

Sure Partners Limited

ARKLOW BANK WIND PARK
PHASE 2
**ONSHORE GRID
INFRASTRUCTURE**

**ENVIRONMENTAL IMPACT
ASSESSMENT REPORT**

VOLUME II

Chapter 18 Population and Human Health

ARUP

 **sse**
Renewables

Contents

	Page	
18	Population and Human Health	1
18.1	Introduction	1
18.2	Assessment Methodology	1
18.3	Baseline Conditions	11
18.4	Likely Significant Effects	21
18.5	Mitigation Measures and Monitoring	33
18.6	Cumulative	36
18.7	Residual Effects	40
18.8	References	41

18 Population and Human Health

18.1 Introduction

This chapter assesses the likely significant effects of the proposed development on population and human health during the construction, operation and decommissioning phases. The socio-economic aspects of population and the public health aspects of human health were addressed.

Chapter 5 *Description of Development* provides a description of the proposed development whilst **Chapter 6** *Construction Strategy* provides a full description of the strategy for construction.

18.2 Assessment Methodology

18.2.1 General

This chapter examines the demographic and socio-economic characteristics of the Arklow area, particularly the areas close to the proposed development, which have the potential to be affected during the construction, operational and decommissioning phases of the proposed development.

Population aspects of relevance to this assessment include residential amenity, community severance, business, tourism and employment opportunities. Other aspects relevant to the local community such as unplanned events, natural amenity, journey patterns, built and natural heritage, material assets and nuisance are dealt with in other chapters of this Environmental Impact Assessment Report (EIAR).

Human health aspects are primarily considered through an assessment of the environmental pathways by which health may be affected (i.e. the determinants of health) such as air, noise, water or soil. The assessment of the effects on human health therefore draws on the findings of other sections of the EIAR as necessary to ensure that the likely significant effects that have the potential for significant effects on human health are considered herein.

The following aspects are particularly relevant to the population and human health assessment:

- Construction:
 - Construction of all infrastructure, including horizontal directional drilling (HDD) and piling at the landfall, HDD at the R772 and the M11 along the cable route, open-cut trench methods along the cable route, the above ground structures and piling at the substation site, flood embankment works and the connection to the National Electricity Transmission Network (NETN) from the substation;

- Potential disturbance to the local community, tourism and economic activity due to the construction works, including associated effects on traffic, and effects on amenity associated with visual, air quality, noise and vibration effects;
 - The potential effects on human health including the effects of emissions including noise and emissions to air and water from plant and equipment; and
 - The effects on the community associated with disturbance and annoyance, and how that may interact with human health.
- Operation:
 - The operation, maintenance and location of the proposed development and its proximity to residential and commercial properties, particularly the above ground structures including the permanent access tracks;
 - The effects of the proposed development on the community, economic activity, tourism and future development in Arklow;
 - The potential effects on human health associated with the electromagnetic fields generated by the proposed development; and
 - The potential effects as a result of the overall Arklow Bank Wind Park Phase 2 Project (the Project) and consideration of the health consequences in comparison to a “do-nothing” scenario.
 - Decommissioning:
 - Potential disturbance to the local community, tourism and economic activity due to the decommissioning works, including associated effects on traffic, and effects on amenity associated with visual, air quality, noise and vibration impacts;
 - The effects on human health including the effects of emissions including noise and emissions to air and water from plant and equipment; and
 - The effects on the community associated with disturbance and annoyance, and how that may interact with human health.

18.2.2 Guidance and Legislation

This assessment has been undertaken with due regard to the Environmental Protection Agency (2017) *Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (Draft EPA Guidelines), which is described in **Chapter 3 EIA Methodology**.

The Draft EPA Guidelines provide advice on impact types including cumulative effects which are often important for socio-economic assessments.

Population

The assessment of effects relevant to the local community has been undertaken in line with the Draft EPA Guidelines, which provide advice on the types of socio-economic effects, including cumulative and in combination effects. Regard was also had to Section 2 of the EPA Advice Notes (EPA 2003).

While these were written in the context of the requirements of an earlier EIA Directive, in which the topic was “Human Beings”, they provide guidance on the matters which could be relevant to the assessment.

Regard was also had to the Fáilte Ireland 2011 guidance on the treatment of tourism in Environmental Impact Statements.

Human Health

No specific guidance on the definition of human health and the assessment of human health in the context of environmental impact assessment has been provided to date.

The relevant health impact assessment guidance that has been considered includes the following:

- The World Health Organisation (WHO) (2009) *Night Noise Guidelines for Europe*;
- US EPA (2016) *Health Impact Assessment Resource and Tool Compilation*;
- WHO (1999) *Guidelines for Community Noise*;
- IEMA (2017) *Health in Environmental Impact Assessment - A Primer for a Proportionate Approach*;
- Institute of Public Health Ireland (2009) *Health Impact Assessment Guidance*;

The relevant topic-specific guidance that has been considered includes the following:

- WHO (2005) *WHO Air Quality Guidelines for particulate matter, ozone, nitrogen dioxide and sulphur dioxide*;
- British Standards Institution (2014) 5228-1 and 2:2009+A1:2014. *Code of practice for noise and vibration control on construction and open sites. Noise and Vibration*;
- EPA (2016) Office of Environmental Enforcement (OEE) ‘*Guidance Note for Noise: Licence Applications, Survey and Assessments in Relation to Scheduled Activities*’ (NG4);
- Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011); and
- European Communities Environmental Objectives (Surface Waters) Regulations 2009 (SI No 272 of 2009) as amended by the European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2012 (S.I. No. 327 of 2012); and the European Communities Environmental Objectives (Surface Water) (Amendment) Regulations 2015 (SI No. 386 of 2015).

Specific Guidance on Human Health is discussed further in **Section 18.2.6**.

18.2.3 Study Area

The overall Project is a proposed offshore wind farm, located off the coast of County Wicklow, on the east coast of Ireland. The proposed development will comprise the onshore grid infrastructure including 220kV onshore export circuits and fibre optic cables, from the landfall of the offshore export circuits at Johnstown North, to a proposed onshore 220kV substation at Shelton Abbey and the connection from the new substation to the National Electricity Transmission Network (NETN).

The principal study area has been determined as the site (i.e. all areas within the planning boundary for the proposed development), and residential, commercial and industrial areas adjacent to the proposed substation site and along the proposed cable route.

For the assessment of effects during construction, the relevant study area includes those areas frequented by people in the immediate environs of the working areas as well as those receptors who might be impacted by ancillary activities such as construction traffic.

For the assessment of effects during operation, the study area includes all receptors that may be impacted by the proposed development including primarily, those who live and work close to the proposed development, as well as those who may come in contact with the above ground structures, including the landowners along the proposed cable route and the substation site within the Avoca River Business Park.

For the assessment of effects during decommissioning, the relevant study area includes those areas frequented by people in the immediate environs of the working areas as well as those receptors who might be impacted by ancillary activities such as decommissioning traffic.

The wider study area is that affected by the social or economic effects arising from construction, operation or decommissioning of the proposed development including impacts on the economic life. This wider area is represented by the greater Arklow urban area, including residential, commercial and industrial areas such as the Avoca River Business Park and the Kilbride Industrial Estate located c. 400m east of the proposed cable route.

18.2.4 Consultation

As outlined in **Chapter 3 EIA Methodology**, Sure Partners Limited (SPL), the Developer, has engaged with a wide range of stakeholders, including elected representatives, statutory bodies, community groups, local businesses, local residents and the general public. Generally, any responses have been supportive, particularly in relation to the opportunity for community gain, such as funding, employment, training, education and engagement in the area.

18.2.5 Categorisation of the Baseline Environment

The assessment of population requires that an understanding of the community is built up through background research and conversations with local people and community representatives. For the assessment of the proposed development, data was collected by means of:

- Primary data sources (e.g. demographic data from Census 2016 and Census 2011 produced by the Central Statistics Office (CSO));
- Study area map and planning drawings of the proposed development;
- Spatial data, including Google Maps and Google Streetview, Open Street Map, Department of Education school maps;
- Relevant environmental data collected by other disciplines during the preparation of the EIAR;
- A review of the Wicklow County Development Plan 2016-2022 and the Arklow and Environs Local Area Plan 2018-2024 (further details in **Chapter 2 Policy Context**);
- A review of secondary sources including the National Planning Framework (GOI 2018a) and the National Development Plan (GOI 2018b),
- A review of previous EIARs, including for the Arklow Wastewater Treatment Plant Project (2018):
- Observation of local settlement, travel patterns and amenity activity and the identification of community facilities.

18.2.6 Impact Assessment Methodology

Sensitive Receptors

Having regard to the Draft EPA Guidelines, the neighbouring occupied premises and land uses which were considered as ‘sensitive receptors’ included the following:

- Homes (including care homes and other residential facilities);
- Hospitals;
- Hotels and holiday accommodation;
- Schools and rehabilitation workshops;
- Tourism and recreational facilities; and
- Economic facilities such as visitor attractions based on cultural/historic or natural assets.

Population Assessment

This section sets out the methodology that has been used to assess the likely significant effects of the proposed development on population.

Likely significant effects were categorised in accordance with the Draft EPA Guidelines.

The effects identified were compared with the “Do-Nothing” scenario. Direct, indirect, secondary and cumulative effects were assessed. Positive, neutral or negative effects were addressed. The significance assigned to an effect included consideration of the following:

- The location and character of the local environment;
- The sensitivity of the local population and its capacity to absorb change;
- The nature of the environmental effect;
- The timing and duration of an effect;
- The scale or extent of the effect in terms of area or population affected;
- The duration, frequency and reversibility of an effect; and
- The probability of an effect’s occurrence.

Short term, medium term or long-term effects were considered.

The rationale used in determining a particular level of significance of effect, included consideration of the following:

- The nature of an effect;
- Location and the population subgroup affected;
- The current character of the local environment;
- The likely significant effects due to the proposed development;
- Significance of an effect;
- Duration of an effect (i.e. temporary, short, medium or long term);
- Receptor extent;
- Proposed mitigation; and
- The residual effect.

The assessment of significance also had regard to the number of receptor types, i.e. people or businesses, likely to be affected as an approximate proportion of the local population or the total number of businesses. Receptor extent was assessed qualitatively as: few; medium; many; or very many.

