cast a shadow, and the shadow falls on a property or properties, then the turbine will automatically shut down; and will restart when the potential for shadow flicker ceases at the affected properties.

It is intended that the measures outlined above, subject to safe shut down time of approximately 60 seconds, will eliminate the potential for shadow flicker to affect any of the properties within the study area. In the event that complaints of shadow flicker are received by the Developer / Site Operator or by Clare County Council, an investigation will take place, and the complaints frequency, duration and time of complaints will be considered and specialist modelling software will be used to confirm the occurrence(s). Should the complaint persist, a shadow flicker survey involving the collection of light data will also be carried out at the property in which the complaint was made. Further refinement of the blade shadow control system will be conducted to eliminate the shadow flicker occurrence. This may result in the shutting off turbines at specific times of day.

3.9 LANDSCAPE AND VISUAL IMPACT

3.9.1 BASELINE ENVIRONMENT

Landscape & Topography

The Study Area spans from low-lying Atlantic coastal plains to upland peaks over 350 m AOD, generally aligned northwest–southeast. The Site is located in uplands between Knockabullaunduff and Slievenalicka, mostly 160–198 m AOD, with a dip at Lough Keagh in the southeast. Surrounding landscapes vary from undulating hills to the east, to rugged coastal plains to the west.

Drainage

Local drainage patterns reflect the Site's hilltop position, with flows generally to the northeast and southwest. Western watercourses connect to the Cleedagh and Cloonbony Rivers, discharging at Spanish Point, while northern flows enter the Clooneyogan North River and reach the sea near Lahinch. On a larger scale, the north drains to the Inagh River and the south to the Annagh River, with several smaller catchments discharging directly to the coast.

Land Cover & Use

The 165 ha Site is dominated by transitional moorland and cutover peat, with extensive commercial conifer forestry, some clear-felled areas, and an active rock extraction pit nearby. The wider Study Area includes a mix of coastal farmland, riparian scrub, seaside settlements, upland moorland, forestry, and pastoral farmland. Elevated moorland areas in the southeast and southwest are already home to numerous wind energy developments.

Settlements

Miltown Malbay, around 4 km southwest, is the nearest town, with Lahinch 4.7 km north and Ennistymon 7 km north-northeast. Smaller coastal settlements such as Quilty, Spanish Point, Liscannor, Doolin, and Lisdoonvarna line the N67, with inland towns serving permanent rural populations and coastal towns catering more to seasonal tourism.

Transport

The N67, part of the Wild Atlantic Way, runs 3 km west of the Site, linking coastal towns. The R460 and R474 regional roads pass within 4 km, and local routes run within 1 km of the Site. Wider connections include the N85 to the northeast and the N68 to the southeast.

Tourism, Recreation & Heritage

Tourism is focused along the coastline, with the Wild Atlantic Way, Cliffs of Moher, and popular walking/cycling trails such as the Burren Way and Mid-Clare Way. Coastal towns offer beaches, caravan parks, and golf courses, including Lahinch and the Trump International at Doonbeg. Heritage features include medieval castles, watchtowers, and monastic sites, many located within 20 km of the Site.

3.9.2 ASSESSMENT METHODOLOGY

The Landscape and Visual Impact Assessment (LVIA) was carried out by qualified Landscape Architects using a combination of desktop studies, site visits, and professional appraisal. The desktop stage involved defining the Study Area, reviewing Zone of Theoretical Visibility (ZTV) mapping, relevant planning policies, settlement and transport mapping, and selecting potential viewpoints. Fieldwork recorded local landscape characteristics and refined viewpoint locations for photomontage production. The appraisal stage considered landscape character, visual receptors, relevant policy, potential effects, mitigation, and cumulative impacts.

Definition of Study Area

Guidelines recommend Study Area radii based on turbine height, with 20 km applied for the proposed 150 m blade tip turbines. Although the full 20 km is assessed, there is a particular focus on the 'Central Study Area' within approximately 5 km, where the potential for significant impacts is greatest.

Assessment Criteria for Landscape Impacts

Landscape impacts are evaluated by combining landscape sensitivity (ranging from very high to negligible) with the magnitude of change (also from very high to negligible). Sensitivity reflects the landscape's capacity to accommodate change, while magnitude considers the scale and extent of alterations to landscape elements and character. The resulting significance is determined using a matrix, with 'substantial' or greater effects considered significant under EIA regulations.

Assessment Criteria for Visual Impacts

Visual impacts are assessed by weighing the sensitivity of visual receptors against the magnitude of change in views. Sensitivity depends on both the susceptibility of viewers (e.g., residents, tourists, recreationists) and the value of the view (e.g., scenic designations, rarity, sense of place). Magnitude considers the visual presence of the proposal and its effect on visual amenity, with classifications from negligible to very high.

Quality and Timescale of Effects

Effects are also categorised as adverse, neutral, or beneficial, and by duration, from temporary (under one year) to permanent (over 60 years). For rural wind farm proposals, visual change is seldom regarded as beneficial due to the introduction of large-scale built forms.

Assessment Criteria for Cumulative Effects

Cumulative effects focus mainly on other wind farms and can occur as combined visibility (seen together in one view) or sequential visibility (seen from different viewpoints along a route). Magnitude ranges from negligible (occasional isolated views) to very high (proliferation where wind farms dominate the landscape and views), based on their contribution to perceived landscape change and visual impact in relation to other developments.

