6.0 POPULATION AND HUMAN HEALTH

6.1 INTRODUCTION

This chapter examines the existing environment and addresses the potential effects on population and human health arising from the proposed development. Population and human health are addressed under separate headings throughout this chapter.

The assessment on population considers the current land use of the site of the proposed development, the current activities occurring within and in the vicinity of the site, as well as local population trends, property receptors, residential amenity, employment and economic data, tourism data, visitor attractions, and community gain opportunities. The assessment on human health considers available Irish health statistics and surveys, as well as a literature review of research carried out on the potential effects of wind farm developments on human health.

In order to establish a baseline and understanding of population and human health status of the local area, where available, data has been gathered at a spatial level in terms of local, county, regional and national level statistics, and local property receptors have been identified within a 2 km radius of the proposed development. In terms of census data, a temporal period of 11-years has been reviewed, i.e., 2011 to 2022, to review local, regional and national change.

The potential effects of the proposed development on other environmental factors which may also have an impact on human beings, as set out in Chapter 9 (Land, Soils and Geology), Chapter 10 (Hydrology and Hydrogeology), Chapter 11 (Air Quality), Chapter 12 (Noise and Vibration), Chapter 13 (Landscape and Visual Impact Assessment (LVIA)), Chapter 15 (Traffic and Transport), Chapter 16 (Material Assets: Aviation and Telecommunications), Chapter 17 (Shadow Flicker) and Chapter 18 (Climate) are addressed in this chapter and discussed in more detail in the relevant chapters of this EIAR. A separate section setting out the likely interactions between this assessment and other technical assessments is presented in Chapter 20 (Interaction of the Foregoing).

This assessment has been carried out in accordance with the following guidelines:

- Department of Housing, Planning and Local Government (DoHPLG), *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (2018);
- Environmental Protection Agency (EPA), *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (2022);
- European Commission (EC), *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report* (2017);
- Department of the Environment, Heritage and Local Government (DoHPLG) *Wind Energy Development Guidelines* (WEDGs) (2006); and
- DoHPLG, *Draft Revised Wind Energy Development Guidelines* (WEDGs) (2019).

6.1.1 Statement of Authority

This chapter was prepared by Serena Byrne of TOBIN Consulting Engineers. Serena Byrne is a project scientist at TOBIN Consulting Engineers, with over 12 years' multidisciplinary experience in engineering and environmental consulting, including EIA co-ordination assistance

and preparation of EIAR deliverables. She holds a MSc in Environmental Sustainability from University College Dublin.

This chapter has been reviewed by Orla Fitzpatrick, Technical Director in TOBIN. Orla has over 20 years' experience working in the delivery of EIA projects in environmental consultancy. She holds a BSc in Geophysics and MSc in Environmental Consultancy and has considerable experience as technical approver of environmental deliverables for major infrastructure projects.

6.2 LEGISLATION, POLICY AND GUIDANCE

The following key information sources and guidance have been used in the completion of this chapter:

- Central Statistics Office (CSO) –2011-2022 Census and associated data;
- CSO Health Survey Data[1];
- Department of Health (Government of Ireland), Health in Ireland: Key Trends 2023 Surveys (February 2024)[2];
- Discover Ireland Website - https://www.discoverireland.ie/;
- Discover Ireland Hidden Heartlands material - https://www.discoverireland.ie/irelands-hidden-heartlands;
- Eastern and Midlands Regional Assembly, *Regional Spatial and Economic Strategy (2019 -2031)* - https://www.emra.ie/rses/;
- EPA Maps - https://gis.epa.ie/EPAMaps/;
- Fáilte Ireland website – https://www.failteireland.ie/;
- Fáilte Ireland, *EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects* (as provided by Fáilte Ireland);
- Fáilte Ireland website information regarding the Ireland's Hidden Heartlands - https://www.failteireland.ie/IrelandsHiddenHeartlands.aspx;
- Health Ireland (Government of Ireland) Surveys[3];
- Health Service Executive (HSE) Website - https://www.hse.ie/eng/about/who/healthwellbeing/healthy-ireland/
- Institute of Public Health Ireland, *Health Impact Assessment* (2009);
- Institute of Environmental Management and Assessment (IEMA), *Health in Environmental Impact Assessment - A Primer for a Proportionate Approach* (2017);
- IEMA Guide - Effective Scoping of Human Health in Environmental Impact Assessment (2022);
- IEMA Guide - Determining Significance for Human Health in Environmental Impact Assessment (2022);
- Longford County Council, Longford County Development Plan (CDP) 2021-2027 - https://www.longfordcoco.ie/services/planning/longford-county-development-plan-2021-2027/;
- Ordnance Survey Ireland (OSI) – Mapping and aerial photography;
- Walking trails - https://www.sportireland.ie/outdoors/find-your-trails outdoors and http://trails.ie/index.php;
- World Health Organisation (WHO), *Environmental Noise Guidelines for the European Region* (2018);

[1] https://www.cso.ie/en/statistics/health/irishhealthsurvey/
[2] https://www.gov.ie/en/publication/fdc2a-health-in-ireland-key-trends-2022/
[3] https://www.gov.ie/en/campaigns/healthy-ireland/

- WHO, *Night-time Noise Guidelines for Europe* (2009); and
- WHO*, Global Air Quality Guidelines* (2021).

The effects of the proposed development on the human environment are assessed in accordance with the EIAR Guidelines as outlined in Chapter 1 (Introduction) of this EIAR.

EIA Directive

The 2014 amendment to the 2011 EIA Directive (2014/52/EU) directs that population and human health factors be assessed in an EIAR. The EIA Directive does not define the term 'human health', however the 2017 EC Guidance on the preparation of the EIAR 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".*

EPA EIAR Guidelines (2022)

The 2022 EPA EIAR Guidelines[4] published by the EPA state that *"while no specific guidance on the meaning of the term Human Health has been issued in the context of Directive 2014/52/EU, the same term was used in the SEA Directive (2001/42/EC). The Commission's SEA Implementation Guidance states 'The notion of human health should be considered in the context of the other issues mentioned in paragraph (f)'"*. Paragraph (f) of Annex I of the SEA Directive lists the environmental factors including soils, water, landscape, air etc.[5].

The 2022 EPA EIAR Guidelines also state that the above health assessment approach is *"consistent with the approach set out in the 2002 EPA EIS Guidelines where health was considered through assessment of the environmental pathways through which it could be affected, such as air, water or soil, namely 'The evaluation of effects on these pathways is carried out by reference to accepted standards (usually international) of safety in dose, exposure or risk. These standards are in turn based upon medical and scientific investigation of the direct effects on health of the individual substance, effect or risk. This practice of reliance upon limits, doses and thresholds for environmental pathways, such as air, water or soil, provides robust and reliable health protectors* [protection criteria] *for analysis relating to the environment'"*.

The 2022 EPA EIAR Guidelines also note that in an EIAR, *"the assessment of impacts on population & human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under the environmental factors of air, water, soil, etc."* and that *"assessment of other health & safety issues are carried out under other EU Directives, as relevant. These may include reports prepared under the Integrated Pollution Prevention and Control, Industrial Emissions, Waste Framework, Landfill, Strategic Environmental Assessment, Seveso III, Floods or Nuclear Safety Directives. In keeping*

[4]2022 EPA EIAR Guidelines - https://www.epa.ie/publications/monitoring--assessment/assessment/guidelines-on-the-information-to-be-contained-in-environmental-impact-assessment.php

[5] Implementation of Directive 2001/42 on the assessment of the effects of certain plans and programmes on the Environment - https://ec.europa.eu/environment/archives/eia/pdf/030923_sea_guidance.pdf

with the requirement of the amended Directive, an EIAR should take account of the results of such assessments without duplicating them".

The classification and description of effects in this EIAR chapter follows the terms provided in Table 3-4 of the 2022 EPA Guidelines, which are provided in Table 1-2 of Chapter 1 (Introduction) in this EIAR for reference.

IEMA Discussion Document – A Primer (2017)

IEMA issued a discussion document in 2017 titled *"Health in Environmental Impact Assessment"*, which it describes as a primer for discussion on the proportionate assessment of the impacts on health within the EIA process and suggests what should be assessed in this context. The IEMA Primer notes with reference to 'proportionate' that 'the scoping of population and human health issues into EIA should focus on whether the potential impacts are likely to be significant. Where they are found likely to be significant, effort should focus on identifying and gaining commitment to avoiding or reducing any adverse effects and to enhancing beneficial effects.

The discussion document notes that Health Impact Assessment (HIA) and EIA are separate processes and that while a HIA can inform EIA practice in relation to human health, a HIA alone will not necessarily meet the EIA human health requirement. The discussion document also notes that the WHO provides an overview of health in different types of impact assessment and presents the WHO perspective on the relationship of HIA to other types of impact assessment as follows: *"The health sector, by crafting and promoting HIA, can be regarded as contributing to fragmentation among impact assessments. Given the value of impact assessments from a societal perspective, this is a risk not to be taken lightly…The need…and justification for separate HIA cannot automatically be derived from the universally accepted significance of health; rather, it should be demonstrated whether and how HIA offers a comparative advantage in terms of societal benefits…Health issues can, and need to, be included* [in impact assessment] *irrespective of levels of integration. At the same time, from a civic society perspective, it would be unacceptable for HIA to weaken other impact assessments. A prudent attitude suggests optimizing the coverage of health along all three avenues*:

- *better consideration of health in existing impact assessments other than HIA;*
- *dedicated HIA; and*
- *integrated forms of impact assessment."* (IEMA, 2007)

This indicates that the WHO does not support a stand-alone HIA unless it could be demonstrated to be of advantage over an EIAR. Furthermore, HIA is not routinely carried out for major infrastructure schemes in Ireland. It is for these reasons that this health assessment is part of the EIAR and there is no stand-alone HIA.

One of the messages in the IEMA document in terms of assessing health in EIA, is that there should be a greater emphasis on health outcomes (i.e., the potential effects on human health), rather than simply the health determinants (i.e., the agents or emissions which could have the potential to have health effects). The IEMA document noted that in EIA, there has previously been a strong focus on just the agents or emission levels (e.g., dust) rather than focusing on the effects of these agents/emission levels on human health. This change in emphasis does not mean a complete change in practice.

The IEMA document notes that *"public health is defined as the science and art of promoting and protecting health and well-being, preventing ill-health and prolonging life through the organised*

efforts of society and has three domains of practice: health protection, health improvement and improving services". The IEMA document suggests that these three domains should be considered in the assessment of health in EIA. Examples of health protection issues to be considered could include issues such as chemicals, radiation, health hazards, emergency response and infectious diseases whilst health improvement issues could include lifestyles, inequalities, housing, community, and employment. Examples of improving service issues could include service planning, equity, and efficiencies.

The WHO defined health, in its broader sense, in its 1948 constitution as *"a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity"*. Therefore, whilst the Irish EPA EIAR Guidance is useful in terms of health protection, for a more holistic assessment, as per the IEMA document, it is also worthwhile to look at broader health effects in terms of opportunities for improvement of health and for improvement of access to services. While it is important to do this, it is also important not to attribute every conceivable event as being a health effect. To further rely on the WHO definition, a health effect would be something that would have a material impact on somebody's physical, mental and social well-being, be that positive or negative.

The IEMA 2017 discussion document is a useful document when considering what can and should be assessed in the context of EIA. Regard has been given to the general approach put forward in this discussion document when preparing this chapter.

IEMA Guide on Effective Scoping of Human Health in Environmental Impact Assessment (2022)

In November 2022, IEMA published a guide to the '*Effective Scoping of Human Health in Environmental Impact Assessment' for* use by EIA practitioners. The guide covers the consideration of health as a topic in EIA. This guidance updates and provides further detail on the position from the aforementioned 2017 IEMA Primer on health in EIA. The aim of this guide is to enable those responsible for commissioning, conducting, or reviewing an EIA determine the scope of the human health chapter in EIA. The guide is focused on the scoping phase of the EIA process, including input to scoping reports and responses within scoping opinions. The relationship with standalone HIA is clarified. Where an EIA is undertaken and there is also a requirement for HIA, projects should normally meet the HIA requirement through the EIAR health chapter. Regard has been given to the general approach put forward in this IEMA guidance when preparing this chapter.

IEMA Guide on Determining Significance for Human Health in Environmental Impact Assessment (2022)

In November 2022, IEMA published a guide to the *'Determining Significance for Human Health in Environmental Impact Assessment'*. The aim of the guide is to enable those responsible for commissioning, conducting, or reviewing an EIA to determine significance in terms of human health in EIA. The guide focuses on and discusses what 'significance' means for 'human health' in terms of EIA. The guide was produced in order to inform current practice and in anticipation of potential changes to the way that EIA is undertaken. The guide also addresses inequalities and population health as environmental outcomes of a project. Regard has been given to the general approach put forward in this IEMA guidance when preparing this chapter.

HSE Position Paper on Wind Turbines and Public Health (2017)

The Public Health Medicine, Environment and Health Group of the HSE were tasked with investigating the potential public health issues involved with wind farm development, given the

increase in wind farm development in Ireland in recent years. The issues often cited in terms of health impacts are considered, including noise, shadow flicker and electromagnetic frequency.

The paper has reviewed the scientific basis for reports on negative heath impact resulting from wind farms. Its findings conclude that the evidence is weak, where present, and in many cases, is lacking. The paper states that *"Published scientific evidence is inconsistent and does not support adverse effects of wind turbines on health"* and that *"adequate setback distances and meaningful engagement with local communities are recommended in order to address public concern"*. In respect of the proposed wind farm site, there is a minimum setback distance of 760 m from the proposed turbine locations to sensitive receptors which is in excess of the minimum setback requirements in the 2006 WEDGs of 500m and complies with the Draft 2019 WEDGs of 4 times tip height.

The position paper states that *"Further research is required to investigate the effects of wind farms on public health. Large-scale prospective cohort studies would be most informative for identifying potential health effects of exposure to wind turbine noise; further cross-sectional studies are unlikely to contribute meaningfully to the current limited evidence base."*

The paper recommends the use of relevant national planning guidelines (which would include the 2006 WEDGs) in order to determine applicable limits for noise, shadow flicker and setback distances from sensitive properties.

Therefore, health protection and health improvement are considered in this chapter. The methodology for assessing health protection is considered further below.

Longford CDP 2021-2027

Policy related to population and human health receptors set out in the Longford CDP includes:

- CPO 5.153: *Ensure that the assessment of wind energy development proposals will have regard to the following:*
  - *sensitivities of the county's landscapes;*
  - *visual impact on protected views, prospects, scenic routes, as well as local visual impacts;*
- *impacts on nature conservation designations, archaeological areas, county geological sites and historic structures, public rights of way and walking routes;*
  - *local environmental impacts, including those on residential properties, such as noise and shadow flicker;*
- *visual and environmental impacts of associated development, such as access roads, plant and grid connections;*
  - *scale, size and layout of the project and any cumulative effects due to other projects; the impact of the proposed development on protected bird and mammal species;*
  - *County Longford Wind Energy Strategy (when adopted);*
  - *impact of the grid connection from the proposed wind farm to the ESB network.*
- CPO 5.154: *Ensure that proposals for energy development demonstrate that human health has been considered and has regard to the forthcoming Draft Wind Energy Development Guidelines, including:*
  - *Noise;*
  - *Shadow Flicker (for wind turbine developments, including detailed Shadow Flicker Study);*

- *Ground Conditions/Geology (including landslide and slope stability risk assessment);*
- *Air Quality;*
- *Water Quality; and*
- *Assessment of impacts on collision risk species (bird and bats).*

6.2.1 Health Assessment and Protection

The assessment of human health for the proposed development, in terms of health protection, follows the approach set out in the 2022 EPA EIAR Guidelines and in the EC's (2017) Guidance on the preparation of the EIAR. Human health protection is considered through the assessment of the environmental factors (pathways) through which health could be affected such as air, noise, water and soils. Potential noise, air, soils and water impacts which could affect human health are identified, the scale of these potential impacts and their duration are assessed, and the significance of the potential impact on human health is determined.

It should be noted that the identification of individual environmental impacts and the associated potential effects and duration are undertaken in other chapters of this EIAR namely, Chapter 9 (Land, Soils and Geology), Chapter 10 (Hydrology and Hydrogeology), Chapter 11 (Air Quality), Chapter 12 (Noise and Vibration), Chapter 13 (LVIA), Chapter 15 (Traffic and Transport), Chapter 17 (Material Assets: Shadow Flicker), Chapter 19 (Major Accidents and Disasters), and Chapter 18 (Climate). The associated significance in terms of the potential impact on human health is then considered in this chapter. In the assessment of cumulative effects, any other existing, permitted or proposed developments in the surrounding area (see Chapter 5 of this EIAR - Planning, Policy and Development Context) have been considered where they have the potential to generate in-combination or cumulative effects with the proposed development. The potential for cumulative effects on the local population and human health is considered below, while elements such as noise, shadow flicker, traffic and visual impacts are discussed in the relevant chapters.

6.3 ASSESSMENT METHODOLOGY

Aspects which the EPA EIAR guidance documents suggest may be examined as part of the environmental assessment of population and human health include; *"employment, settlement patterns, land-use patterns, baseline population, human health (considered with reference to other headings, such as water and air), and amenity (e.g. effects on amenity uses of a site or of other areas in the vicinity may be addressed under the factor of landscape)"* (EPA, 2022).

Population and human health, in this chapter of the EIAR, is therefore considered in relation to the potential effects arising from the activity associated with the proposed development and environmental factors impacting the local population and human health receptors (hereafter referred to as 'sensitive receptors').

The potential sources of effects of the proposed development on the sensitive receptors have been identified as follows:

- Dust emissions from construction activities (construction phase);
- Noise and vibration emissions (construction and operational phases);
- Traffic emissions and disruption (construction phase); and
- Infrastructure installed as part of the proposed development (operational phase).

Potential effects on sensitive receptors in relation to the above sources are assessed in terms of land use, population trends, property receptors, property value, employment/economy, tourism and amenity, and human health.

6.3.1 Population

A desktop study was carried out in order to examine relevant information relating to this population and human health impact assessment. A local population and socio-economic profile has been established and described in terms of available relevant census data obtained primarily from the CSO. Information on population statistics, land use, employment and socio-economic data for the areas surrounding the proposed development have been obtained predominantly from the 2011 to 2022 Census of Ireland and 2020 Census of Agriculture records.

In terms of a 'Study Area', for the purposes of the population and human health assessment, this focuses on the local receiving environment surrounding the proposed development. Where available, CSO data has been reviewed at the smallest available level for the local area, including at Electoral Division (ED) level, which are the smallest legally defined administrative areas within which Small Area Population Statistics (SAPS) are gathered by the CSO. This is considered the most appropriate scale for collated census data and is commonly used for defining the existing population profile. Therefore, in order to discuss the receiving human environment and other statistics in the vicinity of the proposed development site, the Study Area for this assessment includes the EDs within or immediately surrounding to the proposed wind farm site area (Mountdavis, Cashel East, Killashee, Kilcommock, and Rathcline) (see Figure 6-1).

6.3.2 Human Health

For the human health assessment, available census data and surveys from the CSO and Government were reviewed; information has been presented on a county, regional or national scale depending on the availability. Published literature on the effects of wind energy developments on human health was also carried out. Sensitive receptors were identified from a combination of publicly available mapping, aerial imagery, street-level imagery and GeoDirectory address data as well as verification of properties by the Project Team from a drive-around ground-truthing survey (most recently undertaken in September 2024). This allows the team to verify the location and type of properties identified from the desk study and to include additional properties where arising. The ground-truthing exercise noted sites where planning application notices were currently present (i.e., potential future sensitive receptor). A planning application search has been undertaken as part EIAR to identify proposed and consented, but as yet not built, developments, and is discussed in Chapter 5 (Policy Planning and Development Context).

OSI and EPA Maps (including CORINE 2018) were used to identify land use in the local area surrounding the proposed development, as well as relevant amenity facilities within the main settlement areas around the proposed development.

Available statistics data on tourism and visitors from the CSO and Fáilte Ireland were reviewed. Fáilte Ireland tourist literature for County Longford was examined in relation to tourism amenity in conjunction with the websites of relevant tourism assets, locations and amenities in the area. County Longford is located in Ireland's Hidden Heartlands[6], a branding initiative

[6] https://www.discoverireland.ie/irelands-hidden-heartlands

developed by Fáilte Ireland to promote the region as an area *"centred around rural communities and their lifestyles, as well as the many spaces for adventure and relaxation in this region. These guidelines and assets will help you attract visitors 'off the beaten track' and create an internationally compelling visitor experience"* [7]. Information on other tourist attractions and initiatives in the area have been sourced from relevant published literature available on websites, such as Discover Ireland, Visit Longford[8], and Tourism Ireland.

A consultation letter on the proposed development was sent to Fáilte Ireland during both rounds of consultation, on 30th September 2022 and again on 14th October 2024.

A response was received from Fáilte Ireland on the 12th of October 2022 and 16th of October 2024. A copy of the Fáilte Ireland *EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects* (July 2023) was provided in response to both rounds of consultation. Each response noted the purpose of these guidelines is to provide guidance for those conducting EIA and compiling an EIAR, or those assessing EIARs, where the project involves tourism or may have an impact upon tourism; no specific comments related to Population and Human Health were noted.

A response was received from the HSE on the 13th of November 2024 in response to the October 2024 consultation. The HSE provided an Environmental Health Service Submission Report, which stated that details of the application were circulated to the following HSE stakeholders (emergency planning, National Capital Estates Office (Regional), Director of National Health Protection, and the IHA Manager for the Midlands). The HSE response noted EIA guidance and legislation to be taken in to consideration when preparing the EIAR (all of which have been previously set out in Section 6.2 of this EIAR chapter), and that generally the EIA should examine all likely significant impacts and provide the following information for each:

a) Description of the receiving environment (see Section 6.4);

b) The nature and scale of the impact (see Section 6.5);

c) An assessment of the significance of the impact (see Section 6.5);

d) Proposed mitigation measures (see Section 6.6); and

e) Residual impacts (see Section 6.7).

The HSE recommends that in addition to any likely significant negative impacts from the proposed development, any positive likely significant impacts should also be assessed, and that the following matters are included and assessed in the EIAR; public consultation, decommissioning, siting and location of turbines (see Chapter 3 (of the Proposed Development) of this EIAR), noise and vibration (see Chapter 12 (Noise and Vibration) of this EIAR and Section 6.5 of this Chapter), shadow flicker (see Chapter 17 (Material Assets: Shadow Flicker) of this EIAR and Section 6.5 of this Chapter), air quality (see Chapter 11 Air Quality of this EIAR and Section 6.5 of this Chapter), water quality (see Chapter 10 (Hydrology and Hydrogeology) of this EIAR and Section 6.5 of this Chapter), geological impacts (Peat Stability Risk Assessment) (see Appendix 9-2 and Chapter 9 (Land Soils and Geology) of this EIAR and Section 6.5 of this Chapter), ancillary facilities (see Chapter 3 (Description of the Proposed Development) of this EIAR), and cumulative impacts (see Section 6.8 of this Chapter). Refer to Chapter 1

[7] https://www.failteireland.ie/IrelandsHiddenHeartlands.aspx
[8] https://longford.ie/en/visit/

(Introduction) of this EIAR for a summary of the scoping activity and responses received associated with the proposed development.

Typically, a 1-2 km distance from the site boundary is considered for detailing the baseline in terms of population and human health receptors, however, this distance may be amended during the assessment on account of the location of population centres, density of receptors or specific local considerations. Sensitive receptors most likely to experience impacts are typically those in proximity to the proposed wind farm site and have been identified and reviewed on a property-by-property basis (i.e., aerial mapping, GeoDirectory and ground-truthing). It should be noted, there are no statutory guidelines in respect of how far from the site boundary or proposed turbines this assessment should extend for the purpose of population and human health impacts and assessment, however the distances identified as part of the assessment of other environmental factors (e.g., air quality, noise, landscape and visual and shadow flicker) are useful references. Furthermore, the draft 2019 WEDGs recommend a minimum setback distance of four times the tip height from a proposed turbine to the curtilage of any residential property and the proposed development complies with this recommendation.

Aspects examined in this assessment primarily relate to potential impacts from the proposed development on local population, properties, socio-economic activities and local community health. These themes are discussed primarily in this chapter but may be further addressed in other technical chapters, where relevant.

6.3.3 Assumptions and Limitations

As mentioned, sensitive receptors were identified from a combination of publicly available mapping and aerial imagery and GeoDirectory address data, as well as verification of properties from a drive-around ground truthing survey (September 2024). This process provides an indication of the property receptors present in the area at the time it was undertaken. The ground-truthing exercise noted sites where planning application notices were present (i.e., potential future sensitive receptor). However, it should be noted that additional sensitive receptors present in the area since September 2024, will not have been captured by this process.

The study area for this population and human health assessment primarily focused the local receiving environment surrounding the proposed wind farm site, as the works for the Turbine Delivery Route (TDR) are sufficiently minor as not to have any material impact on population and human health, these have been scoped out of the assessment. Any local impacts such as on air quality, noise and vibration, land use, soils, water quality, landscape and visual, traffic and transport, and from shadow flicker and major accidents and disasters are presented and addressed within their respective chapters, and have been reviewed with respect to this assessment. The associated significance in terms of the potential impact on population and human health is considered in this chapter.

6.4 EXISTING ENVIRONMENT

6.4.1 Population

6.4.1.1 Land Use

The proposed wind farm site will be located on three bogs within the Mountdillon peat production group, on the Derryaroge, Derryadd and Lough Bannow cutaway bogs, which are

situated in south County Longford. The site has a total area of approximately 1,900 hectares (ha). These bogs are located between the towns and villages of Lanesborough, Derraghan, Keenagh, Killashee, and the River Shannon. The River Shannon forms the county border with Roscommon.

Lanesborough, is the nearest town, located approximately 500 m west of the proposed wind farm site boundary on the N63. Further amenities and services are available in the larger towns of Longford, Roscommon and Athlone. Longford Town (approximately 9 km northeast) is the closest large town, defined as a 'Key Town' in the Longford CDP settlement hierarchy, which are described as *"Large economically active service and/or county towns that provide employment for their surrounding areas and with high-quality transport links and the capacity to act as growth drivers to complement the Regional Growth Centres".*

Previous land use and activities on the site were a mixture of active peat extraction and associated works (e.g., maintenance of machinery, staff canteen, stores etc.), bare cutaway peat and re-vegetation of bare peat). There are a number of existing Bord na Móna rail lines that pass through the bogs, which historically facilitated the transportation of milled peat and ash. These activities ceased in 2019. The site is operating in compliance with its IPC licence requirements (ref. no P0504-01), and the site is now currently in a decommissioning activity associated with the removal of rail infrastructure, structures and materials from the site. Following the successful decommissioning of the site it is intended that the site would be rehabilitated in line with condition 10 of the IPC licence. Land cover within and surrounding the proposed wind farm site are listed in Table 6-1.

Table 6-1 – Land Cover within and surrounding the proposed wind farm site as per Corine 2018 (EPA Maps, 2024)

Corine 2018 Land Cover within and surrounding the proposed wind farm site			
Code	**Level 1 Description**	**Level 2 Description**	**Level 2 Description**
231	Agricultural Areas	Pastures	Pastures
243	Agricultural Areas	Heterogeneous agricultural areas	Land principally occupied by agriculture with significant areas of natural vegetation
313	Forest and semi-natural areas	Forest	Mixed Forests
324	Forest and semi-natural areas	Scrub and/or herbaceous vegetation associations	Transitional woodland scrub
312	Forest and semi-natural areas	Forest	Coniferous forests
412	Wetlands	Inland wetlands	Peat bogs

112	Artificial Surfaces	Urban fabric	Discontinuous urban fabric

The landscape within and surrounding the proposed wind farm site is a mixture of land uses including forestry, agricultural land and cutaway peatland (CORINE, 2018, source: EPA Maps, 2024). The landscape is predominately flat. There are a number of scattered individual domestic dwellings, small residential clusters, and farm buildings present in the landscape surrounding the proposed wind farm site, along with some linear settlement on the N63 and local roads.

There are 2,515 farms with crops within County Longford, covering an area of 71,084 ha, with an average area of 28.3 ha farmed (CSO, 2022). The total area of farmland within the five EDs around the proposed development site measures approximately 7,610.4 ha, comprising approximately 50% of the combined area (approximately 15,160 ha) for these EDs, according to the CSO Census of Agriculture 2020. The main crop typed farmed is grassland (CSO, 2022).

There are approximately 258 farms (agricultural holdings) located within the five EDs, with an average holding size of approximately 29.34 ha, slightly larger than the 28.3 ha average farm size for Co. Longford (CSO, 2022). Agricultural land use in the vicinity of the proposed development is listed in Table 6-2.

Table 6-2 – Agricultural land use in the vicinity of the proposed wind farm site

ED Area	Agricultural Holdings	Average Size of Holdings (ha)	Total Area Farmed (ha)	Main Crop Type
Mountdavis	46	24	1065.8	Grassland
Cashel East	58	34.8	1103.2	Grassland
Killashee	39	31.8	1238.6	Grassland
Kilcommock	38	28	2018.9	Grassland
Rathcline	77	28.4	2183.9	Grassland
Total	**258**	**29.34**	**7610.4**	**Grassland**

The wind farm site is located in an area designated within the Longford CDP as 'preferred locations' in relation to 'Areas of Wind Farm Potential'.

In terms of existing wind development in the surrounding landscape, the closest existing wind farm to the development is the Sliabh Bawn Wind Farm (Capacity 64 MW, commission year 2019) located approximately 8 km northwest from the nearest turbine to turbine.

6.4.1.2 Population Trends

Population Growth

The CSO published as series of results from the Census 2022 throughout 2023, providing insights into Ireland's Census of Population and housing figures for the latest census year.

The results indicate that the population in the state of Ireland as of Census Night 2022 (Sunday 3rd of April 2022) was 5,149,139 persons; this population result is the first time in over 171 years (since 1841) that a census has recorded a population in Ireland of over 5 million people. The

population increased by 8.1% (approximately 387,274 persons) since the previous census (April 2016), with an average annual population growth of 1.3% a year since 2016, compared to the previous intercensal period, 2011 to 2016, where total growth was 3.8%, or an annual average increase of 0.7% (CSO, 2023).

