



Cush Wind Farm

Environmental Impact Assessment Report

Chapter 4: Population & Human Health

Cush Wind Limited

Galetech Energy Services
Clondargan, Stradone, Co. Cavan Ireland
Telephone +353 49 555 5050
www.galetechenergy.com



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4.1 Introduction

This chapter presents an assessment of the likely and significant effects of the project on population and human health. Human beings comprise a significant and important environmental factor which must be comprehensively assessed. This includes effects on the existence, activities and wellbeing of people, including the local population. While there is no specific definition of the meaning of the term 'Human Health', the European Commission *Guidance on the preparation of the Environmental Impact Assessment Report* (2017) states that:-

"Human health is a very broad factor that would be highly project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the project, effects caused by changes in disease vectors caused by the project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a project in relation to workers on the project and surrounding population".

Many of the likely significant effects on population and human health are therefore addressed in the specific, relevant chapters of this EIAR including, for example, Air Quality & Climate (**Chapter 8**), Landscape (**Chapter 9**), Noise & Vibration (**Chapter 11**), Shadow Flicker (**Chapter 12**) and Interactions between these environmental factors and population and human health (**Chapter 14**).

In accordance with Environmental Protection Agency (EPA) *Advice Notes on Current Practice in the preparation of Environmental Impact Statements (2003)*, issues which are specifically examined in this chapter include *inter alia*:-

- Economic Activity – will the development stimulate additional development and/or reduce economic activity and, if either, what type, how much and where?
- Social Consideration – will the development change patterns and types of activity and land use?;
- Land-uses – will there be severance, loss of rights of way or amenities, conflicts, or other changes likely to ultimately to alter the character and use of the surroundings?;
- Tourism – will the development affect the tourism profile of the area?; and,
- Health and Safety – will there be risks of death, risks to public health, disease, discomfort or nuisance?

Likely significant effects may occur as a result of direct interaction between the project and population and human health receptors, such as farming operations affected as a result of construction activities, or indirectly, such as employment created as a result of the local spending of wages earned by the construction workforce during the construction phase of the project.

4.1.1 Statement of Authority

This chapter was prepared by various members of the Galetech Energy Services (GES) Planning & Environment Team. GES has substantial socio-economic/population and human health assessment experience having prepared Population & Human Health (Human Beings) chapters for multiple permitted and proposed projects which have

been subject to EIA, including those listed at **Section 1.11 (Chapter 1)**.

4.1.2 Description of the Project

In summary, the project comprises the following main components as described in **Chapter 3**:-

- 8 no. wind turbines with an overall tip height of 200m, and all associated ancillary infrastructure;
- All associated and ancillary site development, excavation, construction, landscaping and reinstatement works, including provision of site drainage infrastructure and forestry felling.
- Temporary alterations to the turbine component haul route; and,
- Construction of an electricity substation, Battery Electricity Storage System and installation of 5.6km of underground grid connection to facilitate connection of the proposed electricity substation to the existing 110kV substation at Clondallow, County Offaly;

The project site is located in rural Co. Offaly, approximately 4km north of the town of Birr and c. 28km south-west of Tullamore, County Offaly. Off-site and secondary developments; including the forestry replant lands and candidate quarries which may supply construction materials; also form part of the project.

The turbine component haul route and associated temporary alteration works are located within counties Galway, Roscommon, Westmeath and Offaly. It is envisaged that the turbines will be transported from the Port of Galway, through the counties of Galway, Roscommon, Westmeath and Offaly, to the project site. As the route follows motorway and national roads through counties Galway, Roscommon, and Westmeath, it is assessed that there is no likelihood for significant effects on population and human health and, therefore, these areas have been screened out from further assessment.

A full description of the project is presented in **Chapter 3**.

4.2 Policy and Guidance

This section sets out the policy and guidance which is considered to be of relevance to an assessment of effects on population and human health for a project of this type i.e. Project Type 33 as described in the EPA's *Advice Notes on Current Practice in the preparation of Environmental Impact Statements (2003)*.

4.2.1 National Policy

4.2.1.1 *Wind Energy Development Guidelines for Planning Authorities 2006*

The *Wind Energy Development Guidelines for Planning Authorities 2006* ('the 2006 Guidelines') offer advice to planning authorities in determining planning applications for wind farm developments, including the likely significant effects on human health and population.

4.2.1.2 *Draft Revised Wind Energy Development Guidelines (December 2019)*

The *Draft Revised Wind Energy Development Guidelines* ('the Draft Guidelines') were published in December 2019. The Draft Guidelines include updates to several key aspects of the *Wind Energy Development Guidelines for Planning Authorities 2006*, including in respect of matters which interrelate with population and human health effects; namely noise, visual amenity and shadow flicker.

4.2.2 Regional Policy

Regional policy, as it relates to population and human health, is derived from the Eastern and Midland Regional Assembly *Regional Spatial and Economic Strategy* (RSES). The RSES seeks to provide a framework through which national policies; including in relation to economic, environmental and quality of life factors; are implemented across the Eastern and Midland Region, which includes County Offaly.

4.2.3 Local Policy

4.2.3.1 Offaly County Development Plan 2021-2027

The *Offaly County Development Plan 2021-2027* ('the Offaly CDP 2021-2027') includes a set of Strategic Objectives which also relate to population & human health, including as follows:-

- Plan for a population increase in County Offaly during the plan period of 9,239 persons;
- Ensure better alignment between the location of population growth and employment growth. This will allow settlements to become more self-sustaining, sustainable and balanced rather than based on long distance commuter driven activity;
- Protect and enhance Offaly's natural assets of clean water, biodiversity, landscape, green infrastructure, heritage and agricultural land;
- Make more efficient use of key resources such as land, water, energy, waste and transportation infrastructure;
- Make more efficient use of key resources such as land, water, energy, waste and transportation infrastructure;
- Create a competitive business environment supporting economic development, job creation, tourism and prosperity for all;
- Achieve transition to a competitive, low carbon, climate resilient and environmentally sustainable economy. This should be facilitated through reducing the need to travel, by integrating land use and sustainable modes of transport, and by reducing the use of non-renewable resources. In line with this, promote active and healthy lifestyles through increased opportunities for walking, cycling and active sport recreation; and
- Encourage inclusive and active sustainable communities based around a strong network of community facilities and amenities.

In addition the Offaly CDP 2021-2027 also includes three high level 'key principles', each of which are also directly related to population & human health, including:-

- Healthy Placemaking is focused on promoting people's quality of life through the creation of healthy and attractive places to live, work, visit and study in;
- Climate Action recognises the need to enhance climate resilience and to accelerate a transition to a low carbon economy recognising the role of natural capital and ecosystem services in achieving this; and
- Economic Opportunity develops from creating the right conditions and opportunities for the county to realise sustained economic growth and employment that ensures good living standards for all.