3.9.3 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

3.9.3.1 CONSTRUCTION PHASE LANDSCAPE EFFECTS

The Proposed Development is expected to have only a modest physical impact on the Site's landscape, as most features have a small footprint and the overall topography and land cover will remain largely unchanged. Key components include six turbines, a substation and control building, a met mast, access tracks, turbine hardstands, and a temporary construction compound. Excavations will be minimal, following existing ground levels, and disturbed areas will be regraded and reseeded in consultation with the project ecologist.

The internal road network will consist of approximately 880 m of upgraded tracks and 3,700 m of new tracks, designed to avoid environmental constraints and follow natural contours to minimise earthworks. While construction will involve heavy machinery and materials movement, these effects will be temporary, short-term, and localised. Around 13.14 ha of conifer plantations will be felled, although these trees are commercial crops intended for harvesting regardless of the project's progression.

The substation compound will occupy 7,750 m² and require minor levelling, using similar construction techniques to turbine hardstands. All internal cabling will be underground, primarily following track routes to avoid unnecessary disturbance. Land disturbance will be limited to essential structures and access, and given the existing mixed rural and industrial setting, impacts are considered modest.

Construction activity will peak during the build phase, creating short-term, more visible effects on the Site's character. Long-term changes will be limited to turbine foundations, hardstands, upgraded tracks, and the substation, with most infrastructure removed and the site restored after decommissioning.

With an estimated build period of 12–18 months, the magnitude of construction-stage effects is assessed as **High–medium**, with a **Negative** quality and **Short-term** duration. Given the medium sensitivity of the receiving environment, the overall significance of construction-stage effects is considered **Moderate**, **Negative**, and **Short-term**.

3.9.3.2 OPERATIONAL PHASE LANDSCAPE EFFECTS

The Proposed Development will not introduce a new or unfamiliar feature to the landscape, as wind turbines are already a strong characteristic of the area. Boolinrudda Wind Farm lies within 5 km of the Site, and five other operational wind farms exist in the wider area. This context means the project will intensify an established land use type, further embedding wind energy infrastructure

into the undulating rural landscape. Although it represents a higher level of built development on the Site, it will fit within the Central Study Area's mix of productive rural land uses, including quarrying, without significantly detracting from its character.

With six turbines at 150 m tip height—smaller than many new onshore turbines proposed in Ireland—the development will be of a scale that can be absorbed into the local landform and land use patterns without undue conflict. The magnitude of operational effects (Table 3-1) is assessed as high–medium within the Site and its immediate surroundings (approximately 1 km), reducing to medium in the wider Central Study Area, low beyond 5 km, and negligible at greater distances. The effects are considered negative in quality but proportionally smaller within the broader landscape context.

Table 3-1: Operational Phase Visual Effects

VP No.	Distance to nearest turbine	Visual Receptor Sensitivity	Magnitude of Visual Impact	Significance / Quality / Duration of Impact
VP01	16.7 km (T5)	Medium	Low-negligible	Slight-imperceptible/ Negative/ Long-term
VP02	11.1 km (T4)	High-medium	Low	Moderate-slight / Negative/ Long-term
VP03	10.8 km (T4)	High	Low	Moderate-slight / Negative / Long Term
VP04	7.4 km (T4)	Medium	Low	Slight / Negative / Long-term
VP05	6.4 km (T4)	Medium	Medium-low	Moderate-slight / Negative / Long-term
VP06	6.8 km (T4)	Medium-low	Medium-low	Moderate-slight / Negative / Long-term
VP07	9.4 km (T2)	Medium-low	Negligible	Imperceptible / Neutral / Long Term
VP08	1.0 km (T2)	Medium-low	High-medium	Moderate / Negative / Long Term
VP09	1.8 km (T2)	Medium-low	Negligible	Imperceptible / Neutral / Long Term Post forest felling (Moderate-slight / Negative / Long term)
VP10	1.1 km (T2)	Medium-low	High-medium	Moderate / Negative / Long Term
VP11	0.9 km (T4)	Medium-low	High-medium	Moderate / Negative / Long Term
VP12	5.2 km (T6)	Medium-low	Negligible	Imperceptible / Neutral / Long Term
VP13	0.9 km (T6)	Medium-low	High-medium	Moderate-slight / Negative / Long Term
VP14	0.9 km (T1)	Medium-low	High-medium	Moderate-slight / Negative / Long Term
VP15	1.0 km (T3)	Medium-low	High-medium	Moderate / Negative / Long Term
VP16	4.3 km (T4)	Medium	Medium-low	Moderate-slight / Negative / Long Term

VP No.	Distance to nearest turbine	Visual Receptor Sensitivity	Magnitude of Visual Impact	Significance / Quality / Duration of Impact
VP17	1.6 km (T3)	Medium-low	High-medium	Moderate / Negative / Long Term
VP18	4.2 km (T4)	Medium	Medium-low	Moderate-slight / Negative / Long Term
VP19	4.1 km (T1)	Medium	Medium-low	Moderate-slight / Negative / Long Term
VP20	6.8 km (T4)	Medium-low	Low	Slight / Negative / Long Term
VP21	9.8 km (T4)	Medium	Low-negligible	Slight-imperceptible / Negative / Long Term
VP22	9.6 km (T6)	Medium-low	Negligible	Imperceptible / Neutral / Long Term

Summary of Significance of Effects

It is not considered that there will be any significant effects arising from the Proposed Development.