The CSO outline the following key findings of the Census 2022 results in terms of population growth as:

- The natural increase in population made up 167,487 of the change, and the estimate for net migration was 219,787;
- This represents an annual average increase of almost 65,000 people;
- The number of people with dual Irish citizenship was 170,597, representing a 63% increase from 2016;
- In 2022, there was a drop from 87% to 83% in the number of people who reported their health as being 'good' or 'very good' since 2016; and
- Approximately a third of all workers (approximately 747,961 people) worked from home for at least a portion of their week.

Every county recorded population growth for the period between 2016 and 2022. The data collected during Census 2022 shows that all counties experienced both natural increase and positive estimated net migration in the six years since the previous census (CSO, 2023):

- Increases in population since 2016 ranged from 5% in Donegal, Kilkenny and Tipperary to 14% in Longford;
- Population growth tended to be stronger in the east of the country with Meath growing by 13%, followed by Fingal (12%) and Kildare (11%);
- Population changes by county show that Fingal had the largest natural increase (19,183), followed by Cork (county and city combined) (17,218);
- Leitrim (770) and Sligo (1,373) were the counties with the smallest natural increases; and
- Estimated net migration ranged from 1,847 in Monaghan to 24,070 in Cork (county and city combined).

In contrast to recent demographic trends towards urbanisation experienced by other counties, the Census 2022 indicates that Longford remains, in population terms, a predominantly rural county, with over 65% of the county's population identified as living in a rural setting (Longford CDP 2021-2027).

An examination of the existing population in the study area has been carried out to identify local and wider population trends, density and to define the properties/receptors surrounding the proposed development. Census data from the 10-year period 2011-2022 available from the CSO[9] has been summarised in Table 6-3.

The proposed wind farm site is located in the local authority area of Longford County Council and fall within the EDs of Mountdavis, Cashel East, Killashee, Kilcommock, and Rathcline. Of these, the majority of the proposed wind farm site lies within the ED of Mountdavis (northern and middle sections of the site) and Cashel East (southern section of the site). Killashee, Kilcommock, and Rathcline EDs surround the proposed wind farm site, and fall within the proposed wind farm site boundary at certain points, see Figure 6-1 below. All five EDs identified

[9] https://www.cso.ie/en/census/ (Accessed September 2024)

have been included in defining the existing population (as of Census 2022) in the vicinity of the proposed wind farm site.

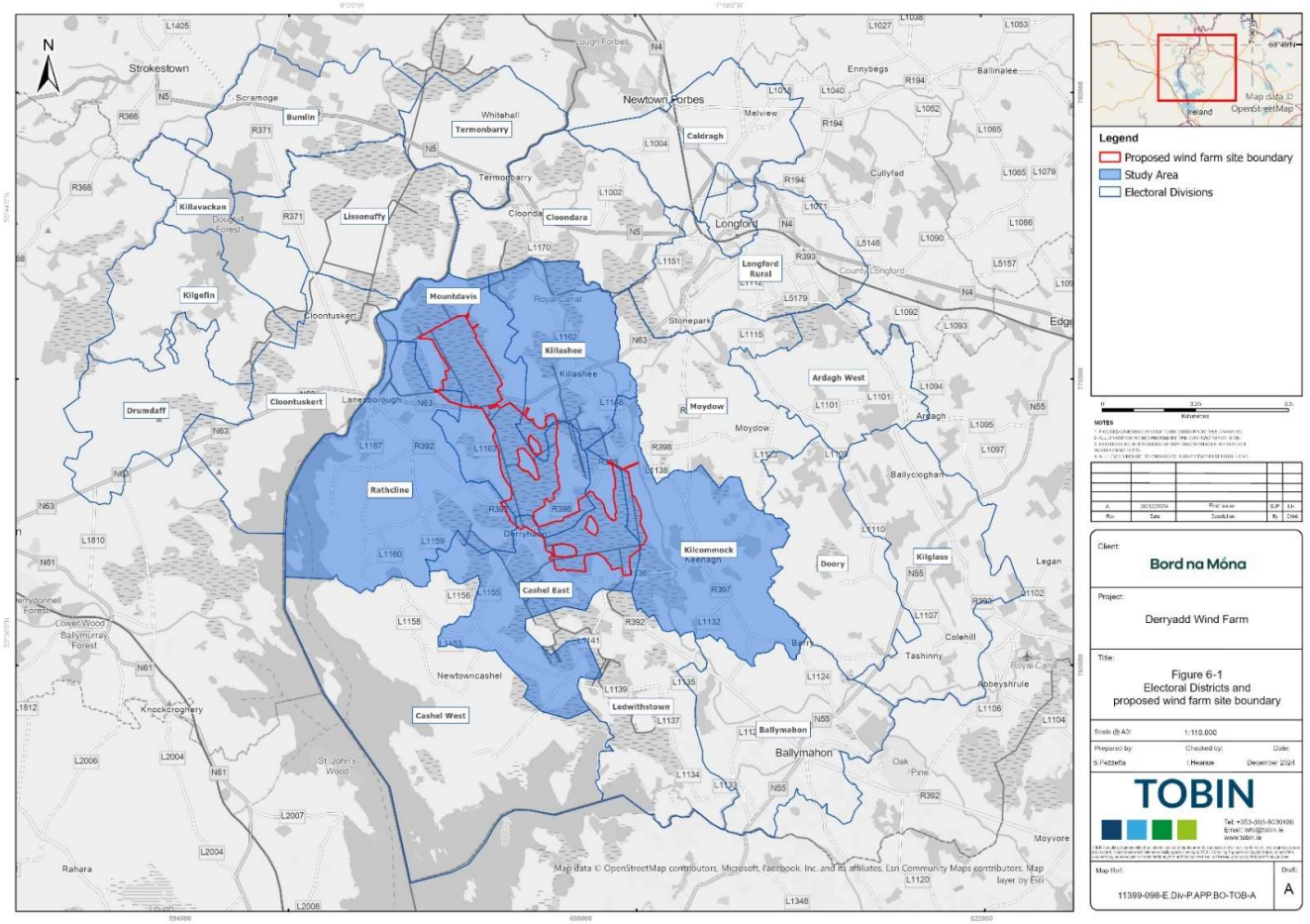

Figure 6-1: Electoral Districts and Proposed Wind Farm Site Boundary

Census results in 2022 show a rise in population in Longford of 5%. However, during the 11-year period between 2011 to 2022, the population nationally increased by approximately 11% and the population of County Longford increased by approximately 19%, while the population of the ED's within which the proposed wind farm site is located increased by approximately 14%. This illustrates that the population of the local area has increased over the 11-year period along with county and national rates.

Table 6-3: Population Trends 2011 – 2022

Area	Population 2011	Population 2016	Population 2022	% Change from 2011 - 2022
State	4,588,252	4,761,865	5,084,879	+11%
Longford County	39,000	40,873	46,373	+19%
Electoral Districts (EDs)				
Mountdavis	250	252	238	-5%
Cashel East	323	302	278	-14%
Killashee	432	437	487	+13%
Kilcommock	953	1,062	1,161	+22%
Rathcline	1,428	1,443	1,700	+19%
EDs (total)	**3,386**	**3,496**	**3,864**	**+14%**

The location of the proposed wind farm site in the context of the above ED's is shown in Figure 6-1. Population density is a useful indicator of the settlement patterns in the area surrounding the proposed wind farm site. Table 6-4 shows population density for the state and the EDs surrounding the proposed wind farm site, which shows a generally sparser population in the study area compared with the overall country.

Table 6-4: Population Density State & EDs - Census 2022

Area	Population density (persons per sq km)
State	73.3
Mountdavis	7.9
Cashel East	9.7
Killashee	22.3
Kilcommock	36.7
Rathcline	42.9

The 2022 census identified that the average population density in Ireland was 73.3 persons/km^2. The population density of the local EDs range between 7.9 to 42.9 persons/km^2, showing the population density in the area surrounding the proposed wind farm site is below the national average, due to the rural nature of the area.

Age and Sex Composition

The census 2022 records the date of birth and sex of respondents, which allows the results to build a picture of Ireland's age profile, providing insight into relative growth and decline among various age cohorts over time, and to generate information on the relative size of the male and female populations. The average age of the population increased from 36.1 and 37.4 years in 2011 and 2016 respectively to 38.8 years in 2022 (CSO, 2023).

The CSO note the following key statistics in relation to age and sex composition from the Census 2022:

- *"The population includes 2,544,549 males and 2,604,590 females;*
- *With 60,041 more females than males in the State in April 2022, the sex ratio fell slightly to 97.7 in 2022 compared with 97.8 in 2016;*
- *Census 2022 data show peaks for people aged in their early 40s and pre-teen years. This reflects high birth rates in the early 1980s and 2010s;*
- *Births declined each year between 2010 and 2020 but increased again in 2021;*
- *The number of children aged under 10 declined compared with 2016;*
- *The fall was greater among females (15% decline) than among males (14%);*
- *The average age was 38.2 years for males and 39.4 for females;*
- *There was a 4% fall in the number of people aged 25 to 39;*
- *The highest increase in population was seen among the over 70s;*
- *The number of people aged 85 years and over increased by 25%;*
- *Fingal, Kildare and Meath continued to be the counties with the youngest age on average;*
- *Mayo, Kerry, Roscommon and Leitrim had the oldest populations;*
- *All counties recorded an increase in average age between 2016 and 2022; and*
- *The county recording the largest growth in average age was Kildare; its average age rose by 2 years*" (CSO, 2023).

Tables 6-5 and 6-6 below provide an indication of the sex and age composition of the local and wider population based on Census 2022 respondents for the State, County Longford and the local EDs surrounding the proposed wind farm site.

Table 6-5: Male & Female Population Composition - Census 2022

Area	Male	Female	Total
State	2,544,549	2,604,590	5,149,139
Longford County	23,449	23,302	46,751
Electoral Districts (EDs)			
Mountdavis	120	118	238
Cashel East	144	134	278
Killashee	247	240	487
Kilcommock	573	588	1,161
Rathcline	836	864	1,700
EDs (total)	**1,920**	**1,944**	**3,864**

Table 6-6: Population Average Age - Census 2022

Area	Age Mean
State	38.3
Longford	37.5
Mountdavis	40.5
Cashel East	43.7
Killashee	38.7
Kilcommock	37.2
Rathcline	39.9

6.4.1.3 Property Receptors

The locations of properties and buildings (referred to as property receptors) in the vicinity of the proposed wind farm site have been identified using address data from the GeoDirectory database which is used to populate Eircodes.

The validity of the GeoDirectory data has been confirmed by way of publicly available mapping, aerial imagery, street-level imagery and a ground truthing survey (September 2024). All receptors within 2 km of the proposed wind farm site boundary have been identified and verified by means of the above desktop reviews and ground truthing surveys. Approximately 981 property receptors have been identified within 2 km of the proposed development. A breakdown of the receptors identified, along with their property type, is outlined in Table 6-7 below. The category 'other' includes other property types present in the area such as community facilities and services. The ground-truthing exercise noted sites where planning application notices were present which are also noted in Table 6-7 below under 'planning applications'.

Table 6-7: Breakdown of Property receptors identified within the 2km of the proposed wind farm site

Property Type		No.
Residential		939
Commercial		21
Other	Health Centres	1
	Schools	4
	Community Centres/Halls	2
	Churches	2
	Fire Stations	1
	GAA Clubs	2
	Cemetery	2
	Power Station	1
Derelict		2
Planning applications		4
Total property receptors identified within 2 km		981

Table 6-8 below outlines the property receptors identified as closest to a turbine; 11 properties (residential) were identified within 800 m of a turbine[10], however, no properties are located within 760 m of a turbine (which is the minimum set back distance (i.e. greater than four times tip height). Figure 6-2 below shows the distribution of property receptors in relation to the proposed wind farm site boundary.

Table 6-8: Property Receptors Identified as being closest to a Turbine

Property Type (Receptor ID)	Closest Turbine No.	Approximate Distance (m)
Residential (P0125)	T05	779
Residential (P1133)	T01	779
Residential (P1508)	T17	780
Residential (P0211)	T03	782
Residential (P1512)	T22	793
Residential (P1906)	T19	793
Residential (P0232)	T07	794
Residential (P1411)	T13	794
Residential (P1516)	T12	794
Residential (P1496)	T22	796
Residential (P1143)	T01	796

[10] Conservative distance of 800 m chosen to ensure properties at a distance of four times the tip height (i.e., 760 m) from a turbine were captured.

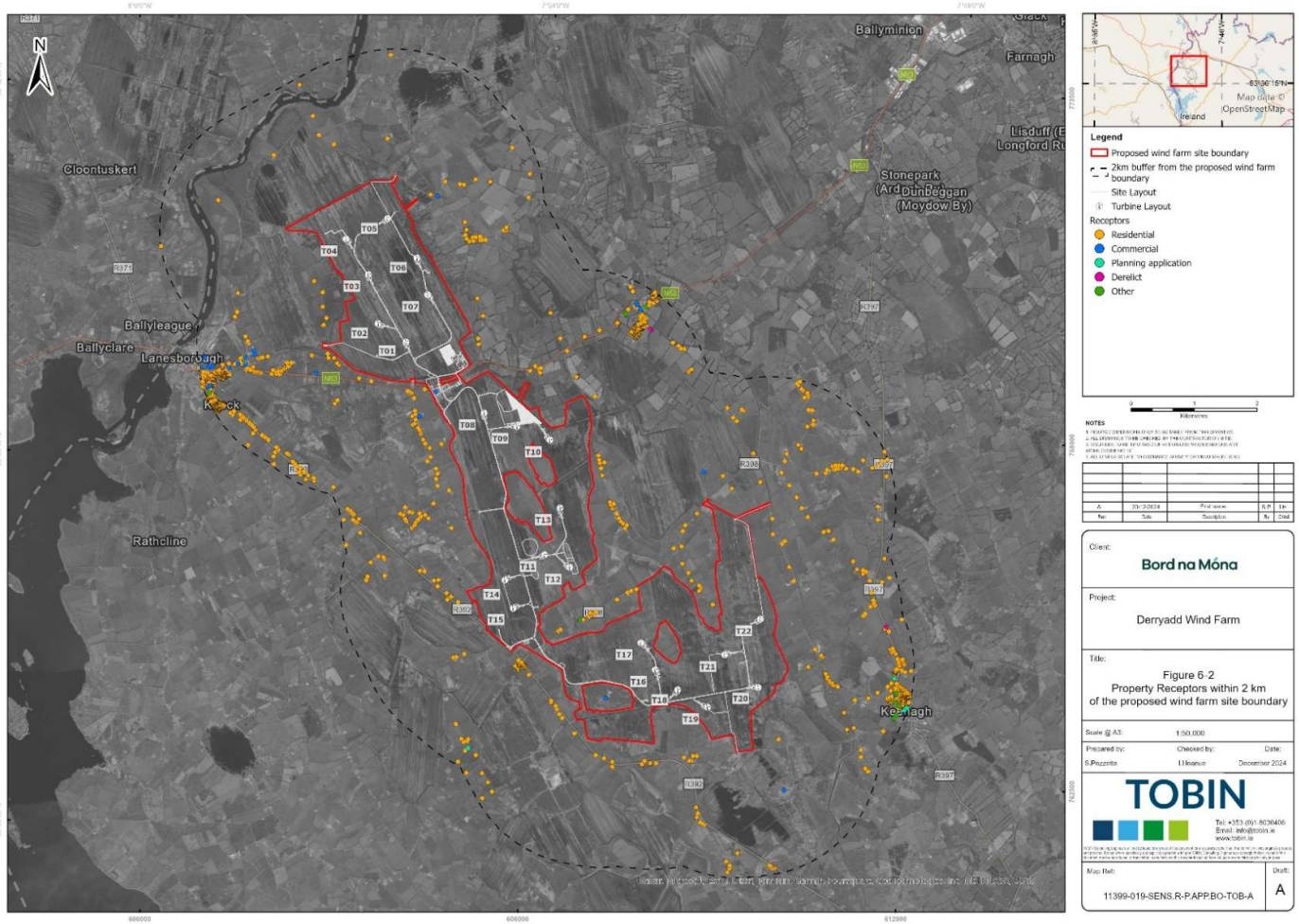

Figure 6-2: Property Receptors within 2 km of the proposed wind farm site

Residential

In terms of residential properties, as mentioned approximately 939 residential properties were identified within a 2 km buffer of the proposed wind farm site. Most of these properties are present along the local road network, and the nearest properties identified are beyond a minimum set back distance of 760 m (i.e. greater than four times tip height) between the curtilage of all/any sensitive receptors and the proposed turbine locations.

Education

In terms of early childhood education, a number of creches and preschool services are located in the surrounding area in the towns, villages or settlements of Longford Town, Lanesborough, Keenagh, Ballymahon, and Stonepark.

Four primary schools[11] were identified within 2 km of the proposed wind farm site:

- Scoil Muire Gan Smal, Lanesborough;
- Naomh Earnain National School, Killashee;
- Cloontagh Mixed National School, Cloontagh, Killashee;
- Naomh Dominic National School, Caonach Longphort.

The closest second level school[12] to the proposed wind farm is Lanesboro Community College, Lanesborough.

The nearest large third level institution is Athlone Institute of Technology (AIT) situated in Athlone, Co. Westmeath (approximately 22 km south).

Commercial

Approximately 21 no. commercial properties were identified within 2 km of the proposed wind farm site. These are primarily located in the towns of Lanesborough, Killashee, and Keenagh, with some individual commercial property receptors located outside of these towns in the wider area.

Local community sports facilities and amenities

A number of community and sports facilities and amenities are available in the locality including:

- Halls / Community Centres: Kenagh Community Centre, Keenagh, Ballyleague Hall, Lanesborough;
- Sports Clubs / GAA Clubs: Rathcline GAA Club, Killashee GAA, Keenagh GAA, St Faithleach's GAA, Cashel GAA Club, Lanesboro / Ballyleague Tennis Club;
- Water Related Recreation: River Shannon, Lough Ree, Lough Ree Access for All Accessible Boat Tours, Lough Ree Angling Club, Mosstown Harbour (located approximately 1.3 km east), Ballyleague Marina (situated in Lanesborough); and
- Recreational Areas: Rathcline Semi-Native Woodland and Recreation Area.

[11] Primary Schools identified through Schooldays and Google Maps, distance noted is between school and nearest point of red-line boundary - https://www.schooldays.ie/articles/primary-Schools-in-Ireland-by-map
[12] Secondary Schools identified through Schooldays and Google Maps, distance noted is between school and nearest point of red-line boundary - https://www.schooldays.ie/articles/secondary-Schools-in-Ireland-by-map

Other sports facilities and halls are available in Longford Town (e.g., Longford Sports and Leisure Centre and Longford Athletics Club Indoor Training Centre).

6.4.1.4 Property Values

CSO Residential Property Price Index (RPPI) and Sales Data

Data available from the CSO on property values is presented in terms of Eircode Routing Key areas. The proposed wind farm site is located within one Eircode Routing Key boundary, namely N39: Longford.

In August 2024, the CSO published the Residential Property Price Index (RPPI) data for the 12-months to June 2024[13]. The latest RPPI data release shows that overall residential property prices rose by 8.6% in the 12-months to June 2024, a marginal increase from 8.5% in the year to May 2024 (previous CSO RPPI release). Residential property prices in Dublin increased by 9.3% overall, and rose by 10% in terms of houses, and 6.6% for apartments. The highest house price growth in the Dublin region was in Dublin City which saw a rise of 11.7%, while Dún-Laoghaire Rathdown rose by 8.5%. Outside of Dublin, house prices increased by 8.0% on the same period a year earlier; and apartment prices grew by 10.0%. Beyond the Dublin region, the greatest increase in house prices was in the Mid-West (Clare, Limerick, and Tipperary) at 12.0%, compared to the South-East (Carlow, Kilkenny, Waterford, and Wexford) which saw a 5.6% increase.

In the 12-months to June 2024, a national median or mid-point price of €337,500 was paid for a residential property. Nationally, the lowest median price paid for a dwelling was in County Longford at €169,000, and the highest in Dún Laoghaire-Rathdown, County Dublin at €630,000.[14]. The CSO states the most expensive Eircode area over the 12-months to June 2024 according to the RPPI was D06 'Dublin 6' (median price of €773,000), while F45 'Castlerea' County Roscommon was the least expensive (median price of €139,000). According to the CSO RPPI data for June 2024, approximately 3,563 dwelling purchases by households at market prices were filed with the Revenue Commissioners, a decrease of 11.5% when compared with the 4,025 purchases in June 2023.

CSO Annual Sales Summary data for 2023 shows the latest annual figures for residential dwelling property transactions. In 2023, the volume of sales executed for in Ireland (i.e., all counties) was 73,182, with a combined value of €24,367.9 million. This was a 1% increase in sales compared to 2022, which saw 72,220 sales executed. In Longford, for the same period 566 sales were executed, -2% compared to 582 sales in 2022. Sales executed in Longford in 2023 equated to a combined value of €88.8 million. The mean sale price of residential dwellings in 2023 for Ireland was €332,977, compared to €156,946 for Longford.

Property values and wind farm developments

A UK study, entitled '*The effect of wind farms on house prices*', was carried out by the Centre of Economics and Business Research (CEBR) in March 2014. The key findings of the study were:

- Overall, the analysis found that country-wide property market drives local house prices, not the presence or absence of wind farms; and

[13]https://www.cso.ie/en/releasesandpublications/ep/p-rppi/residentialpropertypriceindexjune2024/ (Accessed September 2024)
[14] https://visual.cso.ie/?body=entity/rppi (Accessed on September 2024)

- The econometric analysis established that construction of wind farms at the sites examined across England and Wales has not had a detectable negative impact on house price growth within a 5 km radius of the sites.

However, a similar study published in April 2014 by the London School of Economics (LSE) Spatial Economic Research Centre found an average reduction in the value of houses (based on 125,000 house sales between 2000 and 2012) of between 5% and 6% within 2 km of wind farms (Gibbons, 2014). These contradicting studies led to further research in Scotland in 2016[15] which was based on analysis of over 500,000 property sales in Scotland between 1990 and 2014. This study, again, found no evidence of a negative impact from wind turbines on house prices and suggests that *"generally speaking the effect is either positive…or not distinguishable from zero"*.

The authors of the report tried to explain why the research carried out in Scotland found a very different result to that carried out in England even though the approach was very similar to that used in the LSE study. They suggested a number of possibilities including:

- Attitudes towards wind farms may be different in Scotland than in other parts of the UK;
- In Scotland, a much higher proportion of turbines are likely to be located on moors and mountains and in more remote areas than in England and Wales; and
- Some wind farms, especially in Scotland, enhance the local area by providing tracks for walkers, cyclists, horse riders and other members of the community, as well as substantial community benefit funds.

The proposed development will include for the creation of an amenity access track and amenity carparks within the wind farm site and will provide a community benefit fund for the local area.

Large scale studies in United States have indicated that there is no conclusive evidence of any effect on property values located in close proximity to wind farms. A study entitled *A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States* by Lawrence Berkley National Laboratory in 2013, carried out sampling in over 51,000 homes across nine US states. The range of distances examined accounted for as far as 10 miles away (approximately 16 km), but also took into account 1,198 homes within 1 mile (approximately 1.6km) of turbines.,

Presently, there is one Irish based study that has looked at the effect of wind farms on property values within the Irish context. This working paper entitled '*Wind Turbines and House Prices Along the West of Ireland: A Hedonic Pricing Approach'* (Gillespie & McHale, 2023) was published by the Centre for Economic Research on Inclusivity and Sustainable (CERIS) in 2023. This paper reviewed wind turbine developments in west of Ireland covering counties Cork, Donegal, Galway, Kerry, Leitrim, Mayo, and Sligo and associated property values. The study used satellite imagery to identify individual turbines and sourced local housing data from Irish property website 'daft.ie'. Although prices published on daft.ie are not necessarily equivalent to the price agreed on final sale of a property, the assumption was made that property listing and sale agreed prices correspond. The findings of the study indicated a potential decrease in property values of approximately -14.7% within a radius of 0-1 km of a wind turbine. It should be noted that the sample size considered within this range was small, approximately 225 houses, which does not fully represent the distribution of wind turbines and broader landscape of Irish rural residential properties. Furthermore, the paper states that there are "*no significant reduction in house prices beyond 1 km"* and that the effects seen within the 0-1 km radius were

[15] ClimateXChange, *The impact of wind turbines on house prices in Scotland* (October 2016)

not persistent and were seen to diminished over the operational lifetime of the wind turbines (Gillespie & McHale, 2023).

It is a reasonable assumption, based on the available published studies, that the operation of a wind farm at the proposed location would not significantly impact on property values in the area.

Public Perception of Wind Farm Developments

Scotland and Ireland Survey 2005

In 2005, researchers from the University of St. Andrews, Fife and The Macaulay Institute, Aberdeen published the results of a survey conducted on the perception of wind power in Scotland and Ireland, undertaken between 2003 and 2004 (Warren et al., 2005). The study aimed to find the degree to which people support or oppose wind power, to understand reasons for such attitudes and establish how these attitudes relate to certain reasons such as personal experience and proximity. The surveys were conducted around the localities of existing and planned wind farms in Ireland, in Counties Cork and Kerry, and in Scotland, within the Scottish Borders region. Key findings included:

- The large majority of those surveyed indicated that they are greatly in favour of their local wind farm, with their personal experience having prompted their positive attitude;
- In Scotland, attitudes towards the concept of wind energy were found to be *"overwhelmingly positive*" (Warren et al., 2005);
- In Ireland, survey results indicated 92% support for the development of wind energy in the country, with results showing a high level of support for renewable energy;
- The study indicates its findings are in line with previous similar research, which indicate that positive attitudes grow over time and with proximity to wind farms;
- The study found that in terms of the 'not in my back yard' (NIMBY) effect appears, it is much more pronounced in relation to proposed wind farm developments than with existing wind farms;
- Reasons provided by respondents for their positive view of local wind farms were primarily related to positive aspects including, promotion of renewable energy, moving away from fossil fuels, and environmental protection;
- In terms of wind farm size, the study noted that similar to previous research, the surveys found that wind farm developments with small numbers of large turbines are usually preferred over developments with large numbers of smaller turbines;
- In Scotland, problems often cited as negative impacts of wind farms, such as shadow flicker and telecommunications interference, were not cited by respondents;
- Scottish respondents reasons for a positive change in attitude post construction phase included that they thought wind farms were *"not unattractive (62%), that there was no noise (15%), that community funding had been forthcoming (15%) and that it could be a tourist attraction (8%)"*(Warren et al., 2005)*;*
- In Scotland, the surveys found that although those living in proximity to proposed and existing wind farm sites had indicated positive attitudes towards wind power, those around a proposed wind farm site were less convinced than those living in proximity to the existing wind farm site;
- In Ireland, survey results support the Scottish results, showing an increase in positive attitudes to wind power through time and proximity to wind farms;
- Data recorded from Irish respondents indicate that those who regularly see the wind farms are generally most accepting of the visual impact;
- The study further states that the majority of those with direct experience of wind farms do not think that they have had any adverse impact on wildlife, tourism, scenic beauty or property values;

- Overall, the study results indicate *"a clear pattern of public attitudes becoming significantly more positive following personal experience of operational wind farms"* (Warren et al., 2005).

Sustainable Energy Authority of Ireland (SEAI) National Survey 2023

In May 2023, the SEAI published their latest survey findings regarding attitudes towards wind and solar energy farms, which builds upon SEAI surveys undertaken in 2003 and 2017. The objective of the survey was to provide insight on public attitudes to commercial wind and solar energy farms in Ireland, and to understand the impacts of these projects on those who live in surrounding areas, to help inform an "*equitable and socially sustainable energy transition"* (SEAI, 2023).

The SEAI's survey is an initial step to track the impact of projects developed under the government's Renewable Electricity Support Scheme (RESS). Key findings from the research are:

- *"Most households close to new wind or solar power projects have positive attitudes to the project close to them;*
- *Across rural Ireland, general levels of support for wind and solar energy projects remain very high, regardless of whether people live close to new projects or far away;*
- *A large majority of the public living in rural areas supports government policies that secure financial benefits for households and communities close to new renewable energy infrastructure projects through 'Community Benefit Funds';*
- *Most people feel like they and their communities can have a say in the planning process. However, many still feel that the planning process is unfair, and that more effort should be made with community engagement and careful siting of projects;*
- *Currently, 5 GW of renewable electricity capacity is connected to the national grid with 2022 being a record year for new wind and solar energy connections. At peak time, Ireland requires about 5.5GW of energy and renewables and a significant proportion of that is provided by renewable power. In the first quarter of 2023, for example, 34% of Ireland's electricity came from wind, and while solar continues to increase, on a sunny day earlier in May, 10% of the country's energy was produced by solar power;*
- *The* national survey of attitudes *is an early step in a long-term research programme to understand the socio-economic impacts of the RESS policy. To date, SEAI has* commissioned studies *to understand the ways in which community engagement in wind energy can be improved through public participation in decision-making, direct investment, co-ownership in projects and by enhancing developers' practices in establishing community benefits schemes; and*
- *SEAI are planning further studies on the socio-economic impacts of the government's RESS policy"* (SEAI, 2023).

6.4.1.5 Employment / Economy

Employment is an important indicator of the economic standing of an area. This section examines employment status and unemployment levels in the region of the proposed development. The Labour Force Survey[16] undertaken by the CSO, in accordance with standard International Labour Organisation (ILO) criteria and provides details of unemployment on a regional level. Longford is located in the Midland Region (IE063)[17]. The findings from the Q2

[16] https://www.cso.ie/en/surveys/householdsurveys/lfs/

[17] https://ec.europa.eu/eurostat/web/nuts/nuts-maps - NUTS 3 – Nomenclature of Territorial Units for Statistics (NUTS) created by Eurostat

2024 Labour Force Survey (latest available data) published by the CSO[18] are outlined in the following sections.

Nationally, there were 2,754,200 persons (aged 15 years and over) in employment according to CSO data published for Q2 2024, an increase of 71,500 or +2.7% over the year from Q2 2023 (2,682,700 persons). In the Midland Region, there were 160,000 persons in employment in Q2 2024, an increase of 300 persons or +0.2% over the year from Q2 2023 (159,700 persons); this indicates employment in the Midland Region has marginally increased over the 2023-2024 period, in line with the national trend which has indicated an increase nationally.

