5.0 POPULATION AND HUMAN HEALTH

5.1 INTRODUCTION

This chapter examines the existing environment and addresses the potential effects on population and human health arising from the proposed project, as described in Chapter 2 of this EIAR (Description of the Proposed Project).

5.1.1 BACKGROUND

The two environmental factors of population and human health are addressed under separate headings throughout this chapter. The assessment on population considers the current land use of the proposed site, the current activities occurring within and in the vicinity of the site, local population information, employment profiles, tourism, visitor attractions and community gain opportunities. The assessment on human health includes a detailed literature review of studies and research carried out on the potential effects of wind farm developments on human health.

The study area for population and human health includes a review of relevant information on a county and national scale but is mainly concentrated on the Electoral Districts (ED) within which the proposed project is located.

The potential effects of the proposed project on other environmental factors which may also have an effect on human beings, as set out in Chapter 8 (Land, Soils and Geology); Chapter 9 (Hydrology and Hydrogeology); Chapter 10 (Shadow Flicker); Chapter 11 (Material Assets, Telecommunications and Aviation); Chapter 12 (Noise and Vibration); Chapter 13 (Landscape and Visual Impact); Chapter 14 (Air Quality and Climate) and Chapter 16 (Traffic and Transportation), 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 17 (Interaction of the Foregoing).

This assessment has been carried out with consideration of 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 Wind Energy Development Guidelines (2006);
- DoHPLG, Draft Revised Wind Energy Development Guidelines (2019); and
- Institute of Public Health Ireland, Health Impact Assessment Guidance: Manual & Technical Guidance (2021).
- Fáilte Ireland's EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects.

The Scart Mountain Wind Farm Community Benefit Proposal is set out in Section 2.2 of Chapter 2 of this EIAR and has been developed in accordance with the terms and conditions of the Government's Renewable Energy Support Scheme (RESS). The provisions of the Community Benefit Proposal which will have an effect on the local population are discussed in Section 5.3.1.

5.1.2 STATEMENT OF AUTHORITY

This chapter was prepared by Oonagh Fleming and Dr. John Staunton of TOBIN Consulting Engineers. Oonagh Fleming is a Graduate Environmental Scientist in TOBIN. Oonagh holds a B.A. in Geography and Sociology. John Staunton is a Senior Project Manager and Environmental Scientist in TOBIN more than fourteen years' postgraduate experience in both research and environmental consultancy. John holds a BSc and PhD in Environmental Science and has considerable experience in project managing wind energy developments and carrying out associated impact assessments including in preparing assessments in relation to population and human health (human beings).

This chapter has been reviewed by Orla Fitzpatrick, Technical Director in TOBIN's Environment and Planning Division. Orla is a chartered environmentalist with 22 years of experience and holds a BSc in Geophysical Science and a M.Sc. in Environmental Consultancy. Orla has considerable experience as technical approver of environmental deliverables for major infrastructure projects.

5.2 METHODOLOGY

5.2.1 POPULATION

A desktop study and site visit (between March 2022 – Nov 2023) were carried out in order to examine relevant information pertaining to this population impact assessment. The site visit was used to verify descriptions and information of the local area, and thus inform the impact assessment. Maps from Ordnance Survey Ireland (OSI) were used to identify current and historical land use in the area as well as relevant amenity facilities surrounding the proposed wind farm site and within the main settlement areas around the proposed project.

Information on population statistics, employment and social data for the areas surrounding the proposed project have been obtained from the Central Statistics Office (CSO) predominantly from the 2022, 2016 and 2011 Census records.

The study area for the Population and Human Health assessment comprises of the Electoral Divisions (EDs) within which the proposed project is located and those which directly neighbour the proposed wind farm site (See Figure 5-2 below). Data has been captured on an ED basis as this division has been considered the most appropriate scale for collated census data and is commonly used for defining the existing population profile. EDs were considered the appropriate way to choose the study area extents based on professional judgement as they cover a wide area around the proposed project boundary, and as there is a wide range of data available from the Census publications for each ED. EDs are the smallest legally defined administrative areas in the State that are published within the Census Small Area Population Statistics (SAPS). As such, this means that it is possible to get accurate baseline data that represents the area within which the proposed project is located. The EDs included within the assessment include the proposed wind farm site, the proposed GCR and any works areas of the proposed TDR.

Fáilte Ireland tourist literature for County Waterford was examined in relation to tourism amenity in conjunction with the websites of relevant tourism assets, locations, and amenities in the area. County Waterford is located in Ireland's Ancient East[1], a branding initiative developed by Fáilte Ireland to make the area *"the most personally engaging cultural destination in Europe*

[1] https://www.discoverireland.ie/irelands-ancient-east (accessed 14/05/24)

by harnessing the authentic character of the real Ireland, its living culture, lush landscapes and hidden history"[2]. Information on other tourist attractions and initiatives in the area have been sourced from relevant websites, such as Discover Ireland, Visit Waterford, Tourism Ireland and published literature.

As part of the EIAR scoping process, a consultation letter on the proposed project was sent to 35 consultees as described in Chapter 1 (Introduction) including Fáilte Ireland in January 2023 who provided a response that can be found in Appendix 1-4 of this EIAR which was addressed in the preparation of this chapter. This included a copy of Fáilte Ireland's EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects. Other relevant bodies scoped (with no response) were Mountaineering Ireland, Waterways Ireland, and the Department of Tourism Culture Arts Gaeltacht, Sports and Media. Public engagement was also carried out in the local area as described in Chapter 1 (Introduction) of this EIAR, and the feedback obtained during this exercise has been addressed in the preparation of this chapter.

The project as described in Chapter 2 has been assessed and the proposed flexibility considered throughout this chapter for example in relation to the number of jobs which is based on turbine output which has a variance of between 5.7 – 7.2 MW per turbine.

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

- CSO – 2022, 2016 and 2011 Census;
- Fáilte Ireland website – https://www.failteireland.ie/[3];
- Fáilte Ireland, *EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects (Dated 2018, received from Failte Ireland in 2023);*
- Heritage Ireland website https://heritageireland.ie/visit/irelands-ancient-east/[4];
- Waterford City and County Council, Waterford City and County Development Plan 2022 – 2028;
- OSI – Mapping and aerial photography; and
- Walking trails - https://www.sportireland.ie/outdoors/find-your-trails[5] and http://trails.ie/index.php[6].

5.2.2 HUMAN HEALTH

This assessment of the potential effect of the proposed project on human health is based on a comprehensive review of the relevant published literature on the subject (listed below and throughout each section where discussed). 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 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, though such publications are not relied on in this assessment.

[2] https://www.failteireland.ie/Regional-experience-brands/Ireland-s-Ancient-East.aspx (accessed 14/05/24)

[3] Website reviewed Q2 2024
[4] Website reviewed Q2 2024
[5] Website reviewed Q2 2024
[6] Website reviewed Q2 2024

Wind and renewable energy are subjects 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 and an analysis of its scientific robustness.

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

The following specific guidance documents have been consulted in the completion of the human health impact aspect of this chapter:

- Institute of Public Health Ireland, *Health Impact Assessment Guidance: Manual & Technical Guidance* (2021);
- Institute of Environmental Management and Assessment (IEMA), *Health in Environmental Impact Assessment - A Primer for a Proportionate Approach* (2017);
- IEMA, 'Effective Scoping of Human Health in Environmental Impact Assessment' (2022);
- IEMA, Determining Significance for Human Health in Environmental Impact Assessment (2022);
- IEMA, Impact Assessment Outlook Journal Volume 8: Health Impact Assessment in Planning - Thought pieces from UK practice (2020);
- Institute of Public Health in Ireland (IPHI) Health Impact Assessment Guidance: A Manual. Standalone Health Impact Assessment and health in environmental assessment. (2021);
- US Environmental Protection Agency, *Health Impact Assessment Resource and Tool Compilation* (September 2016);
- World Health Organisation (WHO), *Environmental Noise Guidelines for the European Region* (2018);
- WHO, *Night-time Noise Guidelines for Europe* (2009); and
- WHO, Global Air Quality Guidelines (2021).

EIA Directive

Directive 2011/92/EU of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU (the EIA Directive) requires 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[7] 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,*

[7] https://www.epa.ie/publications/monitoring--assessment/assessment/guidelines-on-the-information-to-be-contained-in-environmental-impact-assessment.php (accessed 14/05/24)

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.)[8].

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".* The 2022 EPA Guidelines state *"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 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 and are duplicated in Table 1-1 of Chapter 1 (Introduction) in this EIAR for reference.

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

In November 2022, the Institute for Environmental Management and Assessment (IEMA) in the UK 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 environmental impact assessment EIA. The aim of this guide is to enable those responsible for commissioning, conducting, or reviewing an EIA to 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. Where an EIA is undertaken and there is also a requirement for Health Impact Assessment (HIA) (i.e. where the potential for impacts to human receptors is identified in the EIAR through topics including visual, noise, water, etc.), projects should normally meet the HIA requirement through the EIA Report health chapter rather than having a standalone HIA report. Regard has been given to the general approach put forward in this IEMA guidance when preparing this Chapter, which meets the HIA requirement. See Section 5.2.2.1 for further details.

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

[8] 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 (accessed 14/05/24)

In November 2022, IEMA published a guide to '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 in the UK and Republic of Ireland. 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 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 project, there is a minimum setback distance of 740m (assuming the tallest tip height within this range of 185m) from the proposed turbine locations to the nearest sensitive receptor which is in excess of the minimum setback requirements in the 2006 and Draft 2019 WEDGs. Comprehensive engagement with the local community began in October 2022 when the 1st brochure and newsletter was distributed to houses within 4 km of the proposed development by the Community Liaison Officers (CLOs). A 4 km radius is utilised initially to capture a wide area of potential interest and further engagement focuses on a 2 km radius to capture 'near neighbours' and those that are located within the community benefit fund area. A dedicated project website also went live. Two subsequent newsletters were distributed in March and July 2023 and an information webinar was held in August 2023 and community clinics were held in The Dungarvan Park Hotel on Tuesday 28th and Wednesday 29th of November 2023. Throughout this time the CLOs have been available via phone and email.

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.

5.2.2.1 Health Impact Assessment and Environmental Impact Assessment

The 2017 IEMA Discussion Document[9] notes that Health Impact Assessment (HIA) and EIA are separate processes and that whilst a HIA can inform EIA practice in relation to human health, a HIA alone will not necessarily meet the EIA human health requirement. HIA is not routinely carried out for major infrastructure schemes in Ireland.

Guidance on HIA was issued by the Institute of Public Health in Ireland (IPHI) in 2009 and updated most recently in 2021. There are, however, considerable difficulties in performing a HIA as outlined by the IPHI for infrastructural projects such as the proposed project. Not least of these is the difficulty of getting baseline health data. It is quite difficult due to patient confidentiality, and other reasons, to accurately determine levels of even relatively common medical conditions in a relatively defined population that might be affected by a proposed project. In the absence of an accurate baseline, it is very difficult to assess qualitative and quantitative changes that might occur. One could use more generalised data that might exist for larger areas such as a city or county, but these would be at most an estimate of the local baseline and not accurate enough to allow for meaningful interpretation.

The 2017 IEMA Discussion document also notes that the WHO provides an overview of health in different types of impact assessment (WHO, 2014) 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."*

It is clear, therefore, that the WHO does not support a stand-alone HIA unless it could be demonstrated to be of advantage over an EIAR. It is for these reasons that this health assessment is part of the EIAR and there is not a stand-alone HIA.

The HIA is defined as a combination of procedures, methods and tools that systematically judges the potential, and sometimes unintended, effects of a policy, plan, programme or project on both the health of a population and the distribution of those effects within the population, whilst the health assessment in the context of EIA focuses the attention of the assessment on likely significant effects, i.e. on effects that are deemed likely to occur and, if they were to occur, would be expected to be significant (as per the requirements of the EIA Directive). Conducting a HIA will not necessarily meet the EIA Directive population and human health assessment requirement.

[9] Health in Environmental Impact Assessment - A Primer for a Proportionate Approach. 2017, IEMA

5.2.2.2 Health Protection

The assessment of human health for the proposed project, in terms of health protection, follows the approach set out in the 2022 EPA EIAR Guidelines and in the EC's Guidance on the preparation of the EIAR. It is also similar in nature to the US Environmental Protection Agency (USEPA) Guidance, entitled *Health Impact Assessment Resource and Tool Compilation* (USEPA, 2016). 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. The USEPA Guidance includes a four-step approach which is represented graphically below.

Figure 5- 1: Four-step Risk Assessment Process (Source: USEPA, 2016)

This USEPA risk assessment process is similar to the 2022 EPA EIAR Guidelines in that the potential noise, air, soils and water impacts which could affect human health are identified (Hazard Identification), the scale of these potential impacts (Dose-Response Assessment) and their duration (Exposure Assessment) are assessed and the significance of the potential effect on human health is determined (Risk Characterisation).

It should be noted that the identification of individual environmental hazards and the associated potential impacts and duration are undertaken in other chapters of this EIAR namely, Noise, Shadow Flicker, Material Assets, Air Quality and Climate, Hydrology, Soils and Geology. The associated significance in terms of the potential effect 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 4 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 project. The potential for cumulative effects on the local population and human health is considered below.

5.3 EXISTING ENVIRONMENT

5.3.1 POPULATION

The site of the proposed wind farm lies between Ballynamult and Modelligo which are located approximately 4.2 km and 3.8 km from the nearest proposed turbine, respectively.

A larger settlement Cappoquin town, is located approximately 4 km northeast of the proposed wind farm site.

The main urban centres in the region are Dungarvan, located approximately 13 km (with proposed grid connection route (GCR) work being approximately 2.5 km from Dungarvan at the existing Dungarvan 110 kV substation) southeast of the proposed wind farm site and Clonmel, located approximately 17 km northeast of the proposed wind farm site. The three isolated proposed turbine delivery route (TDR) works areas located at roundabouts are all within 10 km of Waterford City.

Land Use

The land use activities on the proposed wind farm site are primarily commercial forestry and low intensity agriculture. The surrounding landscape is mostly a mixture of forestry and agricultural land, although there is also residential land use at the nearby dwelling houses and commercial land use at nearby businesses (e.g. farm shops, bed and breakfasts, and other businesses). There is recreational land use at the various local amenities such as walking trails, motorsport facilities and other activities. The majority of the proposed GCR is located on public roads, (transport use) with short section within forestry and agriculture areas. The works relating to the TDR are also located mostly within the road corridor, with a small area on agricultural land (approx. 170m of access road).