4.2.4 Relevant Guidance

4.2.4.1 EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022)

The EPA guidelines state that an EIAR does not generally require assessment of land-use planning, demographic issues or detailed socio-economic analysis unless the project gives rise to likely significant effects in respect of new developments and infrastructure which affect economic or settlement patterns.

Whilst the project will not result in such development, it will give rise to the generation of employment during both the construction and operation phases as well as inward investment which may affect the local supply chain. On this basis, the EIAR baseline contains a brief summary of key socio-economic baseline data relating to the wider study area (see **Section 4.3.2** below) and the likely effects on this receiving environment are considered.

In relation to likely effects on human health, the guidelines highlight the importance of avoiding duplication of assessments i.e. care should be taken to avoid 'double-counting' effects that are identified elsewhere in the corresponding chapter of the EIAR e.g. noise or air quality effects etc. As a result, likely effects on population and human health which may arise from these specific environmental factors are addressed in their respective chapters. The likely interactions of these effects, if any, are also addressed in **Chapter 14**.

The guidelines further state that assessments of other health and safety issues, as relevant, may be carried out under other EU Directives e.g. reports prepared under the Integrated Pollution Prevention and Control frameworks or SEVESO Directive etc. In keeping with the requirement of the EIA Directive, an EIAR should take account of the results of such assessments without duplicating them.

4.2.4.2 EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects (Failte Ireland)

These guidelines recognise that the impact and interaction of tourism with the environment is complex and the assessment of environmental impacts is crucial to creating a sustainable tourism economy and protecting natural resources. It is also acknowledged that tourism can be affected both by direct and indirect effects of new developments as well as by interactions between new activities and tourism activities; for example, the effects of high volumes of heavy goods vehicles passing through hitherto quiet, scenic, rural areas.

The guidelines set out that the EIAR should indicate the location of sensitive nearby tourism resources that are likely to be directly affected, and other premises which may be the subject of secondary impacts such as alteration of traffic flows or increased urban development. The EIAR should indicate the numbers of premises and visitors likely to be affected, both directly and indirectly.

4.2.4.3 EMF & You: Information about Electric & Magnetic Fields and the electricity network in Ireland (ESB, 2017)

The provision of electrical apparatus is common practice throughout Ireland and their installation does not give rise to any specific health concerns. The extremely low frequency (ELF) and electrical magnetic fields (EMF) associated with the operation of the electrical equipment will, as is required by legislation, comply fully with the international guidelines for ELF and EMF set by the International Commission on Non-

Ionizing Radiation Protection (ICNIRP), a formal advisory agency to the World Health Organisation, as well as the EU guidelines for human exposure to EMF.

The ESB document 'EMF & You' (ESB, 2017)¹ provides further practical information on EMF.

4.2.4.4 Supplementary Guidance & Information Sources

Other advice and guidance, reviewed as part of the baseline assessment and in developing the assessment methodology include:-

- *Code of Practice for Wind Energy Development in Ireland* (Department of Communications, Climate Action and Environment, 2016);
- *Best Practice Guidelines for the Irish Wind Energy Industry* (Irish Wind Energy Association, 2012);
- *Best Practice Principles in Community Engagement and Community Commitment* (Irish Wind Energy Association, 2013);
- *An Enterprising Wind: An economic analysis of the job creation potential of the wind sector in Ireland* (Irish Wind Energy Association, 2014);
- *Wind Turbine Experiences – 2012 Survey Results* (British Horse Society, 2013); and,
- *Wind Turbines and Horses - Guidance for Planners and Developers* (British Horse Society, 2015);

Key socio-economic data for the baseline has been derived from:-

- Central Statistics Office (CSO);
- Offaly County Council – *Offaly County Development Plan 2021-2027*;
- Pobal Profiling GIS Data (<https://maps.pobal.ie/>);
- Fáilte Ireland data in conjunction with websites of relevant tourism sites and amenities in the area;
- Fáilte Ireland – *Key Tourism Facts 2019* (2021);
- Offaly Tourism – *Statement of Strategy 2017-2022*;
- Offaly County Council – *Offaly Economic Development Strategy and Action Plan 2022-2027*;
- Offaly County Council – *Local Economic and Community Plan 2023-2028 - High Level Goals and Socio Economic Statement*;
- Offaly County Council – *A Socio-Economic and Demographic Profile of Co. Offaly*;
- Offaly County Council (in association with Bord na Mona and Coillte) - *Feasibility Study on the Development of a Major Cycling Destination in the Midlands of Ireland, 2016*; and
- OSI mapping and aerial photography.

4.3 Methodology

4.3.1 Desk Based Research

The majority of effects on population and human health receptors are likely to be experienced during the construction phase. These are likely to include potential beneficial effects on the local economy, including employment opportunities and increased spend on local services as well as potential adverse effects, such as restrictions on farming operations, neighbouring businesses or general disruption to the amenity of the local area, including in respect of road traffic, which may indirectly impact on its recreation or tourism value. Once operational, effects are likely to be

¹ https://esb.ie/docs/default-source/default-document-library/emf-public-information_booklet_v9.pdf?sfvrsn=0

primarily related to the visual impact and potential noise effects from the project.

In respect of human health, the chapter takes into consideration the results of other assessments in the EIAR which have relevance to health, namely: soils; water; air quality; noise; shadow flicker; and landscape. The findings of these assessments are cross referenced in this chapter, but the effects will not be repeated to avoid duplication.

Employment effects and direct expenditure are quantified using data provided by the Developer and, where necessary, using standard industry data. Opportunities for local businesses and the local labour market to be involved in supply chain activities will be identified and where possible quantified.

4.3.2 Study Area

The spatial focus of the assessment is undertaken at two levels. Firstly, effects on specific community, recreation and tourism receptors are assessed at a local level which is defined as 5km from the wind turbines and 500m from the grid connection route and is referred to as the 'Local Study Area' (LSA).

Economic effects are assessed with regard to a wider study area that takes account of a likely catchment for provision of domestically sourced goods and services relating to the construction and operation of the wind farm. This study area comprises the county within which the project is situated, i.e. County Offaly, and is referred to as the 'Wider Study Area' (WSA). Whilst it is recognised that the project is located in relatively close proximity to surrounding counties, including, most notably, Tipperary and Galway, given that County Offaly is presented as a statistical unit in CSO Census data and that the WSA is used as a measure of key population, labour market and economic statistics and trends, it was considered the most appropriate study area. It is, however, noted that the 5km LSA includes a small area of northern County Tipperary, to the southeast of the project site.

Given the scale of the project it is not considered necessary to assess effects at a national or international level.

Study Areas	Spatial Extent
Wider Study Area	County Offaly
Local Study Area	5km from the wind turbines and 500m from the grid connection

Table 4.1: Study Area Details

A desk-based review of existing conditions in the area has been undertaken, covering the following themes:-

- Wider Study Area
 - Population;
 - Labour Market/Education and Skills;
 - Business Diversity and Supply Chain; and,
 - Visitor Economy.
- Local Study Area
 - Recreational assets;
 - Visitor attractions; and,

- o Visitor accommodation and other businesses/services serving the tourism economy.