The unemployment rates outlined in Table 6-10 is the number of unemployed persons expressed as a percentage of the total labour force (aged 15-74). The unemployment rate for the State in Q2 2024 was 4.6%, while the unemployment rate for the Midland Region was 5.3%, indicating that unemployment in the region for the period Q2 2024 is marginally higher (0.7%) than the State.

Nationally, the number of persons aged 15-74 years who were unemployed decreased by 9,000 persons (+7.4%) to 131,200 in the year to Q2 2024, from 122,200 persons in Q2 2023. The unadjusted unemployment rate for persons aged 15-74 years increased from 4.4% to 4.6% over the year to Q2 2024. The number of unemployed persons increased nationally by 3,000 (+4.5%) for males to 69,800, and 6,100 (+11%) to 61,400 for females over the 12-month period to Q2 2024. The unemployment rate for males was 4.6% in Q2 2024, remaining the same as a year earlier (Q2 2023) while the corresponding rate for females was 4.5%, up from 4.2% in Q2 2023.

Nationally, there were 2,885,400 persons aged 15 years or over in the labour force in Q2 2024. Of this 1,518,000 of the labour force are male and 1,367,400 are female. This represents an increase of 80,500 or 2% more persons in the labour force over the year from Q2 2023 (2,804,900 persons). In the Midlands Region, 168,900 persons aged 15 years or over were in the labour force in Q4 2022; this is an increase of 3,200 (+2%) persons on the same period in 2023.

In 2022, approximately 22,000 people were in the labour force for County Longford, a 20% increase on the number recorded 11-years prior (Census 2011), and a 17% increase on the number recorded in the 2016 Census. Table 6-9 below give an indication of the numbers of persons occupation by industry in County Longford between 2011 and 2022. Industries with a high proportion of the labour force in County Longford include wholesale and retail trade, manufacturing, human health and social work, education, construction and public administration.

The agriculture, forestry and fishing industry employed approximately 1,066 persons in County Longford in 2022. As mentioned above under Section 6.4.1.1 Land Use, agricultural activity accounts for a significant proportion of land use within the five EDs surrounding the proposed wind farm site. The average age of farm holders within the five EDs is 57.8 years old, which is in line with the average age for the County Longford and the State of 57.4 and 57.2 years respectively. Over 57% of farm holders in Ireland are above the age of 55 years (CSO, 2022).

Table 6-9: Labour Force – Occupation by industry in County Longford (Census 2011-2022)

Labour force – occupation by industry	2011	2016	2022
Human health and social work activities	1,419	1,696	1,889

[18] https://www.cso.ie/en/releasesandpublications/ep/p-lfs/labourforcesurveyquarter22024/ (Accessed September 2024)

Labour force – occupation by industry	2011	2016	2022
Wholesale and retail trade (including motor repair businesses)	2,110	2,277	2,182
Manufacturing	1,857	2,237	2,965
Education	1,273	1,248	1,655
Agriculture, forestry and fishing	1,300	1,159	1,066
Construction	726	841	1,196
Professional, scientific and technical activities	445	515	768
Public administration and defence (inc. compulsory social security)	1,029	928	1,283
Accommodation and food service activities	558	619	1,181
Financial and insurance activities	328	269	387
Transportation and storage	483	519	583
Administrative and support service activities	423	370	697
Information and communication	212	237	393
Other industries (combines remaining lowest industry numbers / 'Other services activities' / 'Industry not stated')	1,708	2,257	3,450
Unemployed	4,562	3,701	2,367
Total in Labour Force in County Longford	**18,433**	**18,873**	**22,062**

The participation rate is the number of persons available to the labour force (i.e., persons 15 years or older either working or looking for work) expressed as a percentage of the total population. In Q2 2024, the participation rate in the State was 66.0% compared with 63.2% in the Midland Region; this demonstrates that the participation rate in the Midland Region is similar, although marginally lower than the current trend nationally. Refer to Table 6-10.

Table 6-10: Labour Force Survey (Q2 2024)

Location	Unemployment Rate	Participation Rate
State	4.6%	66.0%
Midland Region	5.3%	63.2%

The CSO also publishes figures relating to the Live Register; the latest live register figures published cover the period to August 2024 (Published in September 2024). These figures are not strictly a measure of unemployment as they include persons who are legitimately working part-time and signing on part-time. However, the Register can be used to provide an overall trend within an area.

The figures in Table 6-11 show that over the 12-month period of August 2023 –August 2024, there was an -4% decrease (8,249 persons) in the number of persons on the Live Register[19] in the State as a whole, and an -4% decrease (475 persons) in the number of persons on the Live Register in the Midland Region. County Longford experienced a -3% (63 persons) decrease in the number of persons on the Live Register between August 2023 and August 2024.

[19] https://www.cso.ie/en/releasesandpublications/ep/p-lr/liveregisteraugust2024/ (Accessed September 2024)

Overall, there is a decreasing trend in Live Register figures, with the latest figures indicating a marginal lowering of live register figures compared to the same period in 2023.

Table 6-11: Live Register Total Figures (August 2023 – August 2024)

Location	Aug 2023	Aug 2024	% Change
State	186,117	177,868	-4%
Midland Region	13,232	12,757	-4%
Longford	2,133	2,070	-3%

The Longford CDP 2021-2027 sets out the Economic Development strategy for the County (Chapter 8 of the CDP). At a strategic level within County Longford, the CDP has identified a number of areas and opportunities for development under its Economic Development Strategy, which is primarily derived from the RSES, and the spatial development strategy of the County provided within its Core Strategy (outlined in Chapter 4 of the CDP). The CDP states that the focus of the strategy is *"on developing strategic economic growth centres that will act as engines for economic growth throughout the County"*. Some of the relevant policy objectives identified in the Longford CDP in support of economic growth and employment are:

- CPO 8.3: *Promote and facilitate regional-scale employment development as a priority in the Primary Economic Growth Centre of Longford Town, supported by the Secondary Economic Growth Town of Granard, and the Key Employment Centres of Edgeworthstown, Ballymahon and Lanesborough;*
- CPO 8.4: *Promote small towns and villages as local employment centres where investment can be focused on creating additional employment opportunities that will sustain a local rural hinterland;*
- CPO 8.5: *Ensure that sufficient land is zoned for economic activity through the County Development Plan and any relevant Local Areas Plan. Such land will normally be protected from inappropriate development that would prejudice its long-term development for employment and economic activity;*
- CPO 8.20: *Promote rural economic development by adopting a policy framework that recognises the need to promote the long-term sustainable social and environmental development of rural areas, encourages economic diversification and facilitates the growth of rural enterprises;*
- CPO 8.21: *Promote the development of high-quality tourism, leisure and complementary activities that can build on and complement the existing attractions in the area;*
- CPO 8.23: *Ensure a high-quality living environment in Longford which will help to retain the county's indigenous skilled population and to attract additional high skilled labour into the county.*

Lanesborough, the nearest town to proposed development, is defined in the Longford County Development Plan 2021-2027 (referred to as the 'CDP' hereafter) settlement hierarchy, which is based on the spatial structure and settlement typologies set out in the *Eastern and Midland Regional Spatial and Economic Strategy* (RSES), as a 'Self-Sustaining Town' which are described as having *"high levels of population growth and a weak employment base which are reliant on other areas for employment and/or services and which require targeted 'catch up' investment to become more self-sustaining"*. Ballymahon, also considered a 'Self-Sustaining Town', is situated approximately 7.5 km south of the proposed wind farm site boundary at Corlea.

The Longford CDP acknowledges that the 'Green Economy' will play a significant role in the competitiveness of the county and the country as a whole – *"The growing international*

emphasis on reducing greenhouse gas emissions and improving resource efficiency presents a major opportunity for indigenous enterprises to grow and export innovative products and services. This is further supported in the National Planning Framework, where the transition towards a low carbon and climate resilient society is identified as one of 10 no. National Strategic Outcomes of the NPF".

In addition, the CDP outlines approach regarding a 'Just Transition' to a low carbon economy, the concept of which is an *"economy-wide process that produces the plans, policies and investments that lead to environmentally and socially sustainable jobs, sectors and economies"*. Just Transition has considerable effects for County Longford, given the closure of the ESB power station in Lanesborough at the end of 2020. An indirect effect has been the end of industrial peat harvesting by Bord na Móna in the region, which will also have a considerable indirect impact on the wider region economically.

The Government has committed to the implementation of Just Transition for the Midland Region and a Midlands targeted Just Transition Fund (JTF), with the aim of supporting the retraining and reskilling of workers and to assist local communities and businesses to adjust to the low carbon transition. Longford CDP Just Transition County Policy Objectives include:

- CPO 8.91: *Engage with all relevant government stakeholders, sectoral representatives, ESB and Bord na Móna in developing and supporting sustainable alternative economic development, guided by the principles of 'Just Transition', for those employees and communities affected by the closure of ESB Lough Ree Power Station and associated Bord na Móna peat harvesting practices;*
- CPO 8.92: *Identify, in collaboration with all relevant government stakeholders, sectoral representatives, ESB and Bord na Móna, potential uses for the ESB Lough Ree Power Station site underpinned by the principles of 'Just Transition';*
- CPO 8.93: *Support the use of the former Lough Ree Power Station site in Lanesborough for energy generation and transmission, tourism, industrial, commercial or other suitable alternative use, subject to other planning considerations and proper planning and sustainable development of the area;*
- CPO 8.94: *Support in principle the rehabilitation and restoration of bog habitats and any associated eco-tourism development underpinned by the principles of 'Just Transition', subject to other planning, environmental and ecological considerations;*
- CPO 8.95: *Support in principle, measures relating to the retrofitting of existing residential units, as part of 'Just Transition' process, subject to other planning considerations.*

As mentioned, Lanesborough is the closest town and economic centre to the proposed wind farm site. The Longford CDP 2021-2027 states that *Lanesborough is currently in a state of structural economic change with the closure of the Lough Ree power station having a direct impact on ESB employees, and indirectly on Bord na Móna employees, with peat harvesting being the main source of fuel for the plant".* The CDP also notes, that *"Lanesborough also has strong retail and service sectors catering for both its immediate population, as well as its wider hinterland. Similar to Granard, Lanesborough is a key retail and service centre for its inhabitants and surrounding hinterland, extending outside the county".*

Longford CDP policy objectives relating to the key employment centres of Lanesborough, Ballymahon and Edgeworthstown include:

- CPO 8.38: *Promote the proportionate economic growth of the Key Employment Centres, together with the enhancement of local infrastructure and amenities and improved transport links;*

- CPO 8.39: *Support the regeneration of the core areas of the Key Employment Centres through sustainable targeted measures that address vacancy, encourage economic development and deliver sustainable reuse and regeneration outcomes;*
- CPO 8.41: *Support the Ballymahon, Edgeworthstown and Lanesborough as key tourism hubs within the County and wider region and the further integration of the centres as features of the wider tourism network;*
- CPO 8.43: *Seek to deliver the targeted economic regeneration of the Lough Ree Power Station site in Lanesborough following the decommissioning in cooperation with local stakeholders, sectoral partners, ESB and Bord na Mona.*

Employment and economic potential of wind farm developments

The *Value of Wind Energy to Ireland* (Pöyry, 2014) report states that *"the wind industry would make a valuable contribution to the Irish economy by …providing a good platform for continued growth during the 2020s compounding the benefit to the economy".* It also states that wind farm developments in Ireland, such as the proposed development, have the combined potential to support 10,120 jobs (person-years) during construction between 2020 and 2030. According to the 2014 Pöyry report, wind growth is expected to support €3.5 billion of direct investment to 2020, 1.2% of total Irish investment, and an additional €4.8 billion to 2030. The Pöyry report was produced in 2014 and commitments in the Government's subsequent Climate Action Plans, suggest that the investment in renewable energies, including wind, will be in excess of the above estimates.

A 2021 Wind Energy Ireland (WEI) report on the economic impact of onshore wind in Ireland identified that the wind energy sector currently supports approximately 5,130 jobs, with the potential to grow to up to 7,020 jobs , throughout the sector and its supply chain, supporting the delivery of Ireland's target to deliver 80% renewable energy in Ireland by 2030, as set out in the Government's Climate Action Plan 2024. The WEI states that *"the sector creates direct jobs through its direct activities, indirect employment in particular through capital activities, such as in legal and financial advisory roles and in firms involved in storage, electrical supply, related services, and induced employment, through spend by direct employees in local shops"*.

The sector supports payment of labour incomes equalling approximately €225 million, with a significant share flowing to rural communities through its direct and indirect activities and employment (WEI, 2021). Approximately 62% of labour income in the wind energy sector is generated from the supply chain, demonstrating how the sector can impact / result in wider employment (WEI, 2021). Furthermore, the sector contributes to the generation of a range of pay-related taxes totalling approximately €75 million, with employer PRSI over €25 million, while income-related payments by workers throughout the supply chain amounts to over €50 million (i.e., €40 million in income tax and €10 million in Employee PRSI) (WEI, 2021).

In terms of onshore wind impacts on regional and rural economic activity in Ireland, the WEI's key findings include:

- *"Wind farms in Ireland are predominantly focused in the regions, which results in the investment, economic activity and employment predominantly being based outside of the major urban areas. It is viewed as a critical component contributing to the current and long-term economic development of regional and rural areas.*
  Baseline (2020) wind farm generation capacity influences regions' relative contribution to overall economic impact. Currently, as a share of the Gross Value Added (GVA) impacts of operating activities, the Southern Region generates the greatest capacity and national impacts (~€83 million), followed by the Northern and Western Region (~€50

million), and the Eastern and Midlands Region (~€7 million). The Baseline contribution highlights the spread of impacts across Ireland."

- *"The sector provides a stable source of revenue for many local authorities, with total contributions of ~€45 million annually, and providing local authorities with a valuable source of revenue that can be reinvested in local communities. As the sector's footprint grows over the next decade to 2030, its financial contribution to many local authorities will also increase and has the potential to reach €100 million by 2030.*

  Total baseline local authority contributions are greater than €5 million in a number of counties (e.g. Cork County and Tipperary). In some counties, contributions can also account for a strong share of local authorities' total commercial rates income (e.g. 22.0% and 15.5% of total income in Leitrim and Tipperary respectively)".

In terms of job creation, an ESRI report entitled *An Enterprising Wind: An Economic Analysis of the Job Creation Potential of the Wind Sector in Ireland* (2014) estimates the level of indirect job creation to be between 0.15 and 0.55 jobs per direct job created. The findings in *An Enterprising Wind: An economic analysis of the job creation potential of the wind sector in Ireland* (IWEA, 2014) also suggests that *"a major programme of investment in wind could have a sizable positive effect on the labour market, resulting in substantial growth in employment. It would add noticeably to the GDP* [Gross Domestic Product] *and produce a significant improvement in debt/ GDP ratio by 2020".*

The institute of Sustainable Futures (2015) estimates that the operational and maintenance job output for a wind farm is 0.3 jobs per MW of total installed capacity based on an average of 7 studies examined. SEAI's 2015 report 'A Macroeconomic Analysis of Onshore Wind Deployment to 2020' estimates 0.34 jobs per MW for operations and maintenance of new wind turbines and in the wider electricity supply sector. Based on these estimates, the proposed development has the potential to generate 40 to 45 jobs associated with the operation phase and within the wider electricity supply sector. Chapter 3 (Description of the Proposed Development) states that once operational, the wind farm will support 6 – 8 long term, high quality technical jobs in operation and maintenance as well as a number of jobs in ancillary functions.

During the construction phase, materials such as quarried products and concrete supplies, plant, and equipment can be sourced locally which will support the local economy. Direct and indirect employment opportunities will be created in the region through employment of operatives, as well as jobs associated with off-site quarrying activity and concrete batching and delivery. Furthermore, there is potential for increased employment in the local service and hospitality industries (including, shops, cafés, restaurants, and accommodation) driven by use of the facilities by construction phase personnel.

6.4.1.6 Tourism and Amenity

The National Tourism Development Authority (Fáilte Ireland) periodically collates statistics on overseas visitors to Ireland and regions within the country.

In June 2024, the CSO released data related to annual inbound tourism for 2023. This is the CSO's first annual publication of its new 'Inbound Tourism' series. This series measures the numbers of non-Irish residents who depart the country via Ireland's airports and seaports. The first annual release shows that there were 6.3 million foreign visitors to Ireland in 2023. Key findings of the first annual inbound tourism report included:

- *Some 6.3 million foreign visitors departed Ireland on overseas routes in 2023;*

- *The visitors' most frequent reason (40.6%) for travelling to Ireland was for holidays;*
- *The visitors stayed a total of 51.1 million nights in the country;*
- *The total estimated expenditure of the visitors was €7.3 billion;*
- *The visitors stayed on average 8.2 nights and spent on average €1,171 on their trips* (CSO, 2024).

In terms of domestic tourism (i.e., tourism involving residents of one country travelling only within that country), Table 6-12 shows the most recent regional performance figures for Ireland and Mid-East/Midlands Region[20], which includes County Longford, included in Failte Irelands most recent 'Key Tourism Facts 2022' release (published October 2023)[21].

Table 6-12: Domestic Tourism Statistics 2022 (Failte Ireland, 2023)

Location Travelled To	Domestic Trips	Revenue Generated
Ireland (2022)	13.3 million	€2,930 million
Mid-East / Midlands Region (2019)	1,957,000	€395 million

In relation to domestic tourism, the Fáilte Ireland 2022 data reports 13.3 million domestic trips were taken in 2022[22]. The majority (39%) of these domestic trips were recorded as short (1-3 days) holiday trips, with trips to visit friends/relatives reported at 34% of all domestic trips. Most of these trips (40%) occur in the late summer period (i.e., July to September), with the majority of domestic holidaymakers engaging in hiking/walking (54%) and swimming (37%). In 2022, almost 2 million domestic trips were taken in the Mid-East/Midlands Region, with visitors spending approximately €395 million in the region. Approximately 4,681,000 night stays were made and the average length of visitors stayed for 2.4 nights (Fáilte Ireland, 2023).

Failte Ireland's publications on domestic trips and revenue by county statistics for 2022 and 2023[23] were reviewed (published May 2023 and July 2024 respectively). The 2023 release shows an increase in figures since 2022 with Irish residents having taken 14.3 million domestic trips in 2023, spending a total of €3.1 billion. They stayed an average of 2.4 nights per trip, a total 34 million nights (Fáilte Ireland, 2024). At a county level, County Roscommon and County Longford may be paired together for the purpose of statistical reporting[24] and have been for the aforementioned trips and revenue by county reports also; Tables 6-13 and 6-14 outline the Irish resident trips and spend, and nights and length of stay by visitors for County Roscommon and Longford in 2022 and 2023.

Table 6-13: Irish Resident Trips and Spend 2022 & 2023 in Roscommon and Longford (Fáilte Ireland, 2024)

Year	Trip's	Spend
County Roscommon and Longford (2023)	277,000	€57.3 million

[20] Mid-East and Midlands Region are grouped together for the purposes of reporting by Fáilte Ireland within the 'Key Tourism Facts 2022' release.
[21] https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/Publications/2022-key-tourism-facts.pdf?ext=.pdf
[22] https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/Publications/domestic-trips-and-revenue-by-county-2022.pdf?ext=.pdf
[23] https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/Publications/irish-resident-travel-by-county-2023.pdf?ext=.pdf
[24] The CSO publishes combined figures for counties where the sample size is insufficient to produce a robust result by individual county.

County Roscommon and Longford (2022)	373,000	€97 million
2022 vs 2023 % change	-26%	-41%

Table 6-14: Irish Resident Nights and Length of Stay 2022 & 2023 in Roscommon and Longford (Fáilte Ireland, 2024)

Year	Nights	Length of Stay (no. of nights)
County Roscommon and Longford (2023)	641,000	2.3
County Roscommon and Longford (2022)	1,178,000	3.2
2022 vs 2023 % change	-46%	28%

Fáilte Ireland periodically release 'Tourism Barometer' publications, which are based on regular industry sample surveys, that aim to provide insight and understanding of visitor volumes, turnover, profitability, and expectations. The latest release covers the summer period and was undertaken in August 2024[25]. The previous Tourism Barometer release was in May 2024. Key findings from the survey include:

- *The May barometer had shown a slow start to 2024 performance which has continued through the high summer season;*
- *Approximately 24% of businesses reported having more customers during summer 2024 compared to summer 2023, 23% reported they had the same level, and 53% reported having fewer;*
- *Findings show visitor volumes are down across all tourism markets in all regions of Ireland;*
- *Fáilte Ireland state that a number of factors have combined to lead to these results for summer 2024, including bad weather (cited by 51% as a concern), people lacking disposable income (51%), tourist accommodation costs (46%) and lack of tourist accommodation (43%);*
- *Fáilte Ireland state that these challenges are in addition to the continued high levels of concern regarding rising operating costs;*
- *The results indicate sectors reporting to be up on balance were self-catering operators (36% up vs 25% down) and inbound tour operators & destination management companies (DMCs) (43% up vs 40% down);*
- *The food & drink sector has struggled the most, with 68% receiving fewer customers this summer;*
- *Regarding industry expectations for the remainder of 2024, respondent were not optimistic, with 19% of operators expect business during the remainder of the year to be up on the same period last year, and 31% expect the same level. However, half (50%) expect to be down. All regions of Ireland and all markets are expected to be down* (CSO, 2024).

In 2018, Fáilte Ireland published a report regarding topline performance by county in Ireland[26] which gives an indication of typical standing of counties in terms of visitors. The statistics show

[25] https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/Publications/failte-ireland-tourism-barometer-summer-2024.pdf?ext=.pdf

[26] http://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/2_Regional_SurveysReports/2017-topline-regional-performance-(003).pdf?ext=.pdf

that County Longford attracted 24,000 overseas visitors and generating €10 million in revenue. County Longford sits outside the top 10 visited counties in Ireland, with Dublin topping the list at number one, and County Donegal sitting at number ten. Counties Roscommon and Longford were the least visited counties. The county combined with Roscommon (as per CSO data) supported 130,000 domestic trips in the year reported (Failte Ireland, 2018), generating €18 million in revenue.

More recently, visitor numbers to attractions in Ireland can be viewed through the Fáilte Ireland 'Visitor Numbers to Attractions Dashboard'. The dashboard provides an overview of visitor numbers for attractions that have participated in the Fáilte Ireland's Annual Visitor Attractions Survey, allowing for tracking of attractions performance over time. Approximately 397 visitor attractions participate in the survey. The dashboard tool allows for data to be viewed and filtered by year (from 2015-2022)[27] and county, admission type (free or fee-paying entry) and attraction category (e.g., visitor garden, natural attraction, museum or gallery etc.) (Fáilte Ireland, 2022). Figure 6-3 shows the ten highest ranking visitor attractions (free or fee-paying entry) in Ireland. The Phoenix Park Visit Centre ranks at number one on the list with over 2 million visitors in 2022; the other attractions within the top five places on the list all had over 1 million visitors in 2022.

Ranking of Participating Visitor Attractions	Total Visitors
Phoenix Park Visitor Centre	2,013,211
Kilkenny Castle Parklands	1,418,171
Dublin Zoo	1,242,556
Cliffs of Moher Visitor Experience	1,136,868
Guinness Storehouse	1,110,000
Castletown House Parklands	958,921
The Book of Kells	835,065
National Gallery of Ireland	786,315
Muckross House Gardens	764,534
Tayto Park	751,000

Figure 6-3 - Top 10 highest ranking visitor attractions in Ireland 2022 (Source: Visitor Numbers to Attractions Dashboard, Fáilte Ireland, 2024)

Figure 6-4 shows the highest-ranking visitor attractions (free or fee-paying entry) in Longford; the five attractions listed are the only attractions listed for 2022 in Longford. The Corlea Trackway Visitor Centre[28] ranks at number one on the list with over 11,400 visitors in 2022.

Ranking of Participating Visitor Attractions	Total Visitors
Corlea Trackway Visitor Centre	11,430
Lough Ree Distillery	3,000
Maria Edgeworth Centre	3,000
Knights and Conquests Heritage Centre	1,200
Cloughan Farm & Cookery School	240

[27] Fáilte Ireland note *"performance of attractions in 2020 and 2021 are not comparable with previous years"* due to the Covid-19 pandemic.
[28] https://heritageireland.ie/places-to-visit/corlea-trackway-visitor-centre/

Figure 6-4 - Main visitor attractions in Longford 2022 (Source: Visitor Numbers to Attractions Dashboard, Fáilte Ireland, 2024)

Key recreational and cultural tourist attractions[29] identified in County Longford include[30]:

- Center Parcs (approximately 15 km southeast / approximately 11 km southeast of nearest turbine within the southern proposed development site boundary);
- Granard Motte and Bailey (approximately 30 km northeast in Granard);
- Ardagh Heritage and Creativity Centre (situated approximately 16 km east / approximately 11 km east of nearest turbine within the eastern proposed wind farm site boundary);
- Corlea Trackway (situated approximately 700 m south of the proposed site boundary (at the L1136) / approximately 1.4 km southeast of nearest turbine within the southern proposed wind farm site boundary);
- Edgeworth Literary Trail / Maria Edgeworth Centre[31,32] (situated approximately 20 km east in Edgeworthstown);
- St. Mel's Cathedral (situated approximately 10 km northeast in Longford Town);
- Knights and Conquests Heritage Centre[33] (situated approximately 30 km northeast in Granard);
- Derrycassin Wood (situated approximately 30 km northeast in Mullinroe); and
- Royal Canal Greenway (situated approximately 350-400 m east of the proposed development site boundary at closest point).

The Corlea Trackway Visitor Centre is the closest of the visitor attractions noted to the proposed wind farm site. It is located approximately 700 m south of the proposed wind farm site boundary where it runs along the L1136. The Corlea Trackway is a historical object of prehistory known as a 'togher', an Iron Age road, built around 148 BC. The trackway is the largest of its kind to have been uncovered in Europe. The trackway was built from heavy planks of oak, which sank into the peat, where it has remained perfectly preserved in the bog for over two millennia. At the interpretive visitor centre, an 18 m section of the ancient trackway is on permanent display. All other tourist attractions listed above are all approximately 10 km or further from the proposed wind farm site.

The Mid Shannon Tourist Trail, a driving route, passes through the local area surrounding the proposed wind farm site, following the local road network. This driving route explores the south of the county, taking in the Royal Canal, the Shannon and views of Lough Ree from Saints Island and Barley Harbour; the route is approximately 98 km in length and approximately 2 hours in duration (Longford.ie, 2024a)[34].

Lough Ree is a major lake on the River Shannon. Lough Ree and the River Shannon are popular for fishing and boating and there are local walks around parts of the shoreline. The northern end of Lough Ree is approximately 5 km from the north-western portion of the proposed development site and the eastern shores of the Lough remain between approximately 5 and 8 km from the site as it wraps around it to the south. The River Shannon runs approximately 2 km

[29] Discover Ireland - ten of the top things to do when you visit Longford - https://www.discoverireland.ie/longford/things-to-do-longford

[30] Approximate distances noted are from the Bord Na Mona Mount Dillon facility site. Where sites are particularly close to the proposed site boundary / turbines compared to other tourist/recreational sites, this distance has also been noted.

[31] https://mariaedgeworthcenter.com/

[32] https://www.failteireland.ie/getmedia/eeceb23a-e8a7-4e0b-8a72-7b10527c677e/Longford.aspx

[33] https://www.failteireland.ie/Utility/News-Library/Failte-Ireland-invests-in-new-state-of-the-art-vis.aspx

[34] https://www.longford.ie/en/visit/explore-the-past/mid-shannon-trail/

to the northwest of the site before it passes through Lanesborough having meandered into the study area from the north.

Inchcleraun, or Quaker Island as it is otherwise known, is an island in the middle of Lough Ree that is home to the ruins of St. Diarmaid's Monastery (a National Monument). Inchcleraun is approximately 9 km to the southwest of the wind farm site. There are also the ruins of an Augustinian Monastery on Saints Island in Lough Ree, which lies approximately 8 km to the south of the site.

Other notable heritage attractions in the area include Abbeyderg Monastery near the settlement of Keenagh, which is approximately 3.5 km east of the site.

Also, of note with regards to attracting visitors to County Longford is the Center Parcs 'Longford Forest' resort located within the surrounds of Newcastle Woods, approximately 5 km from Ballymahon (approximately 12 km southeast of the proposed wind farm site boundary). This is Center Parcs only Irish resort, a flagship project operational since July 2019 which has had a significant impact on tourism in the midlands region. The Center Parcs resort is one of Ireland's largest single tourism investments, and has raised the profile of County Longford in terms of tourism promotional and marketing campaigns. The Center Parcs site includes a water park, accommodation (470 lodges and 30 apartments) spread over 400 acres of woodland, and a can accommodate up to 2,500 guests (Longford.ie, 2024b)[35].

Longford is also situated within Ireland's Hidden Heartlands, a tourism initiative which takes in the following counties all situated within the stretch of Ireland's Midlands; Leitrim, Roscommon, Longford, East Clare, Westmeath, Cavan, North Tipperary, Galway, and Offaly. The initiative seeks to promote the region as an area rich in history, diverse culture, and natural beauty, while showcasing cultural experiences native to specific areas within the Hidden Heartlands[36].