The methodology included the assessment of likely significant effects on:

- Journey patterns;
- Amenity;
- Accessibility and community severance; and
- Business, tourism and employment.
- Journey patterns

For a development of this nature and scale, effects on journey patterns may arise due to traffic movements from the proposed development that are additional to normal traffic volumes on the existing network or due to road closures or diversions as they affect traffic movement. Effects can also extend to changes in journey time reliability on the local network.

- Amenity

Amenity effects arise from the proximity to construction works or disturbance during operation or decommissioning as it affects the pleasantness and perceived safety of the environment for walking, cycling or driving. General amenity effects can arise due to any effect that the proposed development may have on residential quality of life, amenity or recreation due to environmental effects such as noise or visual intrusion, for which specific significance levels are identified in the respective chapters of the EIAR. There are also links between effects on amenity and tourism.

- Accessibility and community severance

Accessibility or community severance refers to people's access or use of community facilities from their home or place of work, particularly as it affects facilities used by older people, children or other vulnerable groups such as those with limited mobility and/or disabilities.

- Business, tourism and employment

Economic effects can arise during construction from local employment opportunities and purchasing of local inputs, or from the impact of construction, or decommissioning works on local economic activity or businesses.

During operation, significant effects (positive or negative) can arise due to changes in the local environment due to a proposed development or displacement of existing economic activity, or from local employment opportunities or inputs to the local economy. There are also potential interactions with other economic activities in the local area as well as settlement patterns, population change and tourism.

Human Health Assessment

This section sets out the methodology that has been used to assess the likely significant effects of the proposed development on human health.

As outlined in **Section 18.2.2**, no specific guidance on the meaning of the term Human Health has been issued and no specific guidance on the assessment of human health in the context of EIA has been issued to date.

The Draft EPA guidelines note that:

“while no specific guidance on the meaning of the term Human Health has been issued in the context of Directive 2014/52/EU, the same term was used in the SEA Directive (2001/42/EC)”.

The Draft EPA guidelines note under Section 3.3.6 that the above health assessment approach is consistent with the approach set out in the 2002 EPA Guidelines where health was considered through assessment of the environmental pathways through which it could be affected, such as air, water or soil, viz:

“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 Draft EPA guidelines also note under Section 3.3.6 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”.

In a footnote to Section 1.3.1 its Guidance (EC 2017), the EC says:

“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.”

The Institute of Environmental Management and Assessment (IEMA) is the largest professional body for environmental practitioners worldwide, with nearly 15,000 members and as such it is an authoritative body on Environmental matters. IEMA issued a discussion document on the methodology of the assessment of Human Health in an Environmental Impact Assessment Report in 2017, which it describes as a primer for discussion on what a proportionate assessment of the impacts on health should be in EIA and is a useful document when considering what can and should be assessed in the context of this EIAR. Due regard has been had to the general approach advocated in this document when undertaking this assessment.

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

The IEMA document notes that:

“Public health is defined as the science and art of promoting and protecting health and well-being, preventing ill-health and prolonging life through the organised efforts of society and has three domains of practice: health protection, health improvement and improving services”.

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

The World Health Organization (WHO) defined health in its broader sense in its 1948 constitution as:

“a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity”.

Health Impact Assessment and Environmental Impact Assessment

The IEMA document 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 requirements of the EIA Directive in relation to human health.

It is important to note that this assessment on human health is provided as part of the overall EIAR rather than a stand-alone HIA.

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.

In contrast, the assessment of human health in the context of EIAR 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 Directive 2014/52/EU of the European Parliament and of the Council). Conducting a HIA will not necessarily meet the population and human health requirements of the EIA Directive.

Health Protection

The assessment of human health for the proposed development, in terms of health protection, follows the approach set out in the Draft EPA Guidelines, the IMEA guidelines referred to above and in Directive 2014/52/EU of the European Parliament and of the Council. Human health protection is considered through the assessment of the environmental factors (pathways) through which health could be affected such as air, noise, water, soils and electromagnetic fields. The US EPA guidance includes a four-step human health risk assessment approach which is represented graphically in **Figure 18.1**.

The 4 Step Risk Assessment Process

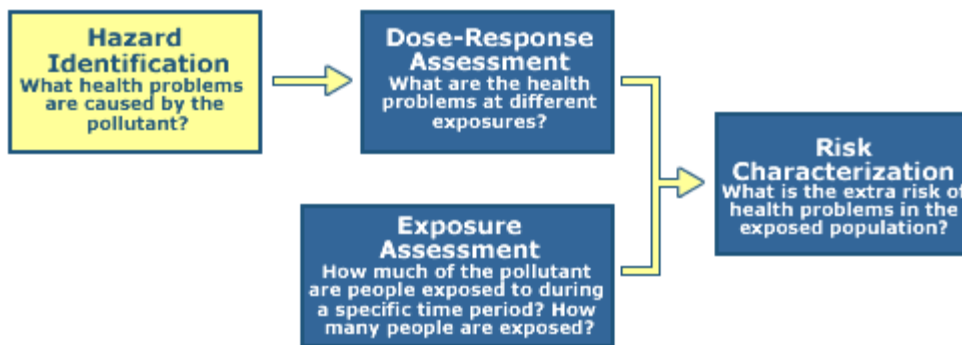


Figure 18.1: Four Step Human Risk Assessment Process

The likely significant effects associated with noise, air, soils, water and electromagnetic fields that could affect human health were identified (Hazard Identification), the scale of these effects (Dose-Response Assessment) and their duration (Exposure Assessment) were assessed and the significance of the likely significant effect on human health was determined (Risk Characterisation).

When using a recognised health based standard, such as one issued by the WHO, the dose-response assessment is actually included in the standard.

In other words, the authorities or expert committees which recommended a specific threshold or parameter (i.e. a limit value) in a standard have taken into account the health problems at the different exposure levels and set the limit value within the standard to prevent these health problems (i.e. significant effects on human health) from occurring.

Health Improvement

Projects that have the potential to generate environmental benefits, protect the population from public health dangers as well as support regeneration, reduce unemployment and improve socio-economic circumstance, could contribute to improving the health and wellbeing of communities.

The assessment for the proposed development, in terms of health improvement, includes an assessment of the likely significant effects of the proposed development on the socio-economics of the community (refer to **Section 18.3.3** for further detail).

18.3 Baseline Conditions

18.3.1 Context

County Wicklow

County Wicklow is located within the Greater Dublin Area and its proximity to Dublin City is central to its socio-economic development. Historically, the settlement patterns and economic development of County Wicklow have been heavily influenced by key infrastructure, notably the M11 and the Dublin-Rosslare railway which mainly follow the east coast.

The population in County Wicklow increased by 4.2% to 142,425 between 2011 and 2016, according to CSO data, which was slightly above the national average growth of 3.8%. However, a reduction on the previous growth rate of 8.3% between 2007 and 2011 was evident, itself similar to the national average of 8.2%, over the same period. Just over 46% of the population of County Wicklow are under the age of 35 years, while 13% are aged over 65 years.

Arklow

Arklow town is located in the southern part of County Wicklow. The Arklow Municipal District covers a wide geographical area in the east of Co. Wicklow, including the town of Arklow and villages such as Rathdrum, Avoca, Aughrim, Redcross, Annacurra and Glenmalure. The Arklow Municipal District covers an area of 48,380 ha and has a population of 26,185 while Arklow town has a population of 13,163. Arklow serves a large area of rural County Wicklow, possessing commercial and retail facilities, a small hospital, primary schools, four secondary schools, leisure and cultural facilities.

Arklow has industrial infrastructure including a shipping and fishing port. It is connected to the Dublin-Rosslare railway line and is located close to the M11 motorway, which connects Dublin to south of Enniscorthy, from where the N11 connects to Wexford town and the N25 to Rosslare Europort.

Arklow is centred on the Avoca River and the coast with a natural setting that is conducive to amenity and recreation, and economic activities associated with commercial fishing and the port. Some port related industrial activity is found on the North Quay and around the harbour area. Other industrial activity is found in industrial and business parks closer to the M11, including the Avoca River Business Park and the Kilbride Industrial Estate.

Arklow town possesses a swimming pool, gyms, GAA, rugby, football, tennis, pitch and putt, golf, sailing clubs, playing fields, and other facilities for exercise and recreation. There are also numerous opportunities for walking, along the South and North Quays and along the seafront, including the northern seafront embankment and Seaview Avenue, near which a public skate park and outside exercise equipment have been installed. Six walk routes have also been designated around Arklow town taking in locations such as North Quay, South Quay and the harbour.

River Walk is also a popular route which loops around a natural area west of the centre to Vale Road. The sandy section of the North Beach commences north of Arklow town.

18.3.2 Significance

Arklow has been designated by Wicklow County Council as a Level 3 - Large Growth Town II in the Regional Planning Guidelines and in the Wicklow County Development Plan 2016 - 2022. Trends towards lower household size, noted in the County Development Plan, means that more housing units are likely to be needed in the coming years. The Arklow and Environs Local Area Plan 2018-2024 (LAP) contains proposals for a large increase in population in the town, ultimately to 23,000. The Plan notes that, since the opening of the N11 bypass in 1999, sequential built development has been permitted up to the road boundary. However, where local circumstances allow, it is proposed, in the LAP, that housing density will be increased to make best use of appropriately zoned lands. Infill development is therefore expected to accommodate some of the proposed new development.

The land at the landfall and along the proposed cable route is primarily outside the settlement boundary and is in agricultural use, with some farms and single residential dwellings. Some sections of the route are classed as mixed land use and new residential, with some small sections of the route passing through areas that are primarily urban in nature (being in public roads within Arklow). The urban areas are made up of employment areas (according to the Arklow and Environs LAP 2018-2024), residential areas and commercial areas.

At the landfall and along the cable route, the land use is dominated by intensive agriculture and the field size is generally large. Arable crops predominate and in general the large arable fields are generally of low ecological value. The substation site is located within an industrial area of the Avoca River Business Park where the land is zoned as 'employment.'

The closest receptors include residential dwellings c. 10-20m from the planning boundary. The closest receptors which have the potential for air quality and noise and vibration effects are assessed in their relevant chapters (**Chapter 7 Air Quality** and **Chapter 11 Noise and Vibration**).

The closest receptors to the HDD works include single residential dwellings. These are located c. 180m from the M11, 115m from the R772 crossing and 300m from the landfall works.