Population Trends

An examination of the existing population in the study area has been carried out to identify population trends and population density surrounding the proposed project. Census data from the period 2011,2016 and 2022 available from the CSO[10] has been summarised in Table 5-1 and Table 5-2.

The proposed wind farm site is situated primarily across three ED's; Cappoquin (25058), Modelligo (25068) and Ballyhane (25054) and across small areas of Ballynamult (25056), as represented in Figure 5-2. It is also directly adjacent to Newcastle (23128) in Co. Tipperary. The proposed GCR is situated across three ED's Modelligo (25032 and 25068) and Colligan (25025). The temporary ancillary works in the public road network which are required as part of the turbine delivery works also incorporate the additional ED's of Rathpatrick (07111) and Kilmeadan (25078). It is noted however, that these proposed ancillary works are minor in the overall context of the proposed project.

All of these nine EDs have been included in the study area for defining the existing local population for the proposed project.

[10] https://www.cso.ie/en/census/ (Accessed on Q4 2023)

7°45'0"W
7°30'0"W
7°15'0"W
7°0'0"W
52°18'20"N
52°9'15"N
52°0'10"N
615000
599500
584000
616500
633000
649500
666000
N
Newcastle (23128)
Ballynamult (25056)
Cappoquin (25058)
Modelligo (25032)
Ballyhane (25054)
Modelligo (25068)
Colligan (25025)
Kilmeadan (25078)
Rathpatrick (7111)
Kilcash
Ballypatrick
Faugheen
Owning
Templeorum
Longfield
Clonmel
Kilsheelan
Carrick-on-Suir
Piltown
Fiddown
Grange
Rathgormack
Clonea
Portlaw
Mooncoin
Kilmacow
Goatenbridge
Newcastle
Ballymacarbry
Waterford
Mahon Bridge
Kilmacthomas
Kilbrien
Ballylaneen (Boolavahoo)
Kill
Fenor
Tramore
Dunmore East
Bunmahon
Annestown
Cappoquin
Lismore
Villierstown
Dungarvan
Dungarvan Harbour
Ringnasilloge
Clashmore
Youghal
Ardmore
Irish Sea
Esri, HERE, Esri UK, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS
8°1'W
52°11'30"N
Munster
Waterford
Cork
© OpenStreetMap (and) contributors, CC-BY-SA
Legend
Proposed project
Proposed Turbine Delivery Route
Population and Human Health Study Area
Electoral Divisions
0
4
8
Kilometres
NOTES
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY \ WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

A	16/12/2024	First issue	S.P	J.S
Rev	Date	Description	By	Chkd.

Client: FuturEnergy Ireland

Project: Scart Mountain Wind Farm

Title: Figure 5-2: EIAR Study Area for Population and Human Health based on Electoral Districts

Scale @ A3: 1:200,000

Prepared by:	Checked by:	Date:
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Map Ref: 11303-007-PHH.Area-EDs-TOB-A

Draft: A

Table 5- 1: Population Trends 2011 – 2022 (Proposed Project Study Area)

Area	Population 2011	Population 2016	Population 2022	% Change from 2011 - 2016	% Change from 2016 - 2022
State	4,588,252	4,761,865	5,149,139	+4%	+8%
Waterford County	113,795	116,176	127,363	+2%	+9%
Tipperary County	158,754	159,553	167,895	+0.5%	+5%
Kilkenny County	95,419	99,232	104,160	+4%	+5%
Ballyhane (25054)	454	474	495	+4%	+4%
Ballynamult (25056)	175	169	207	-3%	+22%
Cappoquin (25058)	1,303	1,253	1297	-4%	+3%
Newcastle (23128)	680	727	726	+7%	-0.1%
Modelligo (25068)	301	294	335	-2%	+13%
Colligan (25025)	660	703	722	+6%	+3%
	Additional EDs for the proposed GCR				
Modelligo (25032)	327	328	338	+0.3%	+3%
	Additional EDs for the proposed TDR				
Kilmeadan (25078)	787	757	778	-4%	+3%
Rathpatrick (07111)	1,140	1,095	1,121	-4%	+2%
Study Area (total)	**5,827**	**5,800**	**6,019**	**-0.4%**	**+3.7%**

Census results between 2011 and 2016 show a rise in population in County Waterford of +2%. However, during the 5-year period of 2011 to 2016, the population nationally increased by approximately 4%. The population of County Tipperary increased by approximately 0.5% and the population of County Kilkenny increased by 4%. The population of the study area however did not follow the same pattern and decreased by 0.4%.

Census results from 2016-2022 highlight a marked rise in population. The national population increased by 8% and the population of County Waterford increased by 9%. The population of both County Tipperary and Kilkenny increased by 5%. Every ED within the study area experienced an increased in population during this period except for Newcastle. The average increase within the study area between 2016-2022 was 3.7%.

Population Density

Population density is a useful indicator of the settlement patterns in the study area and Waterford County overall. Table 5-2 shows population density for the study area as well as Waterford, Tipperary and Kilkenny Counties and shows a generally sparser population in the study area compared with the overall county.

The 2022 census identified that the average rural population density in Ireland is 73 persons/km^2 showing that the population density in the study area is significantly lower than the national average at 25 persons/km^2.

As noted above, the proposed works along the delivery route are minor in the context of the proposed project and constitute temporary works along the public road to facilitate the turbine deliveries The population density will not be affected by such temporary or transient works.

Table 5- 2: Population Density 2022

Area	Population Density 2022(persons/km^2)
State	73
Waterford County	68.5
Tipperary County	39
Kilkenny County	50
Ballyhane (25054)	27
Ballynamult (25056)	11
Cappoquin (25058)	27
Newcastle (23128)	20
Modelligo (25068)	16
Additional EDs for the proposed GCR	
Colligan (25025)	29
Modelligo (25032)	18
Additional EDs for the proposed TDR	
Kilmeadan (25078)	39
Rathpatrick (07111)	60
Study Area (average)	**25**

Sensitive Receptors and 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.

The location of residential properties (referred to as sensitive receptors) in the vicinity of the proposed wind farm site have been initially 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 (OSI maps, Open Street View, MyPlan), aerial imagery, street-level imagery, and a ground truthing survey carried out by TOBIN in July-August 2022. Ground truthing was carried out by Samuele Pezzetta (see Table 1-3 of Chapter 1 Introduction for a full list of qualifications and experience).

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 site surveys. This information is used to inform assessments within this EIAR, in particular for shadow flicker analysis (Chapter 10) and

noise modelling (Chapter 12). A 2 km buffer from the proposed wind farm site boundary was used to ensure that those properties within reasonable proximity of the main wind farm infrastructure are defined, and it is an appropriate distance for the proposed turbine range. This is in excess of the 10 times rotor diameter for the largest wind turbine being considered for this project (i.e. 1.63 km) and is also sufficient to include all of the noise study area (though this study area is defined in Chapter 12 of this EIAR (Noise & Vibration)). As such the 2km buffer allows or the evaluation of the potential impacts that may arise from the proposed wind farm and includes both the shadow flicker and noise assessment areas which are considered in particular in relation to residential amenity and the population and human health assessment. The locations of these receptors in relation to the proposed project are shown in Figure 5-3.

In addition, a search of planning applications within 2 km of the proposed wind farm site boundary was carried out (most recently in September 2024) to identify proposed developments and consented, but as yet not built, developments.

A total of 237 no. receptors from the GeoDirectory database, ground truthing exercise, and planning search were identified within 2 km of the proposed wind farm site and are presented in Table 5-7 (provided as Appendix 5-1). Each receptor identified has been assigned an ID number (e.g., P123) for reference.

During the verification process, properties/buildings that would not be considered sensitive receptors (i.e. farm sheds, garages, commercial buildings, etc.) or that were not deemed habitable without requiring major works (e.g. no roof) to remedy (i.e. derelict) were identified. Regardless of the condition of a receptor, (i.e. derelict or not) they are all assessed through the EIAR. Commercial buildings include shops, pubs, offices, etc. both derelict and commercial buildings are assessed on a case by case basis. Any developments submitted for planning or consented (but as yet unbuilt) developments were included, but any such properties that would not be considered sensitive as described above were omitted. From the planning search, any invalidated planning applications or consented (but unbuilt) developments where the expiry period for development had elapsed were excluded.

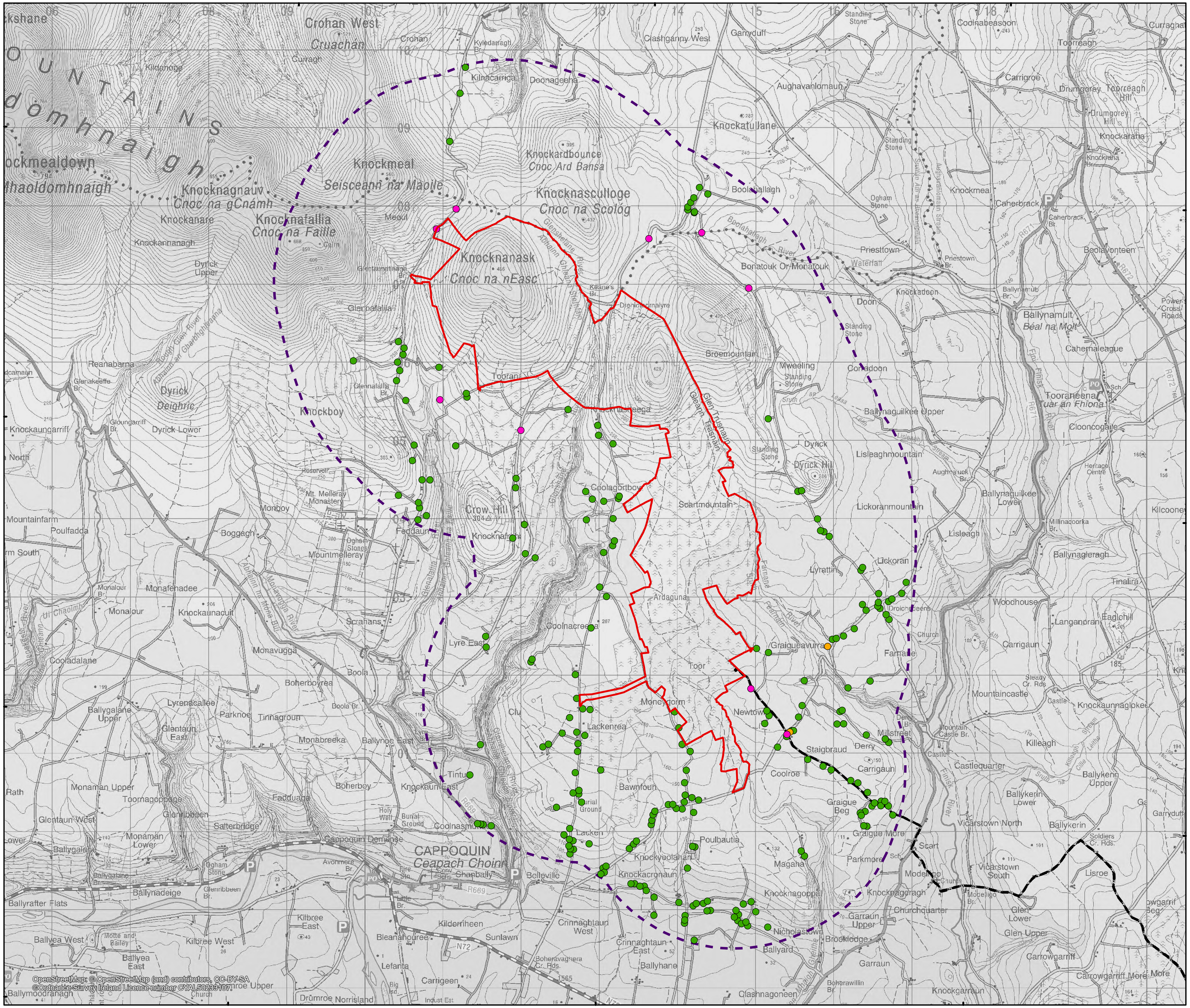
Table 5-3 presents a summary of the identified receptors. The closest sensitive receptor curtilage (i.e. measuring from the nearest boundary of the garden / yard immediately surrounding the house) is located >800m from the nearest proposed turbine location which is in excess of the minimum setback requirement of 500m set out in the 2006 WEDGs. The 2019 Draft WEDGs recommend a minimum setback distance from a turbine to the curtilage of a residential property equal to 4 times the turbine tip height or 500m, whichever is largest. The proposed project includes for the installation of turbines with a tip height of between 179.5 - 185m, therefore (based on the tallest tip height within this range of 185m) the minimum setback distance required in accordance with the 2019 Draft WEDGs is 740m. The proposed project complies with this requirement.

Table 5- 3: Summary of Receptors Within 2 km of Proposed Wind Farm Site Boundary

Receptor Type	No. Within 2 km of Wind Farm Site Boundary
Residential Sensitive Receptors ('residential' and 'both' property types)[11]	225
Other Receptors (e.g. derelict or with condition/status unconfirmed) For the purpose of this assessment these were assumed to be sensitive (those that were derelict could be renovated to be habitable).	10
Commercial Properties	2
Total	**237**

Sensitive receptors along the proposed GCR, material haul routes (see Chapter 16, Traffic and Transportation) and in the vicinity of the proposed TDR works areas have also been considered in the assessments of this EIAR where appropriate (i.e. they are not considered for shadow flicker as that is not a concern at these locations). The study area is defined as required for other assessments such as Noise & Vibration, Air Quality & Climate and Traffic & Transport (See chapters 12, 14 and 16 of this EIAR respectively). Any works that are required for these elements of the project are transient in nature and substantially smaller than those at the proposed wind farm site. It should be noted that the works are located in rural areas with a sparse population. It is considered that the study area that is assessed for this chapter provides sufficient context and detail on these locations.

[11] Properties designated as 'both' refers to a property with both residential and commercial elements; e.g. a farm in rural areas, or a commercial premises with residential accommodation, such as public houses and shops.



Legend

- Proposed Wind Farm Site
- Proposed Grid Connection Route
- 2km Buffer

Sensitive Receptors

- Residential
- Commercial
- Derelict

0 1,000 2,000
Meters

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
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A	13/12/2024	First issue	S.P	J.S
Rev	Date	Description	By	Chkd.