The Longford CDP states that the aim of the Tourism section of the CDP is *"to encourage and provide for the continued expansion of the tourism sector. This shall be achieved by the continued development and enhancements of visitor attractions and activities capitalising on our natural and cultural assets in a sustainable manner. Our local communities, towns and villages in partnership with the Council shall be supported and encouraged to continue their great work in developing destination locations and activities to enhance the visitor experience. Longford County Council is committed to working with other relevant statutory agencies, private sector groups, community associations and individuals to develop a coherent and sustainable approach that is necessary to successfully develop and market County Longford on a national and global tourism stage. It is critically important that all Tourism developments and activities are nature enhancing, carbon neutral and climate friendly. Longford puts substantial emphasis on sustainable tourism with priority projects for walking, cycling, exploring the outdoors, immersing in arts, culture and heritage and experiencing nature. The approach of the County Development Plan Tourism Strategy is to position Longford as 'a go' to County in terms of protecting and enriching our natural environment while encouraging healthy and sustainable means of tourism and transport".*

The CDP outlines the policy context related to the development of the tourism sector in County Longford, including the following in relation to strategies and plans relevant to the County and the location of the development:

[35] https://www.longford.ie/en/visit/accommodation/center-parcs-longford-forest/
[36] https://www.discoverireland.ie/irelands-hidden-heartlands

- Longford Tourism Strategy 2017-2022 (as cited in the CDP, now the County Longford Tourism Strategy 2023-2027)[37] - *"The County Tourism Strategy was prepared by Longford County Council working in partnership with County Longford Tourism Committee, the representative body of all tourism interests within County Longford. The Strategy sets out the overall Vision for tourism in County Longford over the relevant period. The primary goal of the Longford Tourism Strategy is to achieve positive outcomes in a set of identified actions over the year life of this strategy. This will be achieved through the fulfilment of the following key objectives:*
    - *Developing tourism infrastructure*
    - *Delivery of visitor centric experiences*
    - *Development of a Longford Tourism Brand*
    - *Generating greater awareness of Longford as a tourism destination."*
- The Shannon, Mighty River of Ireland - A Tourism Masterplan for the Shannon 2020 – 2030 (Feb. 2020)[38] - As part of the "Ireland's Hidden Heartlands" brand, Fáilte Ireland have developed a tourism masterplan for the River Shannon for the period 2020 – 2030 in association with Waterways Ireland and the relevant Local Authorities. The CDP states that the objective of this plan is to make the River Shannon a key destination in Ireland, identifying visitor experiences based on the region's natural and cultural assets. Longford is identified as part of *'Discovery Zone 2; Mid Shannon'* in the Masterplan. This area stretches from Clondra in the north to Portumna in the south of the region and includes Lough Ree which is situated to the west of the proposed wind farm site. Lough Ree is described as the beating heart of Mid Shannon, a wonderful mosaic of open waters, hidden bays, monastic islands and wooded shorelines, renowned for angling, cruising, sailing and kayaking. Specifically, for Longford and the Mid Shannon zone the Masterplan recommends *Priority Project DZ2.3 Wet'n'Wild Peatlands of Mid Shannon*. This involves "*developing an integrated Discovery Zone focused on peatlands, environmental and industrial heritage, recreational opportunities such as walking, hiking, cycling, guided tours and outdoor classrooms to demonstrate nature, biodiversity and the impact of climate change. The Masterplan also identifies for the Mid Shannon zone that proposals are afoot to create a dedicated Lough Ree Biosphere Reserve, celebrating the natural heritage of the lake, raised bogs and wetlands, as well as proposals for rewilding of (post-production) peatlands. The proposed Biosphere Reserve project is a collaboration between the relevant Local Authorities including Longford County Council, Bord na Móna and the National Parks and Wildlife Services, Waterways Ireland and Failte Ireland"*. It is intended that UNESCO Biosphere status will be achieved during the lifetime of the current Longford CDP 2021-2027.
- Just Transition (2020) – The CDP states the following in relation to Just Transition and tourism - *"With the end of peat production, the future use of the Bord na Móna Bogs is currently being considered under the Just Transition program. No doubt this will produce many innovative projects as well as rewilding large sections of cut away bog land. The Cutaway bogs have potential for beneficial uses including renewable energy, herb, fish and food production, birch water, biodiversity, amenity uses, water storage and other infrastructure. Corlea Amenity Park is an example of a cutaway area that has been developed as an amenity with high biodiversity value, with restored wetland and woodland habitats. As part of the Development Plan this progress is to be developed and built upon"*.

[37] https://www.longfordcoco.ie/your-council/policy-and-publications/county-longford-tourism-strategy-2023-2027/
[38] https://www.waterwaysireland.org/getmedia/06ebcbb4-cb45-482d-949c-e2285307ba8c/Volume-1_Executive-Summary_Tourism-Masterplan-for-the-Shannon.pdf?ext=.pdf

The CDP also outlines the County's 'Destination Towns' which includes Lanesborough at the north end of Lough Ree. The CDP states *"Lough Ree Visitor Centre shall be developed in the town to tell the story of Lough Ree and its unique position not only in human life and experiences but also as a nature reserve for common, rare and endangered wildlife species and biodiversity. Lough Ree Power Station and the Bord na Móna work depots in Lanesborough offer opportunities for repurposing for tourism opportunities. With the ending of peat harvesting by Bord na Móna and the impending closure of the power station at Lanesborough the potential of the related industrial heritage sites for tourism is being investigated and should be considered as part of the Just Transition process. The Bord na Móna work depots offer opportunities for reuse as visitor centres, in addition to the provision of tourism and glamping facilities on the Bogs and associated peatlands. The power station has the potential for utilising the existing station for various activities including a museum, zip wire and a viewing tower across the Shannon".*

Policy Objectives of the CDP related to Tourism considered relevant to the proposed development include:

- CPO10.8: *Promote increased access to state and semi-state lands such as Bord na Móna Bogs, Coillte Forests, Waterways, etc., together with monuments and historic properties, for recreation and tourism purposes, subject to the requirements of the Habitats Directive, National Monuments Act and other provisions and policies to protect and safeguard these resources and the relevant local infrastructure;*
- CPO10.9: *Support the Shannon Tourism Masterplan and tourism projects as a result of the Just Transition process and to support an application for UNESCO Biosphere Reserve for the Lough Ree area during the lifetime of this plan. Continue to support the development and expansion of tourism-related enterprise including visitor attractions, services and accommodation, food and craft businesses;*
- CPO10.13: *Monitor and manage any increase in visitor numbers and/or any change in visitor behaviour in order to avoid significant detrimental impacts, including loss of habitat and disturbance. Visitor/Habitat Management Plans will be required for proposed projects as relevant and appropriate;*
- CPO10.16: *Ensure the potential environmental effects of a likely increase in tourists/tourism-related traffic volumes in particular locations/along particular routes shall be considered and mitigated as appropriate. Such a consideration should include potential impacts on existing infrastructure (including drinking water, wastewater, waste and transport) resulting from tourism proposals;*
- CPO10.19: *Support the development and promotion of Longford town as the principle visitor services centre and hub for Fáilte Ireland's Hidden Heartlands in the County. Promote and develop its historical and cultural attractions and its recreation and amenity potential having regard to its natural amenities including the River Camlin, the Royal Canal and its links to the Longford Bogs and River Shannon;*
- CPO10.23: *Support the local community and businesses to expand and enhance the visitor offering at Lanesborough, taking account of the natural heritage at this location and to animate the story of Bord na Móna and the power station;*
- CPO10.24: *Support the repurposing of the Lough Ree Power Station and Bord na Móna Mount Dillon infrastructure and associated work depots for alternative uses in association with the Just Transition process. A Lough Ree Visitor Centre shall be developed in Lanesborough to tell the story of Lough Ree and its unique position not only in human life but also its importance for natural heritage;*
- CPO10.37: *Continue to promote and develop the Corlea Trackway Centre as a sustainable visitor offering and enhanced access to the site, including an extension to the*

premises and the creation of walking and cycling connections with Ballymahon and Lanesborough across the proposed Bog Greenway;

- CPO10.42: *Support sustainable initiatives and projects that enable visitors to enjoy and connect with our natural heritage, including walking or cycling trails, glamping, viewing points, facilities for bird-watching and angling, tours and events, subject to the requirements for protecting this valuable and sensitive heritage;*
- CPO10.43: *Support enhanced access to state, semi-state and private lands such as Bord na Móna bogs, forests, waterways, together with National Monuments and Historic Properties, for recreation and tourism purposes. Access should be planned and managed in a sustainable manner that protects heritage, environmental sensitivities, ecological corridors, and the ability of local infrastructure to support increased tourism;*
- CPO10.44: *Continue to engage with the Waterways Ireland, NPWS, Coillte, ESB, Bord Na Móna and other stakeholders and agencies with regard to tourism related uses of Lough Ree, forests, cut-away peatlands, restored bogs and related infrastructure and support the development of greenways/peatways and blueways at appropriate locations.*

As mentioned, Longford Town is the nearest large town to the proposed wind farm, and is a key centre for enterprise, employment and tourism in the county. The Longford Local Area Plan (LAP) (2025-2031) is currently being prepared. A Draft LAP was published in September 2024. This draft LAP outlines potential key regional issues for consideration in the new Longford Town LAP priorities for the town including compliance with Longford Key Town Regional Policy Objectives (RPOs), including:

- RPO 4.59: *To enhance accessibility and sustainable mobility within the town centre by improving links between the core and surrounding areas through the further integration of public transport, walking and cycling facilities;*
- RPO 4.60: *Support the development of Longford as a tourism hub having regard to its accessibility to key tourist destinations in the Region including Center Parcs, and proximity to natural amenities, recreational opportunities and the town's location on the Rebel Longford Trail;*
- RPO 4.61: *Support social inclusion measures including the revitalisation of areas by physical regeneration, planning, investment and community development and measures to improve educational attainment levels, up skilling in key competencies and skills acquisition;*
- RPO 4.62: *Support the plan-led development and regeneration of publicly owned land banks in the town for residential, employment, education, community, cultural and recreational opportunities and the consolidation of the town centre and the enhancement and linking of brownfield and outlying sites to the town centre, with a focus on the regeneration of underused building and strategic sites;*
- RPO 4.63: *Support Longford Town as a strategic portal to the northwest and south in recognition of its location at the junction of the N55; M4/N4 Dublin/Sligo and N5; due to its proximity to the regional growth centre of Athlone; and support its role as a strategic employment centre.*

Walking and Cycling Routes

In terms of Walking and Cycling Routes, within its CDP, Longford County Council outlines its commitment to the development of greenways in the county, stating they recognise the strong potential of these for *"generating tourism activity and associated positive wellbeing, quality of life and economic benefits".* Since 2015, large portions of greenway have been provided within the county, and more extensions are planned as stated in the current CDP. The CDP noted that

as of 2020, approximately 85 km of greenways were developed for the enjoyment of walkers and cyclists in the county, including:

- The Royal Canal Greenway from Abbeyshrule to Clondra (36.5 km) with a branch line to Longford town from Kilashee (8 km);
- Additional extensions to the Greenway including at Corlea (10 km), a link from Clondra to Lanesborough (20 km) across the bogs and from River Inny Link to Newcastle Woods (10 km); and
- In addition, walkways have been developed at Drumlish and Cairn Hill.

Additionally, the Midland Trail Networks (Planning Reference No: 24/60132, granted planning permission07/01/2025) is a project aimed at developing a network of walking and cycling trails on Bord Na Móna lands, which includes the repurposing of a 5.2 km section of former rail bed, 3.1 km along existing bog headlands/former high fields, and 185 m along pre-existing machine passes. One of the Midland Trail Networks car parks is located to the north of the proposed development parallel to Derryaroge Bog. Amenity visitors can utilise the Midland Trail Networks car park to the north of the site to access the amenity track within the proposed wind farm site.

The CDP notes that additional links (approximately 40 km) are being constructed at present on old Bord na Móna rail lines traversing the rewilded bogs. It further states, that *"the conversion of the Bord na Móna rail crossing over the Shannon at Kilnacarrow for greenway purposes will facilitate the opening up of the Roscommon Bord na Móna rail line network to allow added links to Roscommon town, Strokestown, Roosky and beyond"* (Longford County Council, 2021). In June 2023, the Granard Greenway was opened. This new greenway is approximately 2 km in length and connects two key points of the North Longford Rebel Trail, and joins Higginstown Sports Grounds with Abbeylara road, accommodating both pedestrians and cyclists (Longford County Council, 2023).

The Longford CDP 2021-2027 sets out a number of policies in relation to greenways, walking and cycling routes, and public rights of way, including the following:

- CPO10.59: *Continue to develop the greenways in the county and to augment the visitor experience through the provision of infrastructure, including car parking and access barriers, having regard to the Department of Transport, Tourism and Sport various Guidelines along with high quality signage and links to nearby visitor attractions and places of interest;*
- CPO10.61: *Continue to support the development of the Longford Bogs Greenway, the Royal Canal Greenway, the National Famine Way, a River Shannon Greenway and a Longford to Westport Greenway by working with Bord na Móna, Regional Authorities (EMRA and NWRA), neighbouring counties and national bodies to develop and complete these routes;*
- CPO10.62: *Support increased opportunities for off-road walking, including looped walks and longer distance trails, taking account of 'positive control points' in trail design, such as areas of natural beauty, lakeshores or rivers, bogs, built heritage and archaeological features and with links to towns and villages. In designing walking trails, the Sport Ireland Guide to Planning and Developing Recreational Trails will be consulted;*
- CPO10.63: *Continue to maintain and further enhance the County's walking and cycling trails, striving to achieve National Trails accreditation and other standards as set by Sport Ireland, in partnership with local communities and landowners;*
- CPO10.64: *Continue to develop the Longford Bogs Greenway utilising the Bord na Móna Rail lines from Longford Town to Clondra, Lanesborough, Corlea and Ballymahon*

interconnected with the Royal Canal Greenway at selected locations (see Appendix 5: Tourism – Longford County Trails Map);

- CPO10.68: *Develop the Mosstown Mill and Mill Race walk at Kenagh to connect to the Royal Canal greenway and to incorporate the addition of the Limetree Avenue from the old Mosstown estate which would create a looped walk of natural and heritage interest;*
- CPO10.69: *Support the provision of visitor interpretation along walking and cycling trails, including storyboards, artworks and other media, to create a greater sense of place, connecting and immersing visitors in our local heritage and stories;*
- CPO10.70: *Support the provision of services for visitors using walking and cycling trails which are appropriate to the location and activity, including bike rental and service points, picnic benches at scenic locations, public toilets, and other ancillary services in remote areas;*
- CPO10.71: *Promote the principles of 'Leave no Trace' in all trail information panels, promotional materials and events and use all statutory procedures to deter negative environmental impact resulting from use of our trails and outdoor recreation amenities.*

Approximately 7,500 m of dedicated amenity access tracks to provide linkages between the proposed wind farm site roads, and the existing royal canal greenway (to the east), the Corlea visitor centre and amenity areas (to the south) and the Midlands Trail Networks project (to the north) are proposed as part of the proposed wind farm.

Bogs, waterways, lakes and forests

The potential for recreational and amenity development centred around walking, angling and swimming in County Longford and in the vicinity of the proposed wind farm is high, given the presence of bogs, waterways and lakes spread across the county's landscape. The Longford CDP 2021-2027 recognises the importance of this natural heritage in terms of tourism and amenity value, and sets out a number of policies in relation to waterways, lakes and bogs including the following related to the bogland areas:

- CPO10.55: *Continue to work closely with Bord na Móna, Fáilte Ireland, Waterways Ireland, NPWS, Coillte, Just Transition related groups and neighbouring counties to realise and develop the potential of the Mid Shannon Wilderness Park and Lough Ree Biosphere Nature Reserve. In this consideration shall be given to Bord na Mona's integrated land use-strategy and be mutually inclusive of any of Bord na Mona's future uses of their land banks;*
- CPO10.50: *Support development, in co-operation with various stakeholders to promote, preserve, improve, encourage public access to lakes, islands, riversides, uplands and other areas that have been traditionally used for outdoor recreation and extend recreational amenities including riverside and canal walks and walking and cycling routes. This shall include the provision of walking and cycling links between lakes, rivers, bogs and nearby towns, villages and visitor attractions, provided such developments do not negatively impact on sensitive environments.*

County Longford has a number of renowned angling destinations. Coarse fishing and angling on the numerous lakes and waterways are a valuable element of the tourist industry in the County. The Longford CDP 2021-2027 includes the following policy in relation to angling:

- CPO10.47: *Support the provision of infrastructure to enable increased tourism activity associated with Longford's waterways, including boating, marina/berthing, kayaking, angling, blueways and harbour amenities while ensuring that such provision does not negatively impact on sensitive environments and subject to the requirements of the Birds and Habitats Directives;*

- CPO12.43: *Agriculture, native tree forestry, appropriate public amenity and recreational projects (Including the provision of slipways and angling infrastructure) and strategic Green Routes / Blueways / Trails will be open for consideration within the biodiversity protection zone, subject to appropriate safeguards and assessments;*
- CPO12.69: *Maintain a biodiversity zone of not less than 10 metres from the top of the bank of all watercourses in the county, with the full extent of the protection zone to be determined on a case by case basis by the Council, based on site specific characteristics and sensitivities. (Agriculture, native tree forestry, appropriate public amenity and recreational projects (Including the provision of slipways and angling infrastructure) and strategic Green Routes / Blueways / Trails will be open for consideration within the biodiversity protection zone, subject to appropriate safeguards and assessments).*

Other recreational activities of note in the vicinity of the proposed wind farm include equestrian activities. Lockside Farm and Stables (approximately 1.5 km) and Mosstown Stables (approximately 800 m) are both located south east of the study area near Keenagh in County Longford. The Roscommon Equestrian Centre is located approximately 10 km to the west of the proposed development in Kilrooskey near Lough Ree on the River Shannon. The ISPCA National Animal Centre at Derryglogher lies immediately west of the proposed wind farm site boundary, within Lough Bannow bog. Golf is a popular activity for both tourists and locals, however, there are no golf courses in proximity to the proposed wind farm. The nearest golfing facilities identified are the County Longford Golf Club is located east of Longford Town, and the Strokestown Golf Club which is located to the northeast of the proposed development in Strokestown, County Roscommon (i.e. >10km from the study area).

The effects of the proposed development on tourism, recreation and heritage features and amenity are considered in Section 6.5 below and Chapter 13 (LVIA) and Chapter 14 (Archaeological, Architectural and Cultural Heritage) of this EIAR.

Tourism and Wind Farm Developments

Since onshore wind farms first began to appear in the landscape, there have been concerns about their potential impact on tourism, and whether tourists may be discouraged from visiting areas in general, or, in particular, areas where wind farms can be seen. The following research has been conducted in Ireland and Scotland relating to the attitudes towards wind farms by tourists

Fáilte Ireland - attitudes to wind farms surveys 2007 and 2012

In 2007, Fáilte Ireland out a survey of domestic and overseas tourists to Ireland in order to determine their attitudes to wind farms. The survey's purpose was to investigate if the development of wind farms impacts on the enjoyment of the Irish scenery by tourists. The survey involved face-to-face interviews with 1,300 tourists, 25% domestic and 75% overseas, (1,000 in the Republic, 300 in Northern Ireland) (Fáilte Ireland, 2007)[39].

The survey looked at the following; visitor awareness of wind farms, perceived impact on sightseeing, perceived impact on beauty of the landscape, and perceived impact on future visits to the area. The results of the survey indicate that most visitors are broadly positive towards the development of more wind farms in Ireland, although there is a minority (1 in 7 surveyed) that

[39] The results of the survey are presented in the Fáilte Ireland Newsletter 2008/No.3 entitled 'Visitor Attitudes on the Environment: Wind Farms'.

indicated a negative response towards wind farms in any context (Fáilte Ireland, 2007). Regarding the awareness of wind farms, findings of the survey include:

- *Almost half of tourists surveyed claimed to have seen at least one wind farm on their holiday, and of those who had seen a wind farm, two thirds claimed to have seen up to two during the holiday;*
- *Typically, wind farms are encountered in the landscape while driving or being driven (74%), while few experienced a wind farm up close;*
- *For more than three in ten, the wind farm observed was seen on the horizon and for a further one in four it was viewed from a distance of 1-2 km;*
- *Around half of the wind farms observed were located in mountain moorland, and a further 37% viewed were in a coastal landscape;*
- *Of the wind farms seen most were made up of less than ten turbines, and 15% had fewer than five turbines* (Fáilte Ireland, 2007).

In terms of the perceived impact of wind farms on sightseeing, the Fáilte Ireland survey found that although almost half of tourists surveyed had seen at least one wind farm on their trip, the majority felt that their presence did not detract from the quality of their sightseeing, with the highest proportion of those surveyed (45%) saying that the presence of the wind farm seen had a positive impact on their enjoyment of sightseeing, with a lower proportion (15%) claiming they had a negative impact on sightseeing in general (Fáilte Ireland, 2007). Fáilte Ireland *(2007)* noted that *"Compared with other types of development in the Irish landscape, wind farms elicited a positive response when compared to telecommunication masts and steel electricity pylons".*

In terms of the perceived impact of wind farms on beauty of the landscape, the Fáilte Ireland survey report states that visitors were asked to rate the beauty of five different landscape types[40], and then rate the potential impact of a wind farm being sited in each landscape. The results indicate that each potential wind farm site must be assessed on its own merits, as rating proportions varied depending on the perceived beauty of the location. However, it was noted when looking across all sites, the numbers claiming a positive impact on the landscape are greater than those claiming a negative impact, in all cases (Fáilte Ireland, 2007).

With regard to the perceived impact of wind farms on future visits, the survey states that "*Almost three quarters of respondents claim that potentially greater numbers of wind farms would either have no impact on their likelihood to visit or have a strong or fairly strong positive impact on future visits to the island of Ireland".* Furthermore, the results indicate that " *Of those who feel that a potentially greater number of wind farms would positively impact on their likelihood to visit, the key driver is their support for renewable energy and potential decreased carbon emissions"* (Fáilte Ireland, 2007). Following the outcomes of the survey, Fáilte Ireland (2007) state that *"while there is a generally positive disposition among tourists towards wind development in Ireland, it is important also to take account of the views of the one in seven tourists who are negatively disposed towards wind farms. This requires good planning on the part of the wind farm developer as well as the Local Authority".*

In 2012, Fáilte Ireland undertook an update on their 2007 survey; this updated research was published in the '*Fáilte Ireland Newsletter 2012/No.1 entitled 'Visitor Attitudes on the Environment: Wind Farms – Update on 2007 Research'.* The updated research found that over half of tourists (56%) surveyed (1,000 domestic and foreign tourists) who visited Ireland during 2012, said that they had seen a wind turbine while travelling in Ireland. Of these tourists, 48%

[40] Coastal, Mountain, Farmland, Bogland and Urban Industrial.

said that wind turbines had no impact on their sightseeing experience, 32% said that they have a positive impact, and 21% claimed they have a negative impact. In terms of future visits to Ireland, 71% of tourists claimed that potentially greater numbers of wind farms in Ireland over the coming years would have either no impact or a positive impact on their likelihood to visit the country. Of those who feel that the potentially greater number of wind farms would impact positively on future visits, this was predominately associated with support for renewable energy, and potential decreased carbon emissions (Fáilte Ireland, 2012).

Scotland – Wind farms and tourism trends survey 2017 and 2021

In 2017, BiGGAR Economics published an independent research study on *'Wind Farms and Tourism Trends in Scotland'*[41]. The aim of the research was to understand the relationship, if any exists, between wind farm developments and the tourism industry in Scotland.

Since 2009, onshore wind development has expanded significantly in Scotland. Between 2009 and 2015 employment in the sustainable tourism sector in Scotland also grew, by 15%. Looking at the Scottish economy as a whole, this suggests that both the onshore wind sector and the sustainable tourism sector can coexist and grow (BiGGAR, 2017). However, the study noted – "*it could be argued that if there were any relationship between the growth of onshore wind energy and tourism, it would be at a more local level*" - therefore the study looked at 28 wind farms constructed between 2009 and 2015 and considered evidence at a local authority level and within the immediate vicinity of operational wind farms (i.e., analysis of local tourism trends within a 15 km radius from onshore wind energy sites) (BiGGAR, 2017). Results indicate that there was growth in employment in the sustainable tourism sector in the majority of local authority areas in Scotland during this period (2009-2015). It was noted that the growth in onshore wind energy capacity was greater in some areas of Scotland than in others. Nine of the local authorities considered had greater increase in wind energy deployment than the Scottish average. Of these, four saw a larger increase in sustainable tourism employment than the Scottish average, while five saw less growth than the Scottish average (BiGGAR, 2017). The analysis undertaken suggests that, at the local authority level, onshore wind development does not have a detrimental impact on tourism.

With regard to analysis of local tourism trends within the immediate vicinity of operational wind farms (radius -15 km), it was found that, in most cases, sustainable tourism employment performed better in the areas in the vicinity of wind farms compared to the wider local authority area. BiGGAR (2017) noted that – "*There was no pattern, which emerged that would suggest that onshore wind farm development has had a detrimental impact on the tourism sector, even at a very local level".* Overall, the conclusion of the study was that "*published national statistics on employment in sustainable tourism demonstrates that there is no relationship between the development of onshore wind farms and tourism employment at the level of the Scottish economy, at local authority level nor in the areas immediately surrounding wind farm development"*(BiGGAR, 2017).

Updated survey and report (2021)

In 2021, BiGGAR published an updated report[42] on wind farms and tourism trends in Scotland. The updated survey and research looked to further investigate if wind farms have discouraged tourism activity, and if there is evidence of such effects given the time that has passed since the

[41] https://biggareconomics.co.uk/wp-content/uploads/2020/01/Wind-farms-and-tourism-trends-in-Scotland.pdf

[42] https://biggareconomics.co.uk/wp-content/uploads/2021/11/BiGGAR-Economics-Wind-Farms-and-Tourism-2021.pdf

first commercial scale wind farms were established in Scotland over 25 years ago. Since 2009, the number of onshore wind turbines in Scotland has grown from 1,082 to 3,772 in 2019. Evidence shows that employment in tourism-related sectors also grew during the decade (increase of 20%) (BiGGAR, 2021).

Employment growth in tourism-related sectors has not been consistent across all areas of Scotland. The highest levels of growth in tourism employment have been seen primarily in rural local authority areas, while in some central belt local authorities there have been decreases in tourism-related employment. An analysis of the rates of change in tourism-related employment and the number of onshore wind turbines in local authority areas found that there is no correlation between the two factors (BiGGAR, 2021).

Like the 2017 research, this update also considered trends in tourism employment in the immediate vicinity of wind farm developments. This included an additional 16 wind farms that became operational since the previous study (2015-2019). Analysis of trends in tourism employment in the locality of these windfarms (based on a 15km radius) found that 11 of the 16 areas experienced more growth in tourism employment compared to Scotland as a whole. Furthermore, tourism employment trends in the locality of 12 out of the 16 wind farms outperformed the local authority area in which they were based (BiGGAR, 2021). The updated study also re-examined the 28 wind farms analysed in the 2017 report and found that the localities in which they were based had outperformed Scotland and their local authority areas in most cases. Additionally, the analysis found that where seven areas that had underperformed in the 2017 study, four had done better than their local authorities in the period since. In total, the study analysed trends in the localities of 44 wind farms developed in recent years, providing a large evidence base. Overall, the latest study found no relationship between tourism employment and wind farm development, be it at the level of the national economy, local authority areas or in the locality of wind farm sites (BiGGAR, 2021).

6.4.2 Human Health

Evidence shows that different communities have varying susceptibilities to health impacts both positive and negative as a result of social and demographic structure, behaviour and relative economic circumstance. Whilst specific health data for individuals in the vicinity of the proposed development is confidential and difficult to establish, a community profile has been identified to establish the baseline health profile of the area and compare this profile to the rest of the country.

The following sections present a brief summary of the baseline environment relative to each of the environmental factors assessed in terms of human health (i.e., air, noise and vibration, water, land and soils, traffic emissions). Full baseline details and their applicable study areas relative to the onshore development area are presented in: Chapter 9 (Land, Soils and Geology), Chapter 10 (Hydrology and Hydrogeology), Chapter 11 (Air Quality), Chapter 12 (Noise and Vibration), and Chapter 15 (Traffic and Transport).

CSO Irish Health Survey 2019/20

In 2020, the CSO published it's second "Irish Health Survey"[43], the data for which was collected in 2019 and early 2020. This is not an annual survey, the first survey was collected for reference year 2015. This publication is part of an EU wide health survey and as other EU countries report

[43] https://www.cso.ie/en/releasesandpublications/ep/p-ihsmr/irishhealthsurvey2019-mainresults/introductionandkeyfindings/

on their data, it will allow for comparison of how the Irish people's health experience compares to that of other EU countries and citizens. The survey was based on self-reported data from persons aged 15 years and over, and outlines their view of their health status, as well as looking at respondents engagement with the Irish health system (CSO, 2020). Some key findings of the survey included:

- *"Affluent people are more likely to feel their health status is Very good or good than people who are disadvantaged - 92% of Very affluent persons compared to 78% of persons who are Very disadvantaged;*
- *Over a quarter of persons aged 15 years and over report having a long lasting condition, with older persons reporting higher levels;*
- *Majority of persons (82%) report no limitations in everyday activities due to a health problem;*
- *Over a fifth (21%) of Unemployed persons report some form of mental ill-health compared to 9% of those In employment;*
- *Prevalence of hospital in-patient admissions rises with age and disadvantage level;*
- *In general, females and older people more likely to use a preventive health service;*
- *Physical activity declines with age and relative disadvantage level;*
- *Younger persons more likely to drink 6 or more units of alcohol in one sitting; and*
- *Over half of persons aged 15 years and over in the State are overweight or obese"* (CSO 2020).

Census 2022

The Census 2022[44] responses regarding general health[45] found that approximately 83% of the Ireland's population felt they had 'Very Good' or 'Good' health, down slightly from 2016 when it was 87%. Approximately 53.5% of men felt their health was 'Very Good', compared with 52.9% of women. The census results also clearly show the decline in general health with age, with 73.5% of 15–19-year-olds in 'Very Good' health, compared with those aged 40-44 (49.8%) and 65 to 69 (30.1%).

Census 2022 responses for Longford indicated the percentage of persons with 'Very Good' and 'Good' health was 76.2% (17,911 Males / 17,701 Females), while 9.7% indicated they were in 'Fair' health (2,237 Males / 2,291 Females), and 2.1% (419 Males / 543 Females) indicated they were in 'Bad' to 'Very Bad' health; 12.1% of respondents did not state the status of their general health.

The 2022 census also indicated that there are 9,857 (4,811 Males / 5,046 Females) with disabilities (any extent) living in Longford, and that there are 2,639 (1,088 Males / 1,551 Females) carers in the County.