Other sensitive receptors along the proposed cable route include the following;

- Aisling House Nursing Home located c. 300m east of the proposed cable route at Seabank;
- The visitor's walkway to Porter's Rock is located c. 730m east of the proposed cable route;
- The Asgard Lodge Nursing Home and Irish Wheelchair Association are located c. 150m south of the proposed cable route at Kilbride;

- The Templeraíneí Church and St Joseph's National School are located c. 1km east of the proposed cable route;
- Kilbride Industrial Estate is located c. 400m east of the proposed cable route.
- There is a sports facility and a Gaelcholáiste located c. 1.25km south-east of the proposed substation site.

Arklow's maritime heritage, built heritage, coastal golf course and beaches underpin its tourism potential. In addition, nearby hinterland includes the Vale of Avoca and Brittas Bay for which Arklow could potentially be the gateway. Annual festivals celebrate the town's coastal location, and maritime and musical heritage. There are two small hotels in the centre of town, the Arklow Bay Hotel on Sea Road, several local B&Bs and a caravan park which cater for the existing flow of visitors.

Transport infrastructure includes connections to the M11. It is proposed to develop a Port Access Road to the south of Arklow to link the M11/R772 to the Roadstone jetty which is located c. 2km south of the town centre, and South Quays, to reduce the volume of heavy good vehicles in the centre of the town.

The focus of industrial development to date in Arklow, as outlined in the LAP, has been in the south of the town in the vicinity of the M11 interchange in the Kilbride Industrial Estate as well as Shelton Abbey on the Avoca River to the west of the M11, in the Avoca River Business Park. The LAP highlights potential opportunities for development of the maritime sector given the existing infrastructure and services available in the port area.

18.3.3 Sensitivity

Community Profile

As of 2016, the settlement of Arklow had a population of 13,163. Most of this population is included within two Electoral Divisions (EDs), Arklow No. 1 Urban (Arklow ED No 1) which is located to the south of the Avoca River, and Arklow No. 2 Urban to the north of the River Avoca (Arklow ED No 2). These two urban EDs capture most of the built-up area for which the relevant population is 12,989. Although the urban area has also extended into the Kilbride ED. Within the environs of Arklow town, Arklow Rural ED is located inland and to the south of Arklow town, while Kilbride ED is located to the north of Arklow town. The proposed development is located within the Kilbride ED and therefore the focus of data below is on Kilbride, with Arklow data provided as a comparator.

As outlined in **Table 18.1**, the population has grown modestly in Arklow between 2011 and 2016 with the population actually decreasing slightly in the Kilbride ED. **Table 18.2** shows that the age profile in Kilbride ED contains a significantly lower representation of younger people (under 30 years), in comparison to the State. This is unlike the neighbouring Arklow town which has a higher representation of children (under 19 years) when compared to the State or County. Kilbride has a significantly higher representation of older people (over 60 years) when compared to Arklow town, Wicklow County or the State.

Table 18.1 Population - Main settlements (Source: CSO)

Electoral Division	Population 2016	Population 2011	Per cent change
Arklow town	13,163	13,009	1.2%
Arklow No1 Urban ED	9,976	9,817	1.6%
Arklow No2 Urban ED	3,013	2,953	2.0%
Arklow Rural ED	1,367	1,310	4.4%
Kilbride ED	889	909	-2.2%
Wicklow town	6,752	6,761	-0.1%
Co Wicklow	142,332	136,640	4.2%
State	4,757,976	4,588,252	3.7%

Source: CSO Census of Population 2011 and 2016

Table 18.2 Age Profile: Census 2016 (Source: CSO)

	0-19	20-29	30-39	40-49	50-59	60-69	70+
Total (Kilbride ED)	186	68	119	123	124	113	156
% Kilbride	20.9%	7.6%	13.4%	13.8%	13.9%	12.7%	17.5%
% Arklow	30.0%	10.9%	15.9%	15.1%	11.9%	8.5%	7.5%
% Co Wicklow	29.0%	10.1%	14.9%	15.2%	12.7%	9.6%	8.5%
% State	27.5%	12.0%	15.8%	14.4%	11.9%	9.5%	8.9%

The total number of households in Kilbride is 287 and **Table 18.3** reveals this is a significantly smaller number than the urban EDs, which comprise Arklow town.

Further, **Table 18.4** shows that a modest proportion of properties were built between 2001 and 2010. Significantly more construction was evident in Kilbride pre 2000, particularly pre the 1970s, in comparison to Arklow town. This is likely due to the preference in recent years for urban expansion. Very little construction has occurred since 2011 due largely to the economic recession. Overall, the residential building stock is older in Kilbride than in Arklow town.

Table 18.3 Numbers of persons in private households (Source: CSO)

	1	2	3	4	5	6	7+
Kilbride	64	198	153	144	110	66	29
Arklow town	1,172	1,326	890	897	388	120	54
% Kilbride	8.4%	25.9%	20.0%	18.8%	14.4%	8.6%	3.8%
% Arklow	24.2%	27.4%	18.4%	18.5%	8.0%	2.5%	1.1%

Table 18.4 Private households by year built (Source: CSO)

	Pre-1971	1971-91	1991-2000	2001-10	2011 or later	Not stated
Kilbride	108	76	35	43	7	14
Arklow town	1,305	949	824	1,415	19	333
% Kilbride	38.2%	26.9%	12.4%	15.2%	2.5%	4.9%
% Arklow	26.9%	19.6%	17.0%	29.2%	0.4%	6.9%

Social class/workforce data (as per CSO) are indicated by **Table 18.5**. Although Arklow's traditional shipping and fishing industries have declined, the table

indicates a relatively high proportion of skilled and technical workers supported by the presence of the strong industrial base. Arklow retains boat building businesses, including vessels for the aquaculture sector and for servicing the existing offshore wind farm (Arklow Bank Wind Park Phase 1).

Table 18.5 Social class/Workforce (Source: CSO)

	Professional	Managerial / Technical	Non-manual	Skilled	Semi-skilled	Unskilled	Other
Kilbride	81	255	119	147	67	34	186
Arklow town	628	3,027	2,331	2,218	1,917	491	2,596
% Kilbride	9.1%	28.7%	13.4%	16.5%	7.5%	3.8%	20.9%
% Arklow	4.8%	23.0%	17.7%	16.8%	14.6%	3.4%	19.7%
% Mid-East	7.9%	30.2%	18.1%	15.0%	10.3%	3.6%	15.0%

The Pobal Deprivation Index for Small Areas (Haase and Pratschke, 2017) is based on census data where this indicates relevant population attributes and an absence of possessions or opportunities. Its value is in providing comparisons between locations and census years.

The latest data for 2016 show that relatively high levels of disadvantage are to be found in small towns across the country, although much recovery will have occurred since 2016 as the economy has grown. Arklow is not uncharacteristic of the fortunes of small towns.

Table 18.6 indicates typical proportions of household occupancy types when compared with aggregate town areas nationally. There is a higher level of home ownership but lower level of private rentals in the Kilbride ED.

County Wicklow as a whole has a high proportion of social housing compared with the national average. **Table 18.7** lists principal economic status. In 2016 there were lower levels of employment and higher levels of unemployment than those for the Mid-East Region and aggregate town areas nationally. Since this time the economy has grown prior to the current Covid-19 pandemic.

Table 18.6 Type of household occupancy (Source: CSO)

	Owner occupied	Rented from private landlord	Rented from local authority	Rented from voluntary body	Occupied free of rent	Not stated
Kilbride	234	27	4	0	11	7
Arklow	3,140	956	531	43	70	105
% Kilbride	82.7%	9.5%	1.4%	0%	3.9%	2.5%
% Arklow	64.8%	19.7%	11.0%	0.9%	1.4%	2.2%
% Mid-East	71.6%	15.6%	7.2%	0.8%	1.5%	2.4%
Aggregate town area	61.4%	24.8%	11.2%	1.4%	1.2%	3.8%

Table 18.7 Principal Economic Status (Source: CSO)

	at work	looking for first job	unemployed	student	home duties	retired	unable to work	other
Kilbride	312	5	55	43	64	172	32	57
Arklow	4,855	91	1,167	995	962	1,322	582	36
% Kilbride	42.2%	0.7%	7.4%	5.8%	8.6%	23.2%	4.3%	7.7%
% Arklow	48.4%	0.9%	11.5%	9.9%	9.8%	13.2%	5.8%	0.4%
% Mid-East	55.0%	0.8%	7.1%	11.4%	8.8%	12.6%	3.9%	0.3%
Aggregate town area	53.4%	0.8%	7.1%	11.4%	8.1%	14.5%	4.2%	0.4%

13% of County Wicklow residents have a disability. Of the 19,244 people with a disability, one third are aged 65 years or older. The number of people with disabilities (of all kinds) in Arklow is 15.4% compared with 12.8% for the Mid-East Region.

Table 18.8 shows that self-perceptions of health in Kilbride were slightly lower than for Arklow and the State as a whole (with the exception of slightly fewer people reporting their health to be very good). Numerous factors will inform these perceptions including age and living conditions.

Table 18.8 Perception of health: Census 2016 (Source: CSO)

	very good	good	fair	bad	very bad	not stated
Kilbride	483	275	104	10	2	15
% Kilbride	54.3%	30.9%	11.7%	1.1%	0.2%	1.7%
% Arklow	59.1%	27.9%	9.0%	1.6%	0.3%	2.1%
% State	62.5%	26.2%	7.4%	1.1%	0.3%	2.5%

18.3.4 Interaction between Population and Environment

In the Wicklow County Development Plan and Arklow and Environs LAP, Wicklow County Council targets Arklow town for a significant expansion in population up to 23,000 by 2028 in addition to industrial, retail and tourism growth.

The ‘Economic Development Strategy’ detailed in the LAP is to take advantage of the existing economic assets in order to stimulate employment within the area. The plan notes the existing infrastructural services in Arklow as key assets including the effective road and transport networks, energy, telecommunications, high voltage electricity lines across the plan area and the location of the existing offshore wind farm. It is also noted that there is availability of plentiful zoned employment land with a highly skilled workforce living in the town and surrounding areas. Lands have been zoned for significant development at Kilbride as outlined in the LAP.

The LAP details the ‘vision’ for Arklow and Environs including climate adaptation directly in the areas of flooding and renewable energy.

The LAP notes that Wicklow County Council supports the identification and realisation of the economic opportunities in servicing the off-shore renewable energy industry.

As detailed in **Chapter 10 Water**, the Avoca Estuary is the only waterbody in Ireland which fails to meet chemical Water Framework Directive standards due to historic mining contamination. Wastewater discharge into the river channel has exacerbated this situation in terms of the corresponding biological criteria.

