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ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED SHANCLOON WIND FARM, CO. GALWAY

VOLUME 2- MAIN EIAR

CHAPTER 6- POPULATION AND HUMAN HEALTH

Prepared for:

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6. POPULATION AND HUMAN HEALTH

6.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) examines the potential effects of the Proposed Development at Shancloon Wind Farm on Population and Human Health. The chapter includes a description of the existing environment in respect of population and human health, and considers the likely effects arising from the Proposed Development during construction, operation and decommissioning under the following elements:

- Population and Settlement Patterns;
- Employment and Economic Activity;
- Land Use;
- Recreation, Amenity and Tourism;
- Human Health and Safety including the potential for the project to cause accidents and/or natural disasters and the vulnerability of the project to potential disaster/accidents.

The assessment presented in this chapter draws upon the findings of other EIAR chapters, such as Chapter 7 – Air Quality and Climate, Chapter 8 – Noise and Vibration, Chapter 11 – Soils, Geology and Hydrogeology, Chapter 12 – Hydrology and Water Quality & F.R.A., Chapter 13 – Shadow Flicker, Chapter 14 - Traffic and Transportation, Chapter 16 - Landscape and Visual Impact and Chapter 17 - Material Assets, Telecommunications and Aviation. In addition, other assessments are set out including those relating to potential effects on population statistics, socio-economics, changes to land use, facilities, human perception, and human safety.

The Proposed Development at Shancloon assessed in this EIAR comprises the following key elements:

- The wind farm site (referred to in this EIAR as 'the Site') which includes the on-site 110 kV substation and loop-in connection to the existing Cashla-Dalton overhead line;
- The Turbine Delivery Route (referred to in this EIAR as the 'TDR').

The layout of the Proposed Development site (Site) are presented in Figure 2.2a, Figure 2.2b and Figure 2.2c, EIAR Volume IV, and the and Turbine Delivery Route (TDR) is presented in Figure 2.3, Volume IV.

The development proposed by RWE Renewables Ireland Ltd. (the Applicant) is an 11 no. turbine wind farm and associated infrastructure including internal access tracks, hard standings, permanent meteorological mast, onsite 110 kV substation, loop-in grid connection, internal electrical and communications cabling, temporary construction compounds, drainage infrastructure, earthworks and spoil management and all associated works related to the construction of the wind farm as well as measures designed to protect and enhance existing habitats and a connection to the National Electricity Grid (NEG).

Where potential significant effects have been identified, mitigation measures have been proposed. Residual effects are then considered which details potential effects following implementation of mitigation measures.

A do-nothing scenario (as described in Chapter 3 - Site Selection and Alternatives Considered) is outlined, in line with requirements of the EIA Directive 2014 (As Amended) which states:

> *"The environmental impact assessment report to be provided by the developer for a project should include a description of …. an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge".*

The assessment details the likely evolution of the receiving environment in the future should the Project not be carried out.

6.2 Statement of Authority

This chapter has been prepared by Rita Mansfield and Anthony Ryan of Fehily Timoney and Company.

Rita Mansfield has worked in environmental consultancy for 20 years and has obtained a Bachelor (Hons) Degree in Applied Ecology from University College Cork and a Higher Diploma in Environmental Protection and Pollution Control from the Sligo Institute of Technology. Rita has managed the preparation of several EISs/ EIARs for large-scale infrastructure developments throughout Ireland.

Anthony Ryan is a Project Planner with a Masters in Planning and Sustainable Development (MPlan) from University College Cork. Anthony has prepared several Population and Human Health EIAR chapters for wind farm developments throughout Ireland.

6.3 Study Area

The Study Area for the Population and Human Health chapter of this EIAR focuses on the local receiving human environment and is described in terms of the Electoral Divisions (ED's), in which the Project is located, as well as adjacent ED's which have the potential to be affected by the Project. Electoral Divisions are the smallest legally defined administrative areas in the state. ED's encompass Small Areas (which typically contain between 10 and 120 dwellings). The extent of the ED's and Townlands considered for the purposes of this assessment are shown in Figure 6.1

The TDR is located along long established national primary routes capable of accommodating large vehicles and heavy loads. No significant works are required other than hedge trimming on the approach to the site and temporary removal of signage etc. at some junctions on this TDR to facilitate delivery of the turbine components from Galway Port to the final delivery point at the site in Shancloon. Therefore, the TDR has not been considered in relation to Population and Human Health. The ED's of the Project are all located within County Galway.

The proposed Shancloon wind farm site is wholly located in the jurisdiction of Galway County Council, in proximity to the Mayo border. At its closest point, the turbine array is located c. 4km north-east of Shrule, County Mayo (which is the closest settlement to the Project) and c. 8.5km north-west of Tuam, County Galway.

The Site is located within the townlands of Beagh, Beagh More, Cloonbar, Cloonmweelaun, Cloonnaglasha, Cloonteen, Corillaun, Derrymore, Ironpool, Shancloon, Toberroe and Tonacooleen, County Galway. Of these, the on-site substation is located within Corillaun and loop-in connection within neighbouring Tonacooleen.

The TDR will be from Galway Port and will pass through the following townlands along the road network: Airgloony, Annagh, Annagh Beg, Annagh Hill, Ballinphuil, Ballintober, Ballybaan Beg, Ballybackagh, Ballybanagher, Ballybrit, Ballygaddy, Beagh, Brockagh, Bullaun, Caherateemore North, Caherateemore South, Caherbriskaun, Caraunduff, Carnmore, Carnmore West, Castlegrove West, Castlelambert, Cloonascragh, Cloondarone, Cloonkeen North, Cloonkeen South, Cloonmore, Cloonmweelaun, Cloonnavaddoge, Cloonteen, Cloontooa, Coolagh, Doughiska, Fartagar, Garraun North, Garrauncreen, Glenmore, Glennascaul, Ironpool, Killaloonty, Killeelaun, Kilmore, Kilskeagh, Laragh More, Lisheenkyle East, Lisheenkyle West, Mahanagh, Mira, Palmerstown, Pollacorragune, Pollnagroagh, Rathmore, Rathmorrissy, Sheeaunpark, Tobernavean and Townparks.

6.3.1 Cumulative Effects

In relation to cumulative effects for Population and Human Health, the cumulation of effects with other existing, approved and proposed projects has been assessed. The cumulative impact assessment provides a baseline from which a full environmental assessment of the potential effects arising from the Proposed Development in combination with other plans and projects can be considered comprehensively. A search for proposed, consented and existing projects within 20km of the Proposed Development was conducted to identify development in proximity to the wind farm site and the TDR.

The geographic extent of the cumulative assessment is considered on a case-by-case basis, in line with the *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions* (European Commission, 1999). However, 20km distance from the Site was considered a reasonable zone of influence for the purpose of assessing potential cumulative effects on population and human health considering the size and extent of the Proposed Development, the nature of the impacts and the receiving environment of the wider area.

The 20km radius from the proposed turbines is considered relevant in line with the recommended study area for the zone of theoretical visibility of proposed wind farm projects as set out in the *Wind Energy Development Guidelines* (2006) which cites the use of a 20 km radius for blade tips greater than 100m. This represents a visual study area for potential cumulative projects but also represents an appropriate study area for other potential cumulative effects including traffic, noise, water quality and air quality. It is considered that potential human health and population impacts beyond this distance are imperceptible.

An final up-to-date planning search was conducted in May 2025 to identify projects in proximity to the Site and TDR. This included a search for major infrastructure projects; large residential, renewable energy or commercial developments; proposed or consented development; as well as an examination of relevant plans and policies for the area as detailed in EIAR Chapter 4 - Policy.

6.4 Consultation

Consultation with relevant organizations was initiated during the initial stage of the EIAR to identify any potential effects of the Proposed Development on Population and Human Health.

In response to the '*Shancloon Wind Farm Scoping consultation letter*' issued on 21st September 2020, requests and observations were made by relevant organizations and bodies. All requests and observations received are included in EIAR Chapter 5 - Scoping and Consultation and are then addressed in the relevant EIAR chapters as outlined in *Table 5-2 - Summary of Scoping Consultation Responses* in EIAR Chapter 5 - Scoping Consultation.

The Applicant also conducted community consultations in relation to the Proposed Development between 2019 and 2023, with further details on all Scoping Consultation and Community Engagement are provided in Chapter 5 - Scoping and Consultation.

6.5 Methodology

This chapter of the EIAR has been completed in accordance with the guidance set out by the '*Environmental Protection Agency*' (EPA), in particular, the '*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*' (EPA, May 2022), The Government of Ireland's *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (August, 2018) and the European Commission's guidance document: *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report as per Directive 2011/92/EU as amended by 2014/52/EU*. The determination of significance of impact is in line with the EPA's *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*' (EPA, May 2022). No difficulties were encountered or identified in drafting this chapter.

6.5.1 Population and Settlement Patterns

A desktop review of online data relating to the demographic information relating to the State, counties Galway and Mayo and the 'Study Area' has been assessed to establish the existing demographic trends (www.cso.ie). The demographic analysis of the study area as set out in this Chapter is defined in terms of Electoral Divisions (ED's), within which the wind farm site boundary and substation is contained. Therefore, there are two separate areas contained within the Proposed Development, which are as follows:

- The wind farm site is located within the EDs of Foxhall (County Galway), Kilshanvy (County Galway) and Beaghmore (County Galway).
- The substation of the Proposed Development is located in the ED of Donaghpatrick (County Galway).

The Study Area including the Proposed Development area is identified in Figure 6.1, below. For the purposes of the assessment of potential effects on population trends, the TDR will be assessed where it covers electoral divisions where significant works are proposed. However, for this project, only temporary accommodation works will be required at selected locations along the TDR to temporarily remove obstacles at junctions such as signage etc., therefore, the TDR located along national primary routes have been screened out as effects are likely to be imperceptible due to the lack of or the limited nature of the proposed works along these routes, as shown in the *Abnormal Indivisible Load Route Survey* (Appendix 14.1 in Volume III of this EIAR).

6.5.2 Employment and Economic Activity

A socio-economic profile of the existing environment was established using live register data (2016 to 2023) and Census (2022) data to outline an employment profile of the area containing the Project. Peer reviewed research from the *Institute for Sustainable Futures and the European Wind Energy Association* (Rutovitz, J. and Harris, S. (2015)), was referred to in order to estimate the employment which the Project has the potential to create through the construction, operation and decommissioning phases of the Project, and the impact this employment will have on the study area.

6.5.3 Land Use of Project area

Land use in the area was examined to determine potential impacts on existing land use patterns which may arise because of the Project. Tailte Eireann (2023) was studied and observations were carried out throughout the ground-proofing survey to determine land uses in the study area. The impact of the Project was then considered with regard to these land uses.

Recreation, Amenity and Tourism

Fáilte Ireland's '*Guidelines on the Treatment of Tourism in an Environmental Impact Statement*' (2011) informed the methodology used in assessing potential impacts on Recreation, Amenity and Tourism with the assessment complying with this guidance provided. A profile of tourism in the region was established through examination of Fáilte Ireland Statistics in order to indicate the strength of Recreation, Amenity and Tourism in the surrounding region. Potential impacts as a result of the Project were then considered in relation to the tourism profile, amenity and recreation facilities and attractions of the area around Shancloon and the wider hinterland within counties Galway and Mayo.

A review of planning policy and strategies was carried out to identify core walking trails and cycling routes and other rights of ways within the study area.

6.5.4 Human Health & Safety

The assessment on human health and safety has regard to the *Environmental Protection Agency's* (EPA US) Human Health Risk Assessment process1 which is a procedure for identifying the nature and magnitude of risks to human health over the lifetime of a project. The risk assessment for the Project includes a review of published literature on the effects of wind energy developments and construction activities on human health. CSO data (2024) and Department of Health (2022), *Health in Ireland – Key Trends 2022*, were examined to establish a baseline health profile of the study area. Criteria of potential impacts on human health was extracted from this literature in order to assess potential effects on human health as a result of the Project.

A desktop examination of Tailte Eireann resources to identify potential hazardous land uses in the study area was carried out and vulnerability of the project to natural disaster was assessed through a desktop geographical study and literature review. The assessment was further informed by field surveys and slope stability assessment which were completed as part of the EIA process. Potential impacts to human health as described throughout this EIAR are detailed in this Chapter, including potential impacts on air quality, noise and traffic and potential impacts on human safety including potential for flood risk and slope failure.

6.6 Existing Environment

6.6.1 Population

This section provides an overview of the population profile for the Study Area, Counties Galway and Mayo and the State between the Census years of 2011 and 2022 to create a baseline demographic profile of the receiving environment and identify potential impacts on demographic trends arising as a result of the Project.

The Study Area for the purpose of assessing population has been chosen based on Electoral Divisions (ED's) within which the proposed Wind Farm Site and proposed Turbine Delivery Route are located. As illustrated in Figure 6.1, this encompasses the ED's as set out in Table 6-3 and Table 6-4, below, which shows the population usually resident and present in state as included in the most recent 2022 census.