Healthy Ireland Survey 2023

In November 2023, the Government released it's Healthy Ireland Survey Summary Report[46]. This is an interviewer-administered survey, commissioned by the Department of Health and carried out by Ipsos, of the health and health behaviours of people living in Ireland. This is the eighth set of findings and adds to the data collected in previous Healthy Ireland Surveys,

[44] https://www.cso.ie/en/csolatestnews/presspages/2017/census2016profile9-healthdisabilityandcarers/
[45] https://www.cso.ie/en/statistics/health/

[46] https://www.gov.ie/en/publication/73c9d-healthy-ireland-survey-2023/

published from 2015–2019 and 2021–2022; due to the COVID-19 pandemic it was not possible to complete the 2020 survey.

The Survey is a key component of the 'Healthy Ireland Framework' and informs the Healthy Ireland Strategic Action Plan, by contributing to the research, monitoring and evaluation required to assess the impact of policy implementation. Approximately 7,500 individual's representatives of the population aged 15 and older are surveyed. The Survey covers a variety of health-related topics, including general health, alcohol, smoking, weight, dental, female health, skin protection, and mental health.

In terms of General Health, respondents were asked to rate their health on a 5-point scale ranging from 'very good' to 'very bad'. Overall, 80% of respondents perceived their health as 'good' or 'very good', which is a 2-point decline since 2022. 81% of men and 79% of women rated their health as 'good' or 'very good'. Overall, 4% of respondents perceived their health as 'bad' or 'very bad'. Results indicate that general 'good' health decreases with age, with 89% of 15–24-year-olds rating their health as 'good' or 'very good', in contrast to 69% of respondents aged 65 and older.

The Survey notes that those with Leaving Certificate education or higher are considerably more likely to report themselves as being in good health than those who did not attain a Leaving Certificate (85% and 66% respectively).

Employment status is also stated as indicative of self-reported health, with those who are employed (88%) or students (91%) significantly more likely to report good health than those who are unemployed (71%).

With regard to the occurrence of health conditions, the Survey results indicated that 40% (2 in 5 people) have a long-standing illness or health problem confirmed by medical diagnosis. Survey results indicated that females are more likely than males to report that health conditions are limiting or severely limiting their day-to day activities (27% and 23% respectively); and respondents aged 65 and older are considerably more likely to report a long-standing illness or health problem than those aged under 45.

Overall, based on a list of 25 of the most common conditions, respondents were asked to report whether they had been medically diagnosed with a long-term illness. Of the responses, high blood pressure (9%), diabetes (5%), arthritis (6%), asthma (%), psychiatric diagnoses (such as anxiety or depression) (4%), and high cholesterol (5%) were the most common conditions reported by respondents.

Deprivation Index

A review of latest deprivation indices (2022) available from Pobal[47]which ranges from 'very affluent' to 'extremely disadvantaged'[48], shows that County Longford is currently considered 'marginally below average'.

A review of the deprivation indices ED shows that the ED (Mount Davis) in which the majority (northern and central areas) of the proposed wind farm is situated is currently considered 'marginally below average', a change from 2016, when this ED was 'marginally above average'.

[47] https://maps.pobal.ie/WebApps/DeprivationIndices/index.html - Pobal administers and manages Government and EU funding to address disadvantage and support social inclusion

[48] 'Very affluent', 'Affluent', 'Marginally above average', 'Marginally below average', 'Disadvantaged', 'Very disadvantaged', and 'Extremely disadvantaged'.

The remaining areas within the proposed wind farm site boundary within other ED's were noted as 'marginally below average', remaining the same status as 2016. Refer to Table 6-15.

It can be inferred that the area is neither particularly affluent nor particularly deprived and is typical in comparison with the county overall. There are likely to be localised areas of deprivation where the county-level statistics simply do not apply.

Table 6-15: Deprivation Index Longford and EDs (Pobal, 2024)

Area	2016		2022	
	Pobal HP Index Score	Description	Pobal HP Index Score	Description
Longford County	-6.01	Marginally Below Average	-5.33	Marginally Below Average
Mountdavis	3.38	Marginally above average	-1.84	Marginally below average
Cashel East	-6.79	Marginally below average	-4.94	Marginally below average
Killashee	-4.65	Marginally below average	-1.95	Marginally below average
Kilcommock	-4.91	Marginally below average	-4.42	Marginally below average
Rathcline	-4.03	Marginally below average	-2.00	Marginally below average

It is not possible to identify specific baseline health data for individual receptors. However, every human community contains vulnerable individuals; be those the old, the very young, or because they have conditions which may make them more susceptible. Examples of such conditions may include asthma, autism, and those with psychological illness.

6.4.2.1 Environmental Factors

Air Quality

In terms of human health, the main pollutants of concern from an air quality perspective (HSE, 2023) are:

- Nitrogen Dioxide (NO_2), Sulphur Dioxide (SO_2), Ozone (O_3): can irritate the airways of the lungs, increasing symptoms in those with lung diseases;
- Particulate matter (PM_{10}, $PM_{2.5}$): Can be carried deep into the lungs causing inflammation and worsening of heart and lung diseases; and
- Carbon Monoxide (CO): Prevents the uptake of oxygen by the blood and poses a greater risk to those with heart disease.

Short-term exposures to air pollution can cause irritation of the eyes, nose, throat and lungs, and impacts existing conditions such as asthma (HSE, 2023). Chapter 11 (Air Quality) of this EIAR outlines the baseline environment in terms of air quality in the vicinity of the proposed development. A summary of the latest data in relation to the main pollutants of concern are outlined in the following sections.

As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones (A, B, C and D)[49] have been defined in Ireland for air quality management and assessment purposes (EPA, 2022). In terms of air monitoring, the proposed development is located within Zone D (Rural Ireland). The most recent monitoring carried out by the EPA is summarised in their annual report "Air Quality Monitoring Report 2023" published in September 2024[50].

Nitrogen dioxide (NO_2) can affect the throat and lung; the main effects are emphysema and cellular damage. Emissions from traffic and industry are the main source of nitrogen oxides in Ireland (EPA, 2024). The EPA undertakes NO_2 testing at a number of designated air quality sites, in rural (Zone D) and urban areas, in order to fulfil the requirements of the Air Quality Standards Regulations, 2011 (S.I. No. 180 of 2011). Over the past 5-year period (EPA Air Quality annual reporting from 2019 to 2023), NO_2 measurements were undertaken within Zone D in the Midlands Region (NUTS IE063) at sites of Emo Court in County Laois (rural) and Birr and Edenderry in County Offaly (suburban/urban). Data from these stations are likely to be representative of the typical background concentrations in the region and at the site of the proposed wind farm site, in particular those measured at a more rural location such as Emo Court. With the annual mean limit value for the protection of human health being 40 µg/m^3 (per station)[51], the Zone D sites were in compliance, falling well below the limit value. The results as presented Table 11-4 within Chapter 11 (Air Quality) highlight a mean annual range of 2.3 – 11.3 µg/m^3 in 2023 for the Zone D Midlands Region sites (2.3 µg/m^3 occurred at the rural location of Emo Court).

Regarding SO_2, latest measurements reported for this parameter in Zone D at rural sites (Kilkitt) were below the limit value for the protection of human health (i.e., 125 mg/m^3 per station) in 2023 (EPA, 2024). For O_3, latest measurements reported for this parameter in Zone D at rural sites (Emo Court and Kilkitt) were below the limit value for the protection of human health (i.e., 120 mg/m^3 per station) in 2023 (EPA, 2024).

In terms of air quality, exposure to fugitive dust and particulate matter (PM) emissions and emissions from equipment and machinery can impact on human health. In Ireland, the main sources are solid fuel burning and vehicular traffic, other sources can include soil, road surfaces, construction works and industrial emissions, as well as natural sources such as windblown salt, plant spores and pollens (EPA, 2024). Small particles can penetrate the lungs and cause damage. PM particles in air are typically measured as PM_{10} and $PM_{2.5}$ with diameters of 10 µm[52] or 2.5 µm. Continuous PM_{10} and $PM_{2.5}$ monitoring has been carried out by the EPA at the Zone D Midlands Region (NUTS IE063) locations of Birr (Co. Offaly), Edenderry (Co. Offaly), and Longford (Co. Longford). It should be noted that each of the sites noted are more urban/suburban in nature compared to the site of the proposed development, where it would be expected that concentrations would be lower than such environments given its rural setting. As such, a fourth site representative of the rural environment was also reviewed in terms of PM_{10}. The site of Kilkitt in Co. Monaghan represents a rural environment similar to the proposed wind farm.

[49] The main areas defined in each zone are: Zone A: Dublin; Zone B: Cork; Zone C: Other cities and large towns comprising Limerick, Galway, Waterford, Drogheda, Dundalk, Bray, Navan, Ennis, Tralee, Kilkenny, Carlow, Naas, Sligo, Newbridge, Mullingar, Wexford, Letterkenny, Athlone, Celbridge, Clonmel, Balbriggan, Greystones, Leixlip and Portlaoise; and Zone D: Rural Ireland, i.e. the remainder of the State excluding Zones A, B and C.
[50] https://www.epa.ie/publications/monitoring--assessment/air/air-quality-in-ireland-2023.php
[51] µg = Microgram

[52] µm = micron

Over the 5-year period (2019-2023) the results show the annual mean concentrations PM_{10} falling well below the annual average maximum value[53] of 40 µg/m^3 for Zone D sites reviewed. Furthermore, the no. of days >50 µg/m^3 has been less than 35 days annually as per the limit value for PM_{10} for these monitoring sites over the 5-year period 2019-2023; ranging from 0 to 10 days over the period. Over the 5-year period, the rural site of Kilkitt experienced the lowest measurements of the sites reviewed, with an annual mean of between 7 – 9 µg/m^3 and experienced only 1 day >50 µg/m^3. In terms of $PM_{2.5}$, this is typically monitored at suburban/urban locations by the EPA. Latest results for 2023 at the Zone D Midlands Region (NUTS IE063) locations of Birr (Co. Offaly), Edenderry (Co. Offaly), and Longford (Co. Longford) all fell well below the annual mean limit value for the protection of human health of 25 µg/m3 per station. Latest measurements report for CO in Zone D (measured at Birr, Co. Offaly) were well below the maximum mean limit value for the protection of human health (i.e., 10 mg/m^3 per station) in 2023 (EPA, 2024).

Overall, data from the stations reviewed were all well below the respective annual mean limit values for the protection of human health, in particular at the rural locations, the data from which is likely to be broadly representative of the typical background concentrations at the proposed development. Furthermore, the most recent live reporting by the EPA indicates that the current air quality in the vicinity of the proposed wind farm is classified as "Good" (according to EPA records accessed on 20/10/24)[54].

Noise

The EPA states environmental noise is *"unwanted or harmful outdoor sound arising from all areas of our everyday activity. Our biggest exposure to environmental noise in Ireland comes from transport including road traffic, railways and aircraft"* and that one of the most common responses in relation to exposure to environmental noise is *"to feel annoyed and this can include a wide range of negative feelings such as disturbance, dissatisfaction and distress"* (EPA, 2024)[55]. Long-term exposure to environmental noise can impact one's health in terms of mental health, interference with daily activities at work, school, home and during leisure time, contribute towards psychophysiological effects, impact performance through sleep deprivation, and provoke feelings of annoyance, anger and some changes in behaviour (EPA, 2024).

Chapter 12 (Noise and Vibration) outlines the baseline environment in terms of noise in the area of the proposed wind farm. The study area for the noise and vibration impact assessment is focused on the areas potentially to be affected by the construction, operational and decommissioning phases of the proposed wind farm.

Background noise levels are measured in the vicinity of Noise Sensitive Locations (NSLs) identified in closest proximity to the proposed wind farm site. Locations were selected to represent the noise environment at the nearest NSLs and to determine the baseline noise levels.

The noise environment has been observed during equipment installations, site visits to maintain the equipment, and equipment collections, and the background noise survey. The existing noise sources and types identified during the baseline noise monitoring activity were typical of those heard in a rural area. Dependant on the location, in general, the main noise sources included a combination of the following:

[53] PM_{10} annual mean limit value for the protection of human health: 40 μ g/m3 applicable from 2005 (EPA, 2024)
[54] https://airquality.ie/
[55] https://www.epa.ie/environment-and-you/noise/noise-and-your-health/

- Local and distant traffic movements;
- Activity in and around the residences;
- Wind generated noise from local foliage; and
- Other typical anthropogenic sources typically found in such rural settings.

Water

Chapter 10 (Hydrology and Hydrogeology) outlines the baseline environment in terms of the water environment. On a regional scale, the proposed development is situated within the Shannon Hydrometric Area and Catchment, and within the Shannon International River Basin District (SHIRBD). There are several surface waterbodies which flow along the boundaries of the bogs, a summary of which is provided in Chapter 10 (Hydrology and Hydrogeology). In general, surface water flow is south to north with all river waterbodies entering the River Shannon. The proposed development is located within the Upper Shannon Catchment (26C), with a small portion to the south of the proposed development located within the Upper Shannon Catchment (26E) and upstream of the Lough Ree Special Area of Conservation (SAC) (Site Code: 000440).

The regional natural surface water drainage pattern, in the environs of the proposed development is outlined in Figure 10-2 and the drainage network of the proposed wind farm site are outlined in Figure 10-3 to Figure 10-5 of Chapter 10 (Hydrology and Hydrogeology).

The proposed development is located on an EPA Licensed site. A network of drainage channels is present throughout the peatland which is operated under IPC licence P0504-01 Mountdillon Bog Group. In terms site specific surface water quality, EPA surface water monitoring associated with the IPC Licence (P0504-01) is conducted at the site on a regular basis as part of licence requirements. For the period 2001 to 2022, the results for the parameters tested were within the recommended discharge limits.

In terms of groundwater quality, the WFD describes the groundwater quality status of the proposed wind farm in this area as 'Good'.

According to publicly available Longford County Council and Uisce Éireann data, two groundwater boreholes were used as part of the Lanesborough Public Water Scheme (PWS). There are no Group Water Schemes (GWS) serving the proposed development. The Lanesborough borehole, also the abstracts groundwater for use in the Lanesborough PWS, is located 4 km to the west (within the grounds of Lough Ree power station) of T02 and the Lisrevagh borehole is located 7.3 km to the east of the proposed wind farm site. There are no PWS within the proposed wind farm site or at the proposed temporary work areas along the TDR. There is no other water abstractions registered on the EPA database (2024). According to the GSI data (2024), there are no domestic wells within 0.25 km of the turbines or borrow pits.

Land & Soils

Impacts related to land/soils are predominantly associated with earthworks operations undertaken during construction activity, where excavation activity and movement of material can generate airborne dust. In general, potential human health risk from soils would be associated with direct contact, ingestion or inhalation with any soils which may potentially contain pollutant concentrations/contamination. Where polluted/contaminated soils occur, people can be exposed to through direct skin contact or by breathing in dust. The degree of

exposure is likely dependent on weather and soil conditions, as well as the proximity to sources of pollution (EEA, 2022)[56].

Chapter 9 (Land, Soils and Geology) outlines the baseline environment in terms of land and soils, including soil mapping and site-specific information. The EPA data indicates that the proposed development site is generally underlain by cutover raised peat. The bogs have been harvested for industrial peat production by Bord na Móna. There are also some bodies of till derived from limestones in the proposed wind farm site.

Based on the desk research, site walkover, and ground investigation conducted for Chapter 9 (Land Soils and Geology), there are no identified areas of concern regarding contamination at the site of the proposed development.

Traffic

In terms of local access, the wider road network in and surrounding the proposed wind farm site includes the following national, regional and local roads; N63, R398, R392, R397, L1162, L1163, L1164, L1148, L1138, L1136 and L1155. The site access points are detailed in Chapter 15 Traffic and Transport.

Public transportation is available in the wider area around the proposed wind farm site but are predominately limited to services provided by road. Train services are provided in the region by Irish Rail to County Longford. The nearest train services available are located in Longford Town (Sligo to Dublin line, operated by Irish Rail). A number of bus services operate in County Longford and the local area operated by Bus Eireann, Transport for Ireland (TFI) and a number of private operators which provide a link to national routes through Longford Town. TFI operate the 'TFI Local Link Bus Services'[57], which serves a number of stops in the county and vicinity of the proposed wind farm site including, Lanesborough, Kilashee, Ballymacormack, Ballymahon and Keenagh. Inter-city bus services connecting County Longford to a number of destinations across Ireland are available including the Expressway Service (Bus Éireann) serving Longford Town and Lanesborough.

Health impacts may be experienced by individual receptors using the local road network due to traffic impacts which may cause nuisance, delays and disruption to routes and access, leading to individual receptors experiencing feelings of anxiety, worry, frustration or irritation caused by such traffic disruption.

Chapter 15 (Traffic and Transport) provides a detailed description of the existing environment in relation to traffic and transport.

6.4.2.2 Human Health and Wind Farm Developments

The assessment of the potential effect of the proposed wind farm on human health is based on a review of the relevant published literature on the subject. In this regard, it is important to assess the quality of available information reviewed. In general, studies which are published in peer-reviewed journals are the most authoritative. Peer-reviewed means that only those with reasonable scientific substance which meets the scientific criteria of experts in the field are published. Even within peer-reviewed journals, there are different qualities of studies. Studies which are merely based on questionnaires or other reporting of symptoms are of less value but

[56] https://www.eea.europa.eu/publications/zero-pollution/health/soil-pollution

[57] https://www.transportforireland.ie/plan-a-journey/network-maps/longford-tfi-local-link-bus-services/

may be useful in identifying areas for further study, particularly if they are linked with scientific measurements. Occasionally, opinion is published, without necessarily strong back-up, to stimulate discussion. Wind and renewable energy are a subject on which there is a lot of opinion available on the internet, with wide ranging and often contradictory information. The following sections provide a summary of some of the available material in relation to potential effects of wind turbines on human health.

Wind Turbine Health Effects

The term *Wind Turbine Syndrome* first appeared in 2009, when a New York Paediatrician, Dr Nina Pierpont (Pierpont, 2009), published *"Wind Turbine Syndrome: A Report on a Natural Experiment".* The experiment comprised speaking on the telephone with 23 people who answered her advertisement asking if they lived near a wind turbine and if they ever felt sick. Fifteen of them said they had family members who would probably answer the question posed in the affirmative. Based on these personal assessments, Dr Pierpont claimed science proved her belief that wind turbines cause a vast array of maladies. This pamphlet was not published in a peer-reviewed journal and would be considered to more closely resemble a relatively unscientific opinion poll.

In terms of research on the health effects of wind turbines generally, a review of the existing literature was performed in 2011 by Knopper and Ollson in *'Health effects and wind turbines: a review of the literature'.* The results of this study were stated as follows: *"Conclusions of the peer reviewed literature differ in some ways from those in the popular literature. In peer reviewed studies wind turbine annoyance has been statistically associated with noise but found to be more strongly related to visual impact, attitude to wind turbines and sensitivity to noise. To date, no peer reviewed articles demonstrate a direct causal link between people living in proximity to modern* wind *turbines, the noise they emit and resulting physiological health effects. If anything, reported health effects are likely attributed to a number of environmental stressors that result in an annoyed/stressed state in a segment of the population. In the popular literature, self-reported health outcomes are related to distance from turbines and the claim is made that infrasound*[58] *is the causative factor for the reported effects, even though sound pressure levels are not measured."* (Knopper and Ollson, 2011).

A further study was carried out by Knopper et al. in 2014 which provides a *"bibliographic-like summary and analysis of the science around the issue* [of wind turbines and human health] *specifically in terms of noise (including audible, LFN* [low frequency noise] *and infrasound), EMF and shadow flicker".* The study states that *"There is also a growing body of research that suggests that nocebo*[59] *effects may play a role in a number of self-reported health impacts related to the presence of wind turbines. Negative attitudes and worries of individuals about perceived environmental risks have been shown to be associated with adverse health-related symptoms such as headache, nausea, dizziness, agitation, and depression, even in the absence of an identifiable cause"* and *"Based on the findings and scientific merit of the available studies, the weight of evidence suggests that when sited properly, wind turbines are not related to adverse health."* (Knopper et al., 2014).

[58] Infrasound is sound below the audible human frequency which is normally taken as being 20 Hz or less. However, it can be associated with vibration and is sometimes an issue discussed with, for example, large tunnelling projects. Infra-sound is also an everyday occurrence with everyday sources. Many of the people who cite human health problems with wind turbines relate these to infrasound and reported symptoms can include nausea, disturbance of sleep, and tinnitus (ringing in the ear).

[59] Nocebo is defined as "*A non-existent or inactive substance or factor that causes symptoms of disease in people who believe that they have been exposed to it*" (Source: Collins English Dictionary: Accessed October 2024).

In 2010, The National Health and Medical Research Council (NHMRC) of Australia published *'Wind Turbines and Health: A Rapid Review of the Evidence'*, which concluded that *"This review of the available evidence, including journal articles, surveys, literature reviews and government reports, supports the statement that: There are no direct pathological effects from wind farms and that any potential impact on humans can be minimised by following existing planning guidelines."* (NHMRC, 2010). In 2015, the NHMRC in Australia published a systemic review of the health effects of wind farms (Merlin et al., 2015). This was a thorough follow up to the 2010 '*Rapid Review'* and was independent research (i.e., no relationship to either wind farm developers, anti-wind groups or objectors). Which looked extensively at all the reported effects and systematically looked at all available evidence. The review concluded that *"The evidence considered does not support the conclusion that wind turbines have direct adverse effects on human health, as the criteria for causation have not been fulfilled"* (Merlin et al., 2015).

Professor Simon Chapman of the School of Public Health and Sydney University Medical School, Australia writing in the New Scientist Magazine in October 2012 pointed out that if wind turbines did cause medical problems, we would expect to find a relationship between prevalence of the syndrome and populations living near wind farms, however this is not the case. He stated, in fact, that it is almost the case that the opposite is true. The people who should be most affected are those who live on the land where the wind turbines are actually located but this is not described in the literature. In September 2015, a further 25 reviews of the scientific evidence that universally conclude that exposure to wind farms and the sound emanating from wind farms does not trigger adverse health effects were compiled by Professor Simon Chapman and Tersa Simonetti (of Sydney University Medical School). Another recent publication by Professor Chapman and Fiona Crichton, published in 2017 entitled 'Wind turbine syndrome: A communicated disease' provides a detailed examination of scientific evidence and critically discusses why certain health effects might often be incorrectly attributed to wind turbines.

A 2021 publication, *'Health Effects Related to Wind Turbine Sound: An Update'* (van Kamp and van den Berg, 2021), looked at literature published between 2017 and mid 2020 on the health impacts of wind turbine sound on local residents. This covered a range of topics such as annoyance, sleep disturbance, cardiovascular disease, and metabolic effects, as well as mental and cognitive impacts. The study indicated there may be a link between annoyance and the sound level of a wind turbine (though low frequency sound did not appear to affect this). There were no consistent results for the other topics (or data was not available). The study also showed evidence that annoyance is lower when people participate in the turbine siting process.

Another more recent UK study, *'Perceptions of Wind Turbine Noise and Self-Reported Health in Suburban Residential Areas'* (Qu and Tsuchiya, 2021) researching potential suburban health impacts associated with wind turbines found that questionnaire results were heavily influenced by whether the person knew the research aims or not. Those that were aware that the research aimed to assess wind farm impacts reported higher levels of health complaints than those that had the aim masked. This highlights the importance of considering good scientific data and studies.

Wind Turbine Noise and Infrasound

In 2009, a report was released by the American Wind Energy Association and Canadian Wind Energy Association – *'Wind Turbine Sound and Health Effects An Expert Panel Review'* (Colby et al. 2009). The report covered the extensive review, analysis and discussion undertaken by an expert panel in to the large body of peer-reviewed literature on sound and health effects in general, and on sound produced by wind turbines in particular. Finding of the expert panel review included:

- That *"Wind Turbine Syndrome"* symptoms are not new, and are the same as those seen in common human stress responses. They include headaches, insomnia, anxiety, dizziness, etc. The findings note *"Stress has multiple causes and is additive. Associated stress from annoyance, exacerbated by the rhetoric, fears, and negative publicity generated by the wind turbine controversy, may contribute to the reported symptoms described by some people living near rural wind turbines"* (Colby et al. 2009);
- That *"there is no evidence for direct physiological effects from either infrasound or low frequency sound at the levels generated from wind turbines, indoors or outside. Effects may result from the sounds being audible, but these are similar to the effects from other audible sounds".* Low frequency and very low frequency 'infrasound' produced by wind turbines are the same as other natural sources of low frequency sound including *"wind, rivers, and waterfalls in both audible and non-audible frequencies"* and other sources including *"road traffic, aircraft, and industrial machinery. The most common source of infrasound is vehicular"* (Colby et al. 2009);
- The review found that such 'infrasounds' or sound levels from wind turbines pose *"no risk of hearing loss or any other nonauditory effect"* and *"The levels of sound associated with wind turbine operations are considerably lower than industry levels associated with noise induced hearing loss"* (Colby et al. 2009); and
- The review stated that media coverage of alleged adverse health effects of wind turbines creates an anticipatory fear in some that they will experience adverse effects from wind turbines and the resulting stress, fear, and hypervigilance may exacerbate or even create problems which would not otherwise exist (Colby et al. 2009).

Following review, analysis, and discussion of current knowledge, the panel reached consensus on the following conclusions:

- *"There is no evidence that the audible or sub-audible sounds emitted by wind turbines have any direct adverse physiological effects";*
- *"Ground-borne vibrations from wind turbines are too weak to be detected by, or to affect, humans";*
- *"Sounds emitted by wind turbines are not unique. There is no reason to believe, based on the levels and frequencies of the sounds and the panel's experience with sound exposures in occupational settings, that the sounds from wind turbines could plausibly have direct adverse health consequences."* (Colby et al. 2009).

In 2010, an independent review by an expert panel on behalf of Renewable UK was published, which consisted of three reviews undertaken by independent experts to provide an update and understanding of the existing scientific knowledge relating to infrasound and wind turbines. The 2010 report also discusses Dr Pierpont's 2009 publication. The independent review found the following in terms of Dr Pierpont's 2009 publication; noise from wind turbines cannot contribute to the symptoms reported by respondents by the mechanisms proposed, the scientific and audiological assumptions presented relating to infrasound are wrong, and the scientific and epidemiological methodology and conclusions drawn in the publication are fundamentally flawed (Renewable UK, 2010).

Commentary on *Wind Turbine Noise* published in the British Medical Journal (The BMJ) in March 2012 (Hanning and Evans, 2008) which was not an evidence-based study but merely an opinion piece. The piece identified that wind turbine noise seems to affect sleep and that an independent review of evidence is necessary. Professor Simon Chapman responded in a letter published in a subsequent issue of the BMJ stating *"Hanning and Evans, who declare histories of*

anti-wind farm activity, say that a large body of evidence now exists that wind turbines within permissible distances from housing disturb sleep and impair health. They are correct about a large body of evidence, but not in their interpretation of its conclusions. There are 17 reviews of the evidence, nearly all with an "independent" provenance. None are referenced in the editorial. These reviews strongly state that the evidence that wind turbines themselves cause problems is poor. They conclude that: Small minorities of exposed people claim to be adversely affected by turbines; …. Negative attitudes to turbines are more predictive of reported adverse health effects and annoyance than are objective measures of exposure" (Chapman, 2012).

A 2013 study published by the South Australian Environment Protection Authority entitled *'Infrasound levels near wind farms and in other environments'* (Evans et al., 2013), the authors objectively measured infra-sound in a number of the different environments including urban and rural as well as in houses adjacent to windfarms and those further away. Among its conclusions were that *"Infrasound levels of between 60 and 70dB(G) commonly occur in the urban environment"* and that *"Noise generated by people and associated activities within a space was one of the most significant contributors to measured infrasound levels, with measured infrasound levels typically 10 to 15dB(G) higher when a space was occupied. Infrasound levels up to approximately 70dB(G) were measured in occupied spaces".* When discussing the specific locations that were tested, the report stated *"At two locations, the EPA* [South Australian Environment Protection Authority] *offices and an office with a low frequency noise complaint, building air conditioning systems were identified as significant sources of infrasound. These locations exhibited some of the highest levels of infrasound measured during the study"*. For rural environments, the report concluded that while infra-sound levels were lower than urban areas, that *"Infrasound levels at houses adjacent to wind farms are no higher than those at houses located a considerable distance from wind farms"* (Evans et al., 2013).

A 2014 study by Health Canada on the effects of wind turbine noise on health and well-being (Health Canada, 2014) had the following key findings:

- No evidence found to support a link between exposure to wind turbine noise and any of the self-reported illnesses (such as dizziness, tinnitus, migraines) and chronic conditions (such as heart disease, high blood pressure, diabetes);
- No association was found between the multiple measures of stress (such as hair cortisol concentration (HCC), blood pressure, heart rate, self-reported stress) and exposure to wind turbine noise;
- No association was found between wind turbine noise and self-reported or measured sleep quality;
- An association was found between increasing levels of wind turbine noise and individuals reporting to be very or extremely annoyed. No association was found with any significant changes in reported quality of life, or with overall quality of life and satisfaction with health; and
- Calculated noise levels were found to be below levels that would be expected to directly affect health (WHO Community Noise Guidelines (1999)). This finding is consistent with self-reported and measured results of the study.

Furthermore, a critical review of the scientific literature published in the Journal of Occupational and Environmental Medicine (JOEM) in 2014 (McCunney, 2014) concluded that:

1. *"Infrasound sound near wind turbines does not exceed audibility thresholds;*
2. *Epidemiological studies have shown associations between living near wind turbines and annoyance;*
3. *Infrasound and low-frequency sound do not present unique health risks;*

4. *Annoyance seems more strongly related to individual characteristics than noise from turbines".*

In 2016, a publication by the Ministry of the Environment in the Federal State of Baden Wuerttemberg, Germany (Ratzel et al., 2016) stated in its conclusion that infrasound and low-frequency noise "are an everyday part of our technical and natural environment" that can be found everywhere and is caused by a large number of different natural and technical sources and compared with other such sources, wind turbines make no considerable contribution to it and the level of infrasound caused by turbines is low. It further concluded that the infrasound levels generated wind turbines lie clearly below the limits of human perception, stating that *"already at a distance of 150 m, it is well below the human limits of perception. Accordingly, it is even lower at the usual distances from residential areas. Effects on health caused by infrasound below the perception thresholds have not been scientifically proven. Together with the health authorities, we in Baden-Württemberg have come to the conclusion that adverse effects relating to infrasound from wind turbines cannot be expected on the basis of the evidence at hand. The measurement results of wind turbines also show no acoustic abnormalities for the frequency range of audible sound. Wind turbines can thus be assessed like other installations according to the specifications of the TA Lärm* [German noise prevention regulations]*. It can be concluded that, given the respective compliance with legal and professional technical requirements for planning and approval, harmful effects of noise from wind turbines cannot be deduced"* (Ratzel et al., 2016).