Wastewater currently enters the river at various locations on the north and south banks of the river. However, water quality is listed as “excellent” at Arklow South Beach in the EPA Report on Bathing Water Quality for 2016, and most recently, at www.beaches.ie for July 2018.

18.3.5 Health Standards

As outlined in **Section 18.2.7**, a standards-based approach has been used particularly in regard to health protection. Therefore, appropriate health standards have been chosen and justification for the particular standards chosen is provided therein. As stated previously, it is important to bear in mind that it is not possible to use standards for all possible health effects.

18.3.5.1 Air Quality

Appropriate Standards

The starting point in selecting the appropriate standard to apply is Directive 2008/50/EC of the European Parliament and of the Council, as amended by Commission Directive (EU) 2015/1480 on ambient air quality and cleaner air for Europe (CAFE Directive). In Ireland, air quality is monitored by the EPA to ensure that the relevant limit values specified by EU Directives (that set out the targets for specific air pollutants) are achieved. Limit values have been specified in the CAFE Directive for the following air pollutants as shown in **Table 18.9**:

- Nitrogen dioxide and oxides of nitrogen, particulate matter (PM₁₀ and PM_{2.5}) and lead;
- Carbon monoxide and benzene.

Table 18.9 Limit values as set out in the CAFE Directive

Pollutant	Limit Value Objective	Averaging Period	Limit Value ug/m ³	Limit Value ppb	Basis of Application of the Limit Value
NO ₂	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year
NO ₂	Protection of human health	calendar year	40	21	Annual mean
PM ₁₀	Protection of human health	24 hours	50		Not to be exceeded more than 35 times in a calendar year
PM ₁₀	Protection of human health	calendar year	40		Annual mean

Pollutant	Limit Value Objective	Averaging Period	Limit Value $\mu\text{g}/\text{m}^3$	Limit Value ppb	Basis of Application of the Limit Value
PM _{2.5}	Protection of human health	calendar year	20		Annual mean
Carbon Monoxide	Protection of human health	8 hours	10,000	8620	Not to be exceeded
Benzene	Protection of human health	calendar year	5	1.5	Annual mean

The limits of pollutants in ambient air, set out in **Table 18.9**, are determined primarily for the protection of human health. Air quality standards protect the vulnerable including those with respiratory illnesses, the old, very young and infirm. Whilst slightly higher levels of oxides of nitrogen above the limit values may have no effect on the vast majority of the population, elevated levels of pollutants in ambient air may be significant for these vulnerable groups within the population. This assessment has relied on compliance with the limit values in the CAFE Directive to determine likely significant effects on human health. Therefore, adherence to these limit values is considered to represent the situation that there will be no adverse effect on human health due to air quality emissions.

Baseline conditions

The Environmental Protection Agency (EPA) *Air Quality in Ireland Reports* describes the air quality zoning adopted in Ireland under the *Air Quality Standards Regulations, 2011* as follows:

- Zone A (Dublin conurbation);
- Zone B (Cork conurbation);
- Zone C (24 Cities and towns); and
- Zone D (Rural Ireland: areas not in Zones A, B and C).

The site falls within Zone D. Background levels from 2019, 2018 and 2017 air quality monitoring of NO₂, NO_x, CO, Benzene, PM_{2.5} and PM₁₀ in Zone D provided by the EPA are presented in **Table 18.10**.

Table 18.10 Annual Mean Background Pollutant Concentrations

Year	Annual Average NO ₂ ($\mu\text{g}/\text{m}^3$)	Annual Average PM ₁₀ ($\mu\text{g}/\text{m}^3$)	Annual Average PM _{2.5} ($\mu\text{g}/\text{m}^3$)	Annual Average NO _x ($\mu\text{g}/\text{m}^3$)	8-hr Annual Average CO Limit ($\mu\text{g}/\text{m}^3$)	Annual Average Benzene ($\mu\text{g}/\text{m}^3$)
Limit	40 $\mu\text{g}/\text{m}^3$	40 $\mu\text{g}/\text{m}^3$	20 $\mu\text{g}/\text{m}^3$	30 $\mu\text{g}/\text{m}^3$	10,000 $\mu\text{g}/\text{m}^3$	5 $\mu\text{g}/\text{m}^3$
2019	5.7	13.0	10.3	7.8	100	0.1
2018	3.3	10.7	7.5	6.7	200	-
2017	4.4	9.9	7.4	5.7	200	-
Average	4.6	11.2	8.4	6.7	167.7	0.1

Please refer to **Chapter 7 Air Quality** for a detailed description of the baseline conditions in relation to air quality.

18.3.5.2 Noise and Vibration

Appropriate Standards

As set out in **Chapter 11 Noise and Vibration**, there is no specific legislation which sets out environmental noise limits that must be achieved. The noise assessment criteria are based on the Guidelines set out by regulatory bodies such as the EPA and the Department of Communications, Climate Action and Environment (DCCA) whose guidance and standards are based on international best practice.

Construction Noise Criteria

Construction noise is temporary in nature and usually experienced over a short to medium-term period. This characteristic requires it to be considered differently to other longer-term sources of noise. Construction activities on larger-scale developments such as the proposed development will inevitably result in temporary noise emissions.

There are no published statutory guidelines on noise levels from construction sites in Ireland. The construction noise assessment therefore makes reference to absolute noise levels found in the relevant British Standard.

Construction noise is assessed in terms of the requirements of the relevant standard and specifically Annex E of the British Standards (2014) *BS 5228-1: Code of practice for noise and vibration control on construction and open sites* details acceptable construction noise limits for differing scenarios.

Annex E of BS5228-1 provides example criteria for the assessment of construction noise impacts, presented in **Table 18.11** (see also **Table 11.3** in **Chapter 11, Noise & Vibration**), which has been used to assess the potential significant effects from construction noise.

A negative, but not significant effect, may be experienced at receptors for construction noise levels above the baseline ambient noise levels but below the BS5228-1 thresholds.

Table 18.11 BS5228-1 threshold of potential significant effect at dwellings. Source: BS5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites: noise (2014)

Period description	Day & Times	Threshold value ($L_{Aeq,T}$) – over one month
‘Daytime’	Weekday 07:00 – 19:00 Saturday 07:00 – 13:00	65
‘Evenings and Sundays’	Weekday 19:00 – 23:00 Saturday 13:00 – 23:00 Sunday 07:00 – 23:00	55

Period description	Day & Times	Threshold value ($L_{Aeq,T}$) – over one month
‘Night’	Night: 23:00 – 07:00	45

Operational Noise Criteria

The Environmental Protection Agency’s ‘*Guidance Note for Noise: Licence Applications, Survey and Assessments in Relation to Scheduled Activities*’ (NG4), hereafter referred to as ‘NG4’ and BS4142 guidance have been used to undertake the assessment of operational impacts of the substation. NG4 sets appropriate noise criteria for new licence applications with the Environmental Protection Agency (EPA) Office of Environmental Enforcement (OEE). While the onshore 220kV substation does not fall within the NG4 schedule of activities, the noise limit criteria have been considered as relevant upper thresholds for the EIAR operational noise assessment. Furthermore, elements of NG4 are derived from BS4142, which provides the context within which to assess the impact of industrial noise on sensitive receptors.

NG4 noise limits are presented in **Table 18.12**, which have been used to define the onset of a significant negative effect.

The baseline noise environment was determined with baseline noise surveys as detailed in **Chapter 11 Noise and Vibration**.

Table 18.12 NG4 Recommended Noise Limit Criteria – ‘All other Areas’

Daytime Noise, dB $L_{Ar,T}$ (07:00 – 19:00)	Evening Noise, dB $L_{Ar,T}$ (19:00-23:00)	Night Noise, dB $L_{Aeq,T}$ (23:00-07:00)
55	50	45

Vibration

The situation regarding vibration standards outlined herein are as described in **Chapter 11 Noise and Vibration**. These standards are:

- British Standards Institution (BSI) (2014) 5228-2:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites.

BS5228-2 provides guidance on the impacts on humans from vibration. In addition to human annoyance, building structures may be damaged by high levels of vibration. The levels of vibration that may cause building damage are far in excess of those that may cause annoyance. Consequently, if vibration levels are controlled to those specified by human annoyance then it is highly unlikely that buildings will be damaged by construction vibration.

Baseline conditions

Table 18.13 below presents a summary of noise monitoring results from the noise surveys undertaken in August and September 2020.

Table 18.13 Noise Monitoring Results

Location	Day 07:00-19:00 T = 12h		Evening 19:00-23:00 T = 4h		Night 23:00-07:00 T = 8h	
	dB L _{Aeq,T}	dB Mode L _{A90,15min}	dB L _{Aeq,T}	dB Mode L _{A90,15min}	dB L _{Aeq,T}	dB Mode L _{A90,15min}
NM1	54	44	48	38	46	35
NM2	50	42	48	39	44	29
NM3	62	58	59	56	54	42
NM4	44	36	41	36	40	31
NM5	51	49	46	47	42	38
NM6	55	52	51	48	47	29
NM7	63	46	N/A	N/A	N/A	N/A
NM8	50	48	47	46	46	33
NM9	58	51	52	43	49	40
NM10	48	42	45	37	43	27
NM11	53	46	50	40	47	27
NM12	70	58	N/A	N/A	N/A	N/A
NM13	57	41	N/A	N/A	N/A	N/A

Please refer to **Chapter 11 Noise and Vibration** for a detailed description of the baseline conditions in relation to noise and vibration.

18.4 Likely Significant Effects

18.4.1 Introduction

The following sections examine the significant effects of the proposed development that are likely to arise during the construction and operational phases.

For population, these are effects of changes in amenity (journey, residential and general amenity), accessibility and community severance, journey patterns and business, tourism and employment. For human health, these are the effects from environmental factors (pathways) through which health could be affected such as air, noise, water, soils and electromagnetic fields.

18.4.2 “Do-Nothing” Scenario

In the event that the proposed development does not proceed, the Arklow Bank Wind Park would remain at the Phase 1 current installed capacity instead of supporting an additional capacity of 520MW.

Without this increase there would be no change to the current situation.

There would not be clean energy powering additional homes, which would still be reliant on fossil fuels. The 530,225 tonnes of annual carbon emissions would not be offset and there would not be significant progress towards Ireland's 2030 targets for carbon emission reduction.