Client: FuturEnergy Ireland

Project: Scart Mountain Wind Farm

Title: Figure 5-3
Receptors within 2km of the proposed Wind farm site boundary

Scale @ A3: 1:45,000

Prepared by:	Checked by:	Date:
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Map Ref: 11303-008-Sens.R-BUFF2-TOB-A

Draft: A

Property Values

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 X91: Waterford. It is located adjacent to E91: Clonmel. In August 2023, the CSO published the Residential Property Price Index (RPPI) data for the 12-months to June 2023[12]. The RPPI shows that the national Residential Property Price Index (RPPI) increased by 2.2% in the 12 months to June 2023, with prices in Dublin decreasing by 0.9% and prices outside Dublin up by 4.5%. The lowest median price paid for a dwelling was in Leitrim and Longford (€160,000), and the highest in Dún Laoghaire-Rathdown in Dublin (€630,000). The region outside of Dublin that saw the largest rise in house prices was the South-East (Carlow, Kilkenny, Waterford, Wexford) at 5.5%. The RPPI shows that the median price of residential properties sold in the X91 Eircode area in Waterford was €220,000, while for the E91 Eircode area it was €252,500. The national median price for a dwelling purchased in the 12-months to June 2022 was €325,000[13].

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 project. The Labour Force Survey undertaken by the CSO provides details of unemployment on a regional level. Waterford is located in the South-East Region (IE052)[14]. Data for the South-East Region has been used to illustrate unemployment in the area.

Error! Reference source not found. illustrates the findings from the Q2 2023 Labour Force Survey published by the CSO[15]. The first case of Covid-19 was reported in Ireland at the end of February 2020 and measures required in accordance with the public health guidance were introduced on 12 March 2020. As a result, the Labour Force Survey statistics from 2020 to 2022 are affected by the crisis. Therefore, over the past number of years employment figures have fluctuated since the beginning of the Pandemic due to public health measures including lockdowns and business closures.

The unemployment rate in **Error! Reference source not found.** 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 2023 was 4.4%.

The participation rate is the number of persons available to the labour force (i.e. persons from 15-74 years old either working or looking for work) expressed as a percentage of the total population. In Q2 2023, the participation rate in the State was 65.7% up from 65.2% in Q2 2022. The participation rate among those aged 15-24 years in the south east stood at 61.6% in Q2 2023, up from 61.2 in Q2 of 2022.

[12]https://www.cso.ie/en/releasesandpublications/ep/p-rppi/residentialpropertypriceindexjune2023/ (Accessed on 6th September 2023)

[13] https://data.cso.ie/table/HPM04 / (Accessed on 6th September 2023)

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

[15]https://www.cso.ie/en/releasesandpublications/ep/p-lfs/labourforcesurveyquarter22023/ (Accessed on 6th September 2023)

Table 5- 4: Labour Force Survey (Q2 2023)

Location	Unemployment Rate	Participation Rate
State	4.4%	65.7%
South East	6%	61.6%

The CSO also publishes figures relating to the Live Register. 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 data in **Error! Reference source not found.** show that over the 12 month period to June 2023, there was a 1.04% decrease in the number of persons on the Live Register[16] in the State as a whole and a 0.8% increase in the number of persons on the Live Register in the South-East Region. Overall, there is a decreasing trend in Live Register figures, the latest figures indicating a need for further employment in the South-East Region.

Table 5- 5: Live Register Figures (June 2022 – June 2023)[17]

Location	June 2022	June 2023	% Change
State	186,819	184,879	-1.04%
South-East	19,507	19,661	+0.8%

Chapter 4 of the Waterford CDP 2022-2028 sets out the Economic Development strategic objectives for Waterford County which is *"To develop, deliver and promote Waterford as a year-round class tourism destination, with authentic, memorable experiences which attracts local, regional and international visitors generating long term and lasting benefits to enhance and support local communities and realise additional economic growth, jobs and prosperity for Waterford".*

At a strategic level within County Waterford, the CDP has identified a number of areas and opportunities for development under the Economic Development Strategy, including:

- Employment and Economic Growth;
- The Retail Strategy;
- Availability of Land and Infrastructure;
- Supporting the provision of education facilities; and
- The Rural Area.

Some of the relevant policy objectives identified in the Waterford CDP in support of the above are:

- ECON 1: "We will support and facilitate regeneration, consolidation and growth at strategic employment and nodal locations along strategic public transport corridors and maximise commercial and employment development opportunities so as to foster more sustainable economic growth, diversity and resilience in accordance with the Core and Settlement Strategies. "
- ECON 3: "To encourage, promote and facilitate economic and employment growth, resilience, diversity, social enterprise and the regeneration of underutilised areas."

[16] https://www.cso.ie/en/releasesandpublications/ep/p-lr/liveregisterjune2023/ (accessed 14/05/24)

[17] https://www.cso.ie/en/releasesandpublications/ep/p-lr/liveregisterjune2023/data/ (accessed 14/05/24

- ECON 9: "We recognise and support collaborative economic partnerships at a local, sub-regional and inter-urban scale and recognise its capacity to act as a multiplier delivering growth of scale. We will work with project proponents, neighbouring local authorities, state agencies and statutory providers to build and enhance our networks, our shared assets and specialism and identify and support strategic opportunities particularly through the provision of sustainable and shared infrastructure."

The Waterford CDP acknowledges that the green economy will provide opportunities for investment and employment creation in emerging sectors such as renewable energy, energy efficiency and waste and water management.

In addition, the CDP states in ECON 20 "*We will support the development of sustainable economic pathways to achieve a reduction in our CO2 emissions across all sectors and the development of low carbon and green tech businesses and industries throughout Waterford Cit and County."*

Tourism

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

Failte Irelands Annual Report 2023[18] states that Ireland welcomed 6.3 million overseas tourists in 2023 (note that this data does not include overseas tourists arriving in the Republic of Ireland via Northern Ireland, and therefore does not account for all overseas inbound tourists to the Republic of Ireland).

In relation to domestic tourism (tourism involving residents of one country traveling only within that country), the Fáilte Ireland 2023 data reports 14.3 million domestic trips in 2023, an increase of 23% on 2019. There were 5.7 million trips to friends/relatives in 2023 up by 49% on 2019.

Failte Irelands Annual Report 2023[19] states that Ireland welcomed 6.3 million overseas tourists in 2023. United Nations World Tourism Organisation (UNWTO) World Tourism Barometer states that "*International tourist arrivals reached 80% of pre-pandemic levels in the first quarter of 2023… boosted by strong results in Europe and the Middle East, compared to a 66% recovery level for the year 2022 overall"*.

Waterford[20] is also a part of Ireland's Ancient East. The Ireland's Ancient East is a tourism initiative covering 12 counties, connecting the past and the present. Three of the areas covered are the Land of 5,000 Dawns, the Historic Heartlands, and the Celtic Coast. The Ancient East initiative centres around the brand of "*a personal experience of 5,000 years of Europe's history. Your journey of discovery in this relaxing, off the beaten track, lush, beautiful landscape, that attracted warring settlers for millennia, will be made illuminating by stories from the best story tellers in the world".* It is aimed at those who want "*to go off the beaten track to experience*

[18] Fáilte Ireland Annual Report 2023

[19] Fáilte Ireland Annual Report 2023

[20] Discover Ireland – Historical Waterford. https://www.discoverireland.ie/waterford (Accessed on 19 July 2023)

thousands of years of history" (Tourism Development and Innovation: A Strategy for Investment 2016-2022, 2016)[21] and is based around the overarching theme:

- 5000 years of European history, lush green landscapes and stories told by the best storytellers in the world.

Waterford has a strategic location in the southeast and regional connectivity through the road network and Irish rail, to the surrounding counties such as Kilkenny, Wexford, and Cork. Further Waterford has its own airport and port positioning it as a focal point of the Southeast Region.

The Waterford CDP states that this plan aims "*to support the marketing and promotion of Waterford City and County, as a significant tourism destination, by continuing to work with and develop the Visit Waterford Destination Marketing Group"* and includes amongst its strategic aims:

ECON 28 of the CDP is: "*To support the development of any update to Waterford's Tourism Statement of Strategy and Work Plan (2017-2022), and to support the creation of a Strategy for the further development of Greenways, Blueways and Trails in County Waterford incorporating walking, cycling and other activities to support tourism development, and to assist in seeking funding opportunities for their development".*

The CDP states its core aim in relation to Tourism is to develop the Council's key flagship projects within the lifespan of the plan including but not limited to:

- The North Quays Regeneration Project
- The "Guardian of the Déise" Project
- Extending the Greenway to the west of Dungarvan

The CDP outlines the following Strategic Objective in relation to Economic development and tourism:

ECON 22: "*We will cooperate with various stakeholders and tourism agencies to build on the strengths of Waterford City as the regional capital, Dungarvan as a Key Town and County Waterford in their promotion as a tourism destination of choice".*

The CDP summarises some of the recent key tourism related developments that enhance Waterford. These include, but are not limited to the following:

- The Viking Triangle
- Relocation of House of Waterford Crystal
- Five Waterford Treasures Museums: Medieval Museum, Bishop's Palace, Reginald's Tower, Irish Silver Museum and Irish Museum of Time
- The Waterford Greenway
- Lismore Heritage Centre

The closest significant visitor attraction, Mount Melleray Abbey, is located approximately 2.5 km from the proposed wind farm site. Mount Melleray Abbey is a community of Cistercian (Trappist) monks and was founded in 1832 by a colony of Irish and English monks expelled from the abbey of Melleray after the French Revolution of 1830. Today, the abbey continues to be a tranquil religious community, however it has been announced in national media that the abbey will close in January 2025. The exhibition centre outlines the history of Mount Melleray in word

[21] https://www.gov.ie/pdf/?file=https://assets.gov.ie/6952/b157ba5f78b04009b5cb413b029e2f0a.pdf#page=null (accessed 14/05/24)

and picture, through a series of panels. Lismore Castle is a popular attraction in Lismore town (approximately 7 km from the nearest element of the proposed project, the proposed TDR works at Affane Cross, or 9 km southwest of the proposed wind farm site), which hosts the annual Lismore Opera Festival and the Lismore Castle Gardens are also a popular tourism attraction in the area.

The Vee Scenic Drive is located approximately 8.3 km northwest of the proposed wind farm site and is famous for its panoramic views of mountains and valley's whilst driving through the Knockmealdown Mountains. The views are mostly available when driving in a northerly direction (i.e. moving away from the proposed project). This route is extremely popular with cyclists and walkers due to the challenge of the climb. The Knockmealdown Mountains themselves are generally a tourist attraction also due to their scenic nature and suitability for walking, etc. There is a motorsport facility located <1 km to the southeast of the proposed wind farm site. There are no significant other tourism facilities within or directly adjacent to the proposed TDR works areas or the proposed GCR. Works associated with the proposed GCR and proposed TDR will be transient in nature and therefore have a brief impact at any one location.

The recreation features described below also form tourist attractions in the study areas (Cappoquin (25058), Modelligo (25068), Ballyhane (25054), Ballynamult (25056), and Newcastle (23128)) around the proposed project.

Recreation

Waterford, including the study area surrounding the proposed project, features a high level of amenity used for walking and hiking, including national looped walks, waymarked routes, hills and mountains.

The nearest walking trails identified in the vicinity of the proposed wind farm is the Mount Melleray Pilgrim Paths, and St. Declans Way, both situated to the west of the site. The Pilgrim walking trails of Mount Melleray collectively cover over 30 km of track in the lower hills of the Knockmealdown Mountains. Mount Melleray is now a leading spiritual centre in Ireland, attracting visitors from all over the world. Glenshelane which is southwest of the site is home to two walking trails and a Grotto Walk. They collectively cover 8.25 km. The trails follow the forest road out along the wooded Glenshelane River and returns on the other, the Grotto walk branches off into the western glen along the combined Monavugga and Glenfallia Rivers to where the converge. They are designated as National Waymarked Trails by the National Trails Office of the Irish Sports Council (Sport Ireland). St. Declan's Way also passes to the west of the proposed wind farm site. St. Declan's Way is a modern walking route linking the ancient ecclesiastical centres of Ardmore in County Waterford and Cashel in County Tipperary. Following full waymarking, St. Declan's Way becomes the sixth, and most recent, addition to the official Pilgrim Paths of Ireland. It is now the longest official Pilgrim Path in Ireland[22]. The St. Declans Way route to the west of the site is also designated as a recreational route on the Waterford County Development Plan Transport Map.

[22] https://www.stdeclansway.ie/about/ (Accessed 6th September 2023)

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621000
604000
587000

Clonmel
Carrick-on-Suir
M8
N24
N25
N72
Newcastle Paric Ard Playground and open space
Recreation Forest - Kilclooney
Kilmacthomas
Old Road - Filed Sports
County Waterford
Lismore Golf Club
Lismore
Lismore Soccer Field
Cappoquin
Recreation Forest - Glenshelane
Recreation Forest - Colligan
Tallow
Dungarvan

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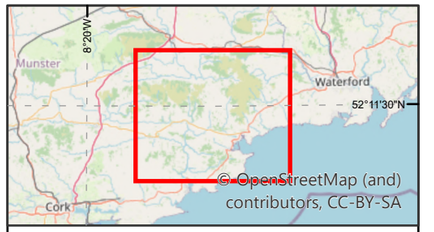

Legend

- Proposed project
- Recreational Centers

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NOTES

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Rev	Date	Description	By	Chkd.
A	13/12/2024	First issue	S.P	J.S

Client: Ireland FuturEnergy

Project: Scart Mountain Wind Farm

Title: Figure 5-4: Recreational sites within the vicinity of proposed wind farm site

Scale @ A3:	1:150,000	
Prepared by:	Checked by:	Date:
S.Pezzetta	J.Dillon	December 2024

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Map Ref: 11303-042-RCS-S.BO-TOB-A

Draft: A

Modelligo GAA club is located adjacent to the proposed GCR in Modelligo. Works associated with the proposed GCR and proposed TDR will be transient in nature and therefore have a brief impact at any one location.

Amenities and Services

A number of community facilities and amenities are available in the locality, with Cappoquin and Lismore providing the nearest at c.5 km and 12 km southwest of the proposed wind farm site, respectively. The town of Cappoquin is larger than Lismore, with more facilities and services present within the town.

Within the town of Cappoquin there are several facilities and services including a community centre, a garda station, a post office, a health centre, a library and a large supermarket. Some of the largest individual local employers are located within the Cappoquin industrial estate. There are also number of restaurants and cafes within the town and accommodation (B&B's / hotels / holiday homes). The town of Cappoquin also features St. Athanasius Coptic Monastery and Cappoquin House and Gardens. Furthermore, there are outdoor amenities (parks/walks), a football club (Cappoquin Football Club), a soccer club (Railway AFC), a rowing club (Cappoquin Rowing Club) and a GAA club (Cappoquin Affane GAA Club).