4.3.3 Consultation

A range of statutory and non-statutory organisations have been consulted as part of the EIAR scoping process. The responses which are relevant to likely effects on population and human health are summarised in **Table 4.2** and provided at **Annex 1.7**.

Consultee	Comments	Reference within EIAR
Offaly County Council	Impacts on residential properties and residential amenity should be assessed; construction phase noise levels should be assessed; and details of community benefit fund to be provided. Consideration to be given to the inclusion of a walkway or cycleway (amenity trail) around the development.	Each of the items referred to are assessed at Section 4.5 below.
Failte Ireland	Supplied copy of <i>EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects</i> .	Incorporated into methodology.

Table 4.2: Scoping advice relating to Population and Human Health

Separately, the Developer has also engaged in an extensive public consultation process during the design phase of the project. This process involved a range of different approaches in which the Developer consulted with the local community by seeking the input of local residents, landowners, business owners and all relevant stakeholders. The various approaches were implemented to ensure that consultation and engagement was continued with local residents while fully accordance with the relevant public health guidelines in place at the time (COVID-19).

Initially, in February 2022, an appointed Community Liaison Officer (CLO) carried out door-to-door consultation and in doing so provided an information pack to all dwellings located within 2km of a wind turbine. Residents were advised of the details of the project and advised of means of contacting the CLO where comments were invited and welcomed. A Cush Wind Farm website², which allowed the developer to provide up-to-date updates on the project, was also developed during this time.

A second round of door-to-door consultation was completed in October 2022, allowing for further information and updates on the project to be communicated to local residents.

Finally, a series of information clinics were held in the locality, between the 25th and 26th of January 2023. These clinics allowed members of the public, by appointment and in accordance with public health guidance, to discuss the project with members of the project team, including those who may have resided beyond 2km from a

² <http://www.cushwindfarm.ie>

turbine and were not initially contacted by the CLO.

In addition to the measures outlined above, a dedicated freephone number (1800 140 247) for the project was launched in Spring 2022. This was a main telephone line for the local community to contact should they have any queries, comments or requests for a call-back regarding the project.

A comprehensive overview of the Developer's approach to public consultation is provided at **Annex 1.8**.

4.3.4 Approach to Assessment of Effects

The approach to the assessment of effects assesses the likely construction, operational and decommissioning effects on:-

- the local economy (employment and economic output);
- the local population;
- opportunities for local involvement in the business supply chain and employment, i.e. how the key construction and operational activities will translate into investment;
- recreation and tourism assets; and,
- land use, through possible effects arising from improved access to the countryside.

Decommissioning phase effects are assessed as being largely similar to construction effects.

4.3.5 Sensitivity Criteria, Magnitude and Significance Thresholds

Likely effects will be assessed in line with the following parameters:-

- beneficial or adverse (or neutral);
- extent (the area over which the effect occurs);
- likelihood (i.e. likely or unlikely);
- duration (the time for which the effect is expected to last prior to recovery or replacement of the resource or feature);
- reversibility (permanent or temporary); and,
- timing and frequency.

4.3.6 Sensitivity Criteria

There are no published standards that define receptor sensitivity relating to population and human health assessments. As a general rule, the sensitivity of each receptor or receptor group is based on its importance or scale and the ability of the baseline to absorb or be influenced by the identified impacts. In assigning receptor sensitivity, consideration is given to the following:-

- importance of the receptor e.g. local, regional, national, international;
- availability of comparable alternatives;
- ease at which the resource could be replaced;
- capacity of the resource to recover or adapt to identified impacts over a period of time; and,
- level of usage and nature of users (e.g. sensitive groups such as people with disabilities).

Based upon competent expert judgement, four levels of sensitivity are used: High; Medium, Low and Negligible. Proposed sensitivity criteria are set out in **Table 4.3** below.

4.3.7 Magnitude Criteria

The magnitude of impact is evaluated based on the change that occurs with respect to the baseline conditions. Four degrees of magnitude are used: High, Medium, Low and Negligible.

4.3.8 Defining Significant Effects

The level of an effect is assessed by combining the magnitude of the impact and the sensitivity of the receptor as shown in **Table 4.3**. Four levels of effect are used: Negligible, Minor, Moderate or Major.

Where an effect is classified as Major, this is considered to represent a 'significant effect' in terms of the EIA Directive. Where an effect is classified as Moderate, this may be considered to represent a 'significant effect' but is subject to competent expert judgement and interpretation, particularly where the sensitivity or impact magnitude levels are not clear or are borderline between categories or the impact is intermittent.

Sensitivity or Value of Resource or Receptor	Magnitude of Impact			
	High	Medium	Low	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Negligible	Minor	Negligible	Negligible	Negligible

Table 4.3: Level of Effect Matrix

4.3.9 Approach to Mitigation

Mitigation measures, additional to those environmental measures embedded in the project design, are considered in order to mitigate any likely significant adverse effects that are identified through the assessment process.

4.3.10 Cumulative Effects

Consideration will be given to the likely cumulative effect of the project in combination with other existing, permitted and proposed developments, including those listed in **Chapter 1**.

4.3.11 Limitations of Assessment

Certain information, in particular information regarding capital expenditure and construction employment, will not be available until the normal pre-construction procurement processes have been completed. This assessment provides estimates, based on experience from other projects, of likely spend and employment during construction sufficient to allow assessment in this EIAR.

Information on interrelated effects is informed by the assessments undertaken on other environmental factors which are set out in the relevant chapters of this EIAR. Any assessment limitations are also set out in those chapters.

The status of certain individual receptors (e.g. accommodation businesses etc) may be subject to change. Information reported in this chapter is based on the receiving environment survey work, as described in **Section 4.4**.

4.4 Description of Existing Environment

4.4.1 Wider Study Area

4.4.1.1 Population

The most recent estimates show that the current population of County Offaly stands at 83,150, which is less than 1.6% of Ireland's total population, as a whole, of 5.15 million according to CSO Census 2022 data.

4.4.1.2 Labour Market/Education and Skills

2022 Census data for County Offaly³, published in September 2023, indicates that there were 35,248 persons aged 15 years and over whose principal economic status was 'at work', whilst 1,136 were short term unemployed, 1,871 were long term unemployed and 644 were looking for their first regular job.

4.4.1.3 Business Diversity and Supply Chain

Data on an area's business population can be obtained from the CSO census data. This data source can be used to identify the structure of the local business base by sector. This is potentially useful in assessing the capacity of the local area to accommodate supply chain activity for infrastructure and other largescale construction projects, such as the subject project. **Table 4.4** provides the latest available (Census 2022) data on the structure of the local business base, both in absolute and relative terms.