The "do-nothing" scenario would avoid the potential negative effects associated with the proposed development.

This includes the potential construction and decommissioning stage effects such as effects on air quality, biodiversity, noise and vibration, traffic and transportation, land and soils, landscape and visual. The "do nothing" scenario would also avoid potential operational effects from electromagnetic fields and effects on aspects such as landscape and visual and noise and vibration. These negative effects are considered to be outweighed by the benefits, outlined above.

18.4.3 Construction Phase

18.4.3.1 Population

Accessibility, Journey Patterns and Journey Amenity

It is proposed that construction traffic will use the existing road network, as well as temporary and permanent access tracks within the proposed development area (working width along the cable route for example). The access routes have been selected to avoid unnecessary closures and where possible only temporary lane closures will occur, as outlined in **Chapter 13 Traffic and Transportation**.

The level of traffic generated during the construction phase of the proposed development has the potential to affect road users. The traffic assessment predicts where construction traffic increases by more than 10% and where there is significant traffic increase due to proposed diversions. The locations identified are the R750, the L6179, Forest Road and L2180. Potential effects on the local transport network and resultant disruptions to vehicle, pedestrian and cyclist movements are discussed in **Chapter 13 Traffic and Transportation**.

A Construction Traffic Management Plan (CTMP) has been prepared (as detailed in the Construction Environmental Management Plan (CEMP), **Appendix 6.1 of Volume 3**) which will be further developed by the contractor prior to the commencement of construction, agreed with the relevant authority and fully implemented. If possible, traffic flow will be maintained by use of temporary traffic signals as outlined in Chapter 8 of the Traffic Signs Manual and Temporary Traffic Management Document Guidelines (Department of Transport, Tourism and Sport, 2019), however, if the road width is insufficient, or on private lanes, the road will be closed and a diversion put in place. For public roads, this will be via other public roads, but for private lanes, the diversion will be more local and involve an access track similar to that used by the construction plant. Mitigation measures for traffic disruption are described in **Chapter 13 Traffic and Transportation**.

There will be a temporary, slight effect on the residents and road users in the vicinity of the cable trench excavations and cable installation through road crossings for the duration of the works.

Once the cable works have been completed, there will be no effect on the road network or on traffic. The construction of the substation and NETN connection will have a **temporary slight** effect on road users.

Residential Amenity

The construction of the proposed development will result in some dust, noise and vibration emissions which have the potential to affect amenity, accessibility, business, tourism and employment, population and human health. Construction visual effects have the potential to have an impact on amenity.

Most of the proposed cable route passes through agricultural lands in primarily rural areas, with single residential dwellings located sporadically along the route. The proposed cable route does not pass through any extensive residential areas. There is residential ribbon development along the proposed cable route at Kilbride, close to the M11 crossing, as well as some smaller commercial developments.

The proposed substation site is located within an industrial area in Avoca River Business Park. A public Right of Way along the canal adjacent to Avoca River borders the substation site. There are a number of sensitive receptors located in the vicinity of the proposed development. The closest sensitive receptors include some single residential dwellings in agricultural areas along the proposed cable route.

Access to local residences, private property, shops and community facilities along the proposed cable route will be maintained during the construction phase. The route has been selected to avoid unnecessary road closures and where required, closures will be single lane closures, where possible, with local access maintained where practicable. This, together with the implementation of the measures in the CTMP, will ensure there is no significant effect on residential amenity. This is detailed in **Chapter 13 Traffic and Transport**.

There will be noise generated during the construction phase of the proposed development particularly during the horizontal directional drilling (HDD) and piling works. However, the effects of the drilling and piling are not expected to be significant in respect of residential amenity considering the short, discontinuous duration of the works. This is detailed in **Chapter 11 Noise and Vibration**.

There is potential for dust emissions during the construction phase of the proposed development which could cause dust soiling. However, the effects of this are predicted to be negligible, as detailed in **Chapter 7 Air Quality**, therefore there are no negative effects to residential amenity expected.

The potential effect on residential amenity is considered to be a **slight negative, temporary** effect.

Business, tourism and employment

The proposed development is anticipated to provide employment for c. 165 people in the locality during the construction phase, with significant investment in materials and services.

This employment will have a positive short-term effect on the local economy with local businesses likely to benefit from an increase in demand for their goods and services. There will also be increased use of material assets and greater waste generated in the local area.

It is proposed that construction works at road crossings, in particular, will be completed as swiftly as possible in order to minimise effects. There are seasonal constraints associated with some of the works (watercourse crossings, in line with Inland Fisheries Ireland requirements) which will constrain the timing of such works.

The construction phase will also generate demand for some locally sourced inputs such as materials or machinery. This would result in a positive effect on the local economy. The construction phase will give rise to an increase in waste generation and greater use of natural resources and material assets in the region. These indirect effects are addressed in **Chapter 16 Resource and Waste Management** and **Chapter 17 Material Assets**.

The construction works will have limited effects on tourism. There is potential for a short-term disturbance to tourists in the form of noise and air emissions and possible visual effects. At an aggregate level, construction of the proposed development is anticipated to have only a slight and temporary negative effect on tourism numbers or length of stay prior to proposed mitigation being in place. Any effects on tourism will have a potential knock-on impact on local businesses such as hotels, guest houses and restaurants. However, the overall Project will have a much greater benefit to these same businesses. Tourism currently makes a modest contribution to the economy of Arklow and most hotels are located away from the working areas.

Therefore, the potential effect on business, tourism and employment during the construction phase is expected to be a **short-term positive** effect.

18.4.3.2 Human Health

The construction strategy requires all contractors to comply with legislation and good industry practice with regard to the health and safety of both workers and the public. As required by regulation and legislation, a Health and Safety Plan will be prepared to address health and safety issues from the design stages through to completion of the construction and maintenance phases. This plan will be reviewed and updated as required, as the development progresses. The Project Supervisor Construction Stage will assemble the Safety File as the project progresses on site. This is detailed in **Chapter 6 Construction Strategy**.

Traffic

As outlined in **Chapter 13 Traffic and Transport**, some slight, short-term, negative effects are predicted in some locations on traffic operations during construction associated with increased traffic flows on the network and diversions. These locations include the following: R772 (Dublin Road), L6179 (Kilbride Road), L2180 (Beech Road), R750 (Sea / Coast Road) and Forest Road.

This has the potential to lead to some temporary annoyance to drivers, pedestrians and cyclists as well as the residents of the properties adjoining the traffic routes.

Annoyance however is not in itself a health effect. Further, given the defined duration of the construction phase, and the extensive mitigation outlined in **Chapter 13 Traffic and Transport** the likely significant effect on human health associated with traffic is **negligible**.

Air Quality

The background concentrations of air pollutants are well below the air quality standard limits determined for the protection of human health. Any increase in the concentrations, due to the construction of the proposed development, are not expected to cause an exceedance of the air quality standards. Given the mitigation measures outlined in **Chapter 7 Air Quality**, there are no likely significant effects predicted on air quality during construction.

On the basis of complying with the limit values outlined in the CAFE Directive, the likely significant effects on human health associated with air quality are **imperceptible** during construction.

Noise

As outlined in **Chapter 11 Noise and Vibration**, noise levels from HDD works proposed for the landfall and M11 will be below the daytime, evening and night-time noise level thresholds. Noise levels from the HDD works at the R772 are below or equal to daytime and evening baseline ambient levels and below noise level thresholds. For night-time works, these are estimated to exceed night-time baseline ambient levels and noise level thresholds. However, as drilling works will only last for up to a week per cable circuit, this will result in a negative, but not significant effect. Along the cable route, at a number of receptors in close proximity to the works, will experience a negative effect from the use of excavators. However, these works will only occur in close proximity to receptors for a limited number of days, as cable trenching works progress along the cable route and the negative effect caused by cabling works is considered to be not significant.

Noise from vibratory sheet piling at the HDD sites and at the flood defence improvement works will in general be below the relevant noise level thresholds, except for the R772 where evening time noise level thresholds are estimated to be exceeded. However, as sheet piling will only last for a few days here, this will result in a negative but not significant effect.

The closest receptors to the substation site may experience a negative effect during the piling works however this is expected to be not significant.

The magnitude of noise impact from construction traffic is considered to be very low and not significant.

The implementation of the mitigation measures outlined in **Chapter 11 Noise and Vibration** will assist in reducing effects on nearby sensitive receptors.

Vibration

At two receptors along the cable route, during excavation and backfill, construction vibration will result in a negative but not significant effect at R8 and R12 as outlined in **Chapter 11 Noise and Vibration**.

The HDD works at the R772 have the potential to cause vibration disturbance, which is not likely to be significant during daytime, but is likely to cause a negative but not significant effect during night-time due to the short duration.

Major Accidents and Disasters

There are no plausible major accidents or disaster hazards identified to which the proposed development will be vulnerable, during the construction phase. The construction works are not expected to cause any change to disease vectors (for example insects). The risk of exposure to contaminated substances will be minimised by good practice methodologies and a phased removal of asphalt at the substation site as per the substation site remediation strategy, outlined in **Chapter 6 Construction Strategy** and **Chapter 9 Land and Soils**.

There will be no increased risk of groundwater contamination. No plausible potential risks were identified which would result in the construction of the proposed development causing a major accident or disaster on or outside the site of the proposed development. This is outlined in **Chapter 17 Major Accidents and Disasters**.

Summary

There will be no emissions of toxic substances to the environment, during the construction phase, which could have an effect on human health. The construction works are not expected to cause any change to disease vectors. The construction phase will have no effect on living conditions or on vulnerable groups in the vicinity or wider area.

Apart from mild, temporary, annoyance due to traffic disruption and a temporary negative effect due to construction noise and vibration, significant effects on human health are not likely during construction.

To minimise the effects of the proposed development on human health during construction, project specific management plans are included in the Construction Environmental Management Plan (**Appendix 6.1 of Volume 3**). These include the Construction Waste Management Plan and Construction Traffic Management Plan. These detailed and robust plans outline the mitigation and monitoring measures to be implemented.

18.4.4 Operational Phase

18.4.4.1 Population

Accessibility, Journey Patterns and Journey Amenity

Operational vehicle movements to/from the proposed site will be limited to occasional routine maintenance of the substation and joint bay locations along the cable route and landfall which will not have a significant effect on traffic flow in the area considering the infrequency and low numbers.