3.9.4 MITIGATION MEASURES AND RESIDUAL EFFECTS (POST-MITIGATION)

Outside of those landscape and visual mitigation measures that formed part of the iterative design process of the Proposed Development over a number of years, and which are embedded in the assessed Project, other specific landscape and visual mitigation measures are not considered necessary / likely to be effective. Thus, the effects assessed in the operational phase are the equivalent of residual impacts in this instance.

3.10 ARCHAEOLOGICAL, ARCHITECTURAL AND CULTURAL HERITAGE

3.10.1 BASELINE ENVIRONMENT

There are relatively few designated or known archaeological or architectural heritage receptors within the study area.

No national monuments or Preservation Order sites are located within the wind farm boundary, and none are located within 5km of the proposed wind turbine locations. There are no nationally significant complexes in elevated positions or with views integral to the setting of the monument within a 10km radius of the proposed wind turbine locations.

While archaeological evidence indicates that the landscape surrounding the Proposed Development has attracted human activity and occupation since the prehistoric period, there are no recorded monuments within the Proposed Development Boundary or immediately adjacent to it, and only 15 within a 1-2km radius. A bivallate ringfort in Drumbaun townland (RMP CL023-044) is located in a pasture field c. 315m from the nearest turbine location (WTG4). In addition to this upstanding monument, a church, graveyard and holy well at Kilfarboy (RMP CL031-008001 to -008003; these are

also designated as protected structure RPS 635), are located c. 900m from the nearest turbine location (WTG4). Both the ringfort and the ecclesiastical remains were identified in terms of potential impacts to their settings.

No previous archaeological investigations have been undertaken within the Proposed Development or in the surrounding townlands. No features of potential archaeological interest were identified from aerial photographs. No stray finds are recorded for the townlands located within or adjacent to the Proposed Development (National Museum of Ireland topographical files and Clare Museum's online Acquisitions Collection).

The first edition OS six-map (1836) depicts a rural landscape at Proposed Development location, one of scarce, dispersed settlement and generally small fields interspersed with larger areas of unenclosed marginal land. Several structures were identified on the first edition OS six-map (1836) and / or later revisions within the Proposed Development Boundary, all of which were cabins, houses, or outbuildings (none lie within areas of proposed groundworks).

3.10.2 ASSESSMENT METHODOLOGY

Cultural Heritage is a broad term that includes Archaeological Heritage, Built (Architectural) Heritage, Portable Heritage, Intangible Cultural Heritage, and other resources inherited from the past by contemporary society. The assessment considered the potential effects of the Proposed Development on cultural heritage receptors during the construction and operational phases. The assessment involved a desk-based review of published and unpublished documents, historical mapping, and aerial imagery, supported by field walkover surveys.

To identify the likely and significant impacts of the Proposed Development on cultural heritage sites of different sensitivity value, the study area for the assessment included the following Zones of Influence:

- World Heritage properties and candidate sites on the tentative list for inscription onto the World Heritage list (20km radius from the proposed turbine locations);
- National monuments (5km radius from the proposed turbine locations) and nationally significant complexes in elevated positions or with views integral to the setting of the monument (10km radius from the proposed turbine locations);
- Recorded Monuments (2km radius from the proposed turbine locations);
- Protected Structures and NIAH sites (2km radius from the proposed turbine locations);
- Non-designated Cultural Heritage features (within the Proposed Development area).

This methodology ensured that a robust assessment took place on all recorded cultural heritage receptors within and in proximity to the Proposed Development and that the likely and significant impacts have been considered.

In accordance with EPA Guidelines (EPA 2022), the context, character, significance and sensitivity of each cultural heritage receptor was evaluated and the significance of the impact then determined by considering the importance of the asset and the predicted magnitude of the impact.

3.10.3 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

No likely significant effects were identified in relation to cultural heritage.

3.10.3.1 CONSTRUCTION PHASE

There will be no impacts on any designated or non-designated cultural heritage receptors during construction phase.

No known archaeological sites are recorded within the Proposed Development area and no potential archaeological sites were identified through the desktop research and field walkover surveys. Nonetheless, the potential exists for the development area to contain as yet unrecorded sub-surface archaeological features or artefacts.

The majority of the proposed access tracks will follow existing farm and forestry access tracks. Three of the proposed wind turbines (WTG2, WTG4, WTG5) and part of a fourth (WTG1), and associated platforms are located within existing forestry, as are the locations for the proposed substation and for the proposed peat repository area (PRA) nearest WTG5. Construction of the existing tracks and tree-planting and tree-root activity in the larger areas is very likely to have disturbed any archaeological deposits which may have existed. The archaeological potential in these areas is considered to be reduced.

For the areas of the Proposed Development that are located within undeveloped / undisturbed agricultural land or otherwise non-forested areas (WTG3, WTG6, part of WTG1, and associated platforms; borrow pits; short sections of new access track; compound; and the PRA at WTG6), these areas are considered to have an archaeological 'greenfield' potential, as they are previously undisturbed. It is possible that previously unknown subsurface archaeological features and finds may be uncovered in these areas. Ground disturbance works for the Proposed Development at these locations would have a direct negative impact on any such features that may be present. The significance of effect is undetermined.

3.10.3.2 OPERATIONAL PHASE

Two impacts were identified in relation to cultural heritage during operational phase, moderate, long-term and negative impact on the setting of a ringfort at Drumbaun (RMP CL023-044), and a slight, long-term and negative impact on the setting of the ecclesiastical remains at Kilfarboy (RMP CL031-008001 to -008003 & RPS 635). No significant effects will occur in relation to these monuments, i.e. there will be no effect which would result in a permanent impact upon a site, leading to a loss of character, integrity and data about an archaeological site.