Industry	Offaly 2022	
Managers, Directors and Senior Officials	2,542	6.6%
Professional Occupations	5,881	15.4%
Associate Professional and Technical Occupations	3,659	9.6%
Administrative and Secretarial Occupations	3,414	8.9%
Skilled Trades Occupations	6,639	17.4%
Caring, Leisure and Other Service Occupations	3,313	8.7%
Sales and Customer Service Occupations	2,232	5.8%
Process, Plant and Machine Operatives	3,590	9.4%
Elementary Occupations	3,422	8.9%
Not stated	3,563	9.3%
Total	38,255	-

Table 4.4: Persons at work or unemployed by occupation

Source: CSO Census Data 2022

The data in **Table 4.4** shows that 'Skilled Trades Occupations', 'Professional Occupations', and 'Associate Professional and Technical Occupations' have the

³ Source: <https://visual.cso.ie/?body=entity/ima/cop/2022&boundary=C03789V04537&guid=2ae19629-1496-13a3-e055-000000000001>

highest percentage of the work force; whilst 'Not Stated' comprises 9.3% of the workforce.

4.4.1.4 Visitor Economy

Fáilte Ireland combines counties together to form seven different regions across Ireland for which tourism statistics are produced. County Offaly forms part of the 'Mid-East/Midlands' region along with counties Wicklow, Kildare, Laois, Meath, Westmeath, Longford and Louth.

The latest data for the Mid-East/Midlands region was published in 2019 and indicates that:-

- there was a total of 954,000 overseas visitor trips to the region, generating approximately €348 million income;
- there was a total of 1,513,000 trips by Irish residents to the region generating approximately €240 million income; and,
- there was a total of 170,000 trips by residents from Northern Ireland to the region generating approximately €52 million income.

The policies and objectives contained within the Offaly CDP 2021-2027 are also focussed on developing the county as a tourism destination.

The Offaly CDP 2021-2027 sets out that the county is strategically located in the centre of Ireland on a rail line, canal, River Shannon and with easy motorway access. In addition the Offaly CDP 2021-2027 also recognises that County Offaly sits within two of Fáilte Ireland's regional tourism brands. The majority of the county is located within 'Ireland's Ancient East' branding region, while the west of the county bordering the River Shannon is located within 'Ireland's Hidden Heartlands'.

The *Offaly Tourism Statement of Strategy 2017-2022* has two main priorities; focus on developing a range of tourism attractions on public land holdings in Offaly, and secondly, market and promote Offaly as a tourism destination to domestic and international tourism markets. The strategy notes that Offaly, located in the heart of Ireland, exhibits an array of distinct landscape features including; vast tracts of wilderness, expanses of bogland, eskers, rivers (including River Shannon) and the rolling hills of the Slieve Bloom Mountains, each of which come together to create an attractive environment for tourists.

Policies and objectives within the Offaly CDP 2021-2027 are focussed on promoting tourism and the development (and extension) of greenways, peatways, blueways and trails at appropriate locations as well as supporting the provision of small-scale complementary facilities and businesses to enhance user experience. The Offaly CDP 2021-2027 refers to Lough Boora Discovery Park and the intention to promote and support its continued development as a tourist and ecological amenity, as well as its linkages with the Grand Canal Greenway and surrounding towns and villages, including Birr, subject to proper planning, environmental protection and sustainable development.

Further amenity or tourism attractions located within Co. Offaly include:-

- Clonmacnoise Monastic Site;
- Birr Castle Gardens and Science Centre;
- Tullamore Dew Visitor Centre;
- Slieve Bloom Mountains;
- River Shannon;

- Grand Canal; and
- Clara Bog Nature Reserve and Visitor Centre;

The Offaly CDP 2021-2027 also refers to the 'Feasibility Study on the Development of a Major Cycling Destination in the Midlands of Ireland, 2016', commissioned by Offaly County Council in association with Bord na Mona and Coillte. The study encourages amenity trail linkages between the existing greenways/blueways in the county, towards the south of the county, with particular reference to a link between Lough Boora and Birr, which includes the identification of an indicative potential future link in lands within and surrounding the project site.

4.4.2 Local Study Area

The following section describes the baseline environment for the LSA i.e. within 5km of the boundary for the wind farm and 500m of the grid connection. As set out at **Section 4.3.2**, this component of the baseline covers:-

- Community;
- Recreation;
- Visitor economy assets; and,
- Land use.

4.4.2.1 Community

The wind farm is located in southwest County Offaly; c. 4km north of the town of Birr and the only notable settlement located within the LSA; however, a number of nucleated clusters (of development) exist at crossroads/junctions e.g. Fivealley and Rath.

The settlement of Birr is identified in Policy SSP-08 of the Offaly CDP 2021-2027 as a 'Self Sustaining Growth Town':-

"It is Council policy that Birr, a Self-Sustaining Growth Town, continues to grow at a sustainable level and at a commensurate scale in accordance with the Core Strategy Table in an effort to become more self-sustaining.."

The Offaly CDP 2021-2027 sets out that the population of Birr, the County's only 'Self Sustaining Growth Town', is currently⁴ 5,052 with a projected population increase of 1,263 within the CDP period (2021-2027).

The centre of Birr and the area around Birr Castle is designated in the Offaly CDP 2021-2027 as being within an Area of Archaeological Potential and an Area of Archaeological Notification (National Monuments Service), see **Section 10.4.9.1, Chapter 8**.

The Offaly CDP 2021-2027 notes that Birr is a sub-county market town that has significant employment and service functions relative to its regional and local catchment. It further notes that Birr supports the regional driver role of Tullamore and acts as an important local driver providing a range of functions for its resident population and its surrounding catchment including housing, employment, services, retail and leisure opportunities.

As well as Birr Castle and the archaeological significance of Birr town centre, the town also contains a series of Recorded Monuments and Protected Structures.

⁴ Central Statistics Office, Census 2022 data, indicates that the population of Birr (Including Crinkill) is 5,521.

4.4.2.2 Recreation

Given the rural nature of the LSA and the absence of a significant number of settlements, recreational facilities are quite limited and are mainly centred around the town of Birr.

Birr Castle, Gardens and Science Centre

Birr Castle is one of the most significant historic houses and demesnes in Ireland and is surrounded by a network of gardens and pathways which provide a key recreation amenity for the local area. With a longstanding connection to astronomy, including the historic 'Leviathan' telescope (once the largest in the world), the science centre at Bir Castle accommodates the Irish Low Frequency Array platform ('I-LOFAR) which is part of a wider European Network of LOFAR stations used to observe the universe at low frequencies.