Traffic generated during the operation of the proposed substation will be minimal. The substation will be unmanned with only occasional maintenance staff present on site. As these traffic levels are considered very low there are minimal effects on the local transport network predicted during the operational phase. Further details are provided in **Chapter 13 Traffic and Transport**.

The operation of the proposed development will have no significant effect on traffic or journey patterns.

Residential Amenity

Considering the size and scale of the substation and associated structures it is predicted the site will not have a significant visual effect on the surrounding population. As the substation will be located within an industrial area, it will be visually in keeping with the immediate surroundings. This is detailed in **Chapter 11 Landscape and Visual**.

Noise will be generated during the operational phase from the substation which will have the potential to affect the nearest receptors. The operational noise predictions for the proposed substation show that noise levels at all nearby sensitive receptors are below the NG4 criteria, although notably during night-time, there are some cases where the rating level is higher than the pre-existing background level, which could lead to an adverse impact on a number of residential receptors. Operational substation noise is a permanent and long-term duration effect and is identified as a negative effect that is not significant.

There are no predicted effects on air quality during the operational phase of the proposed development, therefore, there is no effect on the surrounding population predicted due to air quality. This is detailed in **Chapter 7 Air Quality**.

The proposed development would support a capacity of 520MW of renewable energy. This is enough energy to offset 530,225 tonnes of annual carbon emissions. The development will have an **indirect positive** operational effect to climate and help meet 2030 emission reduction targets. This will have a positive effect on population as there will be an additional renewable energy source reducing the population's reliance on fossil fuels. This is detailed further in **Chapter 8 Climate**.

Business, Tourism and Employment

It is estimated that the overall Project will lead to the creation of around 80 long term jobs in operation and maintenance work. In addition, the project will support companies in the operation and maintenance supply chain, including vessel services, water and fuel, technical inputs, and loading and unloading of project cargoes. The development of a new service base and associated long-term employment represents an opportunity for significant new investment and ongoing economic activity at County Wicklow's existing maritime facilities.

The project will not only maximise regional economic benefits and create local sustainable jobs, it will also unlock focused community participation in the sector, particularly around port towns. Offshore wind energy can create industry sub-sectors delivering output and jobs across overlapping skill sets – from new roles in engineering, operation and maintenance, and offshore turbine servicing, to new opportunities for existing maritime businesses to provide supply chain services to the offshore energy industry.

With the overall Project, a multi-million euro community benefit fund will be established once the Project is operational to support communities near the wind farm. This will be in addition to any commercial rates payable to Wicklow County Council for any onshore infrastructure.

SSE will pay community benefit in accordance with the offshore RESS Terms and Conditions. While the Department of Environment Climate and Communications have yet to define Community Benefit, it appears likely that the rate of payment will mirror that of the recent onshore RESS auction at €2/MWh for the duration of RESS support with coastal communities and stakeholders as the targeted beneficiaries of the fund.

The output of the Project will vary from year to year taking a number of variables into consideration. However, an indicative estimate of energy output is 2 million MWh per year. This output, at €2/MWh would generate a fund of €4 million annually. As with RESS 1, this fund is likely to be made available once the wind farm becomes operational and is likely to be available for 15 years.

SSE has significant experience in delivering community funds, on a voluntary basis, to communities associated with wind farms across the UK and Ireland. In Ireland in particular, SSE Renewables and Greencoat Renewables have been administering the award winning, Galway Wind Park Community Fund, since the site became operational in 2018. At over €400,000 annually, the fund is the largest of its kind in Ireland. Because of its scale, the fund has been divided into three subsets:

1. The Local Fund: supports projects focused on energy efficiency, safety, environmental sustainability, social sustainability, recreation and tourism, and education and skills development. In 2019, over €235,000 in funding was provided to 86 community groups based near the wind park, bringing to almost half a million euro the total amount of funding that has been presented so far since the Local Fund was established in 2018.
2. Major Projects Fund: Launched in 2018 following a period of community consultation, the first two years of the fund saw a major energy efficiency project established for homes close to the wind park. A total of 47 homes in Seanaphaesteen, Fermoyle and Bunagippaun were included and received a number of energy efficiency improvements.
3. Scholarship Fund: Established in 2019, this is Ireland's first wind-power scholarship. This fund is designed to support students located within a 20km radius of Galway Wind Park. Typically, worth approximately €50,000 per annum, it provides 50% grant support towards a student's annual fees for a

maximum of three years. 33 scholarships were awarded to recipients in 2019/20 with over €130,000 awarded.

As tourism currently makes a modest contribution to the economy of Arklow and most hotels are located away from the working areas the operation of the proposed development is predicted to have no significant effects on tourism.

It is expected that the operation of the proposed development will have a **positive** effect on the surrounding population from the **significant positive** effects on business and employment in the community.

18.4.4.2 Human Health

Traffic

As outlined in **Chapter 13 Traffic and Transport**, likely significant effects on traffic and transportation are negligible during operation. On this basis, the likely significant effects on human health associated with traffic will be not significant during operation of the proposed development.

Air Quality

As outlined in **Chapter 7 Air Quality**, likely significant effects on air quality are negligible during operation. There will be no routine operational emissions to air. The substation buildings foundations will include measures to mitigate any residual ground gas risk, as outlined in the substation site remediation strategy and in **Chapter 9 Land and Soils**. Any increase in pollutant concentrations, due to the operation of the proposed development, are not expected to cause an exceedance of the air quality standards. On this basis, there will be no effects on human health associated with air quality during operation of the proposed development.

Noise

As outlined in **Chapter 11 Noise and Vibration**, there are no significant noise effects likely during operation, with the implementation of the proposed mitigation measures. On this basis, the likely significant effects on human health associated with noise are not expected to be significant during the operation of the proposed development.

Vibration

As outlined in **Chapter 11 Noise and Vibration**, there are no vibration effects predicted during the operation of the proposed development, therefore, the likely significant effects on human health associated with vibration will be not significant during operation of the proposed development.

Major Accidents and Disasters

No plausible major accidents or disaster hazards were identified, to which the proposed development will be vulnerable.

No plausible potential risks were identified which would result in the operation of the proposed development causing a major accident or disaster on or outside the site of the proposed development. This is outlined in **Chapter 17 Major Accidents and Disasters**.

Electromagnetic Fields

Compliance Engineering Ireland Ltd undertook an assessment of the likely significant radiation impacts associated with the proposed development as described in **Chapter 5 Description of Development**.

Electromagnetic Fields (EMF) will be generated by the 220kV underground cable circuits which will pass through areas with a number of sensitive receptors from the landfall at Johnstown North to the new 220kV substation at the Avoca River Business Park. The cable route uses two underground cable circuits which carry high voltage alternating current (AC), buried approximately 2m deep. EMF will also be generated by the components within the new 220kV substation and new section of overhead transmission line adjacent to the substation.

International guidelines for extremely low frequency electric and magnetic fields (ELF-EMF) were set in 1998 by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), a formal advisory agency to the WHO. The ICNIRP reviewed the research and concluded it was insufficient to establish exposure guidelines on the basis of long-term health effects; on the other hand, the agency found sufficient evidence for short-term, neurostimulatory effects at very high field levels and exposure guidelines were established to prevent against this effect. The ICNIRP 1998 guidelines subsequently formed the basis of the European Union (EU) public guidelines in 1999.

For public exposure, Irish Government policy is to comply with the 1998 ICNIRP guidelines in terms of the 1999 EU Recommendation. A panel of independent scientists, convened by Ireland's (then) Department of Communications, Marine and Natural Resources (DCMNR), published a brief Q&A document entitled "Health Effects of Electromagnetic Fields." The conclusions of this report were consistent with those of the International Agency for Research on Cancer (IARC), the WHO and other national and international agencies. In relation to ELF-EMF, the report stated, "No adverse health effects have been established below the limits suggested by international guidelines."

The WHO monograph recommended that policy makers establish guidelines for ELF-EMF exposure for both the general public and workers, and the best source of guidance is the ICNIRP guidelines.

The acceptable levels of electric and magnetic fields are published by ICNIRP. In 2010, ICNIRP issued updated guidelines which reviewed the research since the 1998 report and replaced previous recommendations given by ICNIRP for this frequency range. The 1998 guidelines and 2010 guidelines are reproduced below in **Table 18.14**. The EU EMF Recommendation 1999/519/EC for public exposure adopts the 1998 guidelines.

According to international authoritative agencies, the cumulative body of evidence indicates that ELF-EMF from power cables do not have any adverse effects on health at the levels below ICNIRP guidelines.

None of these scientific agencies considered it necessary or appropriate to limit the construction of electric facilities or recommend exposure standards below the ICNIRP limits.

The Irish electricity network, including the proposed development, complies with the ICNIRP guidelines.

Table 18.13 Health Guidelines for ELF-EMF Exposure

Exposure Characteristics	Electric Field Strength kV/m	Magnetic Flux Density, μT
ICNIRP		
-1998 General Public Reference Level	5	100
-2010 General Public Reference Level	5	200

With regard to underground cables there will be no electric fields generated as the metallic outer surface of the cable prevents electric fields. Therefore, the proposed cable route only generates magnetic fields. The cable route will be underground for the entire route up to the substation. The study along the cable route included an assessment of properties up to 100 metres either side of the proposed development.

Magnetic flux densities for AC magnetic fields are reported using units of microtesla (μT) and AC electric fields are reported as kilovolts per metre (kV/m).

These levels have been calculated for a load of 520MW, 260MW on each underground cable circuit. The cables are arranged either in a trefoil or flat arrangement. Houses and other buildings are at least several meters away. The closest house is potentially located at a distance of 10m. At this distance, the magnetic field level is 0.68 μT full load for the trefoil arranged cables and 1.6 μT for flat arranged cables which are below the ICNIRP guideline limits.

The levels have been calculated using the maximum power capability of the cable circuits which is significantly greater than the levels that would typically flow. The magnetic field emissions are directly proportional to the load on the cable circuit. These levels have been calculated for a load of 520MW, 260MW on each circuit.

These electrical components within the substation have been assessed and it has been verified that the electromagnetic field strengths are compliant with the guidelines. The components produce magnetic fields that decrease with the cube root of distance and as a result, any magnetic fields are very localised and will not propagate beyond the boundary fence. The substation design will be compliant with the EMC Directive 2014/30/EU.