Lismore village has a number of services including retail shops, restaurants and pubs. There is a secondary school, Blackwater Community school in the village as well as an active GAA club (Lismore GAA Club).

Further amenities and services are available in the larger towns of Dungarvan (within 2 km of the GCR) and Waterford City (near the eastern end of the proposed TDR).

The works associated with the proposed GCR and proposed TDR are described in detail in Chapter 2 of this EIAR (Description of the Proposed Project). The nearest amenities and services to the these (shopping, accommodation, amenities, food, etc,) can be found in Cappoquin and Dungarvan, while Waterford City is near the localised works at the northeastern end of the proposed TDR.

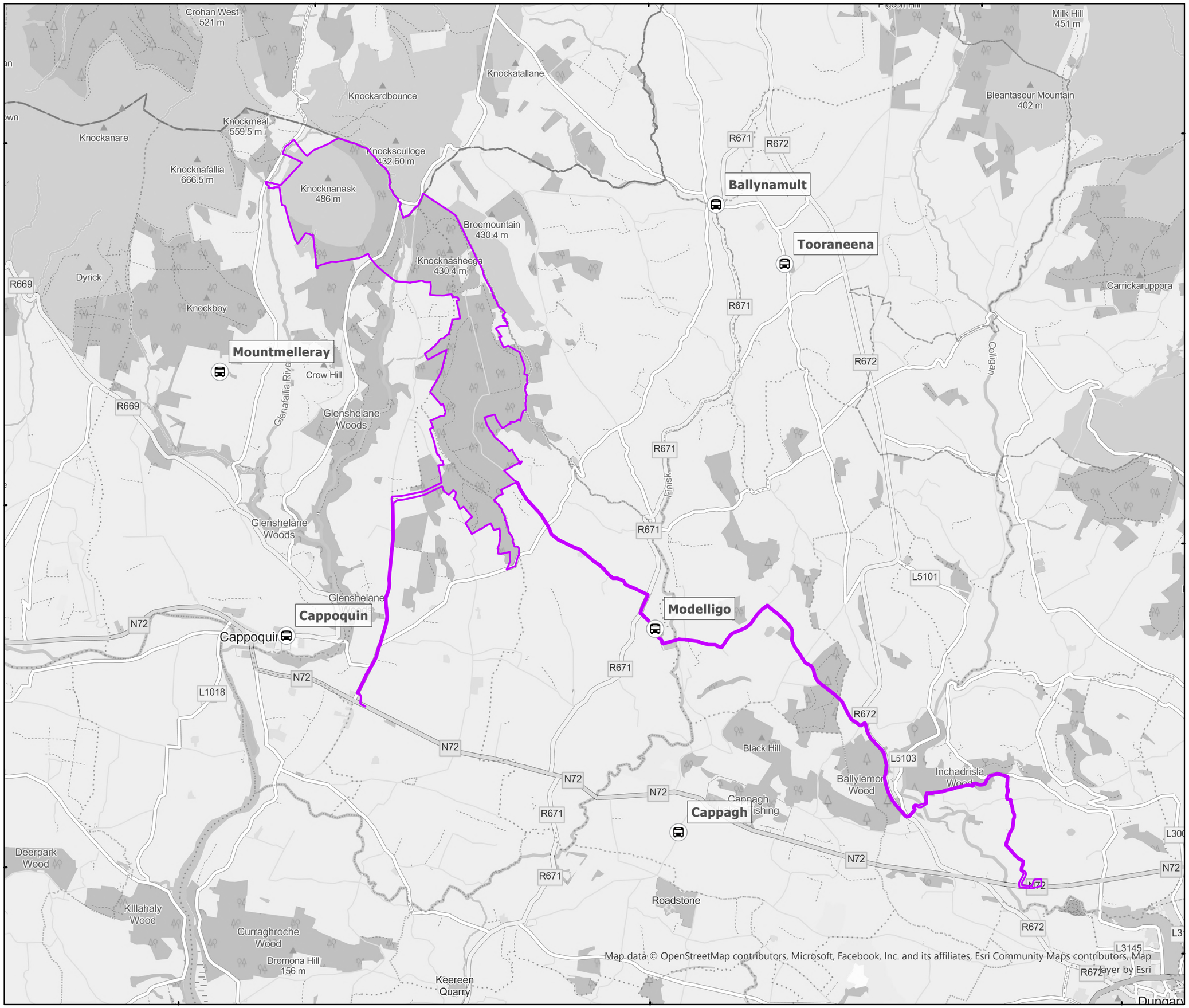
In terms of transport servicesm the nearest National Road is the N72, which is situated to the south of the proposed wind farm site (within approximately 4.75 km of the proposed wind farm site at the nearest point), running in a north-east south-west direction, connecting Lismore and Cappoquin. The N72 provides access to the area around the site and is an important route within the County which extends from Dungarvan to Killarney. The eastern end of the proposed GCR reaches the N72 road.

The wider road network in and around the proposed wind farm site includes the R669, R671, and R672 Regional Roads. The proposed wind farm site will be accessed via the L5055 and L5054 (the latter of which will be for operational phase light vehicles only) local roads, which both tie-in with the L1029. The L5055 and L5054 local roads run in a north-south direction to the west of the site. The site lies between the R671 and the R669, on the southeastern side of the Knockmealdown Mountains. The R671 intersects with the R672, which runs in a north-south direction, crossing the Finisk River, and is situated to the east, c. 2.5 km from the proposed wind farm site at the nearest point. The R669 route is situated to the southwest (c. 3 km from the proposed wind farm site at the nearest point). See Figure 1-1 of this EIAR for an overview of local roads.

Public transportation is available in the wider area around the proposed project but is limited to services provided by road. Transport for Ireland (TFI) and a number of private companies operate buses in the area around the proposed wind farm site and proposed GCR which provide a link to national routes through Waterford City and to the west of the county and Cork, Wexford and Dublin. TFI operate the 'Waterford TFI Local Link Bus Services'[23], which serves a number of stops in the county and vicinity of the proposed project including, Ballynamult, Tooraneena, Cappagh, Cappoquin, Mount Melleray and Modeligo (See Figure 5-5). Inter-city bus services connecting Waterford to a number of destinations across Ireland are available including the Waterford to Galway, Dublin to Waterford Expressway Route (Bus Éireann)[24].

[23] https://www.transportforireland.ie/plan-a-journey/network-maps/waterford-tfi-local-link-bus-services/ (accessed 14/05/24)

[24] https://www.buseireann.ie/inner.php?id=243 (accessed 14/05/24)



Legend

- Proposed project
- Local Bus Pickup Points

0 1.5 3
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NOTES

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Rev	Date	Description	By	Chkd.
A	13/12/2024	First issue	D.E	J.D

Client: FuturEnergy Ireland

Project: Scart Mountain Wind Farm

Title: Figure 5-5: Local bus service locations

Scale @ A3: 1:60,000

Prepared by:	Checked by:	Date:
D.Ekpo	J.Dillon	December 2024

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Map Ref: 11303-030-BUS-PHH.Area-TOB-A

Draft: A

The nearest train services available are the Waterford Plunket – Dublin Heuston and Waterford – Clonmel – Limerick Junction (connections with Dublin, Cork, Limerick and Galway) operated by Irish Rail. The nearest train stations to the proposed project are; Clonmel, Carrick-on-Suir and Waterford Plunkett.

A number of primary schools[25] and pre-schools were identified in the vicinity of the proposed project. A 5km radius surrounding the proposed wind farm site was utilised to carry out this search as it encompasses the schools those living within the 2 km buffer (as discussed above) are most likely to attend. The following four were identified within 5 km (i.e. encompassing any potential areas for effects from noise, shadow, etc.) of the proposed wind farm site:

- Cappoquin Community Childcare Facility Creche and Pre School (P51 E2NV), Cappoquin (approximately c.4.3m southwest of the proposed wind farm site boundary, situated along the N72. Approximately 2.1 km from the TDR works at Affane Cross);
- Modelligo National School (X35 HK12), Modelligo (approximately c. 2.2 km southeast of the proposed wind farm site boundary, situated along the R671. Approximately 150m from the proposed GCR at it nearest point);
- St Mary's National School (E91 K6W7), Tooraneena (approximately c. 4.8 km northeast of the proposed wind farm site boundary, situated along a local road); and
- Bunscoil Gleann Sidheain (P51 E732), Cappoquin (approximately c. 3.5 km southwest of the proposed wind farm site boundary, situated along the R669. Approximately 1.3 km from the proposed TDR works at Affane Cross).

St. Josephs Primary School in Dungarvan and Glenbeg National School in Glenbeg are also located approximately 3 km and 4.5 km from the eastern end of the proposed GCR respectively. Whitechurch National School is located approximately 4.5 km southeast of the proposed TDR works at Affane Cross.

Approximately three post-primary schools[26] were identified providing second level education within 15km of the proposed wind farm site:

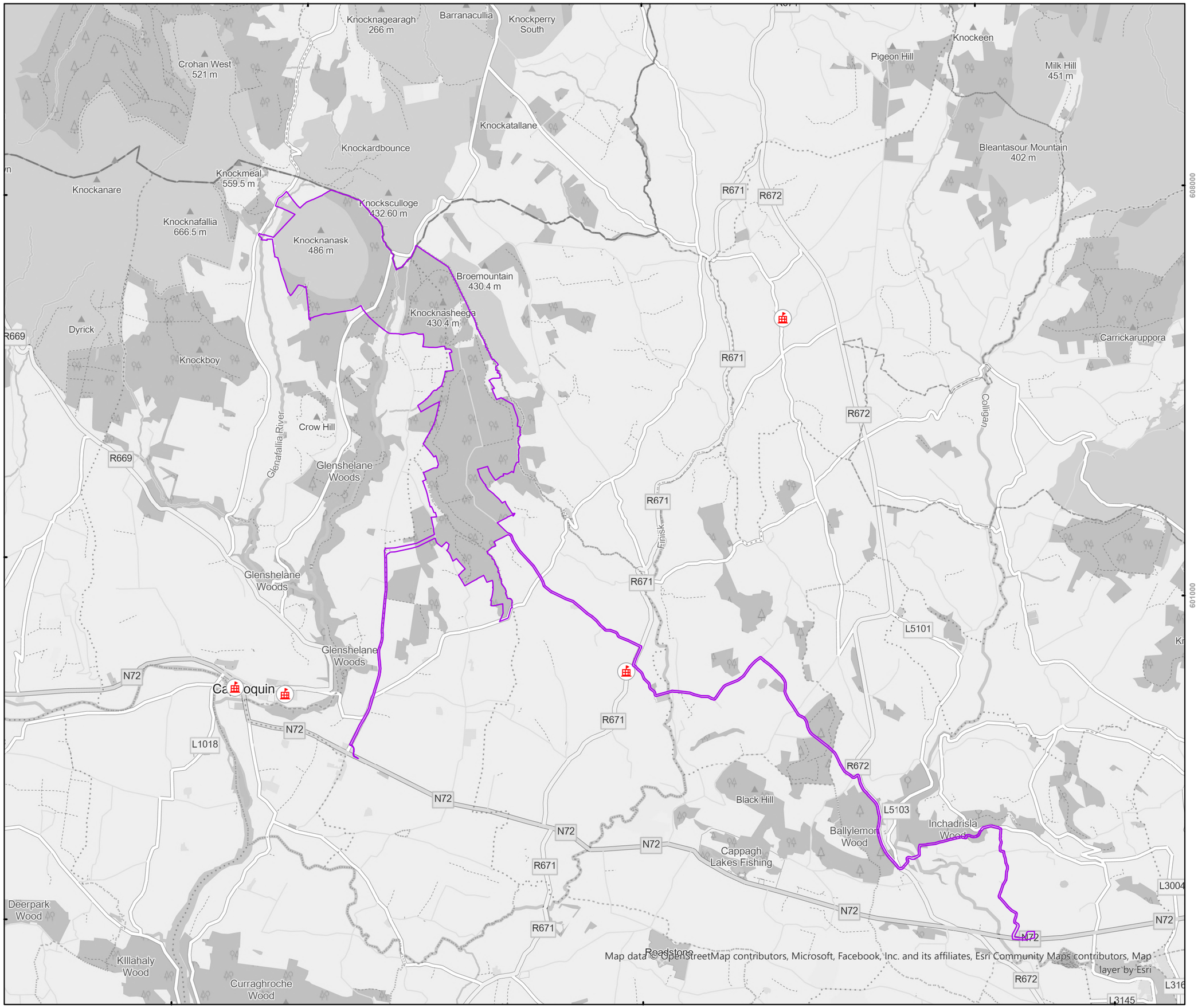
- Blackwater Community School (P51 N472), Ballyanchor (approximately c.10km southwest of the proposed wind farm site boundary, situated along the N72);
- St Augustine's College (X35 AH76), Dungarvan (approximately c.14.6km southeast of the proposed wind farm site boundary (or approximately 4 km east of the end of the proposed GCR), situated along the R675); and
- Dungarvan College (X35 PV34), Dungarvan (approximately c. 13.2km southeast of the proposed wind farm site boundary (or approximately 2.7 km east of the end of the proposed GCR), situated in Dungarvan town).

The schools nearest the works at the northeastern end of the proposed TDR are based in Waterford City and its suburbs.

[25] Primary Schools identified through Schooldays and Google Maps, distance noted is between school and nearest point of wind farm site boundary - https://www.schooldays.ie/articles/primary-Schools-in-Ireland-by-map (accessed 14/05/24)

[26] Secondary Schools identified through Schooldays and Google Maps, distance noted is between school and nearest point of wind farm site boundary - https://www.schooldays.ie/articles/secondary-Schools-in-Ireland-by-map (accessed 14/05/24)

The nearest large third level institutions are the South East Technological University (X91R156) (approximately c.44 km northeast of the proposed wind farm) and the University College Cork (T12 K8AF) (approximately c. 56 km southwest of the proposed wind farm).



Legend

- Proposed project
- Schools within the study area

0 1.5 3
Kilometres

NOTES

1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING\
2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE\
3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY \ WORK COMMENCES\
4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

A	13/12/2024	First issue	S.P	J.S
Rev	Date	Description	By	Chkd.

Client: Ireland FuturEnergy

Project:

Scart Mountain Wind Farm

Title:

Figure 5-6:
Schools within the vicinity
of proposed wind farm site

Scale @ A3:	1:60,000	
Prepared by:	Checked by:	Date:
S.Pezzetta	J.Staunton	December 2024

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Map Ref: 11303-031-SCH-PHH.Area-TOB-A

Draft: A

5.3.2 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 project is confidential and difficult to establish, as has been detailed in Section 5.2.2, a community profile is identified below to establish the baseline health profile of the study area and compare this profile to the rest of the country.