A 2018 study published in Environment International Journal (Bräuner et al., 2018) examined the association between long-term exposure to wind turbine noise and the incidence of myocardial infraction (MI). The study concluded that *"the results of this comprehensive cohort study lend little support to a causal association between outdoor long-term wind-turbine noise exposure and MI. However, there were only few cases in the highest exposure groups and our findings need reproduction."* Another study, published in the Journal of American Heart Association by Bräuner et al. (2019), investigated the association between long-term exposure to wind turbine noise and the risk of stroke and concluded that *"this comprehensive cohort study lends no support to an association between long-term WTN* [wind turbine noise] *exposure and stroke risk".* Another article published in the Environmental Research Journal (Poulsen et al., 2018) examined the potential link between wind turbine noise and adverse birth outcomes and found no associations between the two.

In relation to infrasound, the following extract from the EPA document *Guidance Note for Noise Assessment of Wind Turbine Operations at EPA Licensed Sites (NG3)* (EPA, 2011) states that *"There is similarly no significant infrasound from wind turbines. Infrasound is high level sound at frequencies below 20 Hz. This was a prominent feature of passive yaw "downwind" turbines where the blades were positioned downwind of the tower which resulted in a characteristic "thump" as each blade passed through the wake caused by the turbine tower. With modern active yaw turbines (i.e. the blades are upwind of the tower and the turbine is turned to face into the wind by a wind direction sensor on the nacelle activating a yaw motor) this is no longer a significant feature.".*

With respect to infrasonic noise levels below the hearing threshold, the World Health Organisation (WHO) document *Community Noise* (WHO, 1995) has stated that *"There is no reliable evidence that infrasounds below the hearing threshold produce physiological or psychological effects.".*

In terms of nighttime noise and sleep disturbance, in 2009, the WHO issued *Night-time Noise Guidelines for Europe* (WHO, 2009). The report stated that in two European countries studied

(Switzerland and The Netherlands) almost 50% of the population are exposed to night-time noise in excess of 45dB L_{night}. It quotes some effects at quite low night-time levels and proposed an ideal noise level of 40dB L_{night} outside residences. This, however, is a yearly average. It does accept that this is essentially unachievable and suggests an interim value of 45dB L_{night} outside, again a yearly average.

The current Irish WEDGs (2006) state that *"A fixed limit of 43dB(A) will protect sleep inside properties during the night"*. The Draft 2019 WEDGs (Ireland) propose a change to the approach in applying limits on noise from wind turbines, including during night-time. This is currently the subject of consultation and is discussed in further detail in Chapter 12 (Noise and Vibration).

In 2018, the WHO also carried out a review on environmental noise (Basner and McGuire, 2018). While the review mainly concentrated on road, rail and aircraft noise, it did briefly discuss wind turbine noise and concluded that *"The results of the six identified studies that measured self-reported sleep disturbance are consistent, four of the studies found an association between wind turbine noise levels and increased sleep disturbance. However, the evidence that wind turbine noise affects sleep is still limited. This finding is supported by other recent reviews on wind turbine noise and sleep disturbance. Three of the studies referred to noise specifically in the questions which could have led to a bias in the results. Also, while the results from four out of the six studies suggest that sleep disturbance due to wind turbine may occur when noise levels are above 40 or 45 dBA, for two of the studies less than ten percent of the participants were exposed to these higher noise levels. Therefore, it is difficult to make conclusions on populations exposed to these higher levels. In addition, noise levels were calculated using different methods and different noise metrics were reported in the studies."* (Basner and McGuire, 2018).

In October 2018, the WHO published the *'Environmental Noise Guidelines for the European Region'*, an update on the 2009 Guidelines, and noted the following: *"For the relationship between wind turbine noise and prevalence of hypertension, three cross-sectional studies were identified, with a total of 1830 participants (van den Berg et al., 2008; Pedersen, 2011; Pedersen & Larsman, 2008; Pedersen & Persson Waye, 2004; 2007). The number of cases was not reported. All studies found a positive association between exposure to wind turbine noise and the prevalence of hypertension, but none was statistically significant. The lowest levels in studies were either <30 or <32.5 L_{den}. No meta-analysis was performed, since too many parameters were unknown and/or unclear. Due to very serious risk of bias and imprecision in the results, this evidence was rated very low quality"……."The same studies also looked at exposure to wind turbine noise and self-reported cardiovascular disease, but none found an association. No evidence was available for other measures of cardiovascular disease. As a result, only evidence rated very low quality was available for no considerable effect of audible noise (greater than 20 Hz) from wind turbines or wind farms on self-reported cardiovascular disease"* (WHO, 2018).

The WHO 2018 Guidelines also state that *"For average noise exposure, the GDG* [Guideline Development Group] *conditionally recommends reducing noise levels produced by wind turbines below 45 dB L_{den} as wind turbine noise above this level is associated with adverse health effects"*. The GDG do note however that aside from a potential for annoyance, the evidence relating to any health effects associated with wind turbine noise is either absent or of poor quality. There is therefore a possibility that the effects caused by attitudes towards wind farms may be difficult to tell apart from any potential effects from wind turbine noise. The GDG also note that there are more people exposed to noise from sources such as road traffic than from wind turbines and any benefits associated with reducing exposure to wind turbine noise may be unclear. Taking account of the above, the GDG recommends that the development of

any policies for wind energy development ensure that noise exposure is kept below guideline values. They note that this can be achieved via multiple methods, but they don't specify that any particular methods should be used. It is concluded that there will be no significant adverse effect on human health as a result of sleep disturbance during the operational phase of the proposed development. The most recent literature is thought to represent large modern turbines, and so there is no reason to suggest that it does not represent the full range of turbine dimensions being proposed.

The referenced publications and studies above outline that there appears little scientific evidence of effects of *Wind Turbine Syndrome*, and wind farms are not a significant source of noise and infrasound, and that traffic and everyday human activity are likely to be more relevant.

Further discussion on noise and infrasound is presented in Chapter 12 (Noise and Vibration).

Electromagnetic Interference

When electric current flows, both electric and magnetic fields are produced. The electromagnetic fields (EMF) from electricity are in the extremely low frequency end of the electro-magnetic spectrum. EMF occurs in the home, in the workplace or anywhere that electricity is used. EMF is also naturally generated from earth's geomagnetic field and electric fields from storm clouds.

Guidance from the WHO states that EMF is sometimes cited for potential health effects (WHO, 2007). Concerns expressed in the past include childhood leukaemia, brain tumours and other cancers. Laboratory experiments have provided no reliable evidence that EMF are capable of producing cancer, nor do human epidemiological studies suggest that they cause cancer in general. , Furthermore, the Health Promotion Agency in the UK stated, in November 2007, that *"there is little scientific evidence to support these claims and the current body of evidence does not show that exposure to EMF below guideline levels presents a human health hazard"*.

The aforementioned Australian NHMRC study (Merlin et al., 2015) concluded in relation to EMF that *"There is no direct evidence on whether there is an association between electromagnetic radiation produced by wind farms and health outcomes. Extremely low-frequency electromagnetic radiation is the only potentially important electromagnetic emission from wind turbines. Limited evidence suggests that the level of extremely low-frequency electromagnetic radiation close to wind farms is less than average levels measured inside and outside Australian suburban homes. There is no consistent evidence of human health effects from exposure to extremely low-frequency electromagnetic radiation at much higher levels than is present near wind farms."*

EirGrid have produced a number of publications EMF and health, most recently *"The Electricity Grid and Your Health"* (May 2019) which provides more information on EMF and electricity in terms of health and states that *"the consensus from health and regulatory authorities is that extremely low frequency EMFs do not present a health risk"*. Information on EMF currently provided by EirGrid[60] states that *"the most common concern about EMFs from power lines is a fear that magnetic fields could be associated with childhood leukaemia"*, however, *"recent studies conducted in the UK, France, Denmark and the US have not established associations between a home near transmission lines and childhood leukaemia"* and *"Based on this history*

[60] https://www.eirgrid.ie/emfs

and its own review of research, the World Health Organization states there is no evidence to conclude that exposure to low-level EMFs is harmful to human health" (EirGrid, 2024).

Shadow Flicker

'Shadow flicker' is an effect that occurs when the rotating blades of a wind turbine cast a moving shadow over an observer or a building. The effect is predominantly experienced indoors where a moving shadow passes over a window in a nearby property and results in a rapid change or flicker in the incoming sunlight. Shadow flicker is predominantly an annoyance, but concerns have been raised that the flicker can trigger seizures in persons with photosensitive epilepsy.

The Wind Energy Guidance Note prepared in the UK for the Renewables Advisory Board and Department for Business, Enterprise and Regulatory Reform (BERR) in 2007 states that *"The operating frequency of a wind turbine will be relevant in determining whether or not shadow flicker can cause health effects in human beings. The National Society for Epilepsy advises that only 3.5 % of the 1 in 200 people in the UK who have epilepsy suffer from photosensitive epilepsy. The frequency at which photosensitive epilepsy may be triggered varies from person to person but generally it is between 2.5 and 30 flashes per second (hertz). Most commercial wind turbines in the UK rotate much more slowly than this, at between 0.3 and 1.0 hertz. Therefore, health effects arising from shadow flicker will not have the potential to occur unless the operating frequency of a particular turbine is between 2.5 and 30 hertz and all other pre-conditions for shadow flicker effects to occur exist." The note also states that "Shadow flicker is therefore more likely to be relevant in considering the potential effects on residential amenity [than human health]"*.

Similarly, the aforementioned Australian NHMRC study (Merlin et al., 2015) discusses shadow flicker and states that *"The Environment Protection and Heritage Council of Australia (EPHC; 2010) notes that the risk of seizures from modern wind turbines is negligible, given that less than 0.5% of the population are subject to epilepsy at any point in time and, of this proportion, 5% are vulnerable to strobe lighting (light flashes). In the majority of circumstances (>95% of the time), the frequency threshold for individuals susceptible to strobe lighting is >8 Hz, with the remainder affected by frequencies >2.5 Hz. The EPHC estimates that the probability of conventional horizontal-axis wind turbines causing an epileptic seizure for an individual experiencing shadow flicker is <1 in 10 million in the general population."*

The Wind Energy Development Guidelines (WEDG) 2006 state that *"At distances greater than 10 rotor diameters from a turbine, the potential for shadow flicker is very low"* (DHLGH, 2006), The Draft WEDGs (2019) state *"Generally only properties within 130 degrees either side of north, relative to the turbines, can be affected at these latitudes in the UK and Ireland- turbines do not cast long shadows on their southern side"*. Additionally, the Draft WEDGs (2019) state *"the time period in which a neighbouring property may be affected by shadow flicker is completely predictable from the relative locations of the wind turbine and the property. Modern wind turbines have the facility to measure sunlight levels and to reduce or stop turbine rotation if the conditions that would lead to shadow flicker at any neighbouring property occur. With careful site design and appropriate mitigation, and most critically the use of appropriate equipment and computer software, no existing dwelling or other affected property (e.g. existing work places or schools) should experience shadow flicker".*

Modelling can be used to predict the strength and duration of potential shadow flicker during daylight hours for every day of the year (DHLGH, 2019). A Shadow Flicker Study detailing the outcome of modelling for the potential for shadow flicker from the proposed wind farm has been

undertaken. Further discussion on the modelling outcomes and assessment of Shadow Flicker effects is presented in Chapter 17 (Material Assets: Shadow Flicker).

Psychological Effects

The potential for adverse effects on psychological health, such as anxiety and stress, caused by concern in relation to visual appearance, noise emissions, shadow flicker and other issues, is often highlighted in relation to wind farms. A community may also experience annoyance arising from increased traffic or noise from the construction works. The potential effects on a person's overall psychological well-being is difficult to assess as there are no direct measurements that can be used. While it is possible to predict noise emissions and shadow flicker, for example, the same scientific certainty cannot be used in predicting psychological impacts. The aforementioned 2014 Health Canada report referenced above looked at a number of measures of stress and noted no association with exposure to wind turbine noise.

The potential degree of psychological impact can be both positive and negative. There can be a positive impact, whereby people may look forward to better employment opportunities generated by a major infrastructure development in a rural area or the benefits that may be gained from the Community Benefit Funds. In terms of negative impacts, this can be where somebody is annoyed by for example, the visual appearance of the wind turbines. This annoyance is not a medical health impact, as such. If a person were to develop a psychological illness, such as anxiety or depression, this would be a medical health impact.

In this case, it is useful to look at experience from other operational wind farms to determine if significant psychological effects are reported and published. If this was the case, it would be expected to find recorded evidence of increased levels of depression or anxiety in the vicinity of other wind farms, however, definitive findings on such were not evident in the peer-reviewed literature referenced above.

6.5 POTENTIAL EFFECTS

6.5.1 Do-nothing Scenario

In the Do-Nothing Scenario, the existing lands will continue to be utilised for its current land use purposes. Peat extraction ceased at the proposed wind farm site in 2019. In this scenario the site would continue to naturally revegetate as is evidenced by those areas which ceased peat production many years prior to 2019. The site would continue to operate in compliance with its IPC licence requirements (ref. no P0504-01). This would involve the continuation of ongoing decommissioning activities associated with the removal of rail infrastructure, structures and materials from the site. Following the successful decommissioning of the site it is intended that the site would be rehabilitated in line with condition 10 of the IPC licence.

The current land use will allow for limited use of the site by permitted personnel. The opportunities for local employment, additional economical spend and to diversify the local economy will not be realised. Furthermore, the opportunity to open up the wind farm site to the public and provide amenity and recreational facilities will be lost. The health benefits nationally associated with replacing fossil fuels with renewable wind energy from the proposed development will be lost and alternative candidate sites will need to be identified, either onshore or offshore, to ensure Ireland meets it commitments to reducing carbon emissions.

6.5.2 Population

6.5.2.1 Construction Phase

Land Use

The construction of the proposed development will involve short-term land use change primarily for the excavation of borrow pits and turbine foundations and the construction of access roads, turbine hardstanding's, site compounds, substation, battery storage facility and associated ancillary services. The proposed underground cable route for the grid connection lies within the boundary of the proposed wind farm site. The 4 no. borrow pit areas, and 3 no. temporary construction compounds will be reinstated on completion of the construction works which is anticipated to last for approximately 24-30 months.

Although there will be temporary changes to land use within the site boundary of the proposed wind farm to facilitate the construction of turbines and associated infrastructure, it is not predicted that the construction phase of the proposed wind farm will impact on existing land uses in the surrounding or wider area. Any likely effects on population in terms of land use are therefore predicted to be neutral, imperceptible and short-term.

Chapter 9 (Land, Soils and Geology) outlines the baseline environment in terms of land use and contains a detailed assessment of effects associated with the proposed development on lands, soils and geological receptors.

Population Trends

It is anticipated that those working on the construction phase of the proposed development will commute from the local area or wider region daily. Where relevant, some individual personnel may choose to live locally or commute for a portion or duration of the construction phase (24-30 months).

It is not predicted that the construction phase of the proposed development will have a significant effect on local or wider population trends, such as population levels, density, age or household size. Any likely effects on population trends in the area would be direct, neutral to positive, imperceptible, and short-term.

Property Receptors and Residential Amenity

Negative effects on local property receptors (including residential, educational, and commercial properties) as a result of the construction works can arise from construction activity at the wind farm site, as well as increased traffic movements on the local road network, resulting in potential increases in emissions locally (e.g., noise, vibration and emissions to air (including dust). This may also have potential to impact on local residents' enjoyment of their homes, i.e., residential amenity. Residential amenity relates to the human experience of a person's home, derived from the general environment and atmosphere associated with the residence. The quality of residential amenity is influenced by a combination of factors, including site setting and local character, land-use activities in the area and the relative degree of peace and tranquillity experienced at the residence.

Due to the size of the development area, the proposed wind farm site will be accessed via a number of proposed site entrances to enable access to the different sections of the site, while minimising congestion and traffic levels on the local road network. During construction, the site will be accessed primarily via the main site access A to the southern part of Derryadd Bog, off

the R392. Additional access points for HGVs and LGVs are provided on the N63 National Road (Existing Mountdillon access and site Access C). Potential traffic effects are discussed in detail in Chapter 15 (Traffic and Transport).

The proposed haul routes are using existing public roads which are already used by heavy goods vehicles (HGVs), however there will be a short-term increase in (traffic volume) effects during the construction phase due to increased vehicle trips in the vicinity and on-site construction activity. The design of the proposed wind farm has included a minimum set-back distance of 760 m (i.e., 4 times the tip height) between the curtilage of all/any sensitive receptors and the 22 no. proposed turbine locations, which will reduce the potential for construction of the wind turbine infrastructure to have a significant effect on residential amenity.

There will be some additional works required off site to facilitate turbine delivery (see Section 3.5, Chapter 3 (Description of the Proposed Development)), however, as noted above, the proposed works along the TDR are minor in the context of the proposed development. Furthermore, the works are small scale and transient in nature, and mostly constitute temporary works along the public road to facilitate the turbine deliveries with one blade oversail area. They may result in temporary localised noise and dust emissions, and there may also be some traffic management implications for road users. Although these TDR works will be located near sensitive receptors, they will be similar to any other normal road works that might be carried out. These effects are assessed in detail in the Chapter 11 (Air Quality), Chapter 18 (Climate) and Chapter 12 (Noise and Vibration), and Chapter 13 (LVIA).

Furthermore, the closest borrow pit location is approximately 500 m or further from identified property receptors (see Figure 6-2). The closest property receptor to the internal access road works is approximately 125 m; this receptor is located just off the N63, west of the wind farm site boundary.

Based on the predicted effect(s) outlined above (inc. dust, noise, road traffic etc.), and given the distance between receptors and the proposed wind farm, significant effects on property receptors and residential amenity associated with the construction phase of the proposed wind farm is unlikely. Any likely effects on property receptors in the area would be direct, negative, slight, and short-term.

Property Value

It is not anticipated that the construction works for the proposed development will have any significant effect on local property values. A major UK study entitled *The Effect of Wind Farms on House Prices* carried out in March 2014, discussed in more detail in Section 6.4.1.4, noted that *"The econometric analysis established that construction of wind farms at the sites examined across England and Wales has not had a detectable negative impact on house price growth within a 5 km radius of the sites"*. Furthermore, the 2023 CERIS working paper entitled *'Wind Turbines and House Prices Along the West of Ireland: A Hedonic Pricing Approach'* found that there are *"no significant reduction in house price beyond 1 km for all specifications"* and the results indicate that the effects on house value is not persistent and diminishes over time.

Therefore, based on the available published studies presented in Section 6.4.1.4, it is reasonable to infer that the construction phase of the proposed development will similarly not have a significant effect on local property values.

Construction works for the wind farm will be carried out within the site boundary and traffic associated with travel to the site will use existing public roads. The grid connection will be contained within the wind farm site, crossing a the N63 road via horizontal directional drilling

(HDD) at one point, and the works along the TDR will be localised, relatively minor and temporary.

Based on the above, it predicted that significant effects on property value in the area due to the construction phase of the proposed development are unlikely. Any effects on property value in the area would likely be direct, negative, slight, and short-term.

Employment / Economy

The proposed development will create and support direct and indirect employment during the construction phase at local level, primarily through local construction workforce on site, and at regional and national level, through more specialised construction services and supply of building materials.

It is anticipated that the wind farm will have the following effects locally:

- Development activities such as site monitoring/surveys, site investigations (SI), legal fees, consultancy studies during pre-construction and construction works, etc;
- Spending locally by construction employees; and
- Accommodation and sustenance will be required in the locality for those workers on site.

Guidance from a 2009 IWEA study[61] states "*Our analysis has shown that the wind energy sector in Ireland can support 1.50 jobs per MW to be installed on the island*". Based on the proposed development capacity of ca. 132 MW, this equates to between approximately direct and indirect 198 jobs across a number of different sectors. The study (IWEA, 2009) estimated that 68% of the Irish jobs created are in the construction industry. It is therefore estimated that between 100 and 120 persons will be directly employed during the peak construction period.

Throughout the construction phase, there is potential for materials such as quarried products and concrete supplies, as well as machinery and equipment and associated operatives, to be sourced locally, which will support local business, as well as direct and indirect employment. Furthermore, the local area and region will experience a benefit from secondary investment associated with increased visitors and spend within the area, as well as potential increased activity in the local hospitality and café/restaurant industries driven by use of the facilities by construction staff. The proposed wind farm will be a valuable contribution to Longford County Council's economic aims for further development of its green economy.

The construction of the proposed wind farm will have an estimated capital cost in the region of up to €171.6 million[62] as per the SEAI (2015) report '*A Macroeconomic Analysis of Onshore Wind Development to 2020*' and an estimated 11% of the total capital cost will relate to civil engineering works[63] (i.e. site works) which has the potential to support local contractors and suppliers. The *Life-cycle of an Onshore Wind Farm* published by IWEA in March 2019 stated that *"One recent 169MW windfarm project estimated that €20 million was spent with local suppliers and contractors within 30 kilometres of the site during construction".*

[61] IWEA and Deloitte, *Jobs and Investment in Irish Wind Energy: Powering Ireland's Economy* (2009)
[62] Using an average investment cost of €1.3 million per MW – SEAI, *A Macroeconomic Analysis of Onshore Wind Development to 2020* (2015)
[63] Irish Wind Farmers Association - FAQ | Meitheal na Gaoithe Irish Wind Farmers Association (mnag.ie) - https://mnag.ie/frequently-asked-questions/

Therefore, it is predicted that the construction phase of the proposed development is likely to have direct and indirect positive, slight to moderate, short-term effects on employment and economy in the local area and Midland Region.

Tourism

As set out in Section 6.4.1.6, there are a number of relevant tourist attractions and public amenities in the vicinity of the study area, including the Corlea Trackway (approximately 700 m south), Lough Ree, and the Shannon. No existing designated tourist sites or walkways/trails were identified as intersecting with or within the wind farm area. The Midlands Trail Network Project, Longford section, which runs to the north of the proposed wind farm site, was granted planning approval on 7th of January 2025[64], and is covered within the cumulative effects assessment in Section 6.8.

Intermittent and temporary traffic effects due to movement of vehicles, as well as plant and machinery, related to the proposed development, and the requirement for abnormal loads related to the delivery of the turbines to site may impact local road traffic during the construction phase due to the increased road traffic movements. Abnormal loads will occur at set times and along designated routes. Therefore, there is potential for effects to local and tourist road users in the area during these periods.

No other direct effects on tourism activity are anticipated during the construction phase. Therefore, it is predicted that the construction phase of the proposed development is likely to have an indirect, neutral to negative, not significant, short-term effect on local tourism.

6.5.2.2 Operational Phase

Land Use

The proposed wind farm is located within a former peat extraction site. The overall area of the proposed wind farm site is approximately 1,900 ha spread across three bogs. Permanent infrastructure on the existing land, will include turbine foundations, 22 no. wind turbines, hardstand areas at turbines, internal roads, 1 no. on-site 110 kV electrical substation compound, 1 No. 16 MW battery storage facility, 2 no. Meteorological Masts and 3 No. amenity carparks. Original land use where the installed permanent infrastructure is located will change, with the exception of the 3 no. temporary construction compounds, and other temporary areas (see Chapter 3 (Description of the Proposed Development)), which will be reinstated post construction.

Approximately 18 km of internal site access roads within the proposed wind farm site will provide permanent amenity access (including pedestrian and cyclist access) during the operational phase. There will be 3 no. permanent amenity carparks and approximately 7.5 km of additional dedicated amenity access tracks developed at the wind farm site (providing linkages between the proposed wind farm site roads, the royal canal greenway (to the east) and the Corlea visitor centre and amenity areas (to the south), and the Midlands Trail Networks Project (to the north)). Figure 3-1 - Site Layout Plan (see Chapter 3 Description of the Proposed Development) outlines the final configuration of the internal roads with the additional dedicated amenity access tracks included in the layout plan. Furthermore, change of land use

[64] Midlands Trail Network - Longford (Pl. Ref. No/ 24/60132) - https://www.eplanning.ie/LongfordCC/AppFileRefDetails/2460132/0

associated with the wind farm located on the site will produce clean renewable energy for the duration of the 30-year operational life from the date of commissioning of the entire wind farm.

Significant effect on land use at the proposed wind farm site associated with the operational phase of the proposed development is unlikely. The proposed development will not result in permanent land use change in the wider area beyond the proposed wind farm site boundary. Operational phase effects on population in terms of change of land use at the site are therefore likely to be positive, slight to moderate, and long-term.

Population Trends

A survey of the public perception of wind power in Scotland and Ireland carried out by researchers at the University of St. Andrews, Fife and The Macaulay Institute, Aberdeen (Warren et al., 2005) (see Section 6.4.1.4) found that large majorities of people are strongly in favour of their local wind farm and that positive attitudes to wind power increase through time and with proximity to wind farms. Retrospective questioning regarding pre- and post-construction attitudes at existing wind farms noted that those who changed to a more positive attitude following construction of the wind farm, gave reasons that the wind farm is *"not unattractive (62%), that there was no noise (15%), that community funding had been forthcoming (15%) and that it could be a tourist attraction (8%)"* (Warren et al., 2005). Amenity facilities provided at the wind farm site (i.e., amenity access tracks and car parks), as well as support from the significant Community Benefit Fund, could potentially make the local area attractive for people to move to, which may result in a marginal increase in local population numbers.

It is not anticipated that the proposed development will have a significant effect on population trends locally or in County Longford. Operational phase effects in terms of population trends are therefore likely to be neutral, not significant to slight, and long-term.

Property Receptors and Residential Amenity

The turbine layout at the proposed development has been designed with cognisance of the local population and sensitive receptor locations. As mentioned, the draft 2019 WEDGs recommend a minimum setback distance of four times the tip height from a proposed turbine to the curtilage of any residential property and the proposed development complies with this recommendation. Extensive consideration has been given to the layout of the site and the positions of the 22 no. turbines in ensuring sufficient set-back distances from sensitive receptors and adjustment for noise, shadow flicker, visual impact and telecommunication impacts. A minimum setback distance of 760 m has been applied based on a turbine tip height of 190 m considered for the proposed development (i.e., 190 x 4 - four times the tip height) and will therefore provide an adequate setback distance. There are no turbines located within 760 m of a residential property (see table 6-8, Section 6.4.1, the closest turbine to a property is approximately 779 m).

These considerations during the design, planning and EIA phase, in accordance with the relevant guidelines, are designed to minimise the potential effects on property receptors and residential amenity from the proposed development. Residential amenity relates to the human experience of a person's home, derived from the general environment and atmosphere associated with the residence. The quality of residential amenity is influenced by a combination of factors, including site setting and local character, land-use activities in the area and the relative degree of peace and tranquillity experienced at the residence.

The potential effects on human beings at their residences during the operational phase are assessed in the following chapters: Chapter 9 (Land, Soils and Geology), Chapter 10 (Hydrology

and Hydrogeology), Chapter 11 (Air Quality), Chapter 12 (Noise and Vibration), Chapter 13 (LVIA), and Chapter 15 (Traffic and Transport), Chapter 16 (Material Assets: Aviation and Telecoms), and Chapter 17 (Material Assets: Shadow Flicker), Chapter 18 (Climate), and Chapter 19 (Major Accidents and Disasters). Impacts in terms of environmental factors and human health are discussed in Section 6.5.3 below.

The proposed development will offer amenity and a Community Benefit Fund which will be positive for those residing in the identified property receptors. The proposed wind farm will provide 7.5 km of dedicated amenity access tracks to provide linkages between the proposed wind farm site roads, royal canal greenway (to the east), the Corlea visitor centre and amenity areas (to the south) and the Midlands Trail Networks project (to the north). There will be a potential for low levels of additional traffic on local roads (i.e., from those accessing the amenity carparks and for site maintenance). It is anticipated that a significant effect on local property receptors and residential amenity during the operational phase is unlikely. Operational phase effects in terms of property receptors and residential amenity are therefore likely to be negative, slight, and long-term.

Property Value

Based on the literature reviewed, it is not anticipated that the operational of the proposed wind farm will have any significant effect on local property values. As noted previously, research indicates that the effects on house value tends to occur within a 0-1 km radius and is not persistent and diminishes over time (Gillespie & McHale, 2023).

Furthermore, the proposed development includes approximately 27,500 m of internal site access roads within the proposed wind farm site which will provide permanent amenity access (including pedestrian and cyclist access) once the proposed development construction phase has concluded. An additional approximately 7.5 km of dedicated amenity access track, as well as three permanent amenity car parks, is also proposed to provide connectivity to local roads and allow local access to the wind farm amenity areas. The amenity within the wind farm site will provide opportunity for recreation. Furthermore, an annual Community Benefit Fund for the local area will be provided, this, along with the amenity facilities, may be a motivation for potential property buyers to move to the local area.

Therefore, based on the available published studies presented in Section 6.4.1, it is reasonable to infer that significant effects on property value in the area due to the operational phase of the proposed wind farm are unlikely. Any effect on property value in the area would likely be direct, negative, not significant, and medium-term.

Employment / Economy

It is anticipated that there will be ongoing local employment on the site throughout the operational phase of the proposed development relating to turbine servicing/maintenance, breakdowns/faults, inspections, substation maintenance, and maintaining the roads, drainage and other ongoing site work (2-3 full-time on-site jobs are assumed).

Although only a small proportion of these jobs are likely to be directly based in the wind farm site, it is likely that the operational phase will support indirect jobs, such as suppliers, consultants, research institutions and universities, financial services, energy sector roles, and hospitality and service industry roles, and benefit the wider employment profile.

Furthermore, there may occasionally be a requirement for additional people to visit site if a particular task requires it. Some local employment or contract opportunities may develop over the lifetime of the wind farm from occasional specific requirements.