In relation to population, housing and property values, data and analysis presented in this report show no evidence is found that home prices surrounding wind facilities are consistently, measurably, and significantly affected by either the view of wind facilities or the distance of the home to those facilities, which is outlined further in section 6.7.5.4, below.

1 https://www.epa.gov/risk/conducting-human-health-risk-assessment

6.6.1.1 Population Trends

The Project is located in North County Galway and the Project area of Shancloon Wind Farm is located approx. 8.8km west of Tuam, c. 5.9km North-East of Headford and c. 1.2km east of Shrule in County Mayo.

The area is predominantly rural in character consisting of one-off houses focused on the local road network. For the purposes of this assessment, a radius of 2km set back from the boundary of the Project site is considered an appropriate distance as the possible effects related to noise, visibility and any environmental considerations are greatly reduced at his distance.

According to Eircode data reviewed in January 2025, there are 224 residential properties (or proposed residential developments which have received/hold active planning consent) within 2 km of the turbine array, and 49 residential properties (or consented residential developments) within 1km of the turbine array. The closest property to a turbine (Eircode H54 KH73) is located c. 357 m distance from Turbine T01, however this property belongs to a landowner involved in the project and is no longer in use as a residential residence. The next nearest property is a derelict building (currently uninhabitable property) located c. 720.4m south-east of T1 (no Eircode assigned). The closest inhabited residential property to the Project is located 728m east of T11 (Eircode H54 XC65).

The on-site substation is located within the south-west of the Site and is c. 440 m from the nearest residential neighbour. Figure 2.4, Volume IVillustrates the residential receptors within the vicinity of the Wind Farm Site according to Eircode and Geodirectory data (July 2022). This information is supported by the ground proofing survey and planning application search.

Population statistics for the State, Galway City & County, County Mayo and the 'Population of Study Area' (ED's associated with the proposed wind farm site are shown in Table 6-1, below.

Table 6-1: Population of Study Area

State		County		Project	
Year	Total	Galway City & County	Mayo	Wind Farm Site ED's	Substation ED
2011	4,588,252	250,653	130,638	1316	563
2016	4,761,865	258,058	130,507	1373	543
2022	5,149,139	277,737	137,970	1489	584
2011-2016 (%)	+3.8%	+3%	-0.1%	+4.3%	-3.6%
2016-2022 (%)	+8.1%	+7.6%	+5.7%	+8.4%	+7.5%

The data presented in Table 6-2, below, demonstrates that the state population in the six years between the 2016 Census and the 2022 Census has seen a national increase in population of + 8.1%. This is an upward continuation of the upward trend in national population observed since 2011, which is similarly reflected at County level especially in Galway City and County.

The rate of population growth has been lowering in Mayo compared to the State and Galway between 2016-2022 with a slight decrease between 2011-2016 which may be attributed to the more rural nature of Mayo which would not encompass any large urban centres that would contribute to State and Galway City & County figures. Locally, within the ED's associated with the Site, the growth in population is at a similar rate to state levels observed since the 2011 Census.

Of the Ed's associated with the Site, Foxhall has the largest population in 2022 with a population of 675 persons which is higher than the population of Kilshanvy and Beaghmore with populations of 420 and 394 persons respectively. The population of the Donaghpatrick Substation ED in 2022 is a population of 584 persons.

Similarly in 2016, Foxhall had a larger population of 629 persons which was higher than the respective population of both Kilshanvy and Beaghmore. Likewise, 2011 shows that Foxhall has the highest population of all Site ED's. Overall, the reason behind the larger population of Foxhall is due to its location in closer proximity to Tuam, the location of the regional R332 road to Tuam and the village of Kilconly both located within the Foxhall Electoral Division.

6.6.1.2 Population Density

The population density recorded within the State, Galway City & County and the Project Area during the 2011, 2016 and 2022 Census are set out hereunder in Table 6-2, below. It is clear from the population density figures below illustrates that from 2011 to 2022 the Project Area especially the Site ED's and also County Mayo has a reasonably lower population density in comparison to Galway City and County figures and a considerably lower population than state figures. This lower population density is attributed with the sparser rural nature of the Site ED's and the sparse nature of County Mayo. The Substation ED of Donaghpatrick would have a denser population due to its proximate location to the village of Shrule with a population of 432 person.

Additionally, Donaghpatrick ED also has the main N84 (Galway to Castlebar) road located within its boundary and the surrounding roads (i.e. L2104) which both routes are characterized by linear 'Ribbon Development' where properties are built along a roadway which can create an urban 'street effect' where hedgerows and trees are removed and rural roads are lined with properties.

Table 6-2: Population Density between 2011 – 2022 (Persons per square kilometre)

State		County		Project	
Year	Total	Galway	Mayo	Site ED	Substation ED
2011	67	42.9	24.4	18.4	35.1
2016	70	44.4	24.6	19.3	34.3
2022	73.3	45.2	24.7	20.7	36.2

6.6.2 Socio-Economics, Employment and Economic Activity

This section provides a comprehensive overview of the socio-economic, employment and economic activity associated with the Study Area, which provides an understanding of the overall socio-economic profile of the receiving environment.

6.6.2.1 Employment and Economic Status

Live register data, accessed in July 2024 (Last updated in December 2023 and available through https://data.cso.ie), provides information relating to the number of people registering for Jobseekers Benefit, Jobseekers Allowance, or for various other statutory entitlements. The figure is useful to gauge unemployment estimations for an area, however, it is noted that the Live Register data includes part-time workers (working up to three days per week), seasonal workers and casual workers who are entitled to Jobseekers Benefit or Jobseekers Allowance and therefore, cannot be relied upon entirely for conclusive employment data. Furthermore, there was a significant increase in unemployment throughout the country due to the COVID-19 pandemic, however, the impacts of this have largely receded. Live register data is presented below in Table 6-3 for the State, Galway City and County and Mayo.

In order to obtain the percentage of those unemployed in each month, a percentage of those on live register is taken from the total census 2022 figures for those aged 15-64, which shows that in September 2016, the figures for those on the live register from the 15-64 age group in the state was c. 8.5% in Galway City and County was 12.2% and in Mayo was c. 10.4% and in September 2023, the figures for those on the live register from the 15-64 age group in the state is c. 5.2%, in Galway City and County was 7.1% and in Mayo was c. 6.9%.

The figure is useful to gauge unemployment estimations for an area, however, it is noted that the Live Register data includes part-time workers (working up to three days per week), seasonal workers and casual workers who are entitled to Jobseekers Benefit or Jobseekers Allowance and therefore, cannot be relied upon entirely for conclusive employment data. Furthermore, 2020 and 2021 saw a significant increase in unemployment throughout the country due to the COVID-19 pandemic. Live register data is presented in Table 6-4, below, for Galway City and County, Mayo County and the State.

Table 6-3: Total Population aged 15+ in Galway City and County, Mayo County and the State (2022)

	Total Population Aged 15+ 2022
Galway City and County	277,737
Mayo County	137,970
State	3,065,070

Table 6-4: Live Register Data for Galway City & County, Mayo County and the State between Sept. 2020 and Sept. 2023

	Sept. 2023	Sept. 2022	Sept. 2021	Sept. 2020
Galway City & County	12844	13836	11779	15360
Mayo County	5841	5655	5106	6485
State	174150	179055	162898	211492

Source: CSO & www.data.gov.ie

Between September 2016 and September 2023, unemployment trends in Galway City and County, Mayo County and the State experienced a fluctuation, where numbers recorded on the live register decreased by c. 5.1% throughout Galway City and County, and c. 3.5% throughout Mayo County. However, there was a decrease recorded on the live register of c. 3.3% in the state in the same period. 2

Table 6-5 sets out the percentage of the total population aged 15+ who were in the labour force as of the 2022 Census, and it also sets out those who were not in the labour force which includes students, retired people, those unable to work and persons performing home duties etc.

[2] Note 1 As per OECD (Demography – Working age population – OECD Data) the working age population is defined as those aged 15 to 64. Citizens Information (Children and rights in Ireland, citizensinformation.ie) states that those aged 15 are able to work 8 hours a week light work in school term time. The maximum working week for children outside school term time is 35 hours or up to 40 hours if they are on approved work experience.

Table 6-5: Economic Status of the Total Population Ages 15+ in 2022

	Status	State	County Galway	Wind Farm Site ED's	TDR
% of Population aged 15+, which are:	At Work	56.1%	55.9	52.3%	58.2%
	First time job seeker	0.8%	0.8%	0.8%	0.2%
	Unemployed	4.3%	4.2%	4.3%	2.5%
	Student	11.1%	13.5%	9.7%	9.6%
	Home duties	6.6%	5.7%	6.7%	7.2%
	Retired	15.9%	15.1%	20.7%	18%
	Unable to work	4.6%	4.2%	4.8%	3.9%
	Other	0.7%	0.7%	0.8%	0.4%

As shown in Table 6-5, the principal employment status in 2022 across the State, County Galway City & County, County Mayo and the Project site is 'at work', and the percentage of the population spread across the employment categories (status) generally align across the State, County and Study Area.

6.6.3 Land Use

This section assesses the compatibility of the land use of the Project with the current land use. The determination of the potential effects on existing land use is assessed for the construction, operation and decommissioning phases of the Project, with the potential impact on sensitive land uses in the area of the Project also examined in this section.

The Project is located within a rural setting. Land use within the Project site comprises agriculture and historic peat extraction, with smaller pockets of commercial forestry also present along the periphery. Residential property density in the area is low with ribbon development and one-off housing dominating the residential development in the area.

Tailte Éireann land cover mapping identifies the following land cover types within the Site: bare peat and cutover bog, wet grassland, improved (agricultural) grassland, broadleaf forest, artificial surfaces (tracks), rivers and streams, scrub, transitional forest, raised bog, hedgerows and treelines. Agricultural grassland and wet grassland dominate the Site.

The nearest known archaeological feature to the turbine array is a ringfort (GA028-040----) located c. 90m south of T3. Outside the proposed Project site, there are records for a ringfort (GA028-046----), children's burial ground (GA028-046001-) and hut site (GA028-046002-), with no known archaeological records within the TDR.

The Project site sits within the BLACK (SHRULE)_010 waterbody subbasin, hosting the Black and Togher Rivers. EPA hydrometric station number 30030 located in Shrule does not provide flow data for the catchment, as such the EPA River Flow Estimating Hydrotool was used to determine catchment characteristics as follows: 95%ile (low) flow is 0.352m3/s, 50%ile (mean) flow is 2.559m3/s and 5%ile (high) flow is 11.945 m3/s. Beyond Shrule, the Black River forms part of the Lough Corrib SAC (site code 000297) and SPA (site code: 004042), which is also a Ramsar site. Further details on protected areas in the locality is presented in Chapter 9.

The Togher and Black Rivers are part of the Corrib Headford Arterial Drainage Scheme, which is maintained by the Office of Public Works. Historically, these benefiting lands have flooded, although the Galway County Development Plan Strategic Flood Risk assessment (2022 – 2028) does not assign a flood zone class to the area. Further information on flood risk at the Project site is presented in Chapter 12, which includes the output of a Flood Risk Assessment and flood model for the Project. The Project will require a number of drain and watercourse crossings as discussed further in EIAR Chapter 12.

Ground investigation (GI) at the Site confirms that the underlying geology comprises is Dinantian Pure Bedded Limestones (Ardnasillagh Formation) with varying depths of overburden comprising topsoil / peat (with depths varying between 1.3m to 5.5m below ground level (BGL), typically underlain by sandy/gravelly clay and granular gravel deposits. The depth to rock varies within the Site, with GI indicating rockhead at between 5.20m BGL to 17.00m BGL.

Surface karst features (collapse dolines) are present throughout the Site. These features are believed to form along unmapped fault lines that create zones of weakened and fractured rock beneath the overlying Quaternary deposits (predominantly Glacial Till).

The Project site is considered at a very low risk of flooding from fluvial sources, surface water runoff or groundwater. Mitigation to ensure that the Project does not increase the risk of flooding as a result of increased impermeable area, or impact on existing watercourses and overland flow routes resulting from the construction of access tracks is prescribed in EIAR Chapter 12 – Hydrology and Water Quality & FRA.

The Project site comprising the turbines is located within an area defined as *'Open to Consideration*' for wind energy development, with the on-site substation located in an area described as '*Generally to be Discouraged*' within the Galway County Development Plan 2022-2028.

The Landscape Character of the Project lands is the '*North Galway Complex Landscape Type*' which is described as:

> *"an extensive grassland plain stretching from the Suck River in the east to the watershed of the River Clare in the west. It includes elevated areas such as Slieve Dart in the north, as well as lakes, turloughs, raised bogs, wetlands and winding rivers".*

Site topography is relatively flat and varies broadly between 10m AOD and 41m AOD. The nearest protected view to the Project is close to Headford, looking in a north-westerly direction, which is away from the Project.