A group made up of the Health Services Executive (HSE) and the Irish Health Repository (IHP), known as Lenus, have published separate health profiles for all the Local Authorities areas in Ireland. The most recent County Health Profiles published are from 2015[27] (Lenus, 2015) and establish a community health profile for County Waterford in which the proposed project is situated.

The key facts in the 2015 Health Profile relating to County Waterford are:

- Has a high dependency ratio of 55.9% (i.e. those aged 0-14 and 65 and over as a percentage of the number of persons aged 15-64) compared to national average of 49.3%;
- Is one of the least ethnically diverse areas in Ireland with 90.3% of the population white Irish (national 84.5%) and the lowest percentage of Travellers at 0.2% (national average 0.7%);
- Has a low birth rate for all females and females under 20 years of 12.9 and 11.3 respectively compared to the national rates of 15.8 and 12.3 respectively;
- Cancer incidence rates are average or below average for all cancers, except for male malignant melanomas and male lung cancer which has the highest rate nationally (City & County data);
- Has average or below average death rates for all causes, except deaths due to cancers which are above average (City & County data).

It is important to realise when viewing these figures that they relate to the administrative area of County Waterford. A separate Health Profile for Waterford City exists. While we can take this published data as being correct, it may not necessarily accurately reflect the health profile of smaller areas which are within the study area and close to the proposed project.

In 2020, the Central Statistics Office (CSO) published it's second "Irish Health Survey"[28], the data for which was collected in 2019 and early 2020. 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 on their data, it will be possible to compare how the Irish health experience compares to that of our EU neighbours. 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;

[27] Waterford County.pdf (lenus.ie) (Accessed on 18 August 2023)

[28] https://www.cso.ie/en/releasesandpublications/ep/p-ihsmr/irishhealthsurvey2019-mainresults/introductionandkeyfindings/ (accessed 14/05/24)

- 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).

The Census 2016[29] responses regarding general health[30] found that 87% of the Ireland's population felt they had 'Very Good' or 'Good' health, down slightly from 2011 when it was 88.3%. Nearly six in ten or 59.5% of men felt their health was 'Very Good', compared with 59.3% of women. The census results also clearly show the decline in general health with age, with 79% of 15-19 year olds in 'Very Good' health, compared with those aged 40-44 (58.6%) and 65 to 69 (31.3%). Census 2016 responses for Waterford indicated the percentage of persons with 'Very Good' and 'Good' health was 87% (50,1664 Males / 50,922 Females), while 8.3% indicated they were in 'Fair' health, and 3.4% (1,971 Males / 1,982 Females) indicated they were in 'Bad' to 'Very Bad' health. The 2016 census also indicated that there are 16,675 (8,222 Males / 8,453 Females) with disabilities living in Waterford, and that there are 4,817 (1,919 Males / 2,898 Females) carers in the County.

The map of deprivation included in the County Health Profile shows that the study area in which the proposed project is situated is disadvantaged as shown in **Error! Reference source not found.**.

A review of latest deprivation indices (2016) by ED available from Pobal[31], shows that the EDs in which the proposed project is situated/adjacent to are marginally above average and marginally below average. The ED of Cappoquin and Ballyhane are both marginally below average and the EDs of Modelligo and Ballynamult are both marginally above average (relating to the proposed wind farm site). The EDs of Colligan and Modelligo (additional EDs for the proposed GCR) are both marginally above average, while the EDs of Kilmeadan and Rathpatrick (additional EDs for the proposed TDR works) were marginally above and below average respectively. The study area for this Human Health assessment is the same as that for the Population assessment above (see Figure 5-2).

[29] https://www.cso.ie/en/csolatestnews/presspages/2017/census2016profile9-healthdisabilityandcarers/ (accessed 14/05/24)

[30] https://www.cso.ie/en/statistics/health/ (accessed 14/05/24)

[31] https://maps.pobal.ie/WebApps/DeprivationIndices/index.html - Pobal administers and manages Government and EU funding to address disadvantage and support social inclusion (accessed 14/05/24)

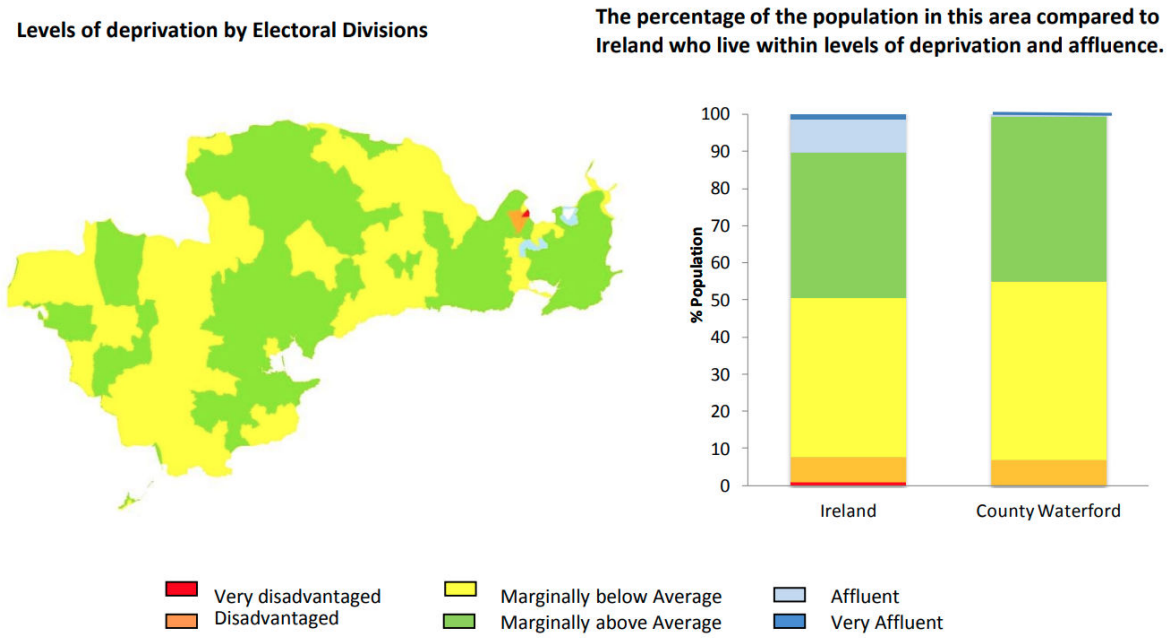

Figure 5- 7 :Map of Levels of Deprivation in County Waterford (Source: Extract from Health Profile 2015 Waterford)

As outlined previously, it is not possible or necessary to identify every vulnerable individual. 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 are as diverse as humans themselves but can include asthma, autism, and those with psychological illness. It is important to note that Health Standards are set for the vulnerable and not for the robust.

The emergence of the Covid-19 virus in Ireland in the early part of 2020 presented a new human health risk and concern amongst the general public across the country and within the proposed project study area. Public health measures, including varying levels of restrictions, have been implemented since 2020 and the long-term effects of the virus on national and local human health is not currently known.

5.4 POTENTIAL EFFECTS

5.4.1 DO NOTHING EFFECTS

In the Do-Nothing Scenario, the existing lands will continue to be utilised for forestry and agricultural purposes with little or no changes in the baseline at the site. Activities such as periodic tree felling and livestock grazing will continue with the associated movement of equipment and personnel remaining the same.

The opportunities for local employment and additional economical spend along with the community benefit fund from the proposed project will not be realised.

In the Do-Nothing Scenario, there will be no emissions generated from construction works (and therefore no associated impacts on air quality and dust that might affect human health) and no potential for noise, shadow flicker or visual effects associated (which could also have an effect on human health) with wind turbines operating at this site.

The health benefits to the country associated with replacing fossil fuels with renewable wind energy from the proposed project will be lost as will the potential of this site to contribute to Ireland's targets to reduce carbon emissions from the electricity sector.

TDR & GCR

The proposed works areas along the TDR and the GCR would be likely to remain as they currently are, with no effects anticipated.

5.4.2 POPULATION

5.4.2.1 Construction Phase

Land Use

The construction of the proposed project will involve permanent land use change primarily for the excavation of borrow pits, the turbine hard standings and new site roads, etc.. The infrastructure is likely to be constructed beginning at the southern part of the site and will take place gradually over the first 12-18 months, so not all infrastructure locations will see impacts at the same time. The construction itself may have short term slight negative effect on the forestry operations within the site, as access to the site for forestry operations is likely to be restricted to only essential works. Significant felling in particular will be postponed for the 24 month construction period. There will also be a short-term, negative effect due to the forestry felled for the construction compounds, which will be returned to forestry use on completion of the construction works which is anticipated to last for c. 24 months. The access roads will remain in place which will have a permanent positive effect on forestry land-use, improving access to the commercial crop while the hardstandings will be allowed to revegetate naturally after the operational phase. Necessary forestry and agricultural activity will be able to continue on the wider proposed wind farm site during the construction phase.

For the proposed GCR, the transportation land use of the road corridors will be maintained through the operational phase and will only briefly be impacted during the construction phase as the works are transient in nature. Table 5-7 Provides an overview of the land use changes associated with the proposed project.

Table 5- 6: Estimated changes in land use associated with the proposed project compared to the current situation.

Land Use Type	Approx area difference during the construction phase (ha)	Approx area difference during the operational phase (ha)	Approx permanent area difference (ha) after decommissioning
Forestry*	Between -71 to -79	Between -70 to -78	Between -70 to -78**
Agriculture	-5.8	-5.8	-3.4
Transportation (road corridor)	-250 metres road length at any one time	-	-
Renewable energy production	Between +76.8 to +84.8	Between +75.8 to +83.8	-

*It is important to note that while there is a loss of forestry proposed on the proposed wind farm site, it will be replanted offsite at another location within the state to compensate and ensure no nett loss of forestry.

**This area will not be unused and allowed to revegetate after decommissioning if it is not redeveloped again for wind energy

TDR & GCR

The proposed project will not have a significant effect on the transportation land use of the public road corridors during the construction phase, although some temporary localised diversions and traffic management will be utilised in some road sections. The same applies to the private farm and forest tracks that will be used to accommodate the GCR. There will be changes to the land use for the farmland and forestry being utilised for the works, as those lands will then be used to accommodate electrical infrastructure. This will have a permanent slight neutral effect.

Population

In 2021 Wind Energy Ireland (WEI), published a report, on the economic impact of onshore wind in Ireland[32]. The report identified that the wind energy sector currently supports 5,130 jobs[33] throughout the sector including its supply chain. The report also highlighted the potential to grow jobs throughout the sector and its supply chain to 7,020 jobs. 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.

In terms of the population within the vicinity of the proposed wind farm site, the effect of these jobs on local population levels and density is likely to be a short-term increase in construction workers staying in local accommodation in the area over the period of c. 24 months which will add value to the local economy. The wind farm development and associated works is expected to employ up to 87-116 people during the construction phase (this point is discussed further below).

This would be a positive direct short-term effect on population as a result of the proposed project being constructed.

TDR & GCR

There would be no additional effects specifically from the TDR and GCR relating to population.

Sensitive Receptors and Residential Amenity

Access to the proposed wind farm site will be via the L5055 and L5054 (the latter of which will be for operational phase light vehicles only) local roads. The potential traffic effects are discussed in detail in Chapter 16 (Traffic and Transportation).

Negative effects on residential properties and the local population as a result of the construction works, will include increased traffic movements, increased potential for local noise and air quality (including dust) emissions culminating in the corresponding potential for these works to impact on local residents' enjoyment of their homes (i.e., residential amenity).

[32] https://windenergyireland.com/images/files/economic-impact-of-onshore-wind-in-ireland.pdf (accessed 14/05/24)

[33] This figure does not include employment in grid development by some players and is therefore a conservative estimate (WEI, 2021).

In this regard the haul roads proposed are existing public roads which are already used by heavy goods vehicles (HGVs), however there will be a short-term increase in effects during the construction phase due to the increased vehicle trips and on-site construction activity.

The design of the proposed project has included a set-back distance of >800m (which is greater than 4 times the tallest tip height being considered) between the curtilage of all sensitive residential receptors (or greater from houses) and the proposed turbine locations, which will reduce the potential for the construction of the wind turbine infrastructure to have a significant effect on residential amenity. The closest borrow pit location is just over c. 450m from the nearest sensitive residential dwelling curtilage. The proposed onsite substation is just over approximately 250m from the nearest sensitive receptor dwelling curtilage There are 3 no. sensitive residential receptors located with 100m of the site entrance. There will be some additional works required along the proposed TDR, however these are small scale and transient in nature. Works along the proposed GCR will also be transient in nature, lasting only for a few days at any particular location. The majority of the proposed GCR is located in the public road corridor and will pass by significant number of residential dwellings. These works on the proposed GCR and proposed TDR may result in temporary localised noise and dust emissions, and there may also be some traffic management implications for road users. Although these proposed TDR works will be located near sensitive receptors, they will be similar in scale and effect to any other localised, small scale road works that might be carried out. These effects are assessed in detail in the Chapter 9 (Air Quality and Climate), Chapter 12 (Noise and Vibration) and Chapter16 (Traffic and Transport).

Based on the above predicted effects to residential amenity (including noise, dust and roads), the construction phase will likely have a moderate, negative effect on the local population and will be short-term in nature.

TDR & GCR

The construction works along the TDR and GCR would result in effects relating to traffic, noise and dust, as assessed in Chapter 9 (Air Quality and Climate), Chapter 12 (Noise and Vibration) and Chapter 16 (Traffic and Transport). These works are, however, transient in nature and as such many of these effects are minimised. The TDR works at Affane Cross are temporary in nature and the area will be reinstated at the end of the construction phase.

Combined, these would have a temporary slight negative effect on sensitive receptors and residential amenity for the GCR and TDR.

Property Value

It is not anticipated that the construction phase works for the proposed project will have any significant effect on the local property values.

Construction works for the proposed wind farm site will be carried out within the site boundary and construction traffic travelling to/from the site will be short term and use existing public roads. The works along the proposed TDR and proposed GCR will be localised, relatively minor and temporary.

Based on the above, there are no anticipated effects on property value in the area of the proposed project during the construction phase.

TDR & GCR

There would be no additional effects specifically from the TDR and GCR relating to property value.

Employment/Economy

The proposed project will create and support direct and indirect employment during the construction phase at local level, primarily through local construction workforce on site, and at a national level, through more specialised construction services and supply of building materials. It is anticipated that the proposed project will have the following effects locally:

- Development activities such as site monitoring/surveys, site investigations, 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.