Economic benefits from operational activities will include ongoing purchases of local materials, supplies, services and equipment required for the operational phase of the wind farm, as well as local spend generated from technical operational and maintenance staff such as on local hospitality facilities and services. Additionally, the amenity access tracks and carparks will attract visitors to the area who may also spend locally.

The impact of a Community Benefit Fund is likely to significantly enhance the local economy, with potential for substantial funding for local projects in support of relevant UN Sustainable Development Goals, clubs, charities and near neighbours, which will be invested in the local area. The Renewable Energy Support Scheme (RESS) also proposes a community investment opportunity although this was not realised in the first RESS scheme. The Community Benefit Fund associated with the proposed development is discussed in Chapter 3 (Description of the Proposed Development). In addition, the proposed development will require payment of rates to Longford County Council which will provide additional revenue for their work around the county.

Positive economic effects will also be felt in the wider area due to the ongoing benefits of renewable electricity generation. The energy generated will feed directly into the national electricity transmission system, providing a sustainable electricity source and a low impact energy supply to the country's domestic and industrial consumers. This is a significant, positive long-term effect for electricity consumers.

Therefore, it is anticipated that the operational phase of the proposed development is likely to have direct and indirect positive, moderate, long-term effects on employment and economy in the local area, Midland Region, and nationally.

Tourism and Amenity

As noted previously, Fáilte Ireland surveyed tourists' perceptions in relation to wind farms in the Irish landscape in 2007 and 2012. Results were positive, with approximately 80% of tourists considering the presence of wind farms to either have no impact or a positive impact on their sightseeing. In addition, when asked if further wind farm development in Ireland would influence their decision to holiday in Ireland again, over 70% of responses cited no impact or a positive impact on their return to Ireland. Similarly, the 2017 study carried out by BiGGAR Economics (see Section 6.4.1.6) examined the link, if any, between onshore wind energy development and the sustainable tourism sector in Scotland and did not find a direct relationship between tourism and the wind energy sector in itself. However, it did conclude that the increase in wind farm development did not negatively impact employment in the sustainable tourism industry in Scotland (BiGGAR, 2017).

As noted previously, there are a number of relevant tourism attractions and public amenities within the vicinity of the wind farm area including the Corlea Trackway, Lough Ree and the Shannon. The proposed development will be visible from a number of features in the area (as discussed in Chapter 13 of this EIAR (LVIA).

As mentioned, as part of the proposed development it is proposed to provide 3 no. permanent amenity carparks and approximately 7.5 km of amenity access tracks (including pathways and cycleways). The amenity access track will be mainly located on the proposed internal road network that will service the wind farm. Details of the configuration of the dedicated amenity

track and amenity access points to the site are discussed in the Amenity Plan in Appendix 3-1 of this EIAR.

The proposed development is not anticipated to have a significant effect on tourism and amenity in the local or wider region. It is considered that the proposed development will likely have a long-term, slight, positive effect on the tourism experience and numbers in the vicinity of the site given local amenity will be enhanced by the provision of the amenity access track and carparks that will be available to the public at the wind farm site.

6.5.3 Human Health

6.5.3.1 Construction Phase

Environmental Factors:

Air Quality

In terms of air quality, potential effects on human health during the construction phase will primarily relate to emissions to air associated with the proposed construction works. Dust or engine emissions generated from the proposed development construction phase will typically arise from:

- Running and movement of vehicles, plant and machinery;
- Transportation of turbines and construction materials to and within the site;
- Earthworks and excavation activities;
- Construction of hardstanding areas;
- Breaking and crushing of rock;
- Movement and placement of stockpiles (excavated soils/fill materials); and
- Wind generated dust from stockpiles, any required excavation, and exposed unconsolidated soils.

Sources of the emissions to air described during construction activities have the potential to impact construction personnel working in proximity of the source, as well as those residing at the properties close to an emissions source.

While during construction of a development of this scale occasional dust generation is inevitable, dust is typically predictable in its dispersion and studies show that the majority of dust deposition occurs close to its creation, and effects are localised. The nature of dust creation and deposition depends on the type of work, ground conditions and weather conditions. Good construction practice and mitigation measures in terms of dust control will minimise any potential effects and are discussed in more detail in Chapter 11 (Air Quality) and the CEMP (Appendix 3-2 of this EIAR). As detailed in Chapter 11 (Air Quality), it is unlikely that the construction activities will result in air quality standards being exceeded over any significant period of time in the environment outside of the construction site.

Furthermore, due to the minimum setback distance of the proposed works from local property receptors (see Section 6.4.1.3) the majority of properties which border the wind farm site are a considerable distance from the proposed works areas and activity, including general construction of turbines and hardstands, construction of internal site roads, borrow pits, substation construction, battery storage compound, and grid connection and underground cables. Significant adverse human health effects arising from emissions to air, including dust generation, as a result of construction works and construction traffic are considered unlikely.

Therefore, any likely potential effects related to air and dust emissions impacting human health would be negative, brief to short-term, and imperceptible.

An assessment of impacts on air quality as a result of construction traffic has been scoped out of Chapter 11 (Air Quality).

Noise

The 2006 WEDGs state that *"in general, noise is unlikely to be a significant problem where the distance from the nearest turbine to any noise sensitive property is more than 500 metres"*. The draft 2019 WEDGs also states "*a mandatory minimum setback of 500 metres…This setback requirement is also subject to the need to comply with the strict noise limits laid down in Chapter 5 of these Guidelines* [the draft 2019 WEDGs)*, the enforcement of which will serve to ensure that wind energy projects operate in accordance with the highest international and World Health Organisation advice in order to protect the amenity of the communities in which they are situated*". Due to the setback distance of the proposed works from local property receptors (see Section 6.4.1.3) and the identified noise sensitive locations (see Chapter 12 (Noise and Vibration)), significant noise and vibration effects are unlikely.

Chapter 12 (Noise and Vibration) notes that effects are described in terms of the potential worst-case associated effects at the nearest sensitive locations, and further notes that the effects described are variable, and that the assessment of noise and vibration considers the locations of the greatest potential impact. It is therefore concluded that significant adverse effects on human health due to noise or vibration from environmental exposure as a result of the construction phase of the proposed development is unlikely. The likely predicted noise and vibration effects are below the limits and/or thresholds identified within Chapter 12 (Noise and Vibration). With respect to the EPA's criteria for description of effects, any likely worst-case effects in terms of noise and vibration associated with the proposed construction phase impacting human health would be negative, temporary to short-term, and slight to not significant. Effects described in terms of noise and vibration should be considered in terms that the effect is variable, and that the noise and vibration assessment consider the locations with the potential for greatest effect (i.e., the potential worst-case associated effects at the NSLs).

For further details and assessment of noise and vibration impacts associated with the proposed development refer to Chapter 12 (Noise and Vibration) of the EIAR.

Water Quality

During the construction phase of the proposed wind farm, risk of accidental pollution impacting local water quality could potentially arise from the following sources:

- Accidental release of oils, fuels, and other contaminants from construction phase vehicles (on-site and off-site);
- Spillage or leakage of chemicals and fuel / hydrocarbons stored on site;
- Run-off from materials and waste temporarily stored onsite;
- Spillage or leakage of oils and fuels stored and used in the refuelling, operation, and maintenance of construction plant, machinery and vehicles; and
- Spillages arising during the delivery and use of concrete and cement for turbine foundations, roads and hardstanding areas.

The key receptors in terms of water quality impacts and human health are the construction personnel due to the potential for direct contact with polluting substances and water during the construction activities. It is anticipated that any incidents related to accidental release,

mobilisation, spillage or leakage of substances would likely be localised, contained, and managed in line with mitigation set out within Chapter 10 (Hydrology and Hydrogeology) and the CEMP.

The potential for significant effects as a result of construction with respect to impacts on public/private water supply and human health are considered low.

Significant adverse effects on human health due to water quality effects associated with the proposed wind farm site is considered unlikely. Any likely effects related to water quality impacting on human health, from a polluting incident, would be negative, indirect or direct depending on the incident, temporary to short-term, and not significant to slight.

Chapter 10 (Hydrology and Hydrogeology) outlines the baseline environment in terms of surface water and groundwater features and quality and contains a detailed assessment of water quality impacts associated with the proposed development.

Land and Soils

No contaminated soils were encountered during SI at the proposed wind farm site. SI works and laboratory results associated with the proposed wind farm site are discussed within Chapter 9 (Land, Soils and Geology) and associated appendices.

Human health-related impacts associated with soil contamination during the construction activities are primarily associated with dust from material extraction and transport of soils and excavated rock, which is discussed under Air Quality above and in Chapter 11 (Air Quality), and risks of spills or leaks from construction vehicles, plant, and machinery, which could result in localised contamination of soils. Other negative effects include the typical risks to construction personnel associated with earthworks and large excavations such as falling from heights, engulfment, drowning. The key receptors in terms of soil impacts on human health are the construction personnel due to the potential for direct contact, ingestion or inhalation with polluting substances and soil (which may potentially contain hydrocarbon concentrations from site activities (potential minor leaks and spills of fuels, oils, and paint)) during the construction activities, e.g., excavation / earthworks activities. It is anticipated that any incidents related to accidental release, mobilisation, spillage or leakage of substances would likely be localised, contained, and managed in line with mitigation set out within Chapter 9 (Land, Soils and Geology) and the CEMP.

The potential for significant effects as a result of construction with respect to impacts on public/private water supply and human health are considered low.

Taking account of the baseline environmental setting and the proposed mitigation measures during the Construction Phase, human health risks associated with exposure to contaminants (i.e., via direct contact, ingestion, or inhalation), as well as typical risks described (e.g., falling from heights), resulting from the proposed development are not anticipated, and significant adverse effects on human health due to soil quality effects associated with the proposed development are considered unlikely. Any likely effects related to soil quality , excavation and earthworks impacting on human health, such as from a polluting incident, would be localised, indirect or direct depending on the nature of the incident, negative, temporary, and not significant..

Chapter 9 (Land, Soils and Geology) outlines the baseline environment in terms of soil and geological features and quality and contains a detailed assessment of impacts associated with the proposed development on lands, soils and geological receptors.

Peat Instability

There is potential for a negative effect to human health from peat instability in excavations, the risk of which is discussed in the Peat Stability Risk Assessment (PSRA) report (Appendix 9-2) and summarised in Section 9.3.21 of Chapter 9 (Land, Soils and Geology). The risk is restricted to within and in the immediate vicinity of the excavations only considering the general site topography. A Peat and Spoil Management Plan (PSMP) has been developed and is included in Appendix 9-2. The risk of long-term instability is considered low following mitigation procedures and completion of the construction phase. Slope stability will be addressed in greater detail with site specific measures identified during the detailed design phase.

Traffic

Traffic movements associated with the construction phase of the proposed development, such as the TDR and construction haul routes, have the potential to cause impact in local road users.

Chapter 15 (Traffic and Transport) provides a detailed assessment of impacts associated with construction phase traffic. None of the junctions impacted were above the 10% threshold set out in Traffic and Transport Assessment Guidelines (TII, 2022). Construction haul route traffic assessment found that average and peak traffic volumes will not be significant and temporary to short-term in duration. Effects associated with traffic volumes is variable and is assessed in terms of peak and average activities. Peak volumes are considered the worst-case scenario the proposed development is envisaged to generate with regards to traffic. Outside of the peak scenario, traffic associated with the development will be below this worst-case impact. During the construction programme, there will be days when construction generated traffic will be lower than the average traffic. The advanced works to accommodate the haulage of the AILs would have a slight effect due to the low volume of permanent works required on the routes.

Furthermore, the appointed Contractor and Haulage Company will be responsible for the temporary traffic management, agreements, and licensing with the Local Authorities and An Garda Síochána during the construction phase.

Negative effect in terms of traffic is due to traffic delays due to the works and the associated traffic management. However, significant adverse effects on human health related to construction phase traffic are considered unlikely. Any likely effects associated with construction phase traffic on sensitive receptors would be negative, slight, and temporary.

6.5.3.2 Operational Phase

Environmental Factors:

Air Quality

The existing environment at the site of the proposed development currently has a high standard in relation to air quality and current levels of key pollutants are significantly lower than their respective limit values (as per latest EPA Air Quality Monitoring Network and annual air quality reporting data). Refer to Chapter 11 (Air Quality) for further details. The emissions to air during the operational phase of the proposed wind farm will mainly result from vehicle use. The proposed wind farm site and amenity facilities at the site (car parks, amenity access track) will have a presence of vehicles during the operational phase, from maintenance personnel carrying out on-site maintenance works, as well as the general public accessing and utilising the proposed amenity car parks. The operational phase of the development will require occasional inspections and maintenance work which will require operation of maintenance vehicles at the proposed

wind farm. Any vehicular activity has the potential to create nuisance dust and exhaust emissions locally, however, vehicle movements associated with the operational phase are anticipated to be intermittent and consistent with typical vehicle use and frequency within the local environment. Furthermore, by definition of the TII criteria referenced in Chapter 11 (Air Quality) and Chapter 15 (Traffic and Transport), there are no road links deemed as affected as a result of the proposed development. Therefore, no further assessment using the 2022 TII guidance was required for the operational phase of the proposed development as there is no potential for significant effects to air quality as a result of vehicle emissions. Additionally, the generation of electricity to the national grid will lead to a saving in terms of NOx emissions which may have been emitted from fossil fuels to produce electricity. Replacing fossil fuel powered generation stations with clean renewable energy from the proposed development, will have a positive overall effect on air quality nationwide, particularly in the regions where fossil fuel generation stations are currently operational, as compared to a Do-Nothing scenario (i.e., where the wind farm is not built).

Therefore, significant adverse effects related to air and dust emissions impacting human health during the operation phase are considered unlikely. Any likely effects associated with air quality are anticipated to be slight, positive, and long-term. Chapter 11 (Air Quality) provides a more detail in relation to operational phase air quality and associated emissions.

Noise

The findings of the noise and vibration assessment confirmed that the predicted operational noise levels associated with the proposed wind farm will be within best practice noise criteria recommended in the Irish guidance '*Wind Energy Development Guidelines for Planning Authorities*' (2006), therefore it is not considered that a significant effect is associated with the proposed development. Chapter 12 (Noise and Vibration) states that while noise levels at low wind speeds will increase due to the development and specifically the operation of the turbines, the predicted levels will remain low, albeit new sources of noise will be introduced to the soundscape.

In terms of the proposed 110kV substation and battery storage (fixed plant), these will typically be operational on a continuous basis. Chapter 12 (Noise and Vibration) has assessed the noise impact to identify the potential effect associated with the operation of the substation and battery storage at the nearest NSL. The level of operational noise associated with these infrastructures are predicted to be low, and it is concluded that there will be no significant noise emissions from the operation of the substation and battery storage at any NSL. Furthermore, the predicted noise levels for each are within the criterion for fixed machinal plant outlined in (see Section 12.3.2.6 of Chapter 12 (Noise and Vibration)) and are unlikely to result in any significant adverse impacts at nearby NSLs.

In general, the distances between the operational wind farm infrastructure associated with the proposed development and the nearest NSLs are such that no significant noise and vibration impacts at NSLs are predicted. Vibration effects are not predicted during the operational phase. Furthermore, due to the distance of the proposed infrastructure from sensitive locations, vibration effects are not likely at any NSL.

It is therefore concluded that adverse effects on human health due to noise and vibration from environmental exposure as a result of the operational phase of the proposed wind farm are unlikely. With respect to the EPA's criteria for description of effects, any likely worst-case effects in terms of noise associated with the operational phase of the proposed wind farm would be negative, not significant and long-term. Effects described in terms of noise and vibration

should be considered in terms that the effect is variable, and that the noise and vibration assessment consider the locations with the potential for greatest effect (i.e., the potential worst-case associated effects at the NSLs).

The detailed assessment of noise and vibration associated with the proposed development is presented in Chapter 12 (Noise and Vibration).

Water

During the operational phase of the proposed development, accidental pollution impacting local water quality as a result of operational and maintenance activity is not anticipated. However, risk of accidental pollution is still associated with the following:

- Spillage or leakage of machinery on site through routine site maintenance activity during the operational phase;
- Spillages arising relating to the use of substation, BESS and hardstanding areas; and
- Risk of pollution from site traffic through the accidental release of oils, fuels, and other contaminants from vehicles.

The key receptors in terms of water quality effects and human health are maintenance personnel due to the potential for direct contact with polluting substances and water during the maintenance activities. It is anticipated that any incidents related to accidental release, mobilisation, spillage or leakage of substances would likely be localised, contained, and managed in line with mitigation measures set out within Chapter 10 (Hydrology and Hydrogeology).

The potential for effects as a result of the operation phase with respect to impacts on public/private water supply and human health are considered low.

Overall, significant adverse effects on water quality associated with the operational phase of the proposed development is considered unlikely. Therefore, any likely effects related to water quality impacting on human health, resulting from a polluting incident, are considered indirect or direct depending on the incident, negative, temporary to short-term, and not significant.

Chapter 10 (Hydrology and Hydrogeology) outlines the baseline environment in terms of surface water and groundwater features and quality and contains a detailed assessment of water quality impacts associated with the proposed development.

Land and Soils

No contaminated soils were encountered during SI at the proposed wind farm site. SI works and laboratory results associated with the proposed wind farm site are discussed within Chapter 9 (Land, Soils and Geology) and associated appendices. Human health related impacts associated with soil contamination during the operational activities are primarily associated with the risks of spills or leaks from maintenance vehicles and machinery, which could result in localised contamination of soils.

The key receptors in terms of soil impacts on human health are the maintenance personnel due to the potential for direct contact with polluting substances and soil during maintenance activities. It is anticipated that any incidents related to accidental release, mobilisation, spillage or leakage of substances would likely be localised, contained, and managed in line with mitigation set out within Chapter 9 (Land, Soils and Geology).

Overall, human health risks associated with exposure to polluting substances and soil during maintenance activities are not anticipated, and significant adverse effects on human health due

to soil quality effects associated with the proposed development are unlikely. Any likely effects on human health resulting from a polluting incident impacting soil quality, would be localised, direct or indirect depending on the nature of the incident, negative, short-term, and not significant.

Chapter 9 (Land, Soils and Geology) outlines the baseline environment in terms of soil and geological features and quality and contains a detailed assessment of impacts associated with the proposed development on lands, soils and geological receptors.

Traffic

It is anticipated that the operational phase will generate very little traffic movements (e.g., six movements per day, consisting of three arriving and three departing). The Wind Farm operational traffic volumes were assessed against the TII TTA Guidelines thresholds and were found to be sub-threshold (refer to Section 15.4, Chapter 15 (Traffic and Transport). Therefore, significant effects on human health related to operational phase traffic are considered unlikely. Furthermore, the maintenance of the visibility splays undertaken during the operational phase will have a positive effect on the safety aspect of the access to the wind farm site. The internal access tracks may be in use for additional purposes to the operation of the wind farm (e.g., for amenity access). The potential effects associated with the operational phase are therefore considered to be neutral, imperceptible and long-term.

Wind Turbine Health Effects:

Wind Turbine Noise and Infrasound

The referenced publications and studies outlined in Section 6.4 above indicate that there appears to be little scientific evidence of effects of *"Wind Turbine Syndrome"*, and that wind farms are not a significant source of noise and infrasound, and that traffic and everyday human activity are likely to be more relevant.

In general, the distances between the proposed wind farm infrastructure and the nearest property receptors are such that significant noise and vibration effects at these receptors are unlikely.

Furthermore, as mentioned above, based on the outcomes of the wind turbine noise assessment undertaken in Chapter 12 (Noise and Vibration), the predicted noise levels associated with operational wind turbines at the proposed wind farm will be within best practice noise criteria. Chapter 12 (Noise and Vibration) states that low frequency noise and infrasound associated with wind turbines is expected to be below perceptibility thresholds and are not likely to result in any significant effects at NSLs. There are no criteria proposed to assess low frequency noise or infrasound as part of the EIAR.

Therefore, it is predicted that wind turbine noise associated with the development will be not significant. It is therefore concluded that human health effects cited as an outcome of wind turbine noise and infrasound (such as nausea, disturbance of sleep, and tinnitus (ringing in the ear)) generated during the operational phase of the proposed wind farm is unlikely. Any likely effects in terms of wind turbine noise associated with the operational phase works would be negative, slight and long-term.

Effects described in terms of noise should be considered in terms that the effect is variable, and that the assessment considers the locations with the potential for greatest impact (i.e., the potential worst-case associated effects at the NSLs).

Electromagnetic Interference

The proposed underground electrical cables will adhere to the international guidelines for ELF-EMF which are described by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). This is a formal advisory agency to the WHO. The proposed wind farm will also adhere to the EU guidelines for human exposure to EMF. As the ICNIRP guidelines will not be exceeded, even directly above the underground cables, there will be no associated operational effects on Human Health.

The on-site substation for the proposed development will be located as indicated in the Planning Drawings (Appendix 1-2) of this EIAR. The distance from the nearest sensitive receptor to this on-site substation is approximately 350 m east. The construction and electrical components of the substations and associated cabling will be to ESB and EirGrid specifications within the parameters assessed. No health agency has concluded that exposure to EMF from power lines and other electrical sources is a cause of any long-term adverse effects on human, plant or animal health.

Based on the above, this assessment concludes that significant effects on human health as a result of electromagnetic radiation are unlikely. Therefore, this assessment concludes that any effect in terms electromagnetic radiation / EMF on human health will likely be neutral, not significant and long-term.

Shadow Flicker

Wind turbines can cast long shadows when the sun is low in the sky. 'Shadow flicker' is an effect that occurs when the rotating blades of a wind turbine cast a moving shadow over a building. The effect is experienced indoors where a moving shadow passes over a window in a nearby property and results in a rapid change or flicker in the incoming sunlight. Rotating wind turbine blades can cause brightness levels to vary periodically at locations where they obstruct the sun's rays. This can result in a nuisance when the shadow is cast over the windows of a building, primarily concerned with residential properties. This intermittent shadow flicker can be a cause of annoyance at residences near wind turbines.

Shadow flicker is largely dictated by the relative position of the turbine(s) and the window, in combination with weather conditions (i.e., presence of direct sunlight, wind speed and wind direction) and the time of day and year (i.e., affecting the position of the sun). Shadow flicker will occur if the turbine rotors are located between an observer within a dwelling and the sun. The frequency of the flicker effect is related to the frequency of the rotating turbine blades. It can also be dependent on the number of individual turbine rotors that are casting shadows on a window.

Chapter 17 (Material Assets: Shadow Flicker) discusses the shadow flicker phenomenon in detail and sets out the criteria which determine the occurrence of shadow flicker, which is summarised as:

- The presence of screening;
- The location and orientation of the property;
- The distance of the property from turbines;
- The presence of direct sunlight;
- The time of day and year;
- Wind speed;
- Direction of wind; and
- The presence of people.

The shadow flicker model undertaken provides a detailed report and illustration of the potential shadow effects on the identified shadow flicker receptors.

Modelling of predicted shadow flicker occurrence is presented in Chapter 17 (Material Assets: Shadow Flicker) and provides a detailed report and illustration of the potential shadow effects on the identified shadow flicker receptors and is assessed in consideration with the current 2006 WEDGs and the 2019 Draft Revised WEDGs. The full report is provided in Appendix 17-1. For the operational phase of the proposed wind farm, the results of the shadow flicker assessment indicate that potential impact from shadow flicker in the worst-case scenario and before mitigation measures are applied at a defined number of receptors (see set out in Table 17-1, Chapter 17) will be likely, significant and long-term and with any individual occurrences of shadow flicker being momentary to brief in duration.

Bord na Móna is committed to minimising any adverse effects from the proposed wind farm on the local community. The implementation of mitigation measures, to screen shadow flicker effects from sensitive receptors and/or implement wind turbine control measures in accordance with a defined Turbine Shutdown Scheme, will ensure that any residual shadow flicker effects from the wind farm will be limited to less than 30 minutes per day (2006 WEDGs) at all shadow flicker receptors. This will be ensured through the mitigation measures set out in Section 17.5, Chapter 17 (Material Assets: Shadow Flicker).

Based on the above, this assessment concludes that significant adverse effects on human health as a result of shadow flicker are unlikely. Any likely effect in terms shadow flicker on human health would be negative, slight to moderate, and long-term.

Health Benefits

Aside from the potential socio-economic benefits previously discussed (see Section 6.5.2), there are significant environmental benefits to the proposed development. The current and historical practice of fossil fuel combustion with the associated release of a range of pollutants including particulate matter, oxides of nitrogen, sulphur dioxide, carbon dioxide and many others is well documented. The release of these pollutants from the power generation sector is also a major contributor to global warming and the resulting changing effects on our climate.

The phasing out of coal, gas and peat burning power stations in Ireland is a key step in achieving Ireland's 2030 decarbonisation ambition as set out in the CAP24 and the placement of fossil fuels in electricity generation by clean renewable wind energy will have significant benefits for air quality and slowing down global warming.

The proposed development will play a significant role in contributing to the country's national renewable electricity production and carbon emissions reduction targets by 2030, while also supporting a growing economy and population. During operation, the proposed wind farm will eliminate the need to generate the equivalent amount of electricity from fossil fuels, and it will therefore help to reduce total national greenhouse gas emissions. As a result, it will reduce our dependence on external energy sources, help improve our energy security of supply and make a major contribution to Ireland's CAP24, which has set a target of 9 GW of onshore wind capacity by 2030.

The contribution of the proposed development to a decrease in reliance on fossil fuel combustion will have a moderate to significant positive long-term effect on the health and well-being of the general population.

6.5.3.3 Decommissioning Phase

As stated previously the wind turbines proposed as part of the proposed development are expected to have a lifespan of 30-years. Following the end of their lifespan, the wind turbines may be replaced with a new set of machines, subject to planning permission being obtained, or the site may be decommissioned fully, with the exception of the electricity substation.

Upon decommissioning of the proposed wind farm, the wind turbines would be disassembled in reverse order to how they were erected. All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and would be covered with earth and allowed to revegetate or reseed as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in potentially significant environment nuisances such as noise, dust and/or vibration. The majority of the site roadways will be in use for additional purposes to the operation of the wind farm (such as a mature amenity and recreational use) by the time the decommissioning of the project is to be considered, and therefore it will be more appropriate to leave the site roads in-situ for future use.

The on-site substation will not be removed at the end of the useful life of the wind farm project as it will form part of the national electricity network and will be managed by EirGrid/ESB. Therefore, the substation will be retained as a permanent structure and will not be decommissioned.

The activities required to facilitate wind turbine decommissioning and removal from site will be similar to those outlined for the construction phase, albeit to a lesser extent and duration than during the construction phase. Therefore, for the purposes of the assessment, it is anticipated that the impacts on population and human health associated with decommissioning phase will be no greater than those identified for the construction phase.

6.6 MITIGATION MEASURES

6.6.1 Construction Phase

No specific mitigation in relation to the construction phase and the population and human health assessment is proposed other than what has already been set out within the CEMP and other chapters of this EIAR.

Where required, mitigation measures for other environmental aspects associated with the proposed development which may interact with the human environment are discussed in the relevant chapters of this EIAR:

- Chapter 9 Land, Soils and Geology;
- Chapter 10 Hydrology and Hydrogeology;
- Chapter 11 Air Quality;
- Chapter 12 Noise and Vibration;
- Chapter 13 LVIA;
- Chapter 15 Traffic and Transport;
- Chapter 16 Material Assets: Aviation and Telecommunications;
- Chapter 17 Shadow Flicker;
- Chapter 18 Climate; and
- Chapter 19 Major Accidents and Disasters.

Construction Health and Safety

All activities carried out by the appointed Contractor on the proposed development will be in accordance with the requirements of the *Safety, Health and Welfare at Work Act 2005* as amended and Regulations made under this Act.

Health and safety plans will be developed before any construction commences. A Health and Safety Plan covering all aspects of the construction process will address the Health and Safety requirements in detail. This will be prepared on a preliminary basis at the procurement stage and developed further at construction stage. All hazards will be identified, and risks assessed.

The proposed TDR to allow for the transport of the turbines to the wind farm site will involve some minor works as discussed in Chapter 3 of the EIAR (Description of the Proposed Development). These works will be carried out to the relevant construction and road safety guidelines. When the turbine components are being transported, they will have a Garda escort and will be carried out at night when there is less traffic on the road. The proposed turbine delivery works will allow for the proposed turbine dimensions.

Once appropriate health and safety guidelines are adhered to and the CEMP is complied with throughout the construction phase, the potential for health and safety related issues are greatly minimised.

6.6.2 Operation Phase

No specific mitigation in relation to the operational phase and the population and human health assessment is proposed other than what has already been set out within the CEMP and the chapters of this EIAR. Where required, specific mitigation measures for other environmental factors discussed previously which may interact with the human environment health are discussed in their respective chapters of this EIAR. A cross reference of environmental factors is also presented in Chapter 20 (Interaction of the Foregoing):

- Chapter 9 Land, Soils and Geology;
- Chapter 10 Hydrology and Hydrogeology;
- Chapter 11 Air Quality;
- Chapter 12 Noise and Vibration;
- Chapter 13 LVIA;
- Chapter 15 Traffic and Transport;
- Chapter 16 Material Assets: Aviation and Telecommunications;
- Chapter 17 Material Assets: Shadow Flicker;
- Chapter 18 Climate; and
- Chapter 19 Major Accidents and Disasters.

Furthermore, benefits associated with the proposed development are outlined in the following paragraphs.

The proposed development has the potential to generate several community and economic gains. These include creation of local jobs, an increase in expenditure in the local area through spend on food/fuel and accommodation (by contractors, workers, tourists, amenity users), and additional employment opportunities in the region (through supply of materials and services).