The upper elevation of the turbines would be a clear and noticeable element in the immediate forested and hillside setting, from the ringfort at Drumbaun (RMP CL023-044). This will introduce substantial change to the view to the east / south-east, however views in this direction are not considered to contribute substantially to the significance of the setting. The long range and distant views to the west and north-west, which may have influenced the siting of the monument and have been more significant in the context of its setting, will remain unchanged. This visual change will not restrict the open and expansive nature of the views from this site. The effect of the introduction of the proposed turbines on the setting of the site from a cultural heritage perspective would therefore

be of a medium magnitude, in which there is a noticeable change in the receiving environment in one direction but this change does not alter the integrity of the monument and is reversible. The sensitivity of the designated receptor is medium, giving an overall significance of effect of moderate, long-term and negative.

Although the turbines will be visible above the ridgeline to the west from the ecclesiastical remains at Kilfarboy (RMP CL031-008001 to -008003 & RPS 635), the distance of will greatly reduce any visual dominance or intrusiveness. There is a change in the receiving environment in one direction but this change does not alter the integrity of the monument and is reversible. The scale of the Proposed Development is small, with only six turbines, and as a development it will be visually permeable (as opposed to a large block of development). In addition, the focus of the ecclesiastical site is insular by nature (being an ecclesiastical site) with no designed vistas or views, all of which mitigates the effect, resulting in a low magnitude. The significance of the designated receptor is medium, giving an overall significance of effect of slight, long-term and negative.

3.10.4 MITIGATION MEASURES AND RESIDUAL EFFECTS (POST-MITIGATION)

3.10.4.1 MITIGATION FOR CULTURAL HERITAGE

All archaeological works will take place under licence to the National Monuments Service (Department of Housing, Local Government and Heritage (DHLGH)).

The topography and land use (wet ground, overgrown areas of rough pasture) precludes the use of geophysical survey in the non-forested / previously undisturbed areas. In addition, no specific sites of archaeological potential were identified on which to undertake advanced targeted archaeological testing. The ground conditions would also present difficulties for or preclude machine access for testing and potentially unsafe working conditions.

Given the archaeological potential of these greenfield areas, a programme of archaeological testing will take place well in advance of construction, in areas where access is possible and conditions are deemed to be safe, to determine whether any features, finds or deposits are present. Where access and ground conditions preclude this, the testing will take place once site enabling works have commenced to allow access into the site and provide safe working conditions.

A report on the results of the testing will be submitted to the relevant authorities. Any archaeological sites or features identified during testing will be preserved by record (archaeologically excavated) or preserved in-situ (avoidance), following consultation with the National Monuments Service and the National Museum of Ireland. Archaeological testing will be carried out at the following locations:

- Proposed turbines WTG3, WTG6, part of WTG1 and associated platforms;
- Proposed borrow pits;
- Proposed compound;
- Proposed PRA at WTG6;
- Sections of access track in greenfield areas.

In addition, archaeological monitoring of all earth-moving works during construction will be undertaken. The purpose of monitoring is to determine if any archaeological material or features are uncovered during ground disturbance works.

Attention is drawn to National Monuments legislation (1930-2014), which states that in the event of the discovery of archaeological finds or remains, the Heritage and Planning Division of the DHLGH and the National Museum of Ireland should be notified immediately. In such a scenario, the archaeological finds or remains will need to be investigated, and no further development will take place in that area until the finds or remains are resolved in agreement with the statutory authorities.

All mitigation measures will be undertaken in compliance with national policy guidelines and statutory provisions for the protection of the archaeological, architectural and cultural heritage.

All physical cultural heritage impact issues will be resolved at the construction stage of the development. With regard to impacts on the settings of the ringfort in Drumbaun (RMP CL023-044) or from Kilfarboy Church, Graveyard and Holy Well (RMP CL031-008001 to -008003 & RPS 635), the effects cannot be mitigated due to the scale and size of the proposed turbines during the project life.

3.10.4.2 RESIDUAL RISKS

No significant residual effects were identified in relation to cultural heritage.

During the 30-year operation of the wind farm, the development will continue to affect the setting of the ringfort in Drumbaun (RMP CL023-044) and Kilfarboy Church, Graveyard and Holy Well (RMP CL031-008001 to -008003 & RPS 635), resulting in a moderate long-term negative and slight long-term negative residual effect respectively.

3.11 MATERIAL ASSETS

This chapter assesses the potential impacts of the proposed Illaunbaun Wind Farm on material assets. Material assets are defined as critical infrastructure and services that are essential for society and the economy. The assessment covers impacts across the wind farm's construction, operation, and decommissioning phases. Assets considered include electricity infrastructure, telecommunications, television, gas, water supply and wastewater, aviation infrastructure, and waste management. The goal is to ensure these systems are protected and any potential disruptions are managed appropriately.

3.11.1 BASELINE ENVIRONMENT

The Proposed Development Boundary lies in rural County Clare, northeast of Milltown Malbay, on land currently used for forestry and peatland. The study area includes various essential infrastructure elements:

- **Electricity**: One existing electrical mast is near the site; a new 38kV substation is planned.
- **Telecommunications**: Several microwave links cross the site, but no infrastructure is directly on-site.