A 2020 study by the UTS Institute for Sustainable Futures[34] on job creation for wind energy projects found that wind energy can support approximately 2.84 jobs per MW during the construction phase. Based on the proposed project capacity of between 85.5-108 MW, this equates to between approximately 243-307 jobs for the construction phase.

Guidance from an earlier 2009 IWEA study[35] 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 project capacity of between 85.5-108 MW, this equates to between approximately 128-162 jobs across a number of different sectors. The study (from 2009) estimated that 68% of the Irish jobs created are in the construction industry. It is therefore estimated that between 87 to 110 persons will be directly employed during the peak construction period. A report from the Sustainable Energy Authority of Ireland in 2015[36] estimated that 1.07 direct construction jobs would be created per MW. This would predict, based on the proposed output range, that the proposed project would create between 91 – 116 direct jobs for the construction phase.

Based on all of the above, and considering the lowest and highest estimates, it is considered that the proposed project construction phase will support between 128 – 307 jobs, of which between 87 – 116 will be direct construction jobs.

The area will experience a benefit from secondary investment associated with increased visitors and spend within the area. 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. Construction materials such as quarried products and concrete supplies will be sourced locally and will support local business (see Chapter 11 Material Assets, Section 11.3.3 for a list of identified quarries). Throughout the construction phase, there is potential that plant, equipment and associated operatives can be sourced locally. Indirect employment opportunities will be created in the region through increased quarrying activity and off-site concrete batching as well as potential increased employment in the local hospitality and café/restaurant industries driven by use of

[34] https://assets.cleanenergycouncil.org.au/documents/resources/reports/Clean-Energy-at-Work/Institute-for-Sustainable-Futures-renewable-energy-jobs-methods-report.pdf (accessed 14/05/24)

[35] IWEA and Deloitte, *Jobs and Investment in Irish Wind Energy: Powering Ireland's Economy* (2009) (accessed 14/05/24)

[36] https://www.seai.ie/publications/A-Macroeconomic-Analysis-of-Onshore-Wind-Deployment-to-2020.pdf (accessed 14/05/24)

the facilities by construction staff. 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 project, have the combined potential to support 10,120 jobs (person-years) during construction between 2020 and 2030.

As previously mentioned, the 2021 WEI report on the economic impact of onshore wind in Ireland identified that the wind energy sector currently supports c. 5,130 jobs throughout the sector and its supply chain and has the potential to grow jobs throughout the sector to c. 7,020 jobs. The WEI report 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".*

Currently, the sector supports payment of labour incomes equalling €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 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)".*

The proposed project will also make a valuable contribution to Waterford City and County Council's economic aims for further development of its green economy.

The construction of the proposed project will have an estimated capital cost in the region of between €111.2 million to €128.7 million[37] and an estimated 11% of the total capital cost will relate to site works[38] 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 169 MW wind farm project estimated that €20 million was spent with local suppliers and contractors within 30 kilometres of the site during construction".*

This EIAR chapter considers the biodiversity enhancement lands which form an ecology/ornithology mitigation measure for the project, however it is considered that this is limited to guiding a particular future land management style with no excavation/construction required for any of the lands outside the proposed wind farm site. There will be some felling works required as part of this on a parcel of land within the proposed wind farm site. There will be a slight long term positive effect on the local economy associated with this mitigation measure as the landowners receive financial compensation for managing the lands in a particular way. This mitigation measure associated with the proposed project will have no other impact on Population and Human Health.

Based on all the above, the construction phase of the proposed project will have a short-term, slight and positive effect on employment and the economy in the study area and the Southeastern Region.

TDR & GCR

The works for the TDR and GCR would result in a short term slight positive effect on employment and economy as a result of the increased local spend (for wages and material supply).

Tourism & Recreation

As set out in Section 5.3.1, there are a number of tourism attractions and public amenities in the vicinity of the study area including Mount Mellary Abbey and Lismore Castle and walking/hiking trails such as Mount Melleray Pilgrim Paths and Glenshelane walking trails.

No designated tourist sites or walkways/trails were identified as intersecting with the proposed wind farm site directly or along the haul routes. The nearest walking trail to the proposed wind farm site is St. Declans Way, which runs along the northwestern side of Knocknanask and is located approximately 500m from the red line boundary. There are some small overlaps along the proposed TDR with the Waterford Greenway [39] . Any disruptions to this route will be brief and not significant. The proposed GCR overlaps with the Colligan Wood walking trails [40]. The 1.5 km of the GCR will run through the Coillte forestry. The construction period for this section of the GCR is anticipated to take 6-8 weeks. The closure of this route will have a temporary effect but the route will reopen as a walking/hiking trial following the construction at this location. There will be a slight localised effect on tourism in the Knockmealdown Mountains

[37] Using an average investment cost of €1.3 million per MW – SEAI, *A Macroeconomic Analysis of Onshore Wind Development to 2020* (2015)

[38] Irish Wind Farmers Association - FAQ | Meitheal na Gaoithe Irish Wind Farmers Association (mnag.ie) (accessed 14/05/24)

[39] Waterford Greenway Walking Trail | Sport Ireland (accessed 14/05/24)

[40] Colligan Wood - Coillte (accessed 14/05/24)

during construction due to the operation of machinery (noise, visual and closing of public access to certain areas during construction.

Section 13.3.3.1 of Chapter 13 discusses the potential impacts on scenic views and routes in proximity of the proposed wind farm site.

Occasional/temporary traffic effects due to movement of project vehicles and plant/machinery and the requirement for abnormal loads related to the delivery of the turbines to site may impact local road traffic during the construction phase. Oversized loads will occur at set times and along designated routes. Potential for effects to local traffic and visitors to the area will be short-term, intermittent, and not significant.

No other direct or indirect effects on tourist or recreational attractions are predicted. Measures to be employed by the appointed Contractor during the construction works to ensure the health and safety of tourists and the general public are outlined in the Construction Environmental Management Plan (CEMP) in Appendix 2-8.

It is predicted that the proposed project will have a slight, short-term and negative effect on local tourism during construction due to the increased road traffic movements during the construction period (See Chapter 16 (Traffic & Transport).

TDR & GCR

There would be no additional effects specifically from the TDR and GCR relating to tourism and recreation.

Amenities and Services

During the construction phase of the proposed project there are no anticipated effects on local amenities and services. Community facilities, public transport and schools will not be affected by the construction works.

TDR & GCR

There would be no additional effects specifically from the TDR and GCR relating to amenities and services.

5.4.2.2 Operational Phase

Land Use

The proposed project will involve permanent works on the existing land primarily including turbine foundations, hardstand areas at turbines, internal roads and an on-site substation. The proposed infrastructure will cover an area of 31 ha within the proposed wind farm site area of ha, which represents 3.18% of the total proposed wind farm site. The forestry land use within the infrastructure area will be permanently lost (with the exception of the temporary construction compound areas and borrow pits which will be replanted post construction and therefore will be a temporary loss), however replacement forestry lands will be planted elsewhere in the state. There will be a wind farm located on the site which will create a long term commercial land use within the site, producing clean renewable energy which will have a long-term moderate positive effect on land use. At the end of the operational phase the wind turbines will be removed and the land use will revert back to agriculture or else unused land (unless further consent is obtained for the land such as planting forestry or repowering the wind farm,

see Section 2.12 of Chapter 2 Description of the Proposed Development for further details on decommissioning).

There will be no other anticipated effect on land use outside the proposed project site at any stage of the proposed development.

Overall the proposed project will have no significant negative effects, and some positive effects on the existing land use at the site during the operational phase. It will result in a slight long term positive effect.

TDR & GCR

There would be an additional land use of electricity transmission along the GCR, resulting in a not significant permanent neutral effect on land use. There would be no additional effects specifically from the TDR and GCR relating to land use. relating to population.

Population

It is not anticipated that the proposed project will have any significant effect on the current population trend in County Waterford or locally as there are no notable studies that support this. Any improved facilities within the area surrounding the proposed project which will be supported by the significant community benefit fund could make the local area attractive for people to move to. The details of what projects will be funded will be decided by a committee of people including locals that will be set up prior to the wind farm construction. Therefore the precise details of this cannot be known at this stage. A study conducted by University of St. Andrews and The Macaulay Institute found that positive attitudes towards wind power can increase through time and with proximity to wind farms. A survey of the public perception of wind power in Scotland and Ireland carried out in 2003/2004 by researchers at the School of Geography & Geosciences, University of St. Andrews, Fife and The Macaulay Institute, Aberdeen (2005) 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%)"*. This suggests that the wind farm associated funding could improve amenities locally and therefore attract people to live in the area.

The proposed project will provide a small number of long-term jobs in the local area (discussed further under Employment/Economy section of this chapter).

Therefore, the operational phase is expected to have an imperceptible positive long-term effect on population trends.

TDR & GCR

There would be no additional effects specifically from the TDR and GCR relating to population.

Sensitive Receptors and Residential Amenity

The turbine layout of the proposed project has been designed with cognisance of the local population and receptor locations. In accordance with the 2006 WEDGs, there are no turbines located within 500m of a residential property. 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 project complies with this recommendation. A minimum setback distance of >800m has been applied as this encompasses and exceeds the full range of tip heights considered for this project x4 (i.e. 718m to 740m setback distance) and will therefore provide an adequate setback distance irrespective of which turbine is selected within the range.

Potential effects on receptors with regard to noise, traffic, telecommunications and visual appearance are assessed in the relevant chapters of this EIAR. There will be a potential for noise, visual effects and low levels of additional traffic on local roads (accessing for site maintenance). In general, there will be a long term slight negative effect on local receptors and residential amenity.

Modelling of predicted shadow flicker occurrence is presented in Chapter 10 (Shadow Flicker) and assessed against the current 2006 WEDGs and draft 2019 WEDGs. The Applicant is committed to exceeding the current guidelines requirements and ensuring there is near zero shadow flicker occurrence at any sensitive receptor in the vicinity of the site. This will be ensured through the mitigation measures set out in Chapter 10 (Shadow Flicker). On this basis, following the implementation of the mitigation measures, there will be near zero shadow flicker occurrence at any sensitive receptor (with the exception of the short time taken to safely bring the turbine to a halt) and, therefore, there will be no potential for an effect on residential amenity due to shadow flicker.

The proposed project will also offer a community benefit fund which will be positive for local residents, though as it is not certain exactly what the community will decide to do with this, it is not considered further in this assessment.

TDR & GCR

There would be no additional effects specifically from the TDR and GCR relating to sensitive receptors and residential amenity.

Property Value

As mentioned in Section 5.4.2.1 above, a UK study, entitled *The effect of wind farms on house prices*, was carried out by the 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
- 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 large wind farms (the study defines a large wind farm as one that produces over 50MW).

These contradicting studies led to further research in Scotland in 2016 [41] which was based on analysis of over 500,000 property sales in Scotland between 1990 and 2014. This study, again,

[41] ClimateXChange, *The impact of wind turbines on house prices in Scotland* (October 2016) (accessed 14/05/24)

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 Scottish study 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.

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 (c. 16 km), but also took into account 1,198 homes within 1 mile (c. 1.6 km) of turbines.

Until recently no similar studies had been carried out in Ireland regarding the effects of wind farms on property prices however in 2023 Gillespie and McHale published a paper investigating the effect of wind turbines on house prices along the West of Ireland. The study found a negative price effect of -14.7% on houses within 0-1km of a wind turbine when compared to houses between 5-15 km of a wind turbine. The study also found that there was not a significant effect on house prices outside of 1km from a wind turbine. It is important to note that as yet this paper has not been peer-reviewed. Furthermore, as discussed above, the propsoed project will have a minimum setback distance of >800m.

The proposed project will have a neutral long-term effect on property values during its operational phase.

TDR & GCR

There would be no additional effects specifically from the TDR and GCR relating to property values.

Employment/Economy

Economic benefits from operational activities will include ongoing purchases of local materials, services and equipment required for the operational phase of the proposed project. It will also include local spend on items such as groceries and accommodation etc generated from technical staff that will be on site during the operational phase of the proposed project.

A 2020 study by the UTS Institute for Sustainable Futures[42] on job creation for wind energy projects found that wind energy can support approximately 0.22 jobs per MW during the operational phase. Based on the proposed project capacity of between 85.5-108 MW, this

[42] https://assets.cleanenergycouncil.org.au/documents/resources/reports/Clean-Energy-at-Work/Institute-for-Sustainable-Futures-renewable-energy-jobs-methods-report.pdf (accessed 14/05/24)

equates to between approximately 19-24 jobs for the operational phase. In an earlier 2015 study, 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 (meaning between 29 – 37 long term jobs for the proposed project). Although only a small proportion of these jobs are likely to be directly based in the wind farm site, it is likely that the indirect jobs the operational phase will support, such as consultants, research institutions, universities and financial services, will provide indirect jobs and benefit the wider employment profile. It is anticipated that there will be ongoing local employment on the site through the project operational phase for 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). 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 less specialised activities.

Based on the above, the project will significantly contribute to achieving a number of objectives in the latest County Development Plan, including ECON 9 and ECON 20 which are described in Section 5.3.1 above.

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 subsequent commitments in the Government's *Climate Action Plan*, published in 2021, 2023 and 2024, suggest that the investment in renewable energies, including wind, will be in excess of the above estimates.

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 impact of the 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 community benefit associated with the proposed project is discussed in Chapter 2 (Description of the Proposed Project). In addition, the project will require payment of rates to Waterford City and County Council which will provide additional revenue for their work around the county. The payment of rates to Waterford City and County Council will facilitate ECON 3 of the CDP which aims "to encourage, promote and facilitate economic and employment growth, resilience, diversity, social enterprise and the regeneration of underutilised areas."

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.

The proposed project will have a long term moderate positive effect on employment and the local economy.

<u>TDR & GCR</u>

There would be no additional effects specifically from the TDR and GCR relating to employment and economy.

Tourism & Recreation

The Fáilte Ireland Guidelines state that *"The impact upon tourism can be considered within this section through the sensitivities of hospitality, safety and pace of life. Changes in population can impact the perception of pace of life or safety in a particular location".* The Guidelines also note that *"Impacts upon these issues in areas which rely heavily on tourism or have a particular sensitive tourism generator should be considered in this section".*

In 2007, a collaboration between Fáilte Ireland and the Northern Ireland Tourist Board surveyed tourists' perceptions in relation to wind farms in the Irish landscape. A follow up survey in 2012, *Visitor Attitudes on the Environment: Wind Farms – Update on 2007 Research'* provided more recent information for the tourism and energy sectors. The results were positive, with 80% of tourists considering the presence of wind farms to have no impact or a positive impact on their sightseeing. In addition, when asked if further wind farm project 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, a 2016 study carried out by BiGGAR Economics '*Wind Farms and Tourist Trends in Scotland*' examined the link, if any, between onshore wind energy development and the sustainable tourism sector in Scotland. The report 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.