There will be a short section of new overhead transmission line adjacent to the substation. The new development in this respect is more than 100m from domestic dwellings and has been assessed based on a maximum load of 513MVA per circuit. The magnetic field is 12 μ T at 7.4m distance from the centreline. The electric field is 2.8 kV/m at 4.8m from the centreline. These levels are compliant with the ICNIRP guideline limits and the EU EMF Recommendation.

There will be no significant impact from the proposed development from an EMF point of view as the development fully complies with the ICNIRP Guidelines (1998) and the EU EMF Recommendation 1999/519/EC. In addition, there will be no significant impact from the proposed development from an EMC point of view as the predicted levels are lower than equipment interference guidelines.

Refer to **Appendix 18.1 of Volume 3** for a detailed assessment of the EMF levels that will be generated by the proposed development, prepared by Compliance Engineering Ireland Ltd.

18.4.5 Decommissioning

As mentioned in **Chapter 5 Description of Development**, the design life of the substation is c. 50 years but may be extended beyond this. When the proposed development reaches the end of its useful life, it may be either refurbished and replaced, or it will be decommissioned.

If decommissioned, all buildings and above ground structures on the substation site will be removed. All above ground structures along the cable route will be removed. It is likely that the ducts and cables will be left in place, as to remove them would be likely to cause a more substantial environmental impact than leaving them in-situ.

The decommissioning activities are expected to be similar, but considerably less intensive than during the construction phase. As a result, there is no significant effect on population and human health predicted during the decommissioning phase.

18.4.5.1 Population

The decommissioning works along the cable route will be minimal. The potential air quality, noise and vibration effects will be slight and of very short duration. The impact on general amenity will be negligible.

The traffic generated during the decommissioning phase of the proposed development has the potential to affect road users. The effects on the local transport network and resultant disruptions to vehicle and pedestrian movements are discussed in **Chapter 13 Traffic and Transport**.

There will be a short-term slight impact on the residents and road users in the vicinity of the decommissioning works along the cable route. There will be a slight increase in traffic on the road network associated with decommissioning the substation. Effects on journey amenity are predicted to be negative, very short-term and slight.

Access to local residences, shops and community facilities along the proposed cable route will be maintained during the decommissioning phase. Access to private property and residential dwellings will be maintained at all times during the decommissioning of the proposed development. Therefore, the potential effect on accessibility is considered to be not significant.

It is anticipated that the proposed development will provide employment for up to 33 people on site during the decommissioning phase.

This employment will have a positive short-term effect on the local economy with local businesses likely to benefit from an increase in demand for their goods and services. This would result in a **short-term positive** effect on the local economy.

The decommissioning of the proposed development will give rise to greater use of material assets in the region. These indirect effects are addressed in **Chapter 17 Material Assets**.

Decommissioning will have an imperceptible effect on tourists and tourism in the area, as the effects on the local amenity and the road network are predicted to be **negative very short-term** and **slight**.

18.4.5.2 Human Health

The decommissioning activities have the potential for effects to traffic, air quality, noise and vibration however the intensity and duration of the activities will be considerably less than that associated with the construction phase which did not pose a risk for human health effects.

There will be no emissions of toxic substances to the environment, during the decommissioning of the proposed development, which could have an effect on human health. The decommissioning phase of the proposed development is not expected to cause any change to disease vectors or to have any effect on living conditions or on vulnerable groups in the vicinity or wider area.

The decommissioning phase is not expected to have any significant effects on human health.

18.5 Mitigation Measures and Monitoring

18.5.1 Mitigation

18.5.1.1 Construction Phase

Population

Mitigation for emissions during construction is proposed throughout **Chapter 7 Air Quality**, **Chapter 8 Climate**, **Chapter 9 Land and Soils**, **Chapter 11 Noise and Vibration**, **Chapter 13 Traffic and Transport**, **Chapter 16 Resource and Waste Management**, **Chapter 17 Material Assets** and **Chapter 19 Major Accidents and Disasters**.

The use of hoarding at the temporary construction compounds and management of the timing and duration of works will, in most cases have the effect of reducing the significance of effects on the population.

The developer recognises the importance of effective community liaison in order to reduce nuisance to residents during the works, to ensure public safety and welfare, and to help ensure the smooth running of construction activities.

Important issues in ensuring good relations are:

- Providing information for the public during the construction phase, (particularly nearby sensitive receptors);
- Providing the correct points of contact and being responsive; and
- Ensuring good housekeeping in all aspects of the operations.

A ‘good neighbour’ policy will also be implemented. Key aspects of this policy include:

- Early implementation of the policy i.e. from the commencement of construction;
- Reduction of nuisance factors;
- Maintaining access to neighbouring premises;
- Clear and concise information; and
- Undertaking timely liaison with stakeholders.

With regard to liaison, the contractor will be required to implement the Community Liaison Plan (included in the Construction Environmental Management Plan (CEMP), **Appendix 6.1** of **Volume 3**), which includes details of how the local community, road users and affected residents will be notified in advance of the scheduling of major works, any temporary traffic diversions and the progress of the construction works.

This plan includes details of the following:

- The Developer’s ‘good neighbour’ policy;
- Personnel nominated to manage public relations;
- A methodology for processing observations, queries and complaints from the general public, relevant authorities, the media and emergency services; and
- The strategy for project-wide liaison with all relevant parties.

A Community Liaison Officer will be responsible for managing such tasks as the following:

- Briefing neighbours on progress and issues as necessary;
- Liaison with Wicklow County Council and emergency services as appropriate;
- Liaison with local Gardaí, particularly in relation to traffic movements and permits where necessary; and

- Contact details for the Community Liaison Officer will be posted on all construction site notice boards and on any other information or correspondence, which may be distributed from time to time.

The selected construction methodologies will help to avoid/minimise negative effects to the surrounding population during the construction phase of the proposed development:

- The implementation of a CEMP to minimise effects of construction works on local amenity and on traffic flow (**Appendix 6.1 of Volume 3**)
- The implementation of the Environmental Incident and Emergency Response Plan to cover foreseeable risks;
- Industry-standard traffic management measures will be put in place to alleviate construction-related traffic disruptions as outlined in **Chapter 13 Traffic and Transport**;
- Dust emissions will be controlled throughout the construction phase. Further details of dust mitigation measures are outlined in **Chapter 7 Air Quality**;
- Best practice measures for noise control on construction sites will be adhered to during construction. Further details of noise and vibration mitigation measures are outlined **Chapter 11 Noise and Vibration**;
- As required by regulation and legislation, a Health and Safety Plan will be prepared to address health and safety issues during the construction phase. Further details are provided in **Chapter 6 Construction Strategy**;
- A Construction Traffic Management Plan (CTMP) has been prepared and is included in the CEMP;
- Temporary traffic management signage Chapter 8 of the Traffic Signs Manual and Temporary Traffic Management Document Guidelines (Department of Transport, Tourism and Sport, 2019) will be erected which will provide advance warning of site entrances as described in **Chapter 13 Traffic and Transport**;
- Deliveries of materials will be planned and programmed to ensure that the materials are delivered only as they are required at the working areas.
- Storage of material will be at the supplier or at the temporary construction compounds, depending on the type of material;
- Works requiring multiple vehicle deliveries, such as concrete pours, will be planned so as to ensure there will no queuing on the public roadways around the working areas. Deliveries will, where appropriate, be limited to outside of peak traffic hours;

Human Health

Other than the mitigation outlined in the respective **Chapter 7 Air Quality**, **Chapter 8 Climate**, **Chapter 9 Land and Soils**, **Chapter 11 Noise and Vibration**, **Chapter 13 Traffic and Transport** and **Chapter 19 Major Accidents and Disasters**. No further mitigation has been proposed with respect to human health effects during construction of the proposed development.

This is because, in accordance with the best scientific evidence no significant health effects are predicted with the mitigation already proposed.

18.5.1.2 Operation Phase

Population

The overall effects of the proposed development will be permanent and positive. Other than the mitigation outlined in the respective **Chapters 7 Air Quality, Chapter 8 Climate, Chapter 11 Noise and Vibration, Chapter 13 Traffic and Transport, Chapter 16 Resource and Waste Management, Chapter 17 Material Assets and Chapter 19 Major Accidents and Disasters.**

No further mitigation measures have been proposed with population respect to effects from operation of the proposed development.

Human Health

Other than the mitigation outlined in the respective **Chapters 7 Air Quality, Chapter 8 Climate, Chapter 11 Noise and Vibration, Chapter 13 Traffic and Transport and Chapter 19 Major Accidents and Disasters.** No further mitigation has been proposed with respect to human health effects during operation of the proposed development. This is because, in accordance with the best scientific evidence no significant health effects are predicted with the mitigation already proposed.

18.5.1.3 Decommissioning Phase

The same mitigation measures will be employed for the decommissioning phase as for the construction phase, where relevant, and updated to reflect best practice at that time.

18.5.2 Monitoring

No additional monitoring has been proposed, further to those outlined in respective **Chapters 7 Air Quality and Chapter 11 Noise and Vibration,** with respect to effects from the construction and/or operation and/or decommissioning of the proposed development.

18.6 Cumulative

This section considers the potential for cumulative effects arising from the proposed development in association with other developments. Specifically, it considers a worst-case scenario, where both the proposed development and other developments for which construction timelines are not known are under construction and/or operation at the same time.

A two-tiered approach to the cumulative assessment has been undertaken, in which the proposed development is considered cumulatively with other projects as follows:

Tier 1 -

- ABWP Phase 2 Offshore Infrastructure;
- ABWP Phase 2 Operations and Maintenance Facility (OMF);
- EirGrid Grid Upgrade Works; and
- Irish Water Upgrade Works.

Tier 2 -

- Other relevant projects currently under construction;
- Other relevant projects with consent;
- Other relevant projects in the planning process; and
- Other existing projects that were not operational when baseline data were collected.

There are a number of developments identified that are currently permitted or proposed in Arklow (outside of those listed above) that were not assessed in this chapter. The nature and scale of these developments are such that development of these projects in combination with the proposed development would not give rise to significant effects on population and human health.

A summary of the cumulative effects is provided in **Chapter 21 Summary of Cumulative Effects**.

18.6.1 Tier 1

18.6.1.1 Arklow Bank Wind Park Phase 2 Offshore Infrastructure and Operations and Maintenance Facility and Proposed Development

Given the scale of these developments, there is potential for cumulative effects to population and human health. However, considering that there will be no significant effects from construction traffic generated from the other proposed developments, as well as the distance between the works associated with these developments, there are no significant negative cumulative effects to population and human health predicted during the construction phase.