The facilities at Birr Castle regularly host educational tours and tourists. The grounds include a series of trails and pathways, which also includes associated gardens and woodland. Whilst Birr Castle provides a key tourism and recreation facility locally, it is considered to be of regional significance. Fáilte Ireland data establishes that there were 101,401 visitors to Birr Castle in 2022⁵, 97% of these visitors were domestic visitors and 3% were international. By comparison Kilkenny Castle (County Kilkenny) attracted 1.42 million visitors in 2022 and Castletown House Parklands (County Kildare) attracted 958,921. The highest number of visitors were attracted to Phoenix Park Visitor Centre in Dublin, which had over 2 million visitors in 2022.

The receptor is assessed to be of regional value and therefore sensitivity is medium for the purposes of this assessment.

Birr GAA Club

Birr GAA Club is located within Birr and c. 4km south of the project. The facilities include a football playing field (St. Brendan's Park) with associated changing facilities, spectator stand(s) and parking. The receptor is assessed to be of local value and therefore sensitivity is low for the purposes of this assessment.

Drumcullen GAA Club

Drumcullen GAA Club is located south of Rath and c. 4km east of the project. As with Birr GAA Club, the facilities include a football playing field (Drumcullen GAA Grounds) with associated changing facilities, spectator stand(s) and parking. The receptor is assessed to be of local value and therefore sensitivity is low for the purposes of this assessment.

Birr Rugby Football Club

Birr Rugby Football Club is located within Birr and c. 4km south of the project. The facilities include four playing pitches and a training pitch, five changing rooms, changing facilities and bar/function room (club house) with associated parking. The receptor is assessed to be of local value and therefore sensitivity is low for the purposes of this assessment.

Birr Golf Club

Birr Golf Club is located in the townland of Glens, c. 2.5km north of Birr and to the immediate south of the project (<1km from its southern boundary). The facilities

⁵ Source: Fáilte Ireland's Visitor Numbers to Attractions Dashboard (<https://www.failteireland.ie/Research-Insights/Activities/visitor-numbers-to-attractions-dashboard.aspx>)

include an 18-hole golf course, clubhouse (including restroom facilities, bar, restaurant and club shop) with associated parking. The receptor is assessed to be of local value and therefore sensitivity is low for the purposes of this assessment.

Highfield United Football Club

Highfield United Football Club is located to the north of Birr, c. 4km south of the project. Facilities include playing pitches, changing facilities and associated parking. The receptor is assessed to be of local value and therefore sensitivity is low for the purposes of this assessment.

Birr Town Football Club

Birr Town Football Club is located to the north of Birr (Frank O'Connell Park), c. 4km south of the project. Facilities include playing pitches, club house, changing facilities and associated parking. The receptor is assessed to be of local value and therefore sensitivity is low for the purposes of this assessment.

Wilmer Tennis Club

Wilmer Tennis Club is located to the north of Birr, c. 4km south of the project. Facilities include tennis courts, changing facilities and associated parking. The receptor is assessed to be of local value and therefore sensitivity is low for the purposes of this assessment.

Birr Leisure Centre

Birr Leisure Centre is located within Birr and c. 4km south of the project. The centre is a community owned facility and facilities include a swimming pool, gymnasium, and private studios. The receptor is assessed to be of local value and therefore sensitivity is low for the purposes of this assessment.

Mill Island Park and Birr Play Park

Both Mill Island Park (walking trail and gardens) and Birr Play Park (children's playground) are located within Birr, c. 4km south of the project. Both facilities provide a local recreational amenity within the LSA and are of local value.

Walking Paths, Trails and Cycling

Sport Ireland Outdoors (formerly National Trails Office of Sport Ireland) is responsible for all waymarked trails. There are no national waymarked walking or off-road cycling trails which pass through the LSA. The LSA does however include a series (Loops 1-5) of 'on-road' cycling routes, as identified by Sport Ireland Outdoors (SIO). These loops are part of the Birr Cycle Hub Loops. The loops centre on Birr and extend as far north as Ferbane, east to Kilcormac, and south to Roscrea. The closest SIO registered walkway/off road cycleway is the Knockbarron Eco Trail, located c. 9km east of the project.

Whilst not a SIO registered trail, the boardwalk at Killaun, located c. 4.5km southeast of the project and c. 3km east of Birr, is a local walking route and a recreational facility of local value.

4.4.2.3 Tourism

Accommodation

Two accommodation businesses, located within Birr; the County Arms Hotel and Townsend House Guest House, have been identified within the LSA. There are, however, a small number of self-catering properties rental properties within the LSA

which are marketed via third party marketing sites, such as Airbnb. The accommodation businesses identified are considered to be of local value and their sensitivity is therefore assessed as low.

4.4.2.4 Land Use

The project site, and the LSA, is predominately used for agricultural/forestry related purposes and, outside of those land uses described above, does not generally provide for notable recreational uses.

4.5 Description of Likely Effects

The following sections assess the effects which are likely to arise during the construction, operational and decommissioning phases of the project.

The forestry replant lands are located beyond the extent of the WSA and LSA; however, it is assessed that there is no likelihood of significant effects on population & human health arising at any point during planting activities or during the growth period. While the replanting of these lands would result in a perceptible alteration to land use within the identified lands, they represent a relatively small, consolidated landholding and would not adversely affect population trends or human health levels at a local, regional or national scale. Similarly, it is assessed that there is no likelihood of the replanting acting in combination with other developments to result in significant adverse effects on population & human health.

4.5.1 Construction Phase

4.5.1.1 Effects on the WSA

Employment and Local Investment

During the 15-18 month construction phase of the project, there will be economic effects resulting from expenditure on site preparation, purchase and delivery of materials, plant, equipment and components. Information provided by the Developer and based on experience at other similar projects in Ireland, indicates that there is expected to be a peak on-site workforce of c. 100 no. workers. It is highly likely that a significant percentage of these workers will be recruited from the local labour market within the WSA, with the remainder being recruited from Ireland as a whole.

The most significant project infrastructure are the 8 no. wind turbines and grid connection infrastructure. The indicative investment sums have been set out in **Table 4.5** which provides a breakdown of the total development and capital expenditure required to develop and construct the project. Total investment comprises approximately €85 million for the project, including turbines, civil engineering works, electrical plant and grid connection.

Item	Description	Cost
Turbines & Other Plant	The activity by wind turbine manufacturers and suppliers, including nacelle/hub component manufacture and assembly and blade and tower manufacture. It includes transport, installation and commissioning but excludes the turbine service/maintenance agreement.	€55 million

Civil Works	The activity by civil contractors and their suppliers; including access tracks and drainage, crane hardstands, turbine foundations, meteorological mast foundations, cable trenches and buildings for electrical switch gear, SCADA equipment and its installation, and a maintenance and spare part facility.	€17 million
Electrical Works	The activity by electrical contractors and their suppliers, including cables, electrical switch gear, protection and control system, and grid connection.	€13 million
Total		€85 million

Table 4.5: Breakdown of Estimated Capital Investment

The procurement of goods and services is likely to have a significant positive effect on the local economy. Of the level of investment presented above, local contract spend (within the WSA) could be in the region of €21 million (c. 25%) over the development and construction period.