- **TV Reception**: Reception may already be weak in parts of the area; nearby transmitters are identified.
- **Gas**: No pipelines or gas infrastructure are located on or near the site.
- **Water & Wastewater**: No water mains or wastewater infrastructure within 1 km of the site.
- **Aviation**: The site is under controlled airspace near Shannon Airport. Obstacle lighting and other safeguards are required.
- **Waste Management**: There are no waste facilities within the site; the closest landfill is 24 km away.

3.11.2 ASSESSMENT METHODOLOGY

To understand how the proposed Illaunbaun Wind Farm might affect key infrastructure and services—known as *material assets*—a careful and detailed assessment process was followed. Material assets considered include electricity, telecommunications, water and wastewater networks, aviation systems, gas infrastructure, and waste management facilities.

The methodology used included the following key steps:

- **Expert-Led Assessment**: A qualified team of environmental consultants with experience in renewable energy projects carried out the assessment in line with Environmental Protection Agency (EPA) guidelines.
- **Stakeholder Consultation**: Input was gathered from key stakeholders such as ESB Networks, EirGrid, Gas Networks Ireland, the Irish Aviation Authority, and Shannon Airport Authority. This ensured potential concerns about safety and service disruptions were properly addressed.
- **Use of Reliable Data**: The team used up-to-date maps, government databases, utility records, and industry tools to identify existing infrastructure near the proposed site.
- **Tailored Study Areas**: Each type of infrastructure was assessed using a study area suited to its location and sensitivity. For example, a 600-metre buffer was used for electricity assets, while telecommunications signals and aviation impacts were considered beyond the site boundary due to the wider range of potential interference.
- **Impact Rating Framework**: Effects were judged using national criteria on how likely and how significant any impact would be. This included whether an effect would be temporary or long-lasting, direct or indirect, and positive, neutral, or negative.
- **Precautionary Approach**: Where data was limited, the assessment used a cautious method to ensure that even low-risk impacts were fully considered.

This approach helped to ensure that all potential risks to important services and infrastructure were carefully evaluated, and that suitable solutions were proposed to avoid or reduce any possible negative impacts.

3.11.3 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

Construction Phase:

- Minor, temporary disruptions to electricity and telecoms are possible.
- No direct effects on gas, water, or wastewater infrastructure due to their absence.
- Slight potential for temporary effects on aviation during crane use.
- Waste will be generated from construction activities.

Operational Phase:

- Electricity from the wind farm will be fed into the grid; no significant impact expected on existing infrastructure.
- Slight long-term effect on telecoms due to potential signal obstruction.
- Minimal risk of TV signal interference, to be managed under agreement with broadcasters.
- No operational impacts on gas, water, or wastewater infrastructure.
- Aviation risks mitigated through lighting and notifications.
- Waste generation will be low and managed per regulation.

Decommissioning Phase:

- Similar to construction phase, involving crane use and traffic.
- Most infrastructure (e.g., cables and foundations) may be left in place for environmental reasons.
- 85% of turbine materials expected to be recycled, though blades may require landfill.
- No significant long-term impacts anticipated.

3.11.4 MITIGATION MEASURES AND RESIDUAL EFFECTS (POST-MITIGATION)

Mitigation Measures:

- **Electricity**: Coordination with ESB and EirGrid to prevent supply interruptions.
- **Telecommunications & TV**: Monitoring and engagement with service providers; issues resolved through protocols.
- **Aviation**: Turbines will include obstacle lighting per aviation authority requirements.
- **Water/Wastewater**: Use of temporary systems; no disruption to public infrastructure.
- **Waste**: Construction and operational waste will be handled by licensed contractors under a Waste Management Plan.

Residual Effects:

- After applying all planned mitigation, no significant adverse effects are anticipated across any phase.
- Most effects are rated as "not significant" or "neutral" in environmental terms.
- Monitoring will ensure all mitigation is implemented and effective throughout the project lifecycle.

3.12 MAJOR ACCIDENTS AND DISASTERS

This Major Accidents and Disasters chapter considered whether the Proposed Development is likely to be significantly affected by major accidents or disasters, such as extreme weather, fire, flooding, peat movement, or industrial incidents. These events are defined as low-likelihood but high-consequence events that could impact human health, the environment, or critical infrastructure.

3.12.1 BASELINE ENVIRONMENT

The baseline environment is defined by rural upland conditions in west County Clare, characterised by commercial forestry, peatland, and limited human settlement. The area experiences moderate annual rainfall and prevailing south-westerly winds, with occasional storms. The site lies outside mapped flood zones and SEVESO/COMAH consultation distances and is underlain by low-productivity aquifers of low to moderate groundwater vulnerability. No evidence of historical landslides or contamination has been recorded, and local roads have low traffic volumes. Surface water bodies nearby are of good ecological and chemical status under the Water Framework Directive

3.12.2 ASSESSMENT METHODOLOGY

A structured, site-specific risk assessment was undertaken for the construction, operation and decommissioning phases of the project. This assessment identified credible hazard scenarios and evaluated each in terms of its likelihood of occurrence and potential consequence, using guidance from the Department of Environment, Heritage and Local Government (2010) and the Institute of Environmental Management and Assessment (IEMA, 2020). Likelihood and consequence ratings were used to calculate risk scores, allowing for a clear and transparent assessment of significance.

The assessment was informed by technical studies including the Peat Stability Risk Assessment, Flood Risk Assessment and Climate Change Risk Assessment. It also took into account the location and nature of the site, which is not within the consultation distance of any SEVESO or COMAH facility, has no history of landslides, and is not considered at risk of flooding. The surrounding environment is rural and lightly populated, and no critical infrastructure is located within the site.