The layout of the Project has been designed to minimise potential environmental impacts, while at the same time maximising the energy yields of the wind resource passing over the Site. Available wind speed is a key factor in determining the economic viability of potential wind energy locations. The *Sustainable Energy Authority of Ireland* (SEAI) *Wind Speed Atlas* 3 displays onshore wind speeds at between 20 and 150 metres above ground level, based on 2013 data. The atlas identifies the Site as having an average wind speed range of 8.5 m/s at 150 m above ground level.

Meteorological monitoring carried out within the Project lands between February 2021 and June 2021 (using a lidar system located at ITM coordinates 531978.72,753818.92) recorded mean horizontal wind speeds at 183m height of 8.944 m/s and 8.689 m/s at 158m height. This correlates well with the SEAI historic data.

There are 224 residential properties (or proposed residential developments which have received/hold active planning consent) within 2 km of the turbine array and 49 residential properties (or consented residential developments) within 1km of the turbine array. The closest property to a turbine (Eircode H54 KH73) is located c. 357 m distance from Turbine T01, however this property belongs to an involved landowner, and this receptor is no longer a residential residence. The next nearest property is a derelict building (currently uninhabitable property) located 720.4m south-east of T1 (no Eircode assigned). The closest inhabited residential property to the Project is located 728m east of T11 (Eircode H54 XC65).

The current Wind Energy Development Guidelines (2006) prescribes a 500m set back distance of turbines from properties. The 'Draft Revised Wind Energy Development Guidelines (2019) outlines a minimum 500m or 4 times tip height set back. The Project will achieve a minimum separation distance in excess of 720 m (4 times tip height) between the closest dwellings and the proposed turbines. AS outlined above, the closest property is located c. 357 m distance from Turbine T01, however this receptor is no longer a residential residence.

The on-site substation is located within the south-west of the Site and is c. 440 m from the nearest residential neighbour.

The lands adjacent to the proposed loop in connection to the Cashla-Dalton overhead line host historical records for a ringfort (GA028-046----), children's burial ground (GA028-046001-) and hut site (GA028-046002-). Otherwise, there are no known archaeological records within the Site or TDR accommodation works. The nearest known archaeological feature to the turbine array is a ringfort (GA028-040----) located ca. 90m south of T3.

Existing land uses adjacent to the proposed Project comprise agricultural land, with operational or proposed wind farm developments located within 20 km of the proposed Shancloon Wind Farm, as illustrated in Table 6-7 *Cumulative Energy Developments within 20km*, below. This shows 2 no. granted wind energy development and 1 no. proposed wind energy developments identified within 20km of the Project site in Shancloon.

The existing operational wind energy development is the Cloonlusk Wind Farm, which comprises 2 No. 2 megawatt wind turbines on 75m towers (V52-850 models) and is located c. 17.1 km south-east of the Project. These turbines were constructed in 2017 under planning consent from Galway County Council (ref. 082407 and ref. 14518).

The proposed Laurclavagh Renewable Energy development located c. 11.4km southwest of the Project, is currently lodged as a Strategic Infrastructure Development (SID) application to An Bord Pleanála (ref: PA07.319307). The Project will comprise 8 no. wind turbines with an overall turbine tip height of 185 metres; a rotor blade diameter of 163 metres; and hub height of 103.5 metres.

[3]https://www.seai.ie/technologies/seai-maps/wind-atlas-map/

Cloonascragh is a 1 no. turbine development located c. 13.5 km south east of the Project with an overall blade tip height of up to 168m.

Cloonlusk Wind Farm is a 2 no. turbine wind farm, with 2 megawatt wind turbines on 75m towers located c. 17.1 km east of the Project site.

Table 6-6: Cumulative Energy Developments within 20km

Energy Development Name	Number of Turbines/Panels	Distance and Direction from Project site	Status
Laurclavagh Renewable Energy Development	8 Turbines	c. 11.4 Km South-West	Currently lodged as a SID development with An Bord Pleanála (ref: PA07.319307)
Cloonascragh (Pl. Ref. 221175)	1 Turbine	c. 13.5 Km South-East	Granted Nov. 2023
Cloonlusk Wind Farm (Pl. Ref. 082407)	2 Turbines	c. 17.1 Km South-East	Granted Nov. 2009
Clonberne Wind Farm	11 Turbines	c. 18 km East	Currently lodged as a SID development with An Bord Pleanála (ref: PA07.320089).

Large components associated with the wind farm construction e.g. turbine blades and tower sections, will be transported to site via the identified TDR. An abnormal load permit will be sought for this movement.

The proposed TDR is presented in Figure 2.3, Volume IV. An *Abnormal Indivisible Load Route Survey* (Pell Freshman, June 2024) was carried out to identify the optimum delivery route from Galway Port to the Project site in Shancloon and is presented as Appendix 14.1 in Volume III of this EIAR.

The only suitable Port of Entry (PoE) for this site is Galway Port. It is not considered feasible to approach the site from the north due to a constraints through a number of towns. As such, the optimum delivery route for turbine components delivery will be via the following route:

- Loads will exit the docks at Galway Port and head northeast on Lough Atalia Road;
- Loads will take a slight right onto College Road / R339. They will then continue to follow R339;
- Loads will turn left at Connolly Avenue;
- Loads will then turn right onto Tuam Road / R336;
- Loads will turn right at the R386 / N6 junction and will proceed eastbound on the N6;
- Loads will continue on the N6 and the M6 eastbound;
- At Junction 18 loads would turn left onto the M17 northbound;
- Loads would follow the Tuam bypass onto the N17;
- Loads will turn left onto the R332;
- Loads will turn left onto the L6483 and continue west to the proposed site entrance.

The objective will be to maintain the strategic capacity and safety of the N17 and N84 carriageways at all times, cognisant of the *National Development Plan 2021 – 2030*, with key sectoral priorities for maintaining the national road network to a robust and safe standard for users.

6.6.4 Recreation, Amenity and Tourism

This section provides an overview of the existing recreation, amenity and tourism value for the Study Area. Tourism is one of the major contributors to the national economy and is a significant source of full-time and seasonal employment. As 2020 and 2021 have experienced an unprecedented negative impact on international tourism due to the COVID-19 epidemic, this section focuses on statistics from 2018 and 2019 as a reasonable scenario for tourism potential for the County and wider region. The preparation of this section complied with Fáilte Ireland's '*Guidelines on the Treatment of Tourism in an Environmental Impact Statement*'. Consultation has taken place with local stakeholders, as detailed in Chapter 5 - Scoping and Consultation of this EIAR, in order to thoroughly understand potential affects to recreation activity in the area.

The latest statistics for overseas tourism relate to 2019, as published by Fáilte Ireland in March 2021. These figures state that overseas tourism in Ireland in 2019 grew by 0.7% to 9.7 million, with tourists from Britain growing by 0.2%, while tourist visits from North America dipped slightly by -3.1%, which was offset by tourists from Mainland Europe growing 2.8%, with other long haul markets growing by 3.4% in 2019. Revenue from Mainland Europe and North America equates to 35.8% and 33.0% of overseas tourism revenue, respectively. British tourists account for 19.8% of overseas tourism spend in Ireland with 11.5% spent by other long haul tourists.

Fáilte Ireland's 2019 survey results indicate the top 5 most popular recreation activity for tourists in Ireland:

1. Hiking and cross country walking;
2. Cycling;
3. Golf;
4. Equestrian;
5. Angling.

Fáilte Ireland's Regional Tourism performance figures for 2018 and 2019 are set out in Table 6-8 and Table 6-9 for the Western Region which includes Counties Galway and Mayo. As demonstrated in the Table 6-8 and Table 6-9, below, tourism numbers for the Western Region contribute a significant tourism revenue of €1822 million and €1724 million in 2018 and 2019, respectively.

Table 6-7: Western Region Performance (Tourists in 2018)

Region		Britain	Mainland Europe	North America	Other Areas	All Overseas	Northern Ireland	Domestic Trips
Western	Tourists (000s)	332	807	677	149	1,963	95	1,662
Western	Tourist Revenue (€mn)	116	260	295	56	727	31	337

Table 6-8: Western Region Performance (Tourists in 2019)

Region		Britain	Mainland Europe	North America	Other Areas	All Overseas	Northern Ireland	Domestic Trips
Western	Tourists (000s)	342	812	647	142	1943	113	1848
Western	Tourist Revenue (€mn)	112	238	264	39	653	48	370

Thus, with the above figures in mind, tourism is considered a vital industry for counties Galway and Mayo.

Galway County Development Plan 2022-2028, Chapter 8 on '*Tourism, Creative Industries and Services*', identifies tourism as a key driver of sustainable socio-economic growth across the urban, rural, island and coastal settings of the County, where it states the following:

> *'Sustainable development of the tourism industry is of critical importance to the county. Galway is one of the most successful counties in the country in terms of the numbers of both domestic and foreign visitors and the economic benefit derived as a result of this tourism activity. The Council aims to integrate sustainable tourism as a core economic activity, by investment in infrastructure, attractions, outdoor activity facilities; festivals and events across the county as well as supporting the development of appropriate visitor infrastructure such as facilities; accommodation; and outdoor recreation and trails; and by enhancing the public realm and increasing attractiveness of urban and rural settings.*

Mayo County Development Plan 2022-2028, Chapter 5 on '*Tourism and Recreation*', identifies tourism as a key strategic aim in the County by stating:

> *'The strategic aim of this chapter is to promote and facilitate a sustainable and well managed year-round, high-quality tourism industry that generates economic benefits to all areas of the county, thereby contributing to the wider tourism industry of the region'. Furthermore, Mayo has a lot to offer as a tourism destination and has great potential to further develop its tourism industry as a key economic sector for the county. A wealth of natural resources, unspoilt environment, scenic and sensitive landscapes as well as internationally renowned destinations such as Céide fields, Wild Nephin Ballycroy National Park, Croagh Patrick, Downpatrick Head, Knock Shrine, Westport/Clew Bay, Achill, Cong, Ballina, Pontoon and its offshore islands allow for the further development of a wide range of tourism products. These include heritage and culture, activity and adventure and religious and pilgrimage tourism. The Great Western Greenway from Westport to Achill has proven to be a very successful walking and cycling amenity and tourism product for the county'.*

The top attractions in the Galway and Mayo, listed by Fáilte Ireland, are as follows:

Table 6-9: Top Galway Attractions and distance from Project

County	Attraction / Destination	Distance and Direction from Project site
Galway	Aughnanure castle	c. 18.2km Southwest
Galway	Connemara Celtic Crystal Visitor Centre	c. 21km Southwest
Galway	Glengowla Silver & Lead Mines	c. 23.1km Southwest
Galway	Galway City Museum	c. 28.1km Southwest
Galway	Galway Atlantaquaria	c. 29.1km Southwest
Galway	Kylemore Abbey	c. 55.5km West
Galway	Connemara National Park	c. 55.5km West
Galway	Dun Aonghasa	c. 64.1km West

Table 6-10: Top Mayo Attractions and distance from Project

County	Attraction / Destination	Distance and Direction from Project site
Mayo	Quiet Man Museum	c. 15km Northwest
Mayo	Lough Mask Distillery	c. 27.4km Northwest
Mayo	Ballintubber Abbey	c. 28.6km Northwest
Mayo	Turlough Park	c. 27km Northwest
Mayo	Knock Museum	c. 27km North
Mayo	National Museum of Ireland - Country Life	c. 39km Northwest
Mayo	Westport House	c. 45.5km Northwest
Mayo	Foxford Woollen Mills Visitor Centre & Factory Tour	c. 45.5km Northwest
Mayo	Achill Experience	c. 84km Northwest

The most significant recreation activity/attractions in proximity to the Shancloon Wind Farm site is trail walking, Glamping, Camping, and Sports Grounds and the cultural amenity associated with a number of abbeys and castles as shown above. Other recreation and tourism amenities located within 15KM of the site located in both Mayo and Galway include:

- Shrule Castle - c. 2.5km West;
- Kilconly Community Centre- c. 4km North East;
- Kilshanvey United Soccer Club- c. 4km North East;
- Caherlistrane GAA Club- c. 4.3km South East;
- Sandra's Field- c. 4.5km North;
- Moyne Castle- c. 5km South-West;
- Turin Castle ireland- c. 5.3Km North;
- Headford GAA Club- c. 5.3km South West;
- Solas Family Resource Centre- c. 5.9km South West;
- Moyne Villa Soccer Club- c. 6km South West;
- Sylane Hurling Club- c. 6.1km East;
- St. Fursas Community Hall Headford- c. 6.4km South West;
- Natalie Greer Studios- 6.5km South-West;
- Knockma Forest Trail- c. 6.7km South East;
- Knockma Wood- c. 6.8Km South East;
- Corrib Rugby Football Club- c. 7km South West;
- Kilmaine Lopp Walk - c. 7.6km North;
- Milltown GAA- c. 8km North East;
- Milltown Community Centre/Playground Area- c. 8.1km North East;
- Belclare Community Hall- c. 8.3km South East;
- Cloughanove Community Centre- 8.4km South-West;
- Kilconly GAA Club- c. 8.4km North East;
- Islamic Cultural Centre of Tuam- c. 9.35km East;
- Kilfraughaun Church and Ancient Holy Well c. 10.km North West;
- The Courtyard Camping 11km North-West;
- Bllycurrin Lighthouse c. 11km- South West;
- Garrymore GAA- c. 11.5km North;
- Cormac Rafferty Sport Horses- c. 11.8km North East;
- Marley stables- c. 12Km East;
- Annaghkeen Castle- c. 12km South West;
- Park Mor Estate Playground- c. 12.3km East;
- Ballymacgibbon Cairn- c. 12.3km West;
- Tuam Golf Club- c. 12.3km East;
- Tuam Rugby Club- c. 12.4km East;
- Roundfort Community Centre- c. 12.5km North;
- The Pyramid- c. 12.9Km North-West;
- Tuam Stars GAA- c. 13km East;
- Western Travellers Development- c. 13.1km East;

- Mall Theatre & Cinema- c. 13.2km East;
- Tuam Scout Hall- c. 13.2km East;
- St. Mary's Cathedral & Adjoining Synod Hall- c. 13.2km East;
- Palace Grounds Park &Playround- c. 13.3km East;
- Tuam Town Hall- c. 13.3km East;
- Corofin United- c. 13.5km South East;
- Dr Duggan Hall- c. 13.7km South East;
- Corofin gaa Club- c. 13.7km South East;
- Gort Scully pitch- c. 13.9km South;
- Davitts GAA Club- c. 13.9km North;
- Cappa Stud- c. 14Km South;
- Garrafranes Community Centre- c. 14.1km East;
- Ballinrobe GAA Club- c. 14.4km North-West;
- Glebe Stone Circle c. c. 14.8km West;
- The Lakeside Sports & Fitness Club- c. 14.9Km North-West;
- Cong Abbey c. 15km-West;
- Ashford Castle c. 15km- West;
- The Neale GAA Club- c. 15km West;
- Clonboo Riding School- c. 15km South;

Further details in EIAR Chapter 16- Landscape and Visual Impact.

6.6.4.1 Community Facilities & Services

Community facilities and services in proximity to the Project are centred on towns and villages in the area. The closest settlement is the town of Shrule which is located c. 1.2Km to the East in county Mayo. Facilities and services within the village include a castle, church, takeaway, supermarket, community sports field and public house.

The next closest settlement is the town of Headford which is located c. 5.9km to the North-East in county Galway. Facilities and services within the town include a Supermarket, Sports Clubs, a Castle, a Rugby Football Club, a Church, Health Centre, Community Gardens, Public Houses, Church, Takeaways, Cafes, Public Houses and Schools.

The next closest settlement is the town of Tuam which is located c. 8km to the west in county Galway. Facilities and services within the town include a Supermarkets, Sports Clubs, Sports Stadium, B&BS, Hotels, Restaurants, Cafes, takeaways, Fire station, Medical Centre, Credit Union, Schools, Family Resource Centre, Theatre and arts Centre, library, Courthouse and a Recreational Park.

The proposed TDR does not pass through or by any significant community facilities.

6.6.5 Human Health & Safety

This section provides an overview of the health profile of the receiving environment and the State. An assessment of peer reviewed literature such as the Department of Health report, *Health in Ireland – Key Trends 2022*, has been carried out to provide a sound, scientific basis for the potential impacts arising from the proposed Shancloon Wind Farm.

Human health, in relation to this assessment, refers to the nature and possibility for adverse health effects on humans. In the context of existing human health, Department of Health (2022), *Health in Ireland – Key Trends 2022*, which provides statistics relating to human health in Ireland over the last 10 years (2012 to 2022). Generally speaking, Ireland's population has a high level of good health as demonstrated in self-evaluation statistics included in Census data (see Table 6-12 below). Human health in relation to this assessment refers to the nature and possibility for adverse health effects on humans.

From analysis of the health statistics below, the majority of the general health of the area containing the wind farm site and TDR is recorded as 'very good'. This is higher that State and County-wide averages with a difference in figures of at least 0.9% upwards. The next highest figures within the Project area are those which are recorded as 'Good' with figures across all jurisdictions in line with each other with a maximum difference of 6.3% between the Project ED's and County and state Figures in favour of Project ED's. For those within the 'fair' category, the averages for the substation ED's is at the lowest , the averages for Galway and State also read lower than figures for Mayo and Site ED's. Mainly, the averages do not fluctuate with the percentages of those in Very Bad, and Bad health status in the Site ED's and State and County having approximately the same averages. The substation has an even lower average within this category. For those who within the 'Not stated' category, there is a higher percentage of those who do not disclose their health status at a State and at Galway City and County level when compared to the main study area with a difference of at least 2.2% upwards.

Overall, The census data indicates that the population of the Project ED's especially the Substation ED is in a slightly better health condition overall especially for those stating that their Health was very good and Good when compared to the state and county averages. These higher figures for those within the 'Very Good' in the Project ED may be attributed to the predominantly rural nature of these and the associated health benefits of clearer air along and sparse population of these sites in contrast to potentially slightly unhealthier densely populated areas with higher levels of various pollutants.

Table 6-11: Population by General Health (Census, 2022)

General Health (Census 2022)	State	County Galway	County Mayo	Project - ED's	Substation ED
Very Good	53.2%	51.7%	51.4%	54.1%	54.6%
Good	29.7%	30%	32.1%	31.7%	36%
Fair	8.6%	8.6%	10.2%	10.1%	6%
Bad	1.4%	1.3%	1.6%	1.1%	0.7%
Very Bad	0.3%	0.3%	0.3%	0.6%	0%
Not Stated	6.7%	8.2%	4.5%	2.3%	2.7%

6.7 Assessment of Likely Significant Effects

6.7.1 Potential Effects on Population - Construction

Population Growth and Density

During the construction phase of the Proposed Development, employment and unemployment figures as shown in Table 6-*4 Live Register Data for Galway City & County, Mayo County and the State between Sept. 2020 and Sept. 2023*, above, indicates that there is an available work force in County Galway and County Mayo due to the number of large and medium sized settlements in proximity of the Project. Therefore, it is expected that workers required for the construction phase of the Project will be drawn from settlements within County Galway and County Mayo, ad will not be based in the locality so having no impact on the local population growth except for during working hours.

There is no impact on population along the TDR from Galway Port to the site at Shancloon.

The population of the Project ED's recorded in the 2022 Census was 2,073 persons. Workers availing of temporary residence during the construction phase would be assessed as a population impact, but workers commuting daily and returning to their home residence are not considered as they have no impact on the local population during the construction phase. The population of the Project Area will increase temporarily during construction hours and return back to normal outside of working hours on a daily basis over the 24 month construction period. As construction work is temporary, it is unlikely that workers coming from outside the ED's will take up residence within the Project ED's. However, it is likely that some workers may stay in accommodation in the larger settlements such as Tuam and Headford located outside the ED's. Overall, this will result in a slight, short-term increase in population resulting in a slight, short-term neutral impact.

There is a potential for impact to local residents during construction and construction/delivery vehicle movements on the existing road network associated with construction and turbine delivery including:

- delay and disruption to road users,
- road safety issues should the works not be carried out in line with good traffic management practices,
- inappropriate parking of construction related vehicles along the route of the works,
- soiling of the public road leading to a general lack of cleanliness and poor skid resistance on roads and
- damage to existing road surface.

Chapter 14 - Traffic and Transportation details a number of proposed mitigations works at the construction phase of the Project, which are outlined within the accompanying Traffic Management Plan (TMP). The project specific TMP is to be agreed with the road's authority and An Garda Siochána prior to commencing construction. With the application of mitigation measures outlined in Chapter 14 - Traffic and Transportation, it has been concluded that there will be minimal impact on the population (local inhabitants) due to traffic disruption during construction.

6.7.2 Potential Effects on Population - Operational

Once constructed, it is envisaged that there will be direct and indirect employment associated with the operational phase of the Proposed Development. Opportunities for mechanical-electrical contractors and craftspeople to become involved with the operation and maintenance of the Proposed Development will arise.

It is expected that the operational phase of the Proposed Development could create 73.8 to 87.2 long term jobs (with an installed capacity of 61.6 MW to 72.6 MW). These jobs include operations and maintenance, back-office support and indirect jobs created by other activities related to installed turbines including IPP/utilities, consultancy firms, research institutions, universities and financial services.

Operational phase employees tend to be specialist contractors who move between developments, and generally do not take up residence close to operating wind farms for the purpose of maintenance of wind farm.

Furthermore, as previously described elsewhere in this EIAR, there are no residential receptors within the Site and the Project has been designed to minimise potential impacts on residential receptors, with a minimum set back of a 4 times tip height is achieved meaning that operational effects on receptors are aimed to be minimised. For further reference on any effects to receptors during the operational phase, please see Chapter 7- Air Quality and Climate, Chapter 8 - Noise & Vibration and Chapter 13- Shadow Flicker.

Any effect on population within the Study Area is expected to be imperceptible.

6.7.3 Potential Effects on Population - Decommissioning

The decommissioning phase of the Proposed Development is described in Chapter 2 - Development Description of this EIAR provides for the removal of turbines and associated infrastructure from the Proposed Development site. The potential impacts associated with the decommissioning phase in relation to population trends will be similar to those associated with the construction phase but of a reduced magnitude.

A construction crew will be required for dismantling the infrastructure and carrying out remediation where necessary.

As removal works will be of relatively short duration, it is unlikely that workers will take up residence in the Wind Farm Site, however, it is likely that some workers will stay in accommodation within the area of the Wind Farm Site or nearby towns, resulting in potential temporary population increases. The decommissioning phase is therefore likely to result in a slight, temporary increase in population within the Wind Farm Site and nearby towns, producing a slight temporary impact on population trends. It is not likely that the decommissioning phase will result in any permanent impact to population in terms of changes to population trends and density.

6.7.4 Potential Effects – Socio-economics, Employment and Economic Activity - Construction

The construction of the Shancloon Wind Farm will create employment opportunities.

According to the *European Wind Energy Association's* (EWEA) report '*Wind at Work'* (2009), 1.2 jobs per MW are created during installation of wind energy projects based on 1 year construction period.

Using this figure, a projection of approximately 73.8 to 87.2 long term jobs could be created as a result of the construction of the Proposed Development which is anticipated to have an installed capacity of 61.6 MW to 72.6 MW, depending on the turbine to be selected within the range proposed.

As a result, the construction phase of the Proposed Development will have a short-term, significant positive impact on the employment profile of the area and a short-term slight, positive impact on local businesses and services in the nearby towns and villages of the Study Area.

6.7.5 Potential Effects – Socio-economics, Employment and Economic Activity – Operational

6.7.5.1 Economic Value

The Project at Shancloon will contribute to achieving Ireland's energy targets as set out in the Climate Action Plan 2024, which has a target of 80% of electricity generated from renewable sources by 2030, with a target increase in onshore wind of 9GW by 2030, the Shancloon Wind Farm has the potential to significantly contribute to this total.

Wind Energy Ireland's Annual Report 2023 states that wind energy provided Ireland with 35% of its electricity in 2023, an increase of 1% on 2022. Wind generated c. 13,725 gigawatt-hours (GWh) in 2023, which is equivalent to the electricity consumption of more than 3m Irish families, thus avoiding significant additional costs related to fossil fuel imports for that year. It is estimated that wind energy alone resulted in the avoidance of c. 4.2 million tonnes of CO2 emissions in 2023.

In relation to sectoral emissions ceilings, the energy production from the Project is estimated to be between 61.6 MW to 72.6 MW. If we conservatively assume a capacity factor of 35% and the fraction of output to back up is 1.93% (i.e. 5% of capacity factor) and use an average of the estimated MW of the Project (67.1 MW), it would be expected the Project will result in a reduction in annual emissions in the electricity sector of c. 94.2 tonnes of CO2 per annum.

The 2023 and 2024/2025 Climate Action Plan's established a target of 6GW of installed onshore wind capacity by 2025 and 9GW by 2030, with c. 4.6MW's of installed onshore wind capacity currently in the Republic of Ireland. This leaves a gap of c. 4,400MW's to achieve the 2030 target. As such, the Project has the potential to contribute c. 1.1% of the total additional onshore wind capacity required nationally.

In the context of the urgent need to deliver renewable projects and the projected shortfall in available projects to meet targets, every individual project is critical. The Project at Shancloon would contribute to increasing Ireland's renewable, domestically produced, wind energy, helping to reduce emissions, improve energy security and achieve renewable electricity targets such as those outlined in CAP24.