The types of supply chain companies that could benefit from this expenditure are wide ranging and are likely to include, but not limited to, the following:-

- haulage and transport services;
- traffic management;
- materials supply, e.g. aggregates;
- plant and equipment hire;
- vehicle servicing/tyres;
- fencing;
- fuel;
- security;
- waste management;
- building construction, electrical, plumbing, roofing, flooring, plastering and joinery services;
- signage and lighting;
- telecommunications;
- drainage;
- planting and seeding;
- catering;
- professional services; and,
- accommodation.

The contractors appointed by the Developer will be actively encouraged to develop local supply chains throughout the WSA and work with local subcontractors and service providers.

In addition, local businesses and services are likely to experience indirect benefits during the construction phase works as the workforce spend locally on general living costs whilst they are based in the area. These effects are further explored in the following section.

Effects on Tourism Economy

The construction period is anticipated to last for 15-18 months and, as stated, is likely to benefit the local economy through expenditure on purchases of accommodation,

food, fuel etc. which will be required to sustain the construction workforce. These beneficial effects would be experienced by businesses already operating within the tourism sector, as well as those that are partly dependent on tourism for their income, for example the retail sector.

Anecdotal evidence, based on other similar construction projects, demonstrates that local businesses such as accommodation providers welcome the enhanced level of occupancy that is achieved due to construction contractors using their accommodation on a year round basis, including periods of the year that are traditionally considered 'low season'. The benefits of increased business, although temporary, can allow businesses to invest in improvements that would not otherwise be affordable, leading to a longer term enhancement.

The positive effects arising during the construction period are assessed to more than offset any likely temporary negative effects to the tourism economy that may occur in the event that tourist visitors were unable to find local accommodation (for example, if accommodation was in use by construction workers) during the construction phase.

Whilst overall effects on the tourism economy are considered to be negligible and not significant (beneficial or adverse), the benefits to individual businesses is likely to be substantial and may indeed be significant. However, until such time as contracts are agreed by the Developer, it is not possible to quantify the precise level of benefit to individual businesses.

4.5.1.2 *Effects on the LSA*

Land Use

The project site comprises a mix of operational agricultural landholdings, commercial forestry and private cutover peat and includes land parcels which are owned by a number of private landowners. The Developer is in regular dialogue with each landowner and each has entered into a legal agreement to allow the Developer to use the land for the project. The legal agreements include a series of measures designed to minimise any likely land use effects including the clear identification of lands which may be subject to works; measures to ensure that disturbed lands are reinstated appropriately and returned to agricultural use insofar as possible; and provision for the use of proposed access tracks by landowners during the operation phase of the project. Measures to facilitate the safe continuation of agricultural/forestry operations during the construction phase have also been developed.

Tourism and Recreation Assets

As the sensitivity of all but one of the tourism/recreational receptors within the LSA is assessed to be low, and the magnitude of any adverse effects would also be low, the effect on receptors in the LSA would be negligible (adverse) and not likely to be significant. This effect would be further reduced, or may become beneficial overall, if businesses in this area generate additional revenue areas a result of the project. It has been assessed that Birr Castle, Gardens and Science Centre will have a medium level of sensitivity, due to its regional importance, however the magnitude of adverse effects is assessed as being low and therefore the overall level of significance (of effect on this recreational facility) is assessed as being 'minor', in line with **Table 4.3** above.

The impact on businesses within the LSA, would be beneficial although, as the

sensitivity is low, the level of beneficial effect is not expected to be more than negligible. Beneficial effects on individual businesses may be higher, particularly where they are regularly used by construction staff, as this affords them regular income that is not seasonally dependent. However, until contracts are agreed, and construction commences, it is not known which businesses would specifically benefit.

The detailed CEMP, to be prepared prior to the commencement of construction, will set out measures to ensure that local residents/businesses are informed of the construction work including the location and duration of temporary road closures and the identification of alternative routes during the construction works. Given the temporary nature of the construction works, the measures to be implemented and the low sensitivity of the receptors, the effect is assessed to be negligible and not likely to be significant.

Major Accidents or Natural Disasters

As set out within **Chapter 6** and **Chapter 7** of this EIAR, the project is not identified to be a likely source of pollution during either the construction or operation phases, predominately due to the limited volume of hydrocarbons stored on site and the bunding arrangements to ensure that spillages do not occur. In the event of an accident on-site, mitigation measures set out in the above chapters will ensure that significant environmental effects are unlikely to occur.

There is limited likelihood for significant natural disasters to occur at the project site. Ireland is a geologically stable country with a generally mild temperate climate. The potential natural disasters that may occur are therefore limited to flooding and fire. The risk of flooding is addressed in **Chapter 7**. It is considered that the risk of significant fire occurring, affecting the project and causing it to have significant environmental effects, is limited. As discussed above, there are no significant sources of pollution from the project with the potential to cause environmental or health effects. Furthermore, one of the core 'mitigation by design' features of the project (maximising the distance to residential dwellings) further limits any likelihood of significant human health effects as a result of accidents or natural disasters.

Major industrial accidents involving dangerous substances pose a significant threat to human health and the environment. Such incidents can give rise to serious injury to local residents or result in damage to the environment, both within proposed development sites and in the vicinity. However, the project site is not regulated by or connected/proximate to any site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations (COMAH/SEVESO Directive) and so there is no likelihood for cumulative effects or interactions with any such site.

4.5.1.3 Cumulative Effects

This assessment has taken into account the cumulative impact of the project including all elements i.e. wind farm and associated ancillary infrastructure, grid connection and upgrade works to the turbine component haul route.

However, there is potential for cumulative effects to arise in relation to the construction of other permitted or proposed developments should the construction phases overlap with the project. While there are a number of existing, permitted or currently proposed developments within the WSA and LSA, it is assessed that none of these projects are of a sufficient scale or nature to be likely to result in cumulative socio-economic, population or human health effects.

4.5.2 Operation Phase

4.5.2.1 Effects on the WSA

Employment and Investment

When the project is operational, it will require a team of personnel to provide servicing, maintenance, repairs and other operational support. It is estimated that up to 5 engineers and technicians (full time equivalent) will be needed to provide operational support to the project. All of these staff are expected to be based within the WSA i.e. County Offaly.

Further employment is anticipated to be supported directly and indirectly elsewhere in Ireland during the operation phase. Additional to the direct impacts on employment, there will also be indirect effects generated throughout the operation phase. Indirect effects arise from the placing of contracts with other businesses, both in the local area and elsewhere in Ireland, supplying services and materials to the project. Examples of such supply chain activity would include the procurement of:-

- site and building maintenance;
- waste management;
- civil engineering contractors for access track maintenance, ditching, crane hardstanding repairs, grass cutting, and weed control etc.;
- supply of consumable items (e.g. lubricants and oils, spare parts, office supplies, etc.); and,
- turbine inspections.