The cumulative noise effects at the landfall from the combination of onshore HDD works and offshore piling works will not exceed noise thresholds for construction works during daytime or night-time. Therefore, there will be no significant cumulative effects in terms of noise and vibration and population and human health.

The Arklow Bank Wind Park Phase 2 Offshore Infrastructure, the OMF and the proposed development will create employment opportunities and associated economic and social benefits, which will have a positive cumulative effect on population and human health during both the construction and operational phases.

18.6.1.2 EirGrid Grid Upgrade Works and the Irish Water Upgrade Works and Proposed Development

Given the nature and scale of these projects, in terms of both construction activities and duration, there is minimal potential for cumulative effects on population and human health with the proposed development. No significant negative cumulative effects are predicted during the construction phase.

In terms of electromagnetic fields, the additional contribution from the proposed development to the EirGrid grid upgrade works, can be regarded as having a negligible effect on the cumulative levels.

The construction phase of both developments will create employment opportunities in Arklow and the associated economic and social benefits, which will have a positive cumulative effect on population and human health in combination with the proposed development.

18.6.1.3 All Tier 1 Projects and the Proposed Development

When operational, the Tier 1 elements of the overall Project in combination with the proposed development will facilitate the generation of 520MW of renewable energy.

This will increase supply, while reducing the reliance on fossil fuels and help to meet national and international renewable energy targets. This will have a significant positive cumulative effect on population and human health.

18.6.2 Tier 2

18.6.2.1 Arklow Wastewater Treatment Plant and the Proposed Development

Given the scale of this project, in terms of construction activities, there is potential for cumulative effects on population and human health. However, given the distance from the proposed development, no significant negative cumulative effects are predicted. The construction phase of both developments will create employment opportunities in Arklow and the associated economic and social benefits, which will have a positive cumulative effect on population and human health.

The operation of the proposed development is expected to have a positive effect on population and human health in terms of increasing energy supply in the local area. The operation of Arklow Wastewater Treatment Plant will increase the capacity for foul wastewater treatment in the area, to 36,000 population equivalent (PE). Both developments will allow for further expansion and growth in the area, which will help to meet the objectives of the Arklow LAP. Therefore, there is potential for a **significant positive** cumulative effect on population and human health in combination with the proposed development.

18.6.2.2 Arklow Solar Farm Developments and the Proposed Development

There are a number of permitted solar farms in Arklow, including;

- BNRG Neon Holdings Limited Solar Farm Johnstown North (Planning Reference 171497)
- BNRG Neon Holdings Limited Solar Farm Ballymoney (Planning Reference 19627)
- Highfield Solar Limited Ballinlea, Lower (Planning Reference 171440)
- Highfield Solar Limited Templerainy East (Planning Reference 161285).

Given the relatively small scale of the developments, in terms of both construction activities and construction traffic, it is not likely there will be significant potential for cumulative effects on population and human health in combination with the proposed development. The construction phase of the solar farm developments will create employment opportunities in Arklow and the associated economic and social benefits, which will have a **positive** cumulative effect on population and human health during the construction phase in combination with the proposed development.

When operational, the solar farms in combination with the proposed development, will facilitate renewable energy generation which will increase supply as well as reduce the reliance on fossil fuels, helping to meet national and international targets in line with Arklow LAP and Wicklow County Development Plan 2016-2022. As such, there is the potential for a **significant positive** cumulative effect on population and human health.

18.6.2.3 Crag Digital 110kV Substation, Permitted Data Centre and Proposed Development

Crag Digital Avoca Ltd (Planning Reference 18940) received planning permission for a data centre in the Avoca River Business Park adjacent to the proposed substation site. An amended application (Planning Reference: 201285) has been made by Crag Digital Avoca Ltd for the site of the permitted data centre, which is adjacent to the proposed substation but has not yet been permitted. An application (Planning Reference PL27.307256) has also been made by Crag Digital Avoca Ltd for a 110kV substation on a site to the west of the proposed development substation. The 110kV substation has not yet been granted planning permission.

Given the proximity to the proposed development, there is potential for cumulative effects to population and human health. However, given the nature of the construction works and the mitigation measures for air quality, noise, vibration and traffic, that will be implemented by both developers, as outlined in their relevant EIARs, there are no significant cumulative effects to population and human health predicted. The construction phase of both developments will create employment opportunities and the associated economic and social benefits, which will have a **positive** cumulative effect on population and human health during the construction phase.

However, there is potential for cumulative operational effects, with the proposed Crag Digital Avoca Ltd data centres. Mitigation is required, in the form of additional noise reduction on plant/equipment, to ensure that cumulative operational noise levels are below the NG4 criteria at all receptors.

The cumulative operational noise predictions, detailed in **Chapter 11 Noise and Vibration**, show that noise levels are likely to be at or below the NG4 criteria at all receptors during all periods and therefore are unlikely to lead to a significant negative effect.

The operation of the proposed development, in combination with the permitted and proposed Crag Digital Avoca Ltd developments, is expected to have an overall **positive, long-term** effect on the immediate area through continued employment opportunities and the associated economic and social benefits.

18.6.2.4 Flood Defence Embankment Works in the Avoca River Business Park

There will be possible maintenance and repair works to the existing flood embankment around the business park as part of a regular inspection, maintenance and repair programme, to manage residual risk of flooding from a potential breach of the embankment. Investigations are to be undertaken which will determine the nature and extent of any works required. Any required maintenance or reinforcement works, will be undertaken in advance of the substation construction, with ongoing maintenance and repair thereafter, subject to regular inspection and monitoring.

As the works are not expected to overlap with the construction of the substation there are no significant cumulative effects to population and human health expected. As there are no significant operational traffic volumes, operational air emissions or noise emissions associated with the proposed development there are no cumulative effects to population and human health expected during the operational phase.

18.6.2.5 All Tier 2 and the Proposed Development

Only the Tier 2 projects listed above were considered to have the potential for a cumulative effect with the proposed development with regard to population and human health.

It is not expected that there will be significant cumulative effects to population and human health caused by the Tier 2 projects and the proposed development.

18.7 Residual Effects

18.7.1 Construction Phase

There will be short term negative effects on population and human health during the construction phase from increased traffic, dust, noise and vibration. These are discussed in the relevant chapters of this EIAR, with suitable mitigation measures

identified to avoid or minimise effects. Following the implementation of these mitigation measures, there will be no significant residual effects on population and human health in the area.

18.7.2 Operational Phase

The proposed development will result in significant long-term positive effects on population and human health through additional renewable energy supply and economic benefits to the community.

A **long-term negative**, but not significant, residual operational noise effect has been identified at the closest receptors to the substation.

18.7.3 Decommissioning Phase

No significant residual effects on population and human health are predicted, in the decommissioning phase.

18.8 References

Air Quality Standards Regulations (2011) *S.I. No. 180/2011- Air Quality Standards Regulations*

British Standards Institution (2014) *5228-1 and 2:2009+A1:2014. Code of practice for noise and vibration control on construction and open sites;*

British Standards Institute (BSI (2019) *British Standard 4142:2014 + A1:2019 'Method for Rating Industrial Sound Affecting Mixed Residential and Industrial Areas'*

Central Statistics Office (2016) *Census 2016 Small Area Population Statistics*. Available at: <http://census.cso.ie/sapmap/>

Central Statistics Office (2018) *Central Statistics Office*. [online] Available at: <https://www.cso.ie/en/census/>

Central Statistics Office (2016) *Population*. [Online] Available at: <https://www.cso.ie/en/statistics/population/>

Department of Transport, Tourism and Sport (2019) *Traffic Signs Manual and Temporary Traffic Management Document Guidelines*. [online] Available at: <https://www.trafficsigns.ie/ttmsuite> [Accessed 08/02/2021]

Environmental Protection Agency (2020) *Air Quality in Ireland 2019- Indicators of Air Quality*. [online] Available at: <http://www.epa.ie/air/quality/> [Accessed 08/02/2021]

Environmental Protection Agency (2019) *Air Quality in Ireland 2018- Indicators of Air Quality*. [online] Available at: <http://www.epa.ie/air/quality/> [Accessed 08/02/2021]

Environmental Protection Agency (2018) *Air Quality in Ireland 2017- Indicators of Air Quality*. [online] Available at: <http://www.epa.ie/air/quality/> [Accessed 08/02/2021]

Environmental Protection Agency (2017) *Advice Notes for Preparing Environmental Impact Statement (Draft August 2017)*

Environmental Protection Agency (2003) *Advice Notes On Current Practice (In The Preparation Of Environmental Impact Statements)*

Environmental Protection Agency (2017) Bathing Water Quality Map of Ireland for the 2017 Bathing Season. [online] Available from <http://epa.ie/pubs/reports/water/bathing/bathingwaterqualitymapofirelandforthe2017bathingseason.html>

Environmental Protection Agency (2016) *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)*

Environmental Protection Agency (2016) *Water Quality in Ireland 2010-2015*. EPA Johnstown Castle, County Wexford

European Commission (2017) *Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU)*

European Commission (2003) *Implementation of Directive 2001/42 on the assessment of the effects of certain plans and programmes on the environment*

European Communities Environmental Objectives (Surface Waters) Regulations 2009 (SI No 272 of 2009) as amended by the European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2012 (S.I. No. 327 of 2012)

European Communities Environmental Objectives (Surface Water) (Amendment) Regulations 2015 (SI No. 386 of 2015) TII (2004) *Guidelines for the Treatment of Noise and Vibration in National Road Schemes*

Fáilte Ireland (2011) *Guidelines on the Treatment of Tourism in an EIS*

Haase, T. and Pratschke, J. (2017) *The 2016 Pobal HP Deprivation Index*. [online] Available at: www.trutzhaase.ie.

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

Institute of Air Quality Management (2018) *Guidance on the assessment of odour for planning*

Institute of Public Health Ireland (2009) *Health Impact Assessment Guidance*

World Health Organization (1999) *Guidelines for Community Noise*

World Health Organization (2009) *Night time Noise Guidelines for Europe*

World Health Organization (2005) *WHO Air Quality Guidelines for particulate matter, ozone, nitrogen dioxide and sulphur dioxide*

Wicklow County Council (2018) *Arklow and Environs Local Area Plan 2018-2024*

Wicklow County Council (2011) *Wicklow County Development Plan 2011-2017*

US Environmental Protection Agency (2016) *Health Impact Assessment Resource and Tool Compilation*