3.12.3 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

A range of potential risks were identified and assessed for each phase of the Proposed Development, including risks from severe weather, flooding, peat movement, traffic incidents, contamination, fire/explosion, and infrastructure failure. For all identified scenarios, the likelihood and potential consequences were evaluated using a structured risk matrix. The assessment found that all risks fall

within the low or very low category once standard mitigation and control measures are in place. Potential risks such as traffic incidents, contamination or fire are mitigated through standard project measures including climate-resilient infrastructure design, secure fuel storage, emergency response protocols, controlled drainage, and traffic management plans. No risks were considered likely to result in significant adverse effects on human health, the environment or infrastructure.

3.12.4 MITIGATION MEASURES AND RESIDUAL EFFECTS (POST-MITIGATION)

The Proposed Development has been designed in accordance with recognised best practices to minimise its vulnerability to major accidents and disasters. A range of embedded safety and mitigation measures are included as part of the project design, with additional safeguards implemented through the Construction Environmental Management Plan (CEMP) and Emergency Response Plan (ERP). These measures include bunded storage for fuels and chemicals, emergency spill and contamination protocols, controlled traffic management plans, and site-specific monitoring systems for peat stability, drainage, and structural safety.

With these measures in place, all identified risks have been assessed as low. No dedicated mitigation measures are proposed solely for Major Accidents and Disasters, as all identified risks are already addressed through the design and management controls set out for other environmental topics in the EIAR. As a result, no significant residual effects are anticipated during the construction, operation or decommissioning phases of the Proposed Development, which is considered safe and resilient to major accidents and disasters.

3.13 TRAFFIC AND TRANSPORT

3.13.1 BASELINE ENVIRONMENT

3.13.1.1 EXISTING ROAD NETWORK

The following paragraphs detail the baseline conditions of the road links identified as being within the study area.

N85

The N85 is a national secondary road in County Clare routing approximately 32 km in a northwest direction from the M18 at Ennis, to the N67 at Ennistimon and bypassing the village of Inagh. The N85 provides a connection between the M18 motorway and the site, via the R460 and Ballard Road.

The road is dual carriageway for approximately 2.7 km west of its junction with the M18, before reverting to single carriageway for the remainder of the route. The N85 has a speed limit of 80-100 km/h except through major junctions or villages where the speed limit reduces to 50-60 km/h. The road is generally rural in nature with grass verges either side of the road and a width of approximately 5m.

A significant proportion of construction traffic is expected to use the N85 to access the site from the M18 motorway.

R460

The R460 is a regional road in County Clare, routing approximately 58 km in a southwest direction from Gort, a town in County Galway, to its junction with the R474, approximately 2 km south of Miltown Malbay. In the context of the study area, the R460 routes approximately 4 km west from Inagh to Bawnslieve, where three other local roads (L5208, L1074 and L1084) form a junction with the R460.

The R460 is a rural single carriageway road of approximately 5 m width and has a speed limit of 80 km/h, except through settlements such as Inagh where the speed limit reduces to 60 km/h.

Ballard Road / L1074

Ballard Road is a minor road leading from Miltown Malbay, in a generally east west direction. Ballard road is a rural road of varying width with narrow grass verges and a speed limit of 80 km/h, with the exception of sections through settlements where the speed limit reduces to 50 km/h. The minor road (Slievenalicka) from which the Proposed Development will be accessed is approximately 3.8km east of Miltown Malbay.

For the purposes of identification, the whole section of the road from Miltown Malbay to the L1074 shall be described as Ballard Road. It is noted that the route changes name to Toreen, then has an unnamed section before becoming named as the L1074.

The L1074 is a 2.5 km long minor road leading west from Bawnslieve, which continues as Ballard Road all the way to Miltown Malbay. The L1074 is generally approximately 3 m in width.

The most likely route for construction traffic to the site will be from the M18, via the N85, R460, L1074 and Ballard Road to Slievenalicka, where the site access is located.

Slievenalicka

Slievenalicka is a minor road which routes north for approximately 1.2 km from Ballard Road. The road is a single track of approximately 2.5 m in width with passing places and provides access to several residential properties and a primary school (Rockmount School). Access to the Proposed Development is located approximately 500 m north of the Ballard Road junction.

3.13.1.2 BASELINE AND CONSTRUCTION YEAR TRAFFIC FLOWS

The 'Project Appraisal Guidelines for National Roads (Unit 5.3)' set out link based annual growth rates by metropolitan area and by county in Tables 6.1 and Table 6.2 of the guidance note. The annual central growth rates for light (car & LGV) and heavy vehicles for County Clare are shown in Table 3-2 for the relevant years.

Table 3-2: Study Area Annual Central Growth Rates

Year	County Clare	
	Light Vehicle	Heavy Vehicle
2016-2030	1.0156	1.0417

Traffic data for the study area was sourced from the TII Traffic Count Data Website and commissioned traffic surveys at key locations as indicated on Figure 19.3. The Central Growth Rate

for County Clare has been applied to the surveyed 2023 traffic flows and the TII 2024 traffic data to derive 2025 baseline traffic counts.

Table 3-3 indicates the 2025 derived baseline two-way Average Annual Daily Traffic (AADT) in the study area and the percentage of traffic which is classified as HGVs.