These savings will continue to rise with the installation of further wind energy and other renewable energy developments. Increased renewable electricity production as a result of the operational phase of the Project will likely have a positive medium to long-term economic effect due to the cost savings associated with the avoidance of fossil fuel imports. This will also act cumulatively with other proposed, consented and existing renewable energy projects throughout the country in providing cost savings, as discussed in section 11.10.

6.7.5.2 Employment Potential

Once the proposed Shancloon Wind Farm is constructed, it is envisaged that there will be direct and indirect employment associated with the operational phase of the Proposed Development. Opportunities for mechanical-electrical contractors and craftspeople to become involved with the operation and maintenance of the project will arise.

According to the *European Wind Energy Association's* (EWEA) Report '*Wind at Work*' (2009), 1.2 jobs per MW are created during installation of wind energy projects based on 1 year construction period. Using this figure, *The Sustainable Energy Authority of Ireland 2015* report 'A Macroeconomic Analysis of Onshore Wind Deployment to 2020' also puts direct construction jobs from wind farm developments at 1.7 per MW. With an export capacity of 61.6 MW to 72.6 MW, this provides an estimate of between 103 and 124 jobs associated with the construction stage of the Project (anticipated to be 24-month period).Although only a small proportion of operational jobs are likely to be directly based at the Shancloon Wind Farm Site, it is likely that the indirect jobs the operational phase will support, such as consultants, research institutions, universities and financial services, will provide a slight effect to the employment profile of the wider economy of Counties Galway and Mayo. Therefore, taking account the 2009, 2014 and 2015 figures and taking a capacity of 61.6 MW to 72.6 MW that could be installed on the Site, it is estimated that between 79 direct and 112 indirect jobs respectively could be created during the construction phase of the Project. It is not expected that all these jobs will be based at the wind farm Site, however, the employment of tradespeople, labourers, and specialised contractors for the construction phase will have a direct, short-term significant, positive impact on employment in the study area.

It is possible that there will be direct employment for people living in the Study Area who may be qualified for construction related roles. Materials will also be sourced in the general locality where possible. This will assist in sustaining employment in the local construction trade. Furthermore, local businesses in the nearby towns and villages will likely receive a slight indirect positive economic impact due to the influx of workers to the area who will require services such as shops and food places.

As a result, the construction phase of the Project will have a short-term, significant positive impact on the employment profile of the area and a short-term slight, positive impact on local businesses and services in the nearby towns and villages of the Study Area.

General council services will benefit from rates and development contributions paid by the developer which include road upkeep, fire services, environmental protection, street lighting, footpath works etc., along with other local community initiatives and supports. Based on the final installed capacity of the Project, the business rates could represent a slight positive, long-term effect on resources of the Local Authority during the operational phase.

The terms of the Renewable Energy Support Scheme 4 (RESS 4), states that all projects looking for support under the new RESS will need to meet pre-qualification criteria including the provision of a community benefit fund. This is discussed further in the following section.

6.7.5.3 Proposed Community Benefit Scheme

On 25 June 2024, the government produced the Terms and Conditions for the *Fourth Competition under the Renewable Electricity Support Scheme*, known as RESS 4. The document sets out the terms and conditions that will apply to the third competition to be conducted under the RESS and to the ongoing administration of awards made in the RESS 4 Auction.

As set out in the terms of the *Renewable Energy Support Scheme* (RESS), all renewable energy projects applying for RESS are required to establish a '*Community Benefit Fund*' prior to commercial operation of the relevant RESS 4 project. With effect from the Commercial Operation Date a RESS 4 Project shall be required to make a contribution of€2/MWh of Loss-Adjusted RESS Metered Quantity for all RESS 4 Projects.

Furthermore, as part of RESS 4, the Community Benefit Fund will provide a minimum of €1,000 that shall be paid to each household located within a distance of a 1 kilometre radius from the Onshore Wind RESS 4 Project. The 1-kilometre distance specified is measured from the base of the nearest turbine of the RESS 4 Project to the nearest part of the structure of the household, the location of which is identified in the An Post's GeoDirectory. Furthermore, a minimum of 40% of the funds shall be paid to not-for-profit community enterprises whose primary focus or aim is the promotion of initiatives towards the delivery of the *UN Sustainable Development Goals*, in particular Goals 4, 7, 11 and 13, including education, energy efficiency, sustainable energy and climate action initiatives.

A *'Good Practice Principles Handbook*' was published in 2021, setting out a range of principles, including the need to ensure community participation in fund decision-making via the establishment of a local committee which should ensure successful dispersal of funds throughout the community.

Thus, for each megawatt hour (MWh) of electricity produced by the wind farm, the project will contribute €2 into a community benefit fund for the RESS period i.e. the first 15 years of operation.

Shancloon Wind Farm has a proposed installed capacity range of between 61.6 MW to 72.6 MW, which could mean an average of almost €378,000 per annum is paid into the fund every year for 15 years. The amount of funding will be dependent on the final capacity and the amount of electricity generated by the wind farm when operational.

The provision of the Community Benefit Fund will have a significant long-term, positive effect on the socioeconomic profile of the study area and wider area, providing a regular payment to near neighbours of the project and providing for projects which will benefit the community as a whole, bringing long-term socio-economic benefits.

6.7.5.4 Property Values

This section provides a summary of the largest and most recent national and international studies from the United States, United Kingdom, Scotland and Ireland.

The largest study of the impact of wind farms on property values has been carried out in the United States. '*The Impact of Wind Power Projects on Residential Property Values in the United States: A multi-Site Hedonic Analysis*' (Hoen, et al. 2009), was carried out by the Lawrence Berkley National Laboratory (LBNL) for the U.S Department of Energy. This study collected data on almost 7,500 sales of single-family homes situated within ten miles of 24 existing wind farms in nine different American states over a period of approximately ten years. The conclusions of the study are drawn from eight different pricing models including repeat sales and volume sales models. Each of the homes included in the study was visited to demonstrate the degree to which the wind facility was visible at the time of the sale, and the conclusions of the report state,

> *"The result is the most comprehensive and data rich analysis to date on the potential impacts of wind energy projects on nearby property values."*

The main conclusion of this study is as follows:

> *"Based on the data and analysis presented in this report, no evidence is found that home prices surrounding wind facilities are consistently, measurably, and significantly affected by either the view of wind facilities or the distance of the home to those facilities. Although the analysis cannot dismiss the possibility that individual or small numbers of homes have been or could be negatively impacted, if these impacts do exist, they are either too small and/or too infrequent to result in any widespread and consistent statistically observable impact."*

This study has been recently updated by LBNL who published a further paper entitled "*A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States*", (Hoen, et al. 2013). This study analysed more than 50,000 home sales near 67 wind farms in 27 counties across nine U.S. states yet was unable to uncover any impacts to nearby home property values. The homes were all within 10 miles of the wind energy facilities - about 1,100 homes were within 1 mile, with 331 within half a mile.

The report is therefore based on a very large sample and represents an extremely robust assessment of the impacts of wind farm development on property prices. It concludes that:

> *"Across all model Specifications, we find no statistical evidence that home prices near wind turbines were affected in either the post-construction or post announcement/pre-construction periods."*

LBNL studies note that their results do not mean that there will never be a case of an individual home whose value goes down due to its proximity to a wind farm – however if these situations do exist, they are considered to be statistically insignificant. Therefore, although there have been claims of significant property value impacts near operating wind turbines that regularly surface in the press or in local communities, strong evidence to support those claims has failed to materialise in all the major U.S. studies conducted thus far.

A further study was commissioned by Renewable UK and carried out by the Centre for Economics and Business Research (Cebr) in March 2014. Its main conclusions are:

- Overall, the analysis found that the county-wide property market drives local house prices, not the presence or absence of wind farms.
- The econometric analysis established that construction of wind farms at the five sites examined across England and Wales has not had a detectable negative impact on house price growth within a five kilometre radius of the sites.

A study issued in October 2016, '*Impact of wind Turbines on House Prices in Scotland*' (Heblich, et al. 2016) was published by Climate Exchange, Scotland's independent centre of expertise on climate change which exists to support the Scottish Governments policy development on climate and the transition to a low carbon economy.

The report presents the main findings of a research project estimating the impact on house prices from wind farm developments. It is based on analysis of over 500,000 property sales in Scotland between 1990 and 2014.

The key findings from the study are:

- No evidence of a consistent negative effect on house prices: Across a very wide range of analyses, including results that replicate and improve on the approach used by Gibbons (2014), they do not find a consistent negative effect of wind turbines or wind farms when averaging across the entire sample of Scottish wind turbines and their surrounding houses. Most results either show no significant effect on the change in price of properties within 2km or 3km or find the effect to be positive.
- Results vary across areas: The results vary across different regions of Scotland. The data does not provide sufficient information to enable them to rigorously measure and test the underlying causes of these differences, which may be interconnected and complex.

The literature described in the studies referenced above demonstrates that at an international level, wind farms have not impacted property values in the local areas.

For an Irish example, the University of Galway conducted and published a study in 2023 which focused on the impact of wind farms on property values on the western seaboard of Ireland titled: '*Wind Turbines and House Prices Along the West of Ireland: A Hedonic Pricing Approach*' (Gillispie, et. al. 2023).

This study collected data from seven counties along the western seaboard of Ireland which included counties Donegal, Leitrim, Sligo, Mayo, Galway, Kerry and Cork. The conclusions of the study are drawn from housing data taken from the property website, www.daft.ie, which reviewed all listings, prices, and individual housing characteristics of c. 64,163 no. property listings within 15km of a wind turbine over a 5 year period between 2016 and 2021.

To conduct the study, individual turbines were identified using satellite imagery and assigned to the nearest known windfarm location (SEAI, 2023). Information on turbine hub height and rotor diameter was sourced from planning records for the 1,342 turbines in the study area, which also included the 366 no. turbines connected after 2016, with the following being provided as examples of some of the factors which may impact on property values:

- Proximity Effect: Where houses located closer to wind turbines tended to have lower market values compared to those further away. The depreciation in value was more pronounced within a 2-3 km radius of the turbines.
- Visual and Noise Pollution: A key contributing factor to the decrease in house prices were visual intrusion and noise pollution. Properties with unobstructed views of the turbines or those subjected to noise above a certain threshold experienced more significant value reductions.
- Mitigating Factors: Certain mitigating factors, such as natural screening by trees or topography and community engagement and community benefits like investment in local infrastructure, could offset some of the negative impacts on house prices.

The main conclusion of this study is as follows:

> *"It is clear from the analysis that turbines can incur a discount on nearby properties. However, there is evidence to suggest that the price effect is not persistent and can be minimised through siting decisions.*
>
> *As renewable policies progress, the west and south of Ireland will likely continue to see disproportionately greater numbers of wind energy developments compared to the rest of the country. Therefore, the results outlined in this paper have important implications for policy, especially in terms of siting locations for wind turbine development.*
>
> *While it is important to reach climate targets through growth in renewable electricity production, it is necessary do so at a minimal cost to the public by focusing developments to remote areas with limited urban influence."*

In comparison with the US, British and Scottish studies described above, the comparative Irish study on property values is conducted over a shorter period of time, 5 years (2016-2021), and does not utilise data based on property prices achieved on the closing of a property sale. Instead, this study established baseline data using price listings based on an assumed valuation of a property, which is largely derived from economic conditions and assumed desirability of a property at a specific period of time. Of the c. 64,163 properties considered for the study between 2016 and 2021, a total of c. 225 no. of the properties are located within 1 km of a turbine. When compared to the previously described US, British and Scottish studies, this is a relatively small pool and duration to establish robust data in comparison to the US, British and Scottish examples, which were carried out over a significantly longer period of over 20 years, and with a significantly larger sample of properties at c. 500,000, where the final sale agreed price was used to establish price trends.

Though this study gives an insight into conditions in a specific geographical location over a specific timeframe, previous studies have shown that property prices achieved on the closing of a sale, and prices achieved over a longer period of time, can provide more robust and accurate quantitative data when establishing reliable information on property prices in relation to the probable influence of wind turbines on that price. Furthermore, studies with a larger sample of properties over a longer duration can also provide more accurate insights into reasons why there may be property price fluctuations and give insights into the reasons why properties achieve the prices they do based on aspects such as long term economic health of the national or even local economy.

It is a reasonable assumption based on the available national and international literature that the provision of a wind farm at the proposed location would not impact on the property values in the area and will therefore have a long-term imperceptible impact.

6.7.6 Potential Effects – Socio-economics, Employment and Economic Activity – Decommissioning

The potential impacts associated with the decommissioning phase in relation to socio-economics, employment and economic activity will be similar to those associated with the construction phase but of a reduced magnitude. A construction crew will be required for dismantling the infrastructure and carrying out remediation where necessary. As the decommissioning of the project is expected to be less intensive than the construction phase, it is likely that less construction workers will be required for this phase. During the decommissioning phase employment opportunities will be available at the Wind Farm Site and outlying areas. The influx of construction workers to the Wind Farm Site will have a temporary to short-term indirect positive impact on local businesses and services contributing to the local economy, similar to that of the construction phase but of lesser magnitude.