In addition to the above, local shops, cafes and accommodation providers often experience an increase in business during the operation phase e.g. extra technicians onsite for during wind farm maintenance and servicing.

The Developer will seek to secure positive benefits for the local economy by encouraging the use of local labour, manufacturers and suppliers where possible during the operation phase.

Tourist Economy

As identified at **Section 4.4**, landscape quality, including the variation between the different types of landscapes (open boglands, eskers, rolling hills and mountains), is an important part of the visitor appeal of the WSA and is one of the reasons why visitors come to the area.

Fáilte Ireland's *Key Tourism Facts 2019* document (2021) includes the results of a research study on tourism experiences⁶. The study provides useful insights into the factors which tourists consider to be most important when considering Ireland as their holiday destination and for comparison the level of satisfaction tourists had with their experience in Ireland. 91% of respondents identified 'beautiful scenery' as an important factor, whilst 96% were satisfied with this aspect of their holiday. 82% of respondents identified 'natural, unspoilt environment' as an important factor, with 91% satisfied with this aspect. The results of the survey underline the important role that the wider landscape plays in attracting visitors and in those visitors enjoying the overall experience.

The landscape qualities of the WSA are appreciated from several scenic roads and viewpoints which are set out in **Chapter 9**. Local planning policies refer to managing

⁶ Fáilte Ireland's Tourism Experience Port Survey 2019

the landscape sympathetically in order to, amongst other reasons, protect this visitor appeal.

Fáilte Ireland continues to undertake research into the attitudes, perceptions and trends of tourists in Ireland, including perceptions of onshore and offshore wind farms. Currently Fáilte Ireland is undertaking research which seeks to understand which developments visitors notice within the Irish landscape, and to determine what impact, if any, these developments will have on their visitor experience. Preliminary conclusions from that research⁷, to date, suggest that the majority of visitors appear not to notice the majority of developments in the landscape and that the majority of visible developments do not appear to have any adverse effects on the impression of the quality of the landscape.

Chapter 9 of the EIAR assesses in detail the landscape and visual effects of the project. Visual impacts have been assessed at 32 no. visual receptor locations throughout the study area, with sensitivity ranging widely from 'Very High' to 'Low'. Those locations with the highest levels of sensitivity (high/high-medium) tend to be sensitive heritage features such as Clonmacnoise; the Walled Garden and 'Leviathan' within Birr Castle; and the Slieve Blooms Mountains and scenic designations that afford broad views across the landscape. Other views with medium sensitivity typically relate to other scenic designations in the respective County Development Plans (across the Landscape Study Area) that are influenced by a range of rural land uses. The majority of the viewpoints have been classified as 'medium-low' and lower sensitivity designations which reflect the working nature of this relatively typical midlands landscape.

The highest level of impact significance occurs within the LSA (referred to as the 'Central Study Area' at **Chapter 9**) and represents views likely to be experienced by the local community (within 5km). Outside of the LSA, the significance of impacts considerably reduces and ranges between 'slight' and 'imperceptible' due to the robust working nature of this landscape context which is not assessed to be highly sensitive or susceptible to development. The chapter concludes that the project will not give rise to significant landscape and visual effects in EIA terms.

Evidently, whilst the project will be visible within the WSA, significant visual impacts (as assessed in Chapter 9) are not assessed as likely to occur. The more prominent views of the project will occur much closer to the site in areas where there is little evidence of significant visitor economy activity. Accordingly, it is assessed that there is likely to be a negligible effect on the visitor economy.

Notwithstanding these considerations, it is noted that there is no evidence to suggest that an occasional view of the project from within the WSA might adversely affect the visitor appeal of the area. Based on the evidence gathered from previous and ongoing studies, as referred to above, the occasional views of the project are not likely to be a deterrent to visitors or discourage repeat visits to the area.

Furthermore, the Developer has participated in early-stage, pre-planning engagement with Offaly County Council in terms of the provision of amenity infrastructure within the WSA. As described in Section 4.4.1.4 above, the project site is located in an area of interest to Offaly County Council in terms of providing an amenity connection between the existing Lough Boora Complex (and associated trails), the proposed amenity trail infrastructure, to be developed as part of the

⁷ As presented by Fáilte Ireland to Wind Energy Ireland in October 2023

Derrinlough Wind Farm (currently under construction), and Birr. Whilst the project does not include for the amenity trail provision the Developer has provided Offaly County Council with a firm commitment to work with them in order to increase amenity infrastructure and connectivity in the project site area, insofar as possible.

4.5.2.2 *Effects on the LSA*

Community Benefit Funds and Community Investment

The operation of the project will bring about a number of financial benefits to both the WSA and LSA. These benefits include investment opportunities, community benefit funds, contributions to local resident energy costs, payment of commercial business rates to Offaly County Council and rental income accrued by involved landowners. Each of these benefits are discussed below.

The Developer is committed to operating a community benefit fund in accordance with Wind Energy Ireland (WEI) best practice and it will be available to the community at a rate of €2 euro per megawatt hour (MWh) produced, should the project qualify for the Renewable Energy Support Scheme (RESS). Therefore, an investment of approximately €37,000 per turbine per year for up to 15 years, is committed to by the Developer.

The community benefit fund will be administered by an independent charitable trust, setup on behalf of the developer, and designed in conjunction with the local community. This will allow the local community to prioritise the fund and target the projects which they consider are of local importance. Local community groups will be invited to submit funding requests to the committee and preference will be given to local projects, thereby contributing to the vitality of the local population, and to projects which are considered to represent an environmental/social benefit or incorporate a renewable energy element/aspect.

The Developer has also committed to introducing a Neighbour Scheme which will offer electricity bill payers living within 1km of a wind turbine an annual contribution of €1,000 towards their electricity usage.

Based on current rates, the project would provide an annual business rates payment of c. €900,000 to Offaly County Council. These annual payments to the local authority will have significant benefits across the entirety of the county, including within the LSA.

Additionally, it should also be noted that, over the operational lifetime of the project, a substantial investment will be made to involved landowners. It is highly likely that these landowners will reinvest a significant proportion of this sum into the local economy and supply chains which will, in turn, result in further community gains. Benefits will accrue in the LSA as a result of this overall spend/investment and, depending on the choices made, will likely have positive social and economic effects.

The long-term, secure nature of the investment would allow the community to plan ahead; to draw in other sources of match funding to maximise the benefits; and to design investment projects to target local priorities. Given the annual contributions, the magnitude of impact is assessed to be 'High'. This would result in a likely positive effect of moderate or major importance on the study area.

Other effects within the LSA

Based on a review of the findings of the assessment in **Chapter 13**, no significant effects are likely as a result of maintenance vehicles accessing the site as this would

be on an occasional basis only and would not significantly increase vehicular movements in the local area.