Table 3-3: Study Area Baseline Traffic Flows

Counter Location	Road Link Category	Source	2025 Base AADT	2025 Base HGV	Percentage HGV
1. Ballard Rd	Local Road	2023 ATC Survey	425	38	9%
2. Slievenalicka	Public Road	2023 ATC Survey	207	19	9%
3. N85 (S of Inagh)	National Secondary Road	2023 ATC Survey	8,001	805	10%
4. N85 (S of Ennistimon)	National Secondary Road	TII 2024	6,559	141	2%

Table 3-4 presents the construction year (2027) derived baseline traffic flows by vehicle type.

Table 3-4: Study Area Construction Year (2027) Baseline Traffic Flows

Counter Locations	2027 AADT	2027 HGV	Percentage HGV
1. Ballard Rd	440	41	9%
2. Slievenalicka	214	21	10%
3. N85 (S of Inagh)	8296	873	11%
4. N85 (S of Ennistimon)	6773	153	2%

Road Safety

The Road Safety Authority publish tables on "Road Casualties and Collisions in Ireland" each year. The last published table is for 2017. Accident records are categorised as occurring "Inside Built-Up Areas" or "Outside Built-up Areas". Table 3-5 summarises the accidents occurring on the N85 from 2013-2017.

Table 3-5: Accident Statistics for the N85 2013 to 2017

Year	Inside Built Up Areas				Outside Built Up Areas				Overall Total	Collision Rate per KM
	Fatal	Serious Injury	Minor Injury	Total	Fatal	Serious Injury	Minor Injury	Total		
2017	0	0	2	2	1	1	4	6	8	0.25
2016	0	0	1	1	0	0	4	4	5	0.16
2015	0	0	1	1	0	0	3	3	4	0.13
2014	0	0	1	1	0	0	1	1	2	0.06
2013	0	0	0	0	0	0	6	6	6	0.13

Table 3-5 indicates that outside built-up areas tend to experience more accidents than inside built-up areas. The tables indicate that there are a number of recorded accidents over the record period for the N85. The results are fairly typical for a national secondary road and it is considered that there are no particular accident issues that would warrant special consideration as part of this application.

3.13.2 ASSESSMENT METHODOLOGY

The assessment of traffic and transport effects was carried out in line with national and international guidance, including the *Traffic and Transport Assessment Guidelines* (Transport Infrastructure Ireland, 2014) and the *Environmental Assessment of Traffic and Movement* (Institute of Environmental Management and Assessment, 2023).

A study area was defined to cover the road network most likely to be affected by construction traffic, including the N85, R460, Ballard Road/L1074, and Slievenalicka. These routes were identified through a review of access options and supported by on-site surveys. Automatic Traffic Count (ATC) surveys were undertaken in September 2023, supplemented by Transport Infrastructure Ireland (TII) traffic data and accident records from the Road Safety Authority.

The methodology considered existing traffic flows, road safety history, and the likely increase in vehicles associated with construction of the wind farm. The main focus was on Heavy Goods Vehicles (HGVs) and abnormal loads, such as the delivery of large turbine components. To ensure a robust assessment, a worst-case scenario was tested, assuming over half of the stone required for access tracks and foundations would be imported rather than sourced on site.

Effects were assessed using threshold criteria set by TII and IEMA. Roads were included in the detailed analysis where construction traffic was expected to increase by 30% or more, or by 10% or more in sensitive locations such as near schools or settlements. The potential effects considered included:

- community severance (difficulty moving within or between settlements),
- driver and passenger delay,
- pedestrian and cyclist delay and amenity,
- fear and intimidation from increased traffic, and
- road safety.

The significance of potential effects was determined by combining the scale of traffic change with the sensitivity of the road and its users. Mitigation measures, including a detailed Construction Traffic Management Plan (CTMP), were then identified to minimise impacts.

3.13.3 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

The traffic generated by the construction of the Proposed Development (over a 12-month period) would result in a temporary increase in baseline traffic levels. The likely significant environmental

effects associated with this increase in traffic have been assessed and are anticipated to give rise to the following effects that are classed as Significant, and which require mitigation:

- Severance of Communities
- Road vehicle driver and passenger delay; and
- Non-motorised user delay and amenity.

With mitigation in place, in the form of a Construction stage Traffic Management Plan (CTMP), the potential traffic and transport related environmental effects during construction are considered to be Not Significant.

3.13.4 MITIGATION MEASURES AND RESIDUAL EFFECTS (POST-MITIGATION)

The CTMP would be produced for approval by Clare County Council in consultation with An Garda Síochána to manage and minimise potential environmental effects associated with increased traffic from the construction of the Proposed Development.

The CTMP would confirm the route proposals for the abnormal load vehicles and general construction vehicles, timing of deliveries, route condition survey details and measures proposed to mitigate potential likely significant transport effects.

This is likely to include measures such as temporary contractor speed limits, informative road signage and measures to minimise the movements of heavy goods vehicles (HGVs).

During the operational phase of the Proposed Development, only a small number of vehicles would attend the Proposed Development on an infrequent basis to undertake inspections or maintenance activities. As such, no likely significant operational effects are anticipated, and no detailed assessment of such effects has been undertaken.

Traffic effects during the decommissioning phase of the Proposed Development are assumed, as a worst case, to be the same as during the construction phase.

No significant residual effects from construction traffic are predicted to arise either as a result of the Proposed Development in isolation or cumulatively when other developments are considered as part of the cumulative assessment.