As noted previously, there are a number of relevant tourism attractions and public amenities within the vicinity of the proposed project study area, however none are within or crossing the proposed wind farm site. They include Mount Mellary Abbey and Lismore Castle and walking/hiking trails such as Mount Melleray Pilgrim Paths and Glenshelane walking trails. The proposed project will be visible from a number of these features in the area (as discussed in Chapter 13 of this EIAR (Landscape and Visual Impact). As mentioned above, this visual impact is subjective, and the proposed project is not anticipated to have a significant impact on tourism.

In this regard, it is considered that the proposed project will have a long-term, slight, neutral effect on the tourism and recreation experience and numbers in the vicinity of the proposed wind farm site.

TDR & GCR

There would be no additional effects specifically from the TDR and GCR relating to tourism and recreation.

Amenities and Services

During the operational phase of the proposed project there are no anticipated negative effects on local amenities and services. Community facilities, public transport and schools may be able to benefit from the community fund that will be available, although the projects chosen to spend this fund on will be decided at the time by a committee comprising a mix of people, including local community members and industry representatives. Therefore, there is a potential, long term, slight positive effect on amenities and services from the proposed project during the operational phase.

TDR & GCR

There would be no additional effects specifically from the TDR and GCR relating to amenities and services.

5.4.2.3 Decommissioning Phase

In terms of land use, the decommissioning of the proposed project after its operational life of 35 years will allow for the return of a portion of the lands to forestry and other existing land uses.

Works required for decommissioning the wind farm will have similar short-term benefits (for the duration of the decommissioning works) to the local economy in terms of employment opportunities for local contractors and an influx of construction workers to the area contributing to the local economy and population.

The activities required to facilitate wind turbine decommissioning and removal from site (as described in Chapter 2, Description of the Proposed Project) will be similar to those outlined for the construction phase in terms of potential noise and air quality as well as increased construction traffic movements, although these will be significantly lower than during the construction stage.

It is not anticipated that the decommissioning works will have any significant effect on local property value or tourism.

See Chapter 2 (Description) of this EIAR for details of the decommissioning works.

TDR & GCR

There would be no additional effects specifically from the TDR and GCR during the decommissioning phase works. The infrastructure will remain in place permanently at the end of the operational phase.

5.4.3 HUMAN HEALTH

5.4.3.1 Construction Phase

Air Quality and Dust Emissions

The construction of the turbine infrastructure and erection of the turbines will take place away from residential properties with at least >800m distance from the proposed turbines to all sensitive properties. Dust is typically predictable in its dispersion and studies show that the majority of dust deposition occurs close to its creation. The nature of dust creation and deposition depends on the type of works, 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 14 Air Quality and Climate and the CEMP (Appendix 2-8 of this EIAR). While in a construction project of this scale it is inevitable that there will be occasional dust generated, this is likely to be very localised in place and time. As detailed in Chapter 14, it is extremely 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. It can, therefore, be stated with confidence that there will be no significant human health effects arising from emissions to air including dust generation.

By replacing fossil fuel burning power generation stations with clean renewable energy such as from the proposed project, there will be a positive overall effect on air quality in the country as a whole and particularly in the regions where fossil fuel burning power stations are currently operational, as compared to a Do-Nothing scenario (i.e. where the wind farm is not built).

TDR & GCR

There would be brief to temporary works at any one location along the TDR and GCR during the construction phase, however these will be transient in nature. This will result in a potential brief to temporary not significant negative effect on human health associated with air quality and dust emissions.

Health and Safety

All activities carried out by the appointed Contractor on the proposed project 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. The CEMP sets out the Health and Safety requirements for the project including the erection of fencing, signage and notification of commencement of works to the Health and Safety Authority (HSA). This will apply to whatever final turbine dimensions are chosen from the entire proposed range of turbine dimensions.

The proposed TDR to allow for the transport of the turbines to the proposed wind farm site will involve some works as discussed in Chapter 2 of the EIAR (Description of the Proposed Project). 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 allow for the entire range of proposed turbine dimensions.

With adherence to the proper health and safety guidelines throughout the construction phase, the potential effects here are anticipated to be short term and slight.

TDR & GCR

The works along the GCR and TDR will be short term and transient in nature. This will result in a potential brief to temporary not significant negative effect on human health associated with air quality and dust emissions.

Noise and Vibration

During the construction phase of the proposed project, environmental noise levels sufficient to cause noise induced hearing loss will not occur. The construction activities are not expected to exceed any of the proposed threshold values for noise or vibration and as such the associated noise and vibration is not expected to cause any significant effects. In general, the distances between the construction activities associated with the proposed project and the nearest noise sensitive locations (NSL's) are such that there will be no significant noise and vibration impacts at NSL's. The highest predicted noise levels are expected to occur for only short periods of time at a very limited number of properties. Construction noise levels will be lower than these levels for most of the time at most properties in the vicinity of the proposed project (refer to chapter 12 Nosie and Vibration for further details).

TDR & GCR

There would be temporary works at any one location along the TDR and GCR during the construction phase, however these will be transient in nature. This will result in a potential brief to temporary not significant negative effect on human health associated with noise and vibration.

Residential Amenity

During the construction phase it is considered that there will be a short-term, slight negative effect. The significance of this effect may be considered as moderate and variable in particular noise conditions. (i.e. a particular wind speed, direction, absence of screening, etc. as described in Chapter 12 (Noise and Vibration).

TDR & GCR

There would be brief to temporary works at any one location along the TDR and GCR during the construction phase, however these will be transient in nature. This will result in a potential brief to temporary not significant negative effect on human health associated with residential amenity.

5.4.3.2 Operational Phase

Wind Turbine Health Effects

The term *Wind Turbine Syndrome* first appeared in 2009, when a New York Paediatrician, Dr Nina Pierpont (Pierpont, 2009), published a pamphlet she called *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 is considered to more closely resemble a relatively unscientific opinion poll.

Entering the term *Wind Turbine Syndrome* into PubMed, a free resource providing access to life sciences and biomedical literature including a database which includes more than 30 million citations and abstracts of biomedical literature, there are only ten reported references[43]. Using key words *Wind Turbine Health* in the PubMed search engine, 254 articles were found[44]. This is still a relatively small number, but it is clear an increased number of medics/academics have studied this particular topic, rather than attributing the term *Wind Turbine Syndrome* to their studies. A large number of these articles are concentrated on the potential effects of the sound/infrasound of the turbines which is discussed further in subsequent sections.

In terms of research on the health effects of wind turbines generally, a review of the existing literature was performed in 2011 by Knopper (Knopper, 2011). 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

[43] https://pubmed.ncbi.nlm.nih.gov/?term=Wind+Turbine+Syndrome (Accessed on 6th September 2023)

[44] https://pubmed.ncbi.nlm.nih.gov/?term=Wind+Turbine+Health (Accessed on 6th September 2023)

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 is the causative factor for the reported effects, even though sound pressure levels are not measured."

A further study was carried out by Knopper in 2014 (Knopper et al, 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*[45] *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."* The study abstract states that *"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."*

The National Health and Medical Research Council (NHMRC) of Australia published *Wind Turbines and Health: A Rapid Review of the Evidence* in 2010 (NHMRC, 2010), 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."*

Professor Simon Chapman (Chapman, 2012) 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.

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, blood pressure, heart rate, self-reported stress) and exposure to wind turbine noise;
- The results of this study do not support an association 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

[45] 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 November 2022).

satisfaction with health. This was assessed using the abbreviated version of the World Health Organization's Quality of Life Scale; and
- Calculated noise levels were found to be below levels that would be expected to directly affect health (World Health Organization— Community Noise Guidelines [1999]). This finding is consistent with self-reported and measured results of the study.

In 2015, the NHMRC in Australia published a systemic review of the health effects of wind farms (Merlin et al., 2015) which was performed by the University of Adelaide. This was an extremely thorough follow on to the *Rapid Review* referred to previously. It was completely independent with no relationship to either wind farm developers, anti-wind groups or objectors. It looked extensively at all the reported effects and systematically looked at all the 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".*

There was a 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 (Chapman, 2012) 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.*
- *Deriving income from hosting wind turbines may have a "protective effect" against annoyance and health symptoms. Opponents claim that turbine hosts sign "gag" clauses that prevent them from complaining. I have seen contracts from different Australian firms, and none say anything about gags. No contract could preclude citizens from pursuing negligence claims in common law."*

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."*

A 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."*

A study published in the Journal of American Heart Association (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.

A 2021 publication (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. There was a link found between annoyance and the sound level of the 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 distance of the proposed project, as well as the use of detailed modelling will ensure that the proposed project will not have a volume to cause annoyance. The study also showed evidence that annoyance is lower when people participate in the turbine siting process. The proposed project carried out public engagement throughout the design process which included door-to-door visits, newsletter drops, online webinars, virtual exhibitions, in-person events (see Appendix 1-5 for further details), and the feedback received from this was considered when producing the final proposed layout. Most notably, the public feedback directly resulted in the location of the proposed onsite substation being moved to alleviate local concerns relating to the previous location (see Chapter 3 of the EIAR – Consideration of Reasonable Alternatives).

Finally, a recent UK study (Qu and Tsuchiya, 2021) looking at the potential suburban health impacts associated with wind turbines found that the results of the questionnaire were heavily influenced by whether the person knew the research aims or not. Those that knew the research aims i.e. to assess wind farm impacts, reported higher levels of health complaints than those that had the research aim masked. This highlights the importance of considering good scientific data and studies.

In conclusion, there is little scientific evidence of effects of *Wind Turbine Syndrome* and furthermore significant health effects in relation to wind farm operation are not anticipated.

TDR & GCR

There are no anticipated health effects associated with wind turbines from the TDR and GCR during the operational phase.

Noise and Vibration

During the operational phase of the proposed project, environmental noise levels sufficient to cause noise induced hearing loss will not occur. The detailed assessment presented in Chapter 12 (Noise and Vibration) assesses the potential for noise impacts from the proposed project and concludes that the greatest potential noise effect from the operation of the wind farm is moderate in terms of its significance and also notes that the effect is variable. It is therefore concluded that there is no risk of noise induced hearing loss due to noise from environmental exposure as a result of the proposed project. Based on detailed information on the site layout, turbine noise emission levels and turbine hub height, turbine noise levels have been predicted at NSLs for a range of operational wind speeds. The predicted noise levels associated with the proposed project will be within best practice noise limits recommended in Irish guidance, therefore it is not considered that a significant effect is associated with the proposed project.

Noise from the proposed substation has also been assessed and found to be within the adopted criteria. No significant vibration effects are associated with the operation of the proposed wind farm site.

TDR & GCR

There are no anticipated health effects associated with noise and vibration from the TDR and GCR during the operational phase.

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).

The WHO also carried out a review on environmental noise in 2018 (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."*

In October 2018, the WHO published the *Environmental Noise Guidelines for the European Region* (WHO, 2018) as a follow on from the above 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".

The 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 project. The most recent literature is thought to represent large modern turbines, and therefore it represents the full range of turbine dimensions being proposed.

Further discussion with regard to noise effects is presented in Chapter 12 (Noise and Vibration).

TDR & GCR

There are no anticipated health effects associated with sleep disturbance from the TDR and GCR during the operational phase.

Infra-sound

Infra-sound is sound below the audible human frequency which is normally taken as being 20 Hz or less. Human ears cannot respond to this, 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 event with everyday sources.

Many of the people who cite human health problems with wind turbines relate these to infra-sound and reported symptoms can include nausea, disturbance of sleep, tinnitus (ringing in the ear) as well as others. Two professionals that have studied and expressed concerns about infra-sound in relation to wind turbines are Dr Alec Salt of the Washington School of Medicine and Dr Marianna Alves Pereira, Associate Professor at Lusófona University, Portugal.

In a 2013 study by the South Australian Environment Protection Authority entitled *Infrasound levels near wind farms and in other environments,* the authors objectively measured infra-sound in a number of the different environments including urban and rural as well as in houses adjacent to wind farms 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"*.

Another relatively recent publication from Ministry of the Environment in the Federal State of Baden Wuerttemberg, Germany (Ratzel, 2016) states in the conclusion that *"Infrasound is caused by a large number of different natural and technical sources. It is an everyday part of our environment that can be found everywhere. Wind turbines make no considerable contribution to it. The infrasound levels generated by them lie clearly below the limits of human perception. There is no scientifically proven evidence of adverse effects in this level range.*

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 [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".*

The referenced publications and studies above outline that wind farms are not a significant source of infra-sound and that traffic and everyday human activity are likely to be more relevant. It is therefore concluded that there will be no significant adverse effect on human health as a result of infra-sound during the operational phase of the proposed project.

Further discussion on infra-sound is presented in Chapter 12 (Noise and Vibration).

TDR & GCR

There are no anticipated health effects associated with infrasound from the TDR and GCR during the operational phase.

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.

Some non-cancerous adverse health effects are also claimed to be associated with EMF. These include miscarriages, reproductive and developmental abnormalities, depression and suicide, allergy and neurological disease. However, 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, 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 produced a publication entitled *EMF and You* in July 2014 which provides more information on EMF and electricity. This publication states that *"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 that *"Based on this history 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"*.

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 World Health Organisation. The proposed project 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 to be built as part of the proposed project will be located as shown in Figure 2-1 of this EIAR. The distance from the nearest sensitive receptor to this on-site substation is approximately 240m. It is noted that a considerable number of existing electrical substations are located much closer than this from nearby sensitive receptors. The proposed substation will be constructed in accordance with national standards for electrical infrastructure and as set out in the EirGrid publication referred to above, 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.

For these reasons, this assessment concludes that there will be no significant human health effects as a result of electromagnetic radiation.

TDR & GCR

There are no anticipated health effects associated with electromagnetic radiation from the TDR during the operational phase. For the reasons outlined above, there are no anticipated health effects associated with electromagnetic radiation from the GCR during the operational phase.