There would also be some likely minor beneficial effects on local businesses within the LSA, probably most likely around Birr arising from expenditure on goods and services by staff and suppliers employed at the project site. This is expected to benefit local shops and food and drink businesses. Although the expenditure would be intermittent, and is therefore difficult to quantify, the benefit would be enhanced by the fact that workers visiting the project would do so all year round, unlike tourism expenditure which tends to be seasonal.

Visual effects on recreational receptors are assessed in **Chapter 9** and the findings have been taken into account in the assessment above, although it is important to note that a significant landscape and visual effect does not necessarily result in a significant effect on population & human health. In assessing effects, there is not a straightforward relationship between users experiencing views of turbines from a point or along a route (for example a passing cyclist) and impacts on usage. Some people may be encouraged/discouraged from using the receptor due to the presence of turbines, but for others there may be no effect, or even a positive effect.

The assessment of landscape and visual effects finds that the greater effects of the project will be contained within a relatively limited area around the site (local community views only), and the magnitude of likely significant effects would dissipate with distance. It is assessed that these visual effects would not result in any significant adverse effects any of the receptors identified in the baseline description.

4.5.2.3 Human Health

Noise

During the construction and operation phase of the project, noise levels sufficient to cause nuisance or sleep disturbance are not likely to occur. The full results of this assessment are presented in **Chapter 11**, Noise and Vibration.

Lighting Protection

Appropriate lightning protection measures are incorporated in modern wind turbines to ensure that lightning is conducted harmlessly past the sensitive parts of the nacelle and down into the earth. The rotor blades of the wind turbines are similarly equipped with lightning receptors mounted in the blade. The turbine is grounded and shielded to protect against lightning. In the event of a lightning strike, or an abnormal increase in voltage (overvoltage), the entire electrical and electronic equipment is protected by built-in energy absorbing components with surge protection in the electrical components.

Lightning protection is also incorporated into the design of the electricity substation and meteorological mast.

Based on the above, it is assessed that the overall sensitivity of the project to lightning strike is low, and the magnitude of impact is assessed as negligible. The overall significance of impact is therefore assessed as being negligible.

Ice Fall

In extremely cold climates or at high altitude, ice can potentially build up on blades or other parts of the turbines. Ice can potentially fall off and cause injury although there is no experience of any such incident occurring in Ireland. Most modern turbines are fitted with anti-vibration sensors, which will detect any imbalance caused by the

icing of the blades. The sensors will cause the turbine to wait until the blades have been de-iced prior to beginning operation. All occupied/habitable properties in the vicinity of the wind turbines are located sufficiently distant from a wind turbine and therefore there is no likely impact in respect of ice throw.

Based on the above, it is assessed that the overall sensitivity of the project to Ice fall is low, and the magnitude of impact is assessed as negligible. The overall significance of impact is therefore assessed as being negligible.

Electromagnetic (EMF) Interference

All electricity, both natural and man-made, produces two types of fields – electric fields and magnetic fields. The on-site electricity cables and grid connection electricity lines will, as is required by law, comply with the international guidelines for ELF-EMF set by the International Commission on Non-Ionizing Radiation Protection (ICNRP), which is an advisory agency to the World Health Organisation. The cables will also comply with EU guidelines for human exposure to EMF. In addition, all electricity lines/cable will be located below-ground, thus avoiding any likelihood of significant adverse EMF effects. The substation will similarly comply with ICNIRP and EU guidelines relating to exposure to EMF.

Shadow Flicker

Shadow flicker is assessed in detail in **Chapter 12**. While, in the absence of mitigation measures, shadow flicker is predicted to be experienced at dwellings; the Developer has committed to the implementation of technological measures such that no dwelling will experience shadow flicker for over/above the applicable limits of 30 minutes per day/30 hours per year, as set out in the *Wind Energy Development Guidelines for Planning Authorities 2006*. This commitment can be achieved by automatically switching off the wind turbines, if the sun is shining, at predetermined times when excess shadow flicker is predicted to occur. This process can be completed by software installed within the turbines computer system. Accordingly, the assessment concludes that there will be no likely significant shadow flicker effects arising from the project.

4.5.2.4 *Cumulative Effects*

While there are a number of existing, permitted or currently proposed developments within the WSA and LSA, it is assessed that none of these projects are of a sufficient scale or nature to have the likelihood to result in in-combination population and human health effects during the operation phase of the project.

4.5.3 *Decommissioning Phase*

These effects are assessed to be the same as the construction phase effects described above.

4.6 **Mitigation & Monitoring**

4.6.1 *Construction Phase*

Allowing for the implementation of embedded mitigation set out elsewhere within this EIAR, no likely significant adverse effects have been identified in respect of socio-economic receptors arising from construction of the project and therefore no mitigation measures are required to reduce or remedy any adverse effect. In terms of beneficial effects, individual businesses or receptors may experience substantial effects during the construction phase of the project.

As identified above, a series of measures has been agreed with involved landowners regarding the management of agricultural/forestry activities during the construction phase. These measures have been incorporated into signed legal agreements with the landowners and will be implemented in full.

4.6.2 Operation Phase

No likely significant adverse effects have been identified in respect of socio-economic receptors arising from the operation of the project and therefore no mitigation measures are required to reduce or remedy any adverse effect.

Mitigation measures proposed elsewhere in this EIAR; including in respect of water protection, noise minimisation and the control of shadow flicker will ensure that significant population or human health effects are unlikely to occur.

4.6.3 Decommissioning Phase

No likely significant adverse effects have been identified in respect of socio-economic receptors arising from the decommissioning of the project and therefore no mitigation measures are required to reduce or remedy any adverse effect.

4.7 Residual Effects

4.7.1 Construction Phase

No significant residual adverse construction effects are assessed as likely to occur.

4.7.2 Operation Phase

No significant residual adverse operational effects are assessed as likely to occur.

4.7.3 Decommissioning Phase

No significant residual adverse decommissioning effects are assessed as likely to occur.

4.8 Summary

The assessment undertaken in this chapter has evaluated data from a range of sources, including the findings and conclusions of other assessments within this EIAR, to determine the likely effects of the project on population and human health. In order to avoid 'double-counting', the assessment focuses on those factors which might result in economic, social and health and safety effects. Other specific assessments on population and human health, including, for example, in respect of noise, visual impact and air quality, are assessed separately elsewhere in this EIAR.

It is assessed that the construction phase of the project will likely result in beneficial effects on employment and local investment, on the tourism economy, and to a greater extent local businesses, including tourism businesses, operating within the WSA. The operation phase of the project will likely have a positive effect on employment and investment, including community benefits, as well as a minor beneficial effect on local businesses. The overall assessment of this chapter is that the project will have no likely significant adverse effects on population and human health. No specific mitigation measures, other than full adherence to all health and safety and public health guidance, have therefore been identified as being required.