3.14 FORESTRY

3.14.1 BASELINE ENVIRONMENT

The Proposed Development site in County Clare includes approximately 83 hectares of predominantly commercial coniferous forestry, with a mix of privately owned and Coillte-managed plots. The forestry, mostly comprising Sitka spruce and Lodgepole pine, is generally of low productivity due to the underlying soil, though some younger stands show better growth. Several plots intersect with the Proposed Development infrastructure and will require clearance. No designated conservation areas overlap the site, but some aquatic zones and one archaeological feature lie adjacent to forestry plots.

3.14.2 ASSESSMENT METHODOLOGY

The methodology used in producing this report incorporated a review of relevant legislative and guidance documents, a desk-based study, a site assessment of existing forestry interacting with the Proposed Development footprint, and an assessment of the permanent and temporary felling requirements for the Proposed Development. The potential effect of the associated felling works was also examined to determine the relevant mitigation required.

3.14.3 POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

The potential effect of construction of the Proposed Development on existing forestry was assessed, and other factors, including soils, water quality and archaeology were considered for mitigation for the proposed forestry harvesting works.

The existing forestry within the Proposed Development site is predominantly plantation forestry, which is being managed on a commercial basis. Under a "Do-nothing" scenario, these trees would be harvested at the end of each respective rotation, irrespective of whether the Proposed Development was being constructed or not. Thus, most of the risks associated with the felling required for the Proposed Development are applicable to a "Do-nothing" scenario.

However, under a "Do-Nothing" scenario, as a stipulation of the Forestry Act 2014, the felled areas would be replanted within a period of two years from the respective felling dates. For construction of the Proposed Development, the removal of 13.14 hectares of existing forestry is required during the construction phase. 11.59 hectares would be removed permanently, while 1.55 hectares would be removed on a temporary basis. In the absence of mitigation, this would result in a moderate effect.

3.14.4 MITIGATION MEASURES AND RESIDUAL EFFECTS (POST-MITIGATION)

In line with the *Felling and Reforestation Policy* (DAFM, 2017), the compensatory afforestation of 11.59 hectares of alternative land(s) will occur to ensure no net forestry loss as a result of the Proposed Development. Additionally, 1.55 hectares of forestry that will be subject to temporary felling will be repaired and replanted *in situ* once the construction phase is complete.

All felling works for the Proposed Development construction will be conducted in strict accordance with all relevant standards/guidance, including:

- Environmental Requirements for Afforestation (DAFM, 2024)
- Standards for Felling & Reforestation (DAFM, 2019)
- Forest Biodiversity Guidelines (Forest Service, 2000a)
- Forestry and Water Protection Guidelines (Forest Service, 2000c)
- Forestry and Archaeology Guidelines (Forest Service, 2000d)

Under the provision that the proposed mitigation measures are adopted, no significant residual impacts on forestry would be expected.

3.15 CUMULATIVE EFFECTS

Chapter 21 of the EIAR for the Proposed Development compiles all the interactive and cumulative effects proposed in chapters 7 to 20 of the EIAR.

3.16 SUMMARY OF MITIGATION MEASURES AND NEXT STEPS

Chapter 22 of the EIAR for the Proposed Development compiles all mitigation measures proposed in chapters 7 to 20 of the EIAR. The summary of mitigation measures includes all mitigations proposed for the construction, operational and decommissioning phases of the Proposed Development, for each topic-specific environmental chapter. The EIAR is also accompanied by an outlined Construction Environmental Management Plan (oCEMP) which takes account of all proposed mitigation measures and will be used by the lead contractor(s) once assigned, to inform the finalised CEMP which the lead contractor(s) will produce.

4 REFERENCES

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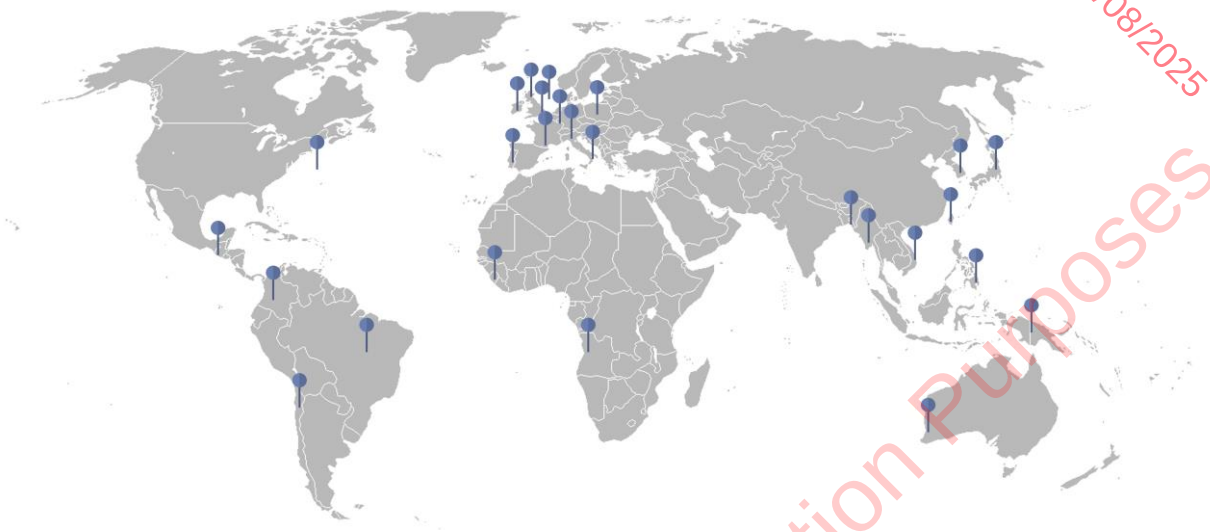

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