Community Benefit Fund

In addition to employment during the construction and operational phases of the proposed development and annual rates that will be paid to the local authority by the developer, a range of other benefits associated with the proposed development will be provided to the local community through the Community Benefit Fund. The Community Benefit Fund will be developed during the first year of operation and will include the following:

- The Fund will provide financial assistance to local communities and not-for-profit organisations within 10 km of the proposed development will be considered first and given priority - subject to the project meeting the overall terms and conditions of the Fund. A key criterion is that the projects and initiatives will benefit the communities surrounding the wind farm. A Fund Committee will be established and will consist of a number of volunteer community representatives and the project Developer. Generally speaking, the Fund Committee should aim to represent the widest cross-section of the community possible. The Fund will also provide an Educational Scholarship Scheme to support a number of local students in accessing further education. It will provide a monetary grant to a number of successful applicants, for each year of study, up to a maximum of 4 years, for a number of students (including apprenticeships) living in the vicinity the proposed development. The Scholarship may be used towards course fees, accommodation, tools, transport costs etc.;
- The Fund will also implement a Near Neighbour Scheme which will offer principal primary residents within a prescribed distance of a wind turbine an annual contribution towards their electricity usage. In addition to the electricity contribution payment, this scheme will also offer participants a contribution towards the completion of energy measures on the property and/or education support. This is in line with existing near neighbour schemes that are active at other Bord na Móna operational wind farms.

The value of the Community Benefit Fund will be directly proportional to the energy produced at the site (per loss adjusted metered generation), which based on current Funds, will be in the region of €15 million over the lifetime of the project.

As an example, Bord na Móna presently manages five Community Benefit Funds at its wind farms in Mountlucas, Cloncreen, Sliabh Bawn, Oweninny Phase 2 and Bruckana. The first of these Funds were established in 2014 with input and cooperation of the communities surrounding the wind farms. These Community Gain Schemes for Mountlucas and Bruckana Wind Farms were set up on the basis of community involvement.

The nature and structure of a proposed Community Benefit Fund for Derryadd wind farm is not known at this time, but is predicted to be similar in type to existing Bord na Móna Community Benefit Funds

A detailed description of the Community Benefit proposal is outlined in the 'Community Report for the Derryadd Windfarm' in Appendix 1-6 of this EIAR.

Other Community Benefits will include:

- Payment of a development contribution and annual rates to Longford County Council will be used to provide benefits to the local community refurbishment and upgrading of roads, carparks, sewers, wastewater facilities, drains or watermains, community facilities, open spaces, landscaping etc.;

- The proposal to open up the site for public use as a recreational amenity for walking and cycling routes, which will connect local communities (villages and towns) and greenways (i.e. the Royal Canal Greenway, etc);
- It is planned that engagement will continue with the local community to further identify ideas for potential amenity plans for the site of the proposed wind farm;
- It is planned that approximately 18 km of the internal site roads will provide permanent amenity access which will be used by the public for walking, running and cycling during the operational phase;
- Approximately 7.5 km of additional dedicated amenity access tracks will be developed to provide local access to wind farm amenity areas, and create connectivity between the proposed wind farm site roads, local roads, the royal canal greenway (to the east), the Corlea visitor centre and amenity areas (to the south), and the Midlands Trail Networks Project (to the north); and
- 3 No. permanent amenity carparks, one of which are situated in Derryaroge Bog and two carparks in Derryadd Bog.

Fáilte Ireland has been consulted to identify any potential concerns for adverse tourism impacts. Fáilte Ireland has provided an EIA guidance document for considering the potential effects of projects on tourism and this guidance document has been considered in the completion of this assessment. An Amenity Plan for provision of amenity facilities at the site has been developed and is included in Appendix 3-1 of this EIAR.

As mentioned, similar to existing Bord na Móna wind farms, it is envisioned that a Community Benefit Fund and will be developed during the first year of operation. The Community Benefit Fund will provide an opportunity for the local community to invest in local facilities and infrastructure and support local clubs/societies and near neighbours.

6.6.3 Decommissioning Phase

The activities required to facilitate wind turbine decommissioning and removal from site will be similar to those outlined for the construction phase, albeit to a lesser extent and duration than during the construction stage. Therefore, it is anticipated that the effects on population and human health associated with the decommissioning phase will be no greater than those identified for the construction phase. No specific mitigation is proposed for the decommissioning phase in respect of effects on population and human health.

6.7 RESIDUAL EFFECTS

6.7.1 Construction Phase - Population and Human Health

The proposed development will have a slight positive residual effect on the local population through an influx of construction workers in the short-term. This influx is likely to cause a slight increase in local population over a short period of time resulting in a boost to the local economy through use of accommodation and spend in local shops and restaurants. Local suppliers will also receive additional business from the proposed development. This will have a moderate short term positive effect on the local economic activity.

It is considered likely that there will be a short-term, not significant, negative residual effect on tourism and recreation amenity during the construction phase following the communication of guidance and information to the public on alternative available transport routes.

A short-term negative and not significant residual effect is likely as a result of construction phase traffic (and associated noise and dust) on residential amenity and sensitive receptors.

Short-term, slight residual effects are predicted on residential amenity and property values and neutral imperceptible effects on the local population and land use.

6.7.2 Operational Phase – Population and Human Health

The proposed development will provide clean energy from a renewable resource and help to achieve targets in national energy and climate change policies. This is a direct positive long-term, slight to moderate residual effect for the country which will benefit the local population and communities.

In terms of population, the residual effects are expected to be positive particularly in terms of local economy, employment, tourism and amenity. Following the implementation of the mitigation measures prescribed in the relevant chapters of the EIAR, the proposed development is unlikely to have significant negative residual effects on the local or wider population.

The establishment of a Community Benefit Fund will be a long-term positive contribution to the local community in general. Furthermore, the proposed amenity track and amenity car parks will provide the community with a facility for outdoor activity and recreation. These aspects of the proposed development will have a positive long-term effect on the individuals living in the local community, including contributing to a positive effect on individuals physical and psychological health through the development of community led projects and maximising the level of local involvement in terms of influencing how the funds are spent, as well as facilitating outdoor activity and recreation.

Based on the literature reviewed, there is currently no reliable evidence to link wind turbines to adverse health impacts. Every community will have vulnerable individuals; however, the health status of the community can only be established to certain level (i.e., small area statistics). Individual health status or potential vulnerability of individual receptors cannot be known or assessed. Emission limits and management, such as for noise or dust, allow for the protection of the most vulnerable, and so long as the limits are met, vulnerable individuals and the wider community are protected. Emissions arising from the operational phase of the proposed development (i.e., air, dust, and noise) are predicted to be fall below the limits and/or thresholds set, therefore it is anticipated that significant adverse effects on health, even amongst the vulnerable, are unlikely. Following the implementation of the mitigation measures set out in the relevant chapters of the EIAR, the proposed development is unlikely to have significant negative residual effects on the human health.

Overall, it is considered likely that there will be a long-term, slight, positive residual effect on the local population and human health as a result of the proposed development.

6.7.3 Decommissioning Phase – Population and Human Health

As stated previously, the wind turbines proposed as part of the proposed development are expected to have a lifespan of 30-years. Following the end of their lifespan, the wind turbines may be replaced with a new set of machines, subject to planning permission being obtained, or the infrastructure on site may be decommissioned fully, with the exception of the electricity substation and the internal roads

The activities required to facilitate wind turbine decommissioning and removal from site will be similar to those outlined for the construction phase, albeit to a lesser extent and duration than during the construction phase.

It is anticipated that residual effects on population and human health associated with decommissioning works will be no greater than those identified for the construction phase.

6.8 CUMULATIVE EFFECTS

In the assessment of cumulative effects, any other existing, permitted, or proposed developments in the surrounding area have been considered where they have the potential to generate in-combination or cumulative effects with the proposed development. The potential for cumulative effects on the local population and human health, in particular noise, shadow flicker, traffic and visual impacts are discussed in the relevant chapters.

There is limited / no potential for an operational phase cumulative effect on noise, shadow flicker and visual impacts associated with wind farms within the study area as the nearest wind farm identified is the Sliabh Bawn Wind Farm (Capacity 64MW, Commission year 2016) located approximately 8 km northwest from the proposed wind farm site.

Population

Considering other planned renewable energy and electrical upgrade projects in the area, the proposed development would be anticipated to have both a short and long term positive cumulative effect under the topic of population.

Land Use

Considering the other projects in the area, the proposed development would be anticipated to have no cumulative effect under the topic of land use.

Sensitive Receptors/Residential Amenity

It is not anticipated that there will be significant cumulative effects on residential amenity due to the distance and type of projects planned in the local area.

Property Value

It is not anticipated that there will be significant cumulative effects for property values due to the nature of the site and the distance and type of projects planned in the local area.

Employment/Economy

Considering the other projects in the area, which would all individually contribute to the local economy, the proposed development would be anticipated to have both a short and long term positive cumulative effect under the topic of employment/economy.

Tourism

All wind energy developments must now include a community benefit fund, and although the details of how this fund is spent would have to be decided by a committee of representatives from industry and the local community.

The Midlands Trail Network is a cycle and walking network that will connect with the proposed amenity track as part of the proposed development, to the northeast of Derryaroge bog.

There is a potential positive cumulative effect for tourism in the event of increased investment in the area from the community benefit funds and the amenity tracks link with the Midlands Trail Network.

Human Health

There is the potential for both positive and negative cumulative effects under the topic of human health, with the negative being in terms of traffic (road safety and dust) and additional work machinery being active in the area if the construction phase of the proposed development and other planned renewable energy/grid upgrade projects coincide. The positive effects relate to long term improvements in air quality from decarbonising the national grid and contributions to climate targets.

Other developments proposed in the study area consist of large residential units and smaller projects, comprising mostly residential one-off houses and agricultural sheds/activity. All of these developments/activities are not anticipated to have a significant cumulative effect on the above population and human health topics due to their type, scale and/or location with respect to the proposed development.

Overall, it is considered that there are no significant cumulative effects from the proposed development on population and human health when considered alongside the other projects in the area.

In addition, there have been several applications submitted over the last number of years in Longford and the surrounding counties for wind farm development. These have been outlined in Table 5-2 of Chapter 5 (Policy, Planning & Development Context) and indicate those applications located in Longford that are connected to the grid and the scale of generation.

Overall, it is considered that there are no significant cumulative effects from the proposed development on population, human health, socioeconomics, employment, tourism and land-use.

6.9 SUMMARY

There is currently no credible evidence to link wind turbines to adverse health impacts. Emission limits, such as for noise or dust, are set to protect the most vulnerable in a community rather than the robust. Compliance with the limits set out in best practice guidelines (described in the relevant chapters on noise and vibration, water, air quality, shadow flicker) will ensure that individuals and communities are protected.

Design stage considerations, such as turbine locations, and the mitigation measures outlined in the relevant technical chapters will be put in place to ensure that the emissions and effects from the proposed development are in compliance with the standards to ensure that there will be no significant adverse effects on health, even amongst the most vulnerable.

Following consideration of the residual effects as set out in Section 6.7, it is considered that the proposed development will not result in a significant negative effect on population and human health in the local and regional area.

7.0 REFERENCES

Basner M, McGuire S. WHO Environmental Noise Guidelines for the European Region: A Systematic Review on Environmental Noise and Effects on Sleep. *International Journal of Environmental Research and Public Health*. 2018; 15(3):519.

BiGGAR (2017). *Wind Farms and Tourism Trends in Scotland.* Available at: https://biggareconomics.co.uk/wp-content/uploads/2020/01/Wind-farms-and-tourism-trends-in-Scotland.pdf

BiGGAR (2021). *Wind Farms & Tourism Trends in Scotland: Evidence from 44 Wind Farms.* Available at: https://biggareconomics.co.uk/wp-content/uploads/2021/11/BiGGAR-Economics-Wind-Farms-and-Tourism-2021.pdf

Central Statistics Office (CSO)(2023). Census of Population 2022: Published Reports. Available at: https://www.cso.ie/en/statistics/population/censusofpopulation2022/

Centre of Economics and Business Research (CEBR) (commissioned by RenewableUK) (2014). *The effect of wind farms on house prices* (March 2014).

Chapman S (2012). Wind turbine noise: Editorial ignored 17 reviews on wind turbines and health (Published 15 May 2012). BMJ 2012;344:e3366. doi: https://doi.org/10.1136/bmj.e3366

ClimateXChange (2016). *The impact of wind turbines on house prices in Scotland* (October 2016). Available at: https://www.climatexchange.org.uk/wp-content/uploads/2023/09/cxc_wind_farms_impact_on_house_prices_final_17_oct_2016.pdf

Colby, W.; Dobie, R.; Leventhall, G.; Lipscomb, D.; McCunney, R.; Seilo, M.; Søndergaard, B. (2009). *Wind Turbine Sound and Health Effects: An Expert Panel Review.* Report by American Wind Energy Association (AWEA).

CSO (2024a). Census data 2011 – 2022. Available at: https://www.cso.ie/en/census/

CSO (2023). Census of Population 2022 Profile 4 - Disability, Health and Carers. Available at: https://www.cso.ie/en/releasesandpublications/ep/p-cpp4/censusofpopulation2022profile4-disabilityhealthandcarers/disability/

CSO (2020). Irish Health Survey. Available at: https://www.cso.ie/en/statistics/health/irishhealthsurvey/

CSO (2022). Census of Agriculture 2020. Available at: https://www.cso.ie/en/releasesandpublications/ep/p-coa/censusofagriculture2020detailedresults/

CSO (2024b). Residential Property Price Index (RPPI). Available at: https://visual.cso.ie/?body=entity/rppi

CSO (2024c). Labour Force Survey (LFS). Available at: https://www.cso.ie/en/surveys/householdsurveys/lfs/

CSO (2024d). Live Register August 2024 (published September 2024). Available at: https://www.cso.ie/en/releasesandpublications/ep/p-lr/liveregisteraugust2024/

CSO (2020). Irish Health Survey 2019/20. Available at: https://www.cso.ie/en/releasesandpublications/ep/p-ihsmr/irishhealthsurvey2019-mainresults/introductionandkeyfindings/

Department of Health (Government of Ireland) (2024). Health in Ireland: Key Trends 2023 Surveys (February 2024). Available at: https://www.gov.ie/en/publication/73c9d-healthy-ireland-survey-2023/

Department of Health (Government of Ireland) (2022). Health in Ireland: Key Trends 2022 Surveys (February 2024). Available at: https://www.gov.ie/en/publication/fdc2a-health-in-ireland-key-trends-2022/

Department of Health (Government of Ireland) (2024). Healthy Ireland. Available at: https://www.gov.ie/en/campaigns/healthy-ireland/

Department of the Environment, Heritage and Local Government (2006). Wind Energy Development Guidelines. Available at: https://www.gov.ie/en/publication/f449e-wind-energy-development-guidelines-2006/

Department of the Housing, Planning and Local Government (2019). Draft Revised Wind Energy Development Guidelines December 2019. Available at: https://www.gov.ie/pdf/?file=https://assets.gov.ie/46097/6e68ea81b8084ac5b7f9343d04f0b0ef.pdf#page=null

Discover Ireland (2024a). Ireland's Hidden Heartlands. Available at: https://www.discoverireland.ie/irelands-hidden-heartlands

Discover Ireland (2024b). *10 great things to do on your visit to Longford*. Available at: https://www.discoverireland.ie/longford/things-to-do-longford

Eastern and Midlands Regional Assembly (2019). Regional Spatial and Economic Strategy (2019 -2031). Available at: https://www.emra.ie/rses/

Economic and Social Research Institute (ESRI) (FitzGerald, J., Denny, E., and O'Mahoney, A.) (2014). An Enterprising Wind: An Economic Analysis of the Job Creation Potential of the Wind Sector in Ireland, Dublin: Siemens & IWEA, https://www.esri.ie/publications/an-enterprising-wind-an-economic-analysis-of-the-job-creation-potential-of-the-wind

EEA (2022). Soil pollution and health. Available at: https://www.eea.europa.eu/publications/zero-pollution/health/soil-pollution

EirGrid (2024). Safety Standards (EMF). Available at: https://www.eirgrid.ie/emfs

EirGrid (2014). EMF & You: Information about Electric & Magnetic Fields and the electricity transmission systems in Ireland.

EirGrid (2019). The Electricity Grid and Your Health: Answering Your Questions.

Bräuner, E.V., Jørgensen, J.T., Duun-Henriksen, A.K., Backalarz, C., Laursen, J.E., Pedersen, T.H., Simonsen, M.K., Andersen, Z.J., 2019. Association Between Long-Term Exposure to Wind Turbine Noise and the Risk of Stroke: Data from the Danish Nurse Cohort. Journal of the American Heart Association, Vol 8, Number 14. https://doi.org/10.1161/JAHA.119.013157

Bräuner, E.V., Jørgensen, J.T., Duun-Henriksen, A.K., Backalarz, C., Laursen, J.E., Pedersen, T.H., Simonsen, M.K., Andersen, Z.J., 2018. Long-term wind turbine noise exposure and incidence of myocardial infarction in the Danish nurse cohort. Environment International, Volume 121, Part 1, 2018, Pages 794-802. https://doi.org/10.1016/j.envint.2018.10.011

Environmental Protection Agency (EPA), Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022).

EPA (2024a). EPA Maps. Available at: https://gis.epa.ie/EPAMaps/

EPA (2024b). Air Quality in Ireland 2023. Available at: https://www.epa.ie/publications/monitoring--assessment/air/air-quality-in-ireland-2023.php

EPA (2024c). Noise and your health – Environmental Noise. Available at: https://www.epa.ie/environment-and-you/noise/noise-and-your-health/

EPA (2024d). Air Quality Ireland Website. Available at: https://airquality.ie/

EPA (2024). Air Quality: What we monitor. Available at: https://airquality.ie/information/what-we-monitor

EPA (2011). Guidance Note for Noise Assessment of Wind Turbine Operations at EPA Licensed Sites (NG3).

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

European Commission (EC) (2017). Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report.

Eurostat (2024). NUTS - Nomenclature of territorial units for statistics. Available at: https://ec.europa.eu/eurostat/web/nuts/

Evans T, Cooper J, and Lenchine V (2013). South Australian Environment Protection Authority: Infrasound levels near windfarms and in other environments. Available at: https://www.epa.sa.gov.au/files/477912_infrasound.pdf

Failte Ireland (n.d.). Developing Tourism in Longford. Available at: https://www.failteireland.ie/getmedia/eeceb23a-e8a7-4e0b-8a72-7b10527c677e/Longford.aspx

Fáilte Ireland (2023). EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects.

Fáilte Ireland(n.d.). Ireland's Hidden Heartlands. Available at: https://www.failteireland.ie/IrelandsHiddenHeartlands.aspx

Failte Ireland (2023a). Key Tourism Facts 2022 (October 2023). Available at: https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/Publications/2022-key-tourism-facts.pdf?ext=.pdf

Failte Ireland (2023b). Irish Resident Travel by County 2022 (May 2023). Available at: https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/Publications/domestic-trips-and-revenue-by-county-2022.pdf?ext=.pdf

Failte Ireland (2024a). Irish Resident Travel by County 2023 (July 2024). Available at: https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/Publications/irish-resident-travel-by-county-2023.pdf?ext=.pdf

Failte Ireland (2024b). Tourism Barometer: Strategic Research and Insight (Summer 2024). Available at: https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/Publications/failte-ireland-tourism-barometer-summer-2024.pdf?ext=.pdf

Failte Ireland (2024c). Visitor Numbers to Attractions Dashboard. Available at: https://www.failteireland.ie/Research-Insights/Activities/visitor-numbers-to-attractions-dashboard.aspx

Failte Ireland (2018). *2017 Topline Tourism Performance by Region.* Available at: https://www.failteireland.ie/Research-Insights/Papers-Reports/Archive/2017-Topline-Tourism-Performance-by-Region-pdf,-1.aspx?feed=Failte-Ireland

Failte Ireland (2019). Fáilte Ireland invests in new state-of-the-art visitor attraction for Longford. Available at: https://www.failteireland.ie/Utility/News-Library/Failte-Ireland-invests-in-new-state-of-the-art-vis.aspx

Failte Ireland (2012). Visitor Attitudes on the Environment – Wind Farms. Available at: https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/4_Visitor_Insights/WindFarm-VAS-(FINAL)-(2).pdf?ext=.pdf

Failte Ireland (2007). Visitor Attitudes on the Environment – Wind Farms. Available at: https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/4_Visitor_Insights/Visitor-Attitudes-on-the-Environment.pdf?ext=.pdf

Gibbons S (2014). Gone with the wind(published by London School of Economics in CentrePiece Autumn 2014). Available at: https://cep.lse.ac.uk/pubs/download/cp433.pdf

Gillespie T, McHale P (2023) Wind Turbines and House Prices Along the West of Ireland: A Hedonic Pricing Approach, Centre for Economic Research on Inclusivity and Sustainability (CERIS) Working Paper Series, 2023/01. Available at: https://www.universityofgalway.ie/media/researchsites/ceris/files/WP-2023-01.pdf

Government of Ireland (2024). Healthy Ireland Survey 2023. Available at: https://www.gov.ie/en/publication/73c9d-healthy-ireland-survey-2023/

Hanning, C. D., & Evans, A. (2012). Wind turbine noise. British Medical Journal, 344(7853), 1-2. Article e1527.

Heritage Ireland OPW (2024). *Corlea Iron Age Roadway and Visitor Centre - A pathway into the past* . Available at: https://heritageireland.ie/places-to-visit/corlea-trackway-visitor-centre/

Health Service Executive (HSE) (2017). Position Paper on Wind Turbines and Public Health. HSE Public Health Medicine Environment and Health Group (February 2017). Available at: https://www.lenus.ie/handle/10147/621467?show=full

HIQA (2024). Central Statistics Office Irish Health Survey. Available at: https://www.hiqa.ie/areas-we-work/health-information/data-collections/irish-health-survey

Hoen, B., Brown, J.P., Jackson, T. *et al.* Spatial Hedonic Analysis of the Effects of US Wind Energy Facilities on Surrounding Property Values. *J Real Estate Finan Econ* 51, 22–51 (2015). https://doi.org/10.1007/s11146-014-9477-9

HSE (2024). Longford and Central Westmeath population profiling. Available at: https://www.hse.ie/eng/about/who/healthwellbeing/knowledge-management/longford-and-central-westmeath-population-profiling.html

HSE (2024). Population profiling maps. Available at: https://www.hse.ie/eng/about/who/healthwellbeing/knowledge-management/population-profiling-maps.html

IEMA (2022). Effective Scoping of Human Health in Environmental Impact Assessment.

IEMA (2022). Determining Significance for Human Health in Environmental Impact Assessment.

Institute of Public Health Ireland (2009). Health Impact Assessment.

Institute of Environmental Management and Assessment (IEMA) (2017). Health in Environmental Impact Assessment - A Primer for a Proportionate Approach.

London School of Economics (LSE) (2013). *Gone with the wind: valuing the local impacts of wind turbines through house prices (Preliminary Draft)* (November 2013).

The Guardian (2014). *Property prices unaffected by windfarms, says CEBR* (March 2014).

Robert J. McCunney, MD, MPH, Kenneth A. Mundt, PhD, W. David Colby, MD, Robert Dobie, MD,Kenneth Kaliski, BE, PE, and Mark Blais, PsyD (2014). Wind Turbines and Health: A Critical Review of the Scientific Literature. Available at: https://www.researchgate.net/publication/281033134_McCunney_Wind_Turbines_2014

Government of Ireland (n.d.). Just Transition MRTT-040 Mid Shannon Wilderness Park Greenway. Available at: https://www.gov.ie/pdf/?file=https://assets.gov.ie/140205/09e6c3a5-d4d3-484c-9d96-09ee5422f679.pdf#page=null

Government of Canada - Health Canada (2014). Wind Turbine Noise and Health Study: Summary of Key Findings. Available at: https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/noise-bruit/turbine-eoliennes/pamphlet-brochure-eng.pdf

Government of Canada (2014). Health Canada Publishes Findings from Wind Turbine Noise and Health Study. Available at: https://www.canada.ca/en/news/archive/2014/11/health-canada-publishes-findings-wind-turbine-noise-health-study.html

Government of Canada - Health Canada (2014). Wind Turbine Noise and Health Study: Summary of Results. Available at: https://www.canada.ca/en/health-canada/services/health-risks-safety/radiation/everyday-things-emit-radiation/wind-turbine-noise/wind-turbine-noise-health-study-summary-results.html

Knopper LD, Ollson CA, McCallum LC, Whitfield Aslund ML, Berger RG, Souweine K, McDaniel M. Wind turbines and human health. Front Public Health. 2014 Jun 19;2:63. doi: 10.3389/fpubh.2014.00063. PMID: 24995266; PMCID: PMC4063257. https://pmc.ncbi.nlm.nih.gov/articles/PMC4063257/

Knopper, L.D., Ollson, C.A. Health effects and wind turbines: A review of the literature. *Environ Health* 10, 78 (2011). https://doi.org/10.1186/1476-069X-10-78

Longford County Council (2023). Official opening of addition to North Longford Rebel Trail as Granard Greenway unveiled. Available at: https://www.longfordcoco.ie/your-council/news/official-opening-of-addition-to-north-longford-rebel-trail-as-granard-greenway-unveiled.html

Longford County Council (2021). Longford County Development Plan (CDP) 2021-2027. Available at: https://www.longfordcoco.ie/services/planning/longford-county-development-plan-2021-2027/

Longford County Council (2023). County Longford Tourism Strategy - Sustainable tourism the way forward for County Longford. Available at: https://www.longfordcoco.ie/your-council/policy-and-publications/county-longford-tourism-strategy-2023-2027/

Longford County Council (2024). Draft Longford Town Local Area Plan 2025-2031. Available at: https://www.longfordcoco.ie/services/planning/longford-town-local-area-plan-2025-2031/draft-longford-town-local-area-plan-2025-2031.pdf

Longford.ie (2024a). Mid-Shannon Trail. Available at: https://www.longford.ie/en/visit/explore-the-past/mid-shannon-trail/

Longford.ie (2024b). Center Parcs Longford Forest. Available at: https://www.longford.ie/en/visit/accommodation/center-parcs-longford-forest/

Merlin, T, Newton, S, Ellery, B, Milverton, J & Farah, C (2015). *Systematic review of the human health effects of wind farms*, National Health and Medical Research Council, Canberra. Available at: https://www.nhmrc.gov.au/sites/default/files/documents/reports/systematic-review-wind-farms-eh54.pdf

The National Health and Medical Research Council (NHMRC) of Australia (2010). *Wind Turbines and Health: A Rapid Review of the Evidence.* Available at: https://www.agl.com.au/content/dam/digital/agl/documents/about-agl/how-we-source-energy/coopers-gap-wind-farm/20100701-agl-nhmrc-wind-turbines-and-health.pdf?srsltid=AfmBOopXR530b_mZxeGxmR6ujZf8PHaECEU49SFWw6jUGQEZZsvNqZlz

Pierpont, N. (2009). *Wind Turbine Syndrome: A Report on a Natural Experiment.*

Pobal (2022). Deprivation Indices (Republic of Ireland). Available at: https://maps.pobal.ie/WebApps/DeprivationIndices/index.html

Pöyry (Management Consulting (UK)) (2014). *The Value of Wind Energy to Ireland: A report to Irish Wind Energy Association* (March 2014).

Qu F, Tsuchiya A. Perceptions of Wind Turbine Noise and Self-Reported Health in Suburban Residential Areas. Front Psychol. 2021 Aug 30;12:736231. doi: 10.3389/fpsyg.2021.736231. PMID: 34526942; PMCID: PMC8435591.

RenewableUK (2010) 'Wind Turbine Syndrome (WTS) - An independent review of the state of knowledge about the alleged health condition'.

Rutovitz, J., Dominish, E. and Downes, J. 2015. Calculating global energy sector jobs: 2015 methodology. Prepared for Greenpeace International by the Institute for Sustainable Futures, University of Technology Sydney.

Sustainable Energy Authority of Ireland (SEAI) (2023). Irish national survey of households near new commercial wind and solar farms. Available at: https://www.seai.ie/sites/default/files/publications/SEAI-RESS-National-Survey.pdf

SEAI (2015). *A Macroeconomic Analysis of Onshore Wind Deployment to 2020: An analysis using the Sustainable Energy Economy Model* (June 2015).

School Days Ireland (2024). Primary and Secondary Schools In Ireland. Available at: https://www.schooldays.ie/

Sport Ireland (2024). Find Your Trails. Available at: https://www.sportireland.ie/outdoors/find-your-trails

Trails.ie (2024). Your guide to the outdoors: Hiking, Walking, Biking, Trails. Available at: https://trails.ie/index.php

Transport for Ireland (2024). Longford TFI Local Link Bus Services. Available at: https://www.transportforireland.ie/plan-a-journey/network-maps/longford-tfi-local-link-bus-services/

U. Ratzel, O. Bayer, P. Brachat, M. Hoffmann, K. Jänke, K.-J. Kiesel, C. Mehnert, Dr. C. Scheck (2016). Landesanstalt für Umwelt Baden-Württemberg: Low-frequency noise incl. infrasound from wind turbines and other sources. Available at: https://pudi.lubw.de/detailseite/-/publication/13796

van Kamp I and van den Berg F. Health Effects Related to Wind Turbine Sound: An Update. Int J Environ Res Public Health. 2021 Aug 30;18(17):9133. doi: 10.3390/ijerph18179133. PMID: 34501721; PMCID: PMC8430592. https://pmc.ncbi.nlm.nih.gov/articles/PMC8430592/

Warren, C.R., Lumsden, C., O'Dowd, S. and Birnie, R.V., 2005. "Green on Green": public perceptions of wind power in Scotland and Ireland. Journal of Environmental Planning and Management 48(6): 853–875 https://doi.org/10.1080/09640560500294376

Waterways Ireland and Failte Ireland (2020). The Shannon Mighty River of Ireland: A Tourism Masterplan (2020-2030): Reimagining the River Shannon and the Shannon Erne Waterway (Volume 1/5: Executive Summary). Available at: https://www.waterwaysireland.org/getmedia/06ebcbb4-cb45-482d-949c-e2285307ba8c/Volume-1_Executive-Summary_Tourism-Masterplan-for-the-Shannon.pdf?ext=.pdf

Wind Energy Ireland (WEI) (2021). *Economic impact of onshore wind in Ireland* (Prepared for Wind Energy Ireland (WEI) by KPMG)) (April 2021).

World Health Organisation (WHO) (2018). *Environmental Noise Guidelines for the European Region (2018).*

WHO (2009). *Night-time Noise Guidelines for Europe (2009).*

WHO (2021). *Global Air Quality Guidelines (2021).*

WHO (1995). *Community Noise.*

WHO (2007). *Exposure to extremely low frequency fields.*