There will be a temporary to short-term slight, positive impact to socio-economics, employment and economic activity in the Wind Farm Site associated with the employment of construction workers within the vicinity of the development during the decommissioning phase.

6.7.7 Potential Effects – Land Use - Construction

The existing land-uses in proximity to the proposed Shancloon Wind Farm will remain broadly unchanged during the construction phase of the project, however, some land use within and in close proximity to the Site will be temporarily disrupted during the construction phase. This will occur on the forestry lands and the Cutover Bogs where turbines and associated infrastructure are proposed.

There are 5 no. proposed wind turbines located within cutover bogs and 5 no. proposed turbines located on improved Agricultural grassland. Existing access tracks will be used and upgraded where possible and new tracks will be required in agricultural grasslands.

Felling of approximately 0.43 ha of coniferous forestry is required at the turn off onto the L-6483 from the R332 road in order to accommodate turbine delivery. An additional 0.35 ha of coniferous forestry will be clear-felled to accommodate the construction of the on-site electrical caballing between the wind farm and 110 kV substation. It should be noted that the clear-felling of trees in the State requires a felling licence. The Forest Service of the Department of Agriculture, Food & the Marine is Ireland's national forest authority and is responsible for all forest licensing which is governed by the Forestry Act 2014 as amended and the Forestry Regulations 2017 (S.I. No. 191 of 2017).

The area of trees to be felled should be the minimum required to accommodate the Project. However, for the purpose of the EIAR the area identified for felling has been identified as the maximum area that could conceivably be required to construct the Project. In advance of other construction works, clearance felling will commence on site and is expected to take up to 2 weeks. This will result in a temporary slight, negative impact to residential and agricultural land use where access may be temporarily restricted during works. Traffic management measures will be put in place, as detailed in Chapter 14 - Traffic and Transportation of this EIAR.

A felling licence will include the provision of relevant replant lands (afforestation area) to be planted in lieu of the proposed tree felling on the Site. The associated afforestation of alternative lands equivalent in area to those lands being permanently clear-felled is also subject to licensing ('afforestation licensing').

TDR works along public roadways have potential to cause non-significant brief impacts where street furniture/sign removal, installing of temporary load bearing surfaces and vegetation trimming is needed. Brief impact may also occur to the supply of electricity and telecommunications to homes and businesses as a result of temporary removal of services to accommodate turbine delivery. Turbine delivery will temporarily impact land use due to the transportation of oversized loads on the public road. Measures to facilitate works on the TDR are described within the EIAR Chapter 14 - Traffic and Transport.

This is likely to have a temporary slight negative impact on residential land-use due to noise nuisance because of machinery. The impact of noise is further considered in EIAR Chapter 8 – Noise and Vibration.

6.7.8 Potential Effects – Land Use - Operation

The operational phase of the Project will occupy a small proportion of the development site area when operational, and it is anticipated that there will be minimal impact on existing land uses arising from the operational phase.

The operational phase of the Shancloon Wind Farm will result in a change of land use in areas where access tracks, wind turbine bases, hardstanding areas, met mast, substation, recreation trail and associated drainage infrastructure will be located. The lands affected are currently in use for Agricultural grassland and Cutover Bog.

The operational phase of the Shancloon Wind Farm will not negatively impact agricultural practices on lands adjacent to the site. There are no peer reviewed studies which indicate that wind energy development has a negative impact on the health of livestock. There are numerous examples of renewable energy developments throughout the country and internationally where livestock coexist and routinely graze in the same fields as wind turbines (AWEA, 2019). Existing land-use, such as grazing livestock or crops can continue on the site as normal. As such, there will be no likely significant negative impact to existing agricultural land use as a result of the Proposed Development.

It is proposed to upgrade existing agricultural and forestry tracks where possible to avoid additional land take from roads. Where this is not possible, new access tracks have been proposed. These access tracks will be used throughout the operational phase for operation and maintenance of the proposed wind farm. The tracks will also be used for forestry and agricultural practice, providing a long-term slight, positive impact to these land uses through provision of upgraded and new roads infrastructure throughout the site.

Activity is not expected at the TDR during the operational phase of the Proposed Development. It is unlikely that the TDR route will be required during the operational phase of the project, unless in the unlikely event a turbine component is required to be transported for replacement or repair. Any potential TDR works during the operational phase will be limited to temporary accommodation works in the event that turbine replacement is required.

During the operational phase, accidental pollution from spills and leaks of fuel, oil and chemicals from vehicles and maintenance works may occur. Additionally, transformer oil will be used in cooling the transformers associated with the sub-station which creates potential for oil spills during any oil replacement activity or leaks during the operational phase, although the likelihood of this is low. There is no significant risk of sediment release to cause increase suspended solids in surface waters during the operational phase as vegetation will not be disturbed during this phase, with further information contained within EIAR Chapter 12 – Hydrology and Water Quality.

Biodiversity enhancement measures will be incorporated into the site. The area of the site designated for biodiversity enhancement is adjacent to the SPA. The works to re-wet this habitat, such as drain blocking and grazing management will not result in changes in ecological functions and/or features that are essential for the ecological requirements of habitats and species. The designation of an area for biodiversity will result in some loss of existing land use, which will have an overall positive impact on land-use by enhancing the biodiversity of the Project. A Biodiversity Enhancement Management Plan (BEMP) for elements of the Project such as the turbine, substation and TDR can be found in Chapter 9 - Biodiversity, Appendix 9.1: Biodiversity Enhancement and Management Plan (BEMP).

6.7.9 Potential Effects – Land Use – Decommissioning

The decommissioning phase of the Project is described in Section 3.8 of this EIAR and provides for the removal of turbines and associated infrastructure from the site. The potential impacts associated with the decommissioning phase in relation to land use will be similar to those associated with construction phase but of a reduced magnitude.

Decommissioning works will include removal of all above ground structures including the turbines and met mast. The on-site substation will be taken in charge by Eirgrid / ESB and therefore will remain in situ. The turbine foundations will be covered over and allowed to re-vegetate naturally and access tracks will be left in situ to continue to be used for agricultural, forestry and recreation land uses.

The decommissioning works will require a construction crew on-site and may cause temporary disruption to surrounding land uses. Removal of infrastructure from the site may temporarily impact on forestry and agricultural practices. During decommissioning works agricultural access tracks within the wind farm site may be in use by construction crews which may temporarily prohibit access to certain areas of forestry or hinder access to areas of agricultural pasture. Impact to these land uses during the decommissioning phase is expected to be temporary to short-term slight, negative.

Recreation and Agricultural activity will also benefit from the upgraded access tracks left in situ throughout the site resulting in a long-term moderate, positive impact on recreation and agricultural activity at the site.

The BEMP lands are contracted for the duration of the project, thereafter their full control will revert back to the landowner.

6.7.10 Potential Effects – Recreation, Amenity and Tourism - Construction

There are no significant tourism attractions located in proximity to the proposed Shancloon Wind Farm site and TDR, and as such, the construction phase of the Proposed Development is not expected to impact on major tourism attractions, tourism numbers or tourism revenue.

The proposed works associated with the Proposed Development will avoid negatively impacting on nearby community facilities, town centre services and amenities due to lack of proximity. The proposed works, including the construction haul routes do not interact with nearby recreation and tourism amenities as listed in 6.6.4 *Recreation, Amenity and Tourism*, and therefore there are no expected direct impacts on these features.

The TDR passes through the settlements of Tuam, County Galway. During turbine delivery, there is potential for indirect impact to town/settlement centre services due to the transportation of large and bulky loads through the settlements. This will likely be as a result of traffic calming measures during the escorting of the turbine components. Temporary accommodation works will not be required in these settlements and therefore impact is likely to be temporary to brief, negative and not significant.

Mitigation is set out in Chapter 14 - Traffic and Transportation in order to avoid indirect impact as far as possible on town and village centre facilities and services during turbine delivery.

6.7.11 Potential Effects – Recreation, Amenity and Tourism - Operation

In relation to tourism and wind energy development, the Wind Energy Development Guidelines for Planning Authorities (2006) states the following:

> *"Wind Energy developments are not incompatible with tourism and leisure interests, but care needs to be taken to ensure that insensitively sited wind energy developments do not impact negatively on tourism potential. The results of survey work indicate that tourism and wind energy can co-exist happily"*

The Draft Revised Wind Energy Development Guidelines (2019) also maintain that wind energy development "*can co-exist happily*" with tourism and go on to detail the survey works as also cited in the 2006 guidelines.

The survey work referred to in the guidelines is Sustainable Energy Ireland's (SEI's) Attitudes towards the Development of Wind Farms in Ireland (2003). The SEI (now SEAI) report found that the overall attitude towards wind farms is positive.

> *"The overall attitude to wind farms is very positive, with 84% of respondents rating it positively or very positively (Chart 2.6). Only 1% rate it negatively ('fairly bad'), with 14% not having an opinion either way, and no one rating wind farms 'very negatively'. Interestingly, this time it is those from Dublin who are most positively disposed; this could arise from the fact that Dubliners are less likely than others to have a wind farm built in their locality."*

Where negative attitudes were voiced towards wind farms, the visual impact of the turbines on the landscape was the strongest influence. The report also notes however that the findings obtained within wind farm catchment areas showed that impact on the landscape is not a major concern for those living near an existing wind farm (SEI, 2003).

With regard to the economic and environmental impacts of wind farm development, the national survey reveals that attitudes towards wind energy are influenced by a perception that wind is an attractive source of energy:

> *"Over 8 in 10 recognise wind as a non-polluting source of energy, while a similar number believe it can make a significant contribution to Ireland's energy requirements. People therefore seem to have little difficulty with the concept of wind energy".*

This report concludes that based on the detailed study of attitudes, it is clear that there is "*widespread goodwill towards wind farm developments*".

Recent independent research conducted by BiGGAR Economics in 2016 entitled 'Wind Farms and Tourism Trends in Scotland', assessed the relationship between wind farm developments and the tourist industry in Scotland. An analysis was carried out on eight local authorities which had witnessed a higher increase in wind energy developments than the Scottish average. Of the eight local authorities, five also witnessed a greater increase in sustainable tourism employment than that of the National Average with just three witnessing less growth than the Scottish average. The research concluded that at local authority level, no detrimental impact occurred on the tourism sector as a result of wind energy development, rather that, in the majority of cases, sustainable tourism employment performed better than other areas.

Fáilte Ireland conducted research titled "*Visitor Attitudes on the Environment*", which was first published in 2008 and updated in 2012. The research surveyed both domestic (25%) and overseas (75%) holidaymakers to Ireland to determine their attitudes to wind farms. The survey results indicate the following:

Most visitors are broadly positive towards the idea of building more wind farms on the island of Ireland. A minority (one in seven) were negative towards wind farms in any context.

Despite the fact that almost half of the tourists interviewed had seen at least one wind farm on their holiday, most felt that their presence did not detract from the quality of their sightseeing.

The largest proportion (45%) said that the presence of the wind farm had a positive impact on their enjoyment of sightseeing, with 15% claiming that they had a negative impact.

Almost three quarters of respondents claimed that potentially greater numbers of wind farms would either have no impact on their likelihood to visit or would have a positive impact on future visits to the island of Ireland.

The updated survey, 2012, found that over half of tourists surveyed had seen a wind turbine while travelling the country. The survey results were as follows:

- 32% said that the wind turbines enhanced the surrounding landscape.
- 47% said that it made no difference to the landscape.
- 21% claimed wind turbines had a negative impact on the landscape.
- 71% of respondents claimed that potentially greater numbers of wind farms would either have no impact on their likelihood to visit or have a positive impact on future visits to the island of Ireland.

In 2019, Fáilte Ireland's produced its guidelines on tourism and environmental impacts, described in Shancloon Wind Farm EIAR Chapter 5 - Scoping and Consultation, titled '*Project Factors Affecting Tourism*'. This document titled '*EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects*' states that whilst tourism projects may be diverse, the projects which can impact tourism are considerably more wide ranging, from large infrastructural developments to local energy developments. Disruption to or suppression of a tourist resource or amenity can have very local or more strategic impacts, directly or indirectly- for example energy projects in a rural area can have both a negative and positive impact in different regards. There can be temporary, periodic or even seasonal impacts occurring during construction or operational periods.

The 2022 Public Attitudes Monitor document produced by Wind Energy Ireland states that in relations to wind farm favourability that 'over 4 in 5 nationally (81%) are in favour of wind power; over half (54%) claim to be strongly in favour, while a further quarter (27%) generally tend to favour wind power. Furthermore, amongst those in Rural areas that 55% of those are strongly in favour with 4 in 5 rural residents registered favourable attitudes while only a very niche minority (3%) claimed to be against wind power. Finally, in terms of openness to local Wind farm in rural areas, the survey points out that 21% are strongly in favour and that 35% tend to favour wind farms.

From a review of literature as detailed above, it is concluded that the majority of tourists surveyed had a generally positive view on wind energy development in the landscape. Further analysis of the potential visual impact of the proposed Shancloon Wind Farm is described in Chapter 16 – Landscape and Visual Impact.

The most proximate major tourist attractions to the Shancloon Quiet Man Museum (c. 15km North West), Lough Mask Distillery (c. 27.4km North West) and Ballintubber Abbey (c. 28.6km North West). Furthermore, the most proximate amenity facilities include walking trails, recreational amenities and historical sites associated with historical site all located within 15km of the site.

An assessment of the Viewshed Reference Points (VRP's) over a 20km study area, as described in in EIAR Chapter 16: Landscape and Visual, Section 16.9.1, indicates that, in most instances, the proposed Shancloon turbines will generally not be viewed in combination with other existing, permitted or in-panning wind turbines. There are no other large-scale developments within the vicinity of the Site in terms of cumulative impacts with other forms of development. Overall, the Proposed Development will result in an intensification of wind energy development within this landscape context and within the surroundings of the planes of northeast Galway and south Mayo. Furthermore, existing wind energy development is an established feature within the wider Study Area (existing Cloonlusk Wind Farm).

6.7.12 Potential Effects – Recreation, Amenity and Tourism - Decommissioning

The decommissioning phase of the Proposed Development is described in Chapter 2 - Development Description of this EIAR and provides for the removal of turbines and associated infrastructure from the site.

The decommissioning phase will have similar temporary impacts as the construction phase with the movement of large turbine components away from the site. There may be a minor loss of roadside and trackside vegetation that has grown during the operational phase of the Proposed Development, but this can be reinstated upon completion of decommissioning. Areas of hard standing that are of no further use will be reinstated and reseeded to blend with the prevailing surrounding land cover of the time. It is expected that the decommissioning phase would be completed within a period of approximately 3 months.

Furthermore, within 2-3 years of decommissioning, there will be little evidence that a wind farm ever existed on the site, albeit the proposed on-site substation will remain in perpetuity as part of the national grid infrastructure, in addition to residually useful access tracks.

Due to the temporary nature of the decommissioning phases of the Shancloon Wind Farm, it is expected to have an insignificant and temporary impact on recreation, amenity and tourism.

6.7.13 Potential Effects – Human Health & Safety - Construction

With respect to health and safety, the Health and Safety Authority (HSA) of Ireland monitor fatal workplace injuries throughout Ireland. In January 2024, the HAS stated the construction sector accounted for the second highest fatalities reported in 2023, with 11 reported work-related fatalities. This is above average in relation to most other economic sectors with only agriculture, forestry and fishing accounted for higher work-related fatalities in 2023. This indicates the above average danger levels which workers are exposed to on construction sites when compared to other economic sectors.

The Proposed Development will be obliged to be constructed in accordance with national legislation including Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013).

Construction and accommodating works taking place on the public road and the delivery of heavy/bulky goods (TDR) and machinery on narrow roads may lead to temporary limited access to farmlands, forestry lands and residential properties creating a potential hazard. This may cause a potential temporary moderate, negative impact to public safety along the TDR route during the construction phase.

The Proposed Development will be obliged to be constructed and any road closures will be in accordance with national legislation including the Road Traffic Act 1993 (S.I No.75 of 1993). Furthermore, any road closures required must be in accordance with local authority licence and any abnormal loads must be transported in accordance with Road Traffic (Permits for Specialised Vehicles) Regulations 2009 requiring a An Garda Siochana to grant permission to move abnormal loads as defined on inter-urban routes specified in the Schedule of Designated Roads in above Regulations require independent authorization from the Local Authority concerned and or Minister for Transport.

The delivery of turbines will require transport of heavy/bulk goods from the Port of Galway in County Galway via the M6, M17, N17 before entering the local roads R332 on approach to the proposed wind farm site. Due to the abnormality of the turbine components, there is potential human safety risks associated with their delivery including traffic safety and pedestrian safety at special manoeuvring points. This has potential for temporary significant, negative impacts to human safety during the delivery of turbine components if unmitigated.

Potential impacts on air quality have the potential to affect human health. This has been assessed in Chapter 7 - Air Quality and Climate.

Following the implementation of the mitigation measures, the Proposed Development will result in slight to moderate residual impacts arising from fugitive dust emissions during construction activities involving excavations, felling or earthmoving. These will be localised in nature and as they will be associated with particular elements of the construction phase, they will be temporary in nature and will not result in any permanent residual impacts.

The construction and operational phase of the Proposed Development will not have a significant impact on air quality.

There is no statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. In the absence of specific noise limits, appropriate emission criteria relating to permissible construction noise levels for a project of this scale may be found in the British Standard BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise.

Potential impacts on human health associated with Soils, Geology and Hydrogeology during the construction phase relate to potential contamination of ground water which can be caused by hydrocarbon spills, siltation and landslide. Furthermore, landslides have the potential to cause injury and fatality. A slope stability assessment has been carried out and Proposed Development and proposed infrastructure locations are generally located within areas of 'Low' susceptibility, with localised areas classified as 'High' (northernmost extent of the site). Furthermore, stable in the long-term drained conditions at the wind farm site. Climate change would have an effect on groundwater in limiting the amount of water to replenish groundwater. Thus, less water will infiltrate through soil, there will be less deep percolation and hence groundwater recharge. Considering the mitigation measures as set out in Chapter 11 - Soils, Geology and Hydrogeology, the impact on human health during construction works over an 24 month period is expected to be temporary, negligible and imperceptible.

Potential impacts on human health associated with hydrology during the construction period relate to standing water caused by blocked drains, water collecting in excavated areas or diverted water resting in an undrained area. This has the potential to cause drowning with particular risk to on-site staff. There is also potential for blockage of roadside drains causing potential hazard to traffic. A flood risk assessment has been carried out and a drainage design has been incorporated into the Proposed Development as detailed in Chapter 10: Hydrology and Water Quality. The flood risk model has identified that the Proposed Development will not have a n flood risk in the surrounding area. The likely impact of flooding on human health and safety as a result of construction activities is therefore negligible.

Overall, the engineering solutions and inclusion of proper construction and safety protocols, as shown in the TMP, demonstrate the impacts to human health and safety within and in proximity to the site during construction has been adequately analysed and assessed, with appropriate mitigation measures applied. As a result of the mitigation measures, the impacts to human health and safety during the 24 month construction period is considered low.

6.7.14 Potential Effects – Human Health - Operation

6.7.14.1 Site access and usability of lands

During the operation phase of the Proposed Development, potential impact to human health and safety are unlikely following assessments and appropriate mitigation against through proper engineering design and the development of mitigation strategies.

Potential human safety issues can occur due to the falling ice as a result of the icing of turbine blades in cold weather conditions. This is unlikely to present safety problems as wind turbines are fitted with anti-vibration sensors. These sensors detect any imbalance caused by the icing of the blades. The sensors will cause the turbine to shut down until the blades are de-iced prior to beginning operation again.

Potential impacts to the safety of operation and maintenance staff are associated with working at heights, working at steep gradients or uneven ground, moving vehicles and machinery and working with high-voltage electricity. Properly qualified staff will be employed at the wind farm site and safety protocol will be followed at all times. Therefore, impact to the safety of operation and maintenance staff is unlikely.

Under normal conditions, operational wind turbines do not pose a threat to public safety or the safety of animals. Section 5.7 of the *Wind Energy Development Guidelines* (2006) states the following:

> *"There are no specific safety considerations in relation to the operation of wind turbines. Fencing or other restrictions are not necessary for safety considerations. People or animals can safely walk up to the base of the turbines. There is a very remote possibility of injury to people or animals from flying fragments of ice or from a damaged blade."*

As contained within the Traffic Management Plan (TMP), analysis of the Project and TDR shows there is no works expected along the TDR during the operational phase of the Project. If maintenance works are required in these areas, or bulk equipment is required to be delivered, proper safety protocols will be put in place in line with the mitigation measures set out in section 6.7.5. Therefore, impact to human safety on public roads during the operation phase is unlikely.

6.7.15 Potential Effects – Human Health – Decommissioning

The decommissioning phase of the Project, as described in Section 3.8 of this EIAR, provides for the removal of turbines and associated infrastructure from the site. The potential impacts associated with decommissioning phase in relation to human health will be similar to those associated with construction phase as detailed in Section 6.7.2.

Decommissioning works will include removal of above ground structures including the turbines, mountings, and fencing. The proposed on-site substation will be taken in charge by EirGrid or ESB following decommissioning. During the decommissioning works there is potential for significant impact to human health and safety for construction workers on site. These impacts are similar to those set out in section 6.7.2. Potential impacts to human health and safety on-site will be prevented through best practice methods as per the construction phase CEMP and will include staff training and knowledge of the site-specific decommissioning plan. Once mitigation measures and best practice construction site methods are followed, potential negative impact on human health and safety is expected to be imperceptible and temporary.

During the decommissioning works there is potential for negative impact on health and safety of the public. Similar to Section 6.7.2, impacts are associated with the presence of a construction crew, increased traffic, presence of heavy goods vehicles and machinery, potential obstructions on the public road and potential obstruction to recreation and amenity trails. Potential impact to public health and safety during the decommissioning phase is considered temporary moderate and negative.

However, a Construction and Environmental Management Plan for decommissioning works will be followed, clear signage will be utilized on public roads and walkways and the community will be informed of works prior to commencement to avoid any potential negative impact to public health and safety. Once good practice is followed, the potential for negative impact on public health and safety is expected to be temporary and not significant.

6.7.16 Health and Safety Standards and Procedures

As part of the human health assessment of the proposed Shancloon Wind Farm, an analysis of peer-reviewed literature on potential health impacts arising from wind energy projects was undertaken, with the Project design to date being carried out under the supervision of *Project Supervisor Design Process* (PSDP), and a safety file will be handed over to the construction team prior to commencement of the construction phase, with all construction will be undertaken under a *Project Supervisor Construction Stage* (PSCS).

The review of available literature did not find any credible scientific sources that link wind turbines to adverse health effects. The key documents that have been taken into consideration with respect of potential effects on human health are as follows:

- '*Wind Turbine Sound and Health Effects - An Expert Panel Review'*, American Wind Energy Association and Canadian Wind Energy Association, December 2009.
- '*Wind Turbine Syndrome – An independent review of the state of knowledge about the alleged health condition*', Expert Panel on behalf of Renewable UK, July 2010.
- '*A Rapid Review of the Evidence*', Australian Government National Health and Medical Research Council (NHMRC) Wind Turbines & Health, July 2010.
- '*Position Statement on Health and Wind Turbines'*, Climate and Health Alliance, February 2012.
- '*Wind Turbine Health Impact Study - Report of Independent Expert Panel*' – Massachusetts Departments of Environmental Protection and Public Health, 2012.
- '*Wind Turbines and Health, A Critical Review of the Scientific Literature Massachusetts Institute of Technology'*, Journal of Occupational and Environmental Medicine, Vol. 56, Number 11, November 2014.
- '*Wind Turbine Noise and Health Study'*, Health Canada, 2014.
- '*Wind Turbines and Human Health*', Front Public Health, 2014.
- '*Position paper on wind turbines and public health*', Health Service Executive, February 2017.
- '*Environmental Noise Guidelines for the European Region*', World Health Organisation, 2018.

'*Infrasound*' has been cited as a cause of potential health impacts as a result of wind turbine development. This is discussed in detail in Chapter 8 - Noise and Vibration, Section 8.2.4. It states that infrasound is noise occurring at frequencies below that at which sound is normally audible, that is, less than about 20 Hz, due to the significantly reduced sensitivity of the ear at such frequencies. In this frequency range, for sound to be perceptible, it must be at very high amplitude, and it is generally considered that when such sounds are perceptible then they can cause considerable annoyance. However, wind turbines do not produce infrasound at amplitudes capable of causing annoyance as outlined in the following paragraphs.

The predicted operational noise from the proposed windfarm exceeds the 40 dB daytime noise limit marginally at 6m/s at two properties, north and centre of the proposed windfarm. The predicted noise level at R184 and R185 are 41.0 and 40.3 LA90 dB, respectively. As outlined within Chapter 8 - Noise and Vibration, all locations meet the day time noise limit. All residential noise sensitive locations meet the nighttime noise limits. Predicted levels at all properties with mitigation are presented in the Appendix 8.1 and discussed in Chapter 8 – Noise and Vibration. Note that noise mitigation can be provided in different ways, and the mitigation presented here is an example of how this might be implemented.

Based on the predicted noise levels, a new source of noise will be introduced into the soundscape, and it is expected that there will be a long-term slight to moderate significance of impact for dwellings within the 35 dB LA90 study area with a moderate significance of impact on the closest dwellings to the proposed wind farm.

Should the project be granted permission, an operational noise survey will be undertaken to ensure the project complies with the noise limits once the windfarm is operational. In the unlikely event that an exceedance in the noise limit occurs, mitigation measures will be refined to ensure compliance with the noise limits is achieved at all noise sensitive locations, which are described within Chapter 8 - Noise and Vibration

The UK Department of Trade and Industry study, '*The Measurement of Low Frequency Noise at Three UK Windfarms*' (2006), concluded that:

> *"Infrasound noise emissions from wind turbines are significantly below the recognised threshold of perception for acoustic energy within this frequency range. Even assuming that the most sensitive members of the population have a hearing threshold which is 12 dB lower than the median hearing threshold, measured infrasound levels are well below this criterion."*

It goes on to state that, based on information from the World Health Organisation, '*there is no reliable evidence that infrasound below the hearing threshold produce physiological or psychological effects*' and that 'it may therefore be concluded that infrasound associated with modern wind turbines is not a source which may be injurious to the health of a wind farm neighbour.

In terms of perceived effects from shadow flicker and noise, a shadow flicker assessment has been conducted and is included in Chapter 13 of this EIAR and a Noise and Vibration assessment is included in Chapter 8.

In relation to shadow flicker, the developer commits to zero shadow flicker through the installation of shadow flicker monitoring and software management measures. In terms of noise, The closest property to a turbine (Eircode H54 KH73) is located c. 357 m distance from Turbine T01. However this property belongs to a landowner involved in the project, and is no longer in use as a residential residence, therefore, the layout and design of the wind farm complies with the current Wind Energy Development Guidelines, 2006, therefore, the operational wind farm noise levels meet the derived night and daytime noise limits at all residential properties surrounding the proposed Shancloon Wind Farm, excluding the involved receptor previously identified.

Following a review of literature regarding the potential impact of operational wind farms on human health, it is concluded that there is no scientific consensus to support an association between negative health impacts and responsible wind turbine development. The operational phase will therefore likely have a long-term, imperceptible, neutral impact on human health in proximity to the wind farm site.

With respect to safety, only trained and licenced employees will be permitted to access the turbines and associated electricial cables. Appropriate training will be provided for potential emergencies; therefore, the operational phase of the Project will have a negligible impact on public health and safety.

6.7.16.1 Potential Health and Safety Impacts from Proposed Cables and Electromagnetic Interference

Wind turbines, like all electrical equipment, produce electro-magnetic radiation. The provision of underground electricity cables similar to the proposed capacity is however commonplace throughout Ireland and the installation to the required specification does not give rise to health concerns. The following research outlines the potential for health impacts caused by electromagnetic interference.

The EirGrid document 'EMF & You: Information about Electric & Magnetic Fields and the electricity transmission system in Ireland' (EirGrid, 2014) provides information on studies which have been carried out on the health impact of electromagnetic fields (EMF). This report notes that since 1979, many scientific studies have been carried out on the possible effects of EMF on people. Agencies include the World Health Organisation (2006), the National Radiological Protection Board of Great Britain (2004), and the International Agency for Research on Cancer (IARC) (2002).

In 2009 the International Commission on Non-Ionising Radiation Protection (ICNIRP) issued guidelines for exposure for members of the public to DC magnetic fields. Other more recent reviews have been performed for the UK's Health Protection Agency (2012) and the European Union's Scientific Committee on Emerging and Newly Identified Health Risks (2015). The Eirgrid (2014) report notes that:

> *"These agencies concluded that exposure to only very strong DC magnetic fields can cause biological effects. The exposures required to produce such effects, however, are extraordinarily high relative to levels of DC magnetic fields produced by common sources."*

The EirGrid (2014) report concludes that exposure to extremely low frequency (ELF)-EMF from power lines or other electrical sources is not a cause of any long-term adverse effects on human, plant, or animal health. A 2019 EirGrid report titled 'The Electricity Grid and Your Health' states that:

> *"The consensus from health and regulatory authorities is that extremely low frequency EMFs do not present a health risk."*

To ensure such adverse effects do not occur, the WHO (World Health Organisation) monograph recommended that policymakers establish guidelines for ELF-EMF exposure for both the public and workers, and that the best source of guidance is the ICNIRP guidelines.

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 revised range is detailed in Table 6-13. The underground cable to be installed complies with these ICNIRP guidelines:

- ICNIRP Guidelines for limiting exposure to time varying electric and magnetic fields (1Hz–100kHz) Health Physics 99(6):818-836; 2010.

Magnetic flux densities for Alternating Current (AC) magnetic fields are reported using units of microtesla (µt) and electric fields in kilovolts per metre (Kv/m). The ICNIRP guidelines formed the basis of the EU guidelines for human exposure to EMF (EU, 1999) and the EU Directive 2013/35/EU on the minimum health and safety requirements regarding the exposure of workers to the risks from EMFs.

Table 6-12: ICNIRP Guidelines

Exposure Characteristics	Electric Field Strength (kV/m)	Magnetic Flux Density (µT)
ICNIRP 2010 General Public Reference Level	5	100

The magnetic fields associated with underground cables decrease rapidly with distance. For underground cables, the fields decrease with the square of distance. The electric field emissions from underground cables are negligible as the ground absorbs the field.

As any proposed cabling does not pass under housing, the exposure levels will be extremely low. Most homes have average magnetic field levels in the range 0.2 µT to greater than 0.4 µT. These magnetic fields are attributable to low voltage sources such as wiring, appliances, and distribution circuits (Mastanyi et al, 2007). In dwellings and other properties with electricity, the levels will not exceed the ICNIRP guidelines by a significant margin.

Based on the details of the Project, there will be no impact on residential properties at any distance from the Project as the ICNIRP guidelines are not exceeded at all relevant distances including directly above the cables. The magnetic field associated with an underground 110kV cable is 2.32 µT directly above ground and 0.15 µT at 10 meters from the cable (EirGrid, 2019), significantly below the ICNIRP Guidelines levels of 100 µT. The ESB state that exposure to electrical fields associated with underground cables are considered negligible (ESB, 2017).

The HSE, in their 2017 report 'Position paper on wind turbines and public health' state the following with regard to Electromagnetic radiation:

> *"There is no direct evidence from which to draw any conclusions on an association between electromagnetic radiation produced by wind farms and health effects. Extremely low-frequency electromagnetic radiation is the only potentially important electromagnetic emission from wind farms that might be relevant to health. Limited evidence suggests that the level of extremely low-frequency electromagnetic radiation close to wind farms is less than average levels measured inside and outside suburban homes."*

In the case of the proposed grid connection between the Shancloon Wind Farm and the on-site substation and the proposed grid connection point at the existing Dungarvan substation, the electric and magnetic fields expected to be associated with the operation of the proposed cable fully complies with the ICNIRP and EU guidelines on exposure of the general public to ELF EMF. Therefore, the potential impact to human health as a result of electromagnetic interference associated with the operational phase of the Shancloon Wind Farm will be negligible and imperceptible.

EU Directive 2013/35/EU on the minimum health and safety requirements regarding the exposure of workers to the risks from EMFs was transposed into Irish law on 1st July 2016 by the Safety, Health and Welfare at Work (Electromagnetic Fields) Regulations 2016 (S.I. No. 337 of 2016). The regulations impose a number of duties on employers to maintain safety during work procedures. This includes the carrying out of risk assessment, avoiding and reducing risk, employee information, training and consultation and health surveillance where appropriate. The Proposed Development will comply with both EU and Irish law and will result in a negligible impact to human health on employees at the Shancloon Wind Farm during the operational phase.

With respect to safety, only trained and licensed employees will be permitted to access the turbines. Appropriate training will be provided for potential emergencies; therefore, the operational phase of the Proposed Development will have a negligible impact on public health and safety.

6.7.16.2 Vulnerability of the Project to Major accidents and Natural Disasters

EU Directive 2014/52/EU which amends Directive 2011/92/EU states the following in relation to vulnerability of a project to major accidents and natural disaster:

'In order to ensure a high level of protection of the environment, precautionary actions need to be taken for certain projects which, because of their vulnerability to major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment. For such projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and/or disasters, the risk of those accidents and/or disasters occurring and the implications for the likelihood of significant adverse effects on the environment'.

The following section considers the Proposed Development's vulnerability to major accidents and natural disasters and considers the preparedness of the Proposed Development in case of accident, disaster or emergency.

Should a major accident or natural disaster occur, the potential sources of pollution onsite during the construction and operational phases of the Shancloon Wind Farm are limited. The primary sources with the potential to cause significant environmental pollution and associated negative impacts on human health and the environment include the storage of hydrocarbons, chemicals (Incl. grout and cementing chemicals, potentially drilling muds and chemicals/explosives for blasting ammonium nitrate fuel oil) and wastes. It should be noted that vehicles will be refuelled off-site as especially the case for regular, road going vehicles. However, for construction machinery that will be based on-site continuously, a limited amount of fuel will have to be stored on site. In the case of the Proposed Development of Shancloon Wind Farm, the storage of chemicals of this kind are strictly limited.

There is limited potential for significant natural disasters to occur at the Proposed Development at Shancloon, as Ireland does not suffer from extreme temperatures like that of many countries at a similar latitude due to the dominant influence of the Gulf Stream. This provides Ireland with a mild temperate climate. Potential natural disasters that may occur are therefore limited to:

- Flooding;
- Fire;
- Major incidents involving dangerous substances;
- Catastrophic events; and
- Landslides.

6.7.16.3 Flooding

As outlined in Chapter 12 - Hydrology and Water Quality & FRA., the Proposed Development site is not located within an area at risk of fluvial flooding, with the exception of Turbine 7, which will be fully protected against flooding and located above the 1 in 100 flood event.

Access tracks will be constructed from a permeable aggregate material allowing the runoff to infiltrate underground, with access still achievable by using local roads if water levels on tracks make passing difficult. Excess water will drain into the swales which will be connected, during the construction stage to the settlement ponds. Settlement ponds will have a diffuse outfall dispersing flow across the site. Thus, the site will not add to risk of major accidents, with flood risks managed at all stages of development by a surface water drainage network incorporating swales, drainage channels and settlement ponds. The settlement ponds will have a diffuse outfall which will disperse the flow across the site. The network will be designed to retain high flows during storm events and allow these to disperse naturally, with no uncontrolled discharge to downstream areas.

6.7.16.4 Fire

In May 2017, a fire incident occurred on an area predominantly comprising of grassland in proximity to the 169MW Galway Wind Park, which is located in Finnaun, Co. Galway, c. 32km south west of Shancloon. This incident highlights fire as a non-significant negative impact for the Shancloon Wind Farm. In order to avoid negative impact from potential wild fires management plans are in place to control the potential spread of forest fires. This is achieved through the implementation of fire breaks within the lands and the training of staff in firefighting. The proposed infrastructure including turbines, met mast and substation are set away from any the surrounding forestry in order to maintain a fire break.

In the event of electrical equipment catching fire at the proposed Shancloon Wind Farm, there is potential for negative impact on human health and safety, air quality, water quality, biodiversity, soils, material assets, archaeological or architectural heritage and landscape and visuals.

The magnitude of these consequences has potential to be significant and negative, resulting in potential injury or fatality, property damage, infrastructure damage, loss of forested lands and damage to ecosystems. It is unlikely that potential fire at the Shancloon Wind Farm will have an effect on noise, vibration, telecommunication, and aviation.

6.7.16.5 Major Incidents Involving Dangerous Substances

Major industrial accidents involving dangerous substances pose a significant risk to human health and to the environment both on and off the site of an accident. The Health and Safety Authority (HSA) of Ireland list all upper and lower tier SEVESO establishments throughout Ireland.

The proposed Shancloon Wind Farm site is not in proximity to any site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations i.e., SEVESO site, which would fall within the consultation radius distance from a SEVESO site as per Galway County Development Plan 2022-2028: Policy Objectives MAS 1 and as per Mayo County Development Plan 2022-2028 Objective EDO 70 and EDO 71. The most proximate SEVESO site located c. 19.2km North of the proposed wind farm site is Calor Teoranta Claremorris, Mayo (Lower tier Seveso Site).

Given the nature of the Proposed Development, coupled with the lack of proximity to established Seveso sites, there is a negligible potential risk of negative impact to the Proposed Development and its receiving environment, as set out throughout this EIAR, arising from the occurrence of such a potential accident.

6.7.16.6 Catastrophic Events

According to the Health and Safety Authority (HSA), operational wind farms are still considered a workplace (albeit not permanently occupied). All employers who have control to any extent over the wind farm have duties to ensure, so far as reasonably practicable, that the wind farm does not pose a risk to those working there or to anyone not employed there but who may be affected by activities on the wind farm.

Each wind turbine, incorporating the tower, blades, gearbox and ancillary equipment in the tower and nacelle are considered to be machines under the European Machinery Directive [2006/42/EC]. The duties on designers and manufacturers of machinery are set out in the Machinery Directive, which has been transposed into national law by the 2008 European Communities (Machinery) Regulations, as amended, [S.I.No.407/2008]. All wind turbines will be CE marked, which is in effect, a mark of assurance that the wind-turbine complies with the essential health and safety requirements