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, 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."*

Following the above information and based on the fact that there will be no shadow flicker occurrence at any sensitive receptor[46], it can be determined that there will be no significant effect on human health due to shadow flicker (for more information see Chapter 10 of the EIAR – Shadow Flicker). Even if the project was to simply comply with the 2006 Wind Energy Guidelines for shadow flicker (i.e. adhering to the 30 minutes per day and 30 hours per year values) there would still be no significant effect on human health. Regardless of what turbine dimensions are chosen within the proposed range, the mitigation can be applied in the same way and the effects remain the same.

TDR & GCR

There are no anticipated health effects associated with shadow flicker from the TDR and GCR during the operational phase.

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. The 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 2014 Health Canada report referenced in Section 5.4.3.2 looked at a number of measures of stress (such as hair cortisol, blood pressure, heart rate, self-reported 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

[46] With the exception of the short time taken to safely bring a rotating turbine to a controlled stop

generated by a major infrastructure project 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 there are no such findings in the peer-reviewed literature referenced above.

On that basis, it is considered that no significant adverse effects on psychological health will occur as a result of the proposed project.

TDR & GCR

There are no anticipated health effects associated with psychological effects from the TDR and GCR during the operational phase.

Health Benefits

Aside from the potential socio-economic benefits previously discussed, there are significant environmental health benefits to the proposed project. 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 Climate Action Plan 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 contribution of the proposed project 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.

TDR & GCR

There are no anticipated health benefits associated with the TDR and GCR during the operational phase.

Residential Amenity

Based on a combined consideration of the above impacts discussed already, the location of the site and the proposed turbine layout, it is considered that there will be a slight negative effect on residential amenity which will be long-term for the operational phase. For a number of the nearest noise sensitive locations, as described in Chapter 12 (Noise and Vibration), the significance of the effect may be considered as not significant and variable in particular noise conditions. (i.e. a particular wind speed, direction, absence of screening, etc. as described in Chapter 12 (Noise and Vibration).

TDR & GCR

There are no anticipated health effects associated with infrasound from the TDR and GCR during the operational phase.

5.4.3.3 Decommissioning Phase

The decommissioning work will have similar works to the construction phase, albeit on a smaller scale. All of the same mitigation measures will be robustly implemented and the guidance adhered to, thereby ensuring that there will be no significant effects to human health for the decommissioning phase. There will be less groundworks required as the site roads will be left in situ to be used for forestry extraction, and turbine foundations and hardstands will be covered in topsoil and seeded over. Therefore, the potential dust emissions and potential health and safety effects will be reduced significantly when compared to the construction phase. Overall, there will be a short-term slight negative effect to human health in the decommissioning phase.

TDR & GCR

There are no anticipated health effects associated with the TDR and GCR during the decommissioning phase as the infrastructure will be left in place and will remain in use (with the exception of the temporary TDR works areas which will be reinstated at the end of the construction phase.

5.5 MITIGATION MEASURES

Aspects such as Noise and Vibration (Chapter 12), Air Quality and Climate (Chapter 14) and Landscape and Visual (Chapter 13) are discussed in the respective EIAR chapters in detail, and mitigation for these is discussed in those chapters.

5.5.1 CONSTRUCTION PHASE – POPULATION AND HUMAN HEALTH

The proposed project is not anticipated to have any significant effect on sensitive receptors, residential amenity, tourism, property values and therefore no mitigation measures in respect of these are required.

Best practice construction methodology and measures to minimise impacts from excavation works, as described in Chapter 8 (Land, Soils and Geology), will keep the project area to a minimum and reduce land use changes.

The proposed project is not anticipated to have a significant effect on the local or regional population, therefore no mitigation measures in respect of population trend impacts are required.

From an economic perspective, the proposed project will provide employment opportunities to the local community and wider region. The project, primarily at construction stage, is also likely to increase spend in local businesses as persons involved in the project stay locally or purchase goods as well as local suppliers providing material and equipment to the site. The community benefit fund will have a positive effect on the locality. Overall, there will be a positive effect on the local economy and no mitigation measures are required.

The proposed project is not anticipated to have a significant effect on local or regional tourism, therefore no mitigation measures in respect of tourism impacts are required.

The project will employ all of the latest and relevant guidelines and legislation (See CEMP in Appendix 2-8 in terms of health and safety both for works within the proposed wind farm site as

well as for works outside the main wind farm such as those on the proposed TDR). The required levels of safety (e.g. during road works) will be maintained for all road users as well as pedestrians. The proposed wind farm site itself will not be open to the public. Public access will be restricted to works areas outside the proposed wind farm site such as the proposed TDR works areas and the proposed GCR while work is underway. Appropriate health and safety measures as described in the CEMP (Appendix 2-8) will be taken for all works areas during the construction phase in the interest of worker and public safety also. Should any public health advice be in place during the construction phase (such as the recent Covid-19 public restrictions) these will be implemented on site. No further human health mitigation measures are required.

TDR & GCR

There would be no additional (to the above) mitigation required specifically for the TDR and GCR.

5.5.2 Operational Phase – Population and Human Health

Fáilte Ireland has been consulted to identify any potential concerns for adverse tourism effects. It is noted that Fáilte Ireland have a guidance document for considering the potential effects of projects on tourism and this guidance document has been considered in the completion of this assessment. The proposed project is not anticipated to have a significant effect on local or regional tourism, therefore no mitigation measures in respect of tourism impacts are required.

Overall, there will be a positive effect on the local economy and no mitigation measures are required.

Mitigation by design has been utilised in the design of this project to assure minimal effects to Population and Human Health. Where required, specific mitigation measures for other environmental factors discussed previously which may interact with human health, such as landscape and visual effects, shadow flicker, air quality, water quality, noise & vibration and transport, are discussed in the relevant chapters of this EIAR. A cross reference of environmental factors is also presented in Chapter 17 (Interactions of the Foregoing).

The proposed project is not anticipated to have any significant additional effect on sensitive receptors, residential amenity, tourism, property values and therefore no mitigation measures in respect of these are required. TDR & GCR

There would be no additional (to the above) mitigation required specifically for the TDR and GCR.

5.5.3 Decommissioning Phase – Population and Human Health.

The same mitigation as the construction phase is proposed for the decommissioning phase in respect of effects on land use, population, sensitive receptors and residential amenity property value, employment/economy, tourism and human health, (for information regarding decommissioning refer to Chapter 2, Section 2.) This is because many of the same effects will occur during this phase, but to a much lesser extent.

TDR & GCR

There would be no additional (to the above) mitigation required specifically for the TDR and GCR.

5.6 RESIDUAL EFFECTS

5.6.1 CONSTRUCTION PHASE – POPULATION AND HUMAN HEALTH

The proposed project will have a slight positive residual effect on the local population through an influx of construction workers in the short-term. This influx of people 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 accommodation and spend in local shops and restaurants. Local suppliers will also receive additional business from the project. This will have a moderate short term positive effect on the local economic activity.

There will be a short-term slight negative effect as a result of the construction phase traffic (and associated noise and dust) on residential amenity and sensitive receptors.

There will be a long-term slight to moderate neutral effect on land use

There will be no significant residual effects on the remaining topics (i.e., sensitive receptors and residential amenity, property values, employment/economy, tourism, and health effects.

TDR & GCR

There would be no additional (to the above) residual effects specifically from the TDR and GCR for the construction phase for population and human health.

5.6.2 OPERATIONAL PHASE – POPULATION AND HUMAN HEALTH

The proposed project 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 residual effect on land use for the country which will benefit the local population and communities. The establishment of a Community Benefit Fund is considered to have the potential to be a long-term positive effect on the local economy and community in general, depending on how the community choose to use the fund. This in turn would have the potential to have a positive effect on the individuals living in this community and have a positive effect on their residential amenity and individual 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.

There will be a long-term effect on local residential amenity as a result of the presence of the wind farm from landscape and visual effects primarily, as well as noise (these specific elements are discussed in their relevant EIAR chapter). This is a subjective effect that depends on the view that any given person takes on the project (i.e. some people may like the wind farm, while others may become stressed by it), but in general it is considered as a slight long term negative effect.

The additional of 2-3 full time local jobs will help maintain the local population from employment, resulting in a slight positive long term effect in that regard.

The project will have a slight positive long-term effect on human health on a national scale as it will offset other fossil fuel based energy sources that might otherwise have a greater negative effect associated with them. There will be an imperceptible positive effect on the local human health associated with this.

There will be no significant residual effects on the remaining topics of property values and tourism. Overall, it is considered that there will be a long-term, slight, neutral effect on the local population and human health as a result of the proposed project.

TDR & GCR

There would be no additional (to the above) residual effects specifically from the TDR and GCR for the operational phase for population and human health.

5.6.3 Decommissioning Phase – Population and Human Health

It is considered that there will be a short-term, imperceptible, negative effect associated with the works (relating to land use and residential amenity) required to decommission the wind turbines at the end of their operational lifetime.

Works required for decommissioning the wind farm will have similar short-term benefits (for the duration of the decommissioning works) to the local economy in terms of employment opportunities for local contractors and an influx of construction workers to the area contributing to the local economy and population. This will result in associated short term slight positive effects.

There will be no significant residual effects on the remaining topics of property values and tourism.

TDR & GCR

There would be no additional (to the above) residual effects specifically from the TDR and GCR for the decommissioning phase for population and human health.

5.7 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 project (please see Chapter 4 of this EIAR for a full description of developments considered). The potential for cumulative effects on population and human health are considered here and noise, shadow flicker, traffic and visual effects are discussed in the relevant chapters of this EIAR.

It should be noted that the clear felling of trees in the State requires a felling licence. The associated afforestation of alternative lands equivalent in area to those lands being permanently clear felled is also subject to licensing ('afforestation licensing'). The Forest Service of the Department of Agriculture, Food & the Marine is Ireland's national forest authority and is responsible for all forest licensing. In light of the foregoing and for the purposes of this project, the developer commits that the location of any replanting (alternative afforestation) associated with the project will be greater than 10km from the wind farm site and also outside any potential hydrological pathways of connectivity (i.e. outside the catchment within which the proposed project is located). On this basis, it is reasonable to conclude that there will be no more than imperceptible indirect or in-combination effects associated with the replanting. In addition, the developer commits to not commencing the project until both felling and afforestation licences are in place and this ensures the afforested lands are identified, assessed and licensed appropriately by the relevant consenting authority.

The proposed Dyrick Hill Wind Farm (ABP Ref. 317265), the site of which is located directly adjacent to the currently proposed Scart Mountain Wind Farm site, was recently (October 2024) refused planning permission by An Bord Pleanála. As there is still a potential for judicial review at the time of writing this EIAR chapter (November 2024), it has been decided to include the project in the cumulative impact assessments. In the event that the refusal of the Dyricck

Hill Wind Farm application is confirmed prior to the determination of the current application, then any discussions around cumulative impacts for this project in this EIAR can be ignored by ABP.

Population

Considering the other projects in the area, in particular the proposed Dyrick Hill Wind Farm, the proposed project 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, in particular the proposed Dyrick Hill Wind Farm, the proposed project would be anticipated to have both a short and long term positive cumulative effect under the topic of land use.

Sensitive Receptors/Residential Amenity

There is potential for an operational phase cumulative effect on noise and shadow flicker from the adjacent proposed Dyrick Hill Wind Farm, which is discussed in Chapter 10 (Shadow Flicker) and Chapter 12 (Noise & Vibration). There will also be a potential cumulative landscape and visual effect associated with the proposed Dyrick Hill Wind Farm as well as the others (permitted or existing) from the wider area for anyone living locally that dislikes wind farms as listed in Table 4-1 of Chapter 4 of this EIAR and assessed further in Chapter 13 (Landscape and Visual Impact). Traffic volumes are also a factor when considering residential amenity effects. The potential for cumulative effects will occur primarily during the construction phase where construction traffic associated with the proposed project could overlap with construction or operations of other projects, including commercial forestry operations, which are currently permitted but not yet constructed, as identified in Chapter 16 (Traffic and Transport).

With this proposed project being so close to the proposed Dyrick Hill Wind Farm, in the event that both were constructed there would be a potential for moderate negative effects on residential amenity. This would reduce to not significant to slight for the remaining considered projects (including wind farms),

Property Value

There are no significant cumulative effects anticipated for property values.

Employment/Economy

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

Tourism

All wind energy projects 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. There is a potential positive cumulative effect for tourism in the event that more than one wind farm is constructed as a result of increased investment in the area from the community benefit funds.

Human Health

There is potential for an operational phase cumulative effect on noise and shadow flicker from the adjacent proposed Dyrick Hill Wind Farm, which is discussed in Chapter 10 (Shadow Flicker) and Chapter 12 (Noise & Vibration). There will also be a potential cumulative landscape and visual effect associated with the proposed Dyrick Hill Wind Farm as well as the others (permitted or existing) from the wider area as listed in Table 4-1 of Chapter 4 of this EIAR and assessed further in Chapter 13 (Landscape and Visual Impact). Each of these topics have been assessed in this EIAR to ensure that there is no significant negative effect on human health in particular (i.e. the project will adhere to appropriate guidelines for noise and will ensure 'near zero shadow flicker' (See Chapter 10 Shadow Flicker).

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. The positive effects relate to long term improvements in air quality from decarbonising the national grid and contributions to climate targets in the event that both wind farms are constructed.

Other developments proposed in the study area are relatively small, comprising mostly residential one-off houses and agricultural sheds/activity. There is also a significant level of ongoing forestry and intensive agricultural activity locally. 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 small scales and/or location with respect to the proposed project.

Overall, it is considered that there are no significant cumulative effects from the proposed project on population and human health when considered alongside the other projects in the area, in particular the adjacent proposed Dyrick Hill Wind Farm.

TDR & GCR

There would be no additional (to the above) cumulative effects specifically from the TDR and GCR for the population and human health topics.

5.8 CONCLUSION

This chapter has assessed the potential effects on land use, population, Sensitive receptors, residential amenity, property value, employment, economy, tourism and human health,

The assessment has considered the findings of other EIAR chapters, including Chapter 10 (Shadow Flicker), 11 (Material Assets), 12 (Noise & Vibration), 13 Landscape and Visual), 14 (Air Quality and Climate) and 16 (Traffic and Transportation). There are some positive effects anticipated, including the potential economic benefits to the area and the employment from the proposed project, as well as some negative effects, such as the short term effect on residential amenity associated with construction (e.g. noise and traffic). The proposed project is not anticipated to have any significant effects relating to land use, population, Sensitive receptors, residential amenity, property value, employment, economy and tourism .

There is currently no credible evidence to link wind turbines to adverse health effects. 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, 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 Section 5.5 and in specific technical chapters will be put in place

to ensure that the emissions and effects from the proposed project 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 5.6, it is considered that the proposed project will not result in a significant negative effect on population and human health in the local and regional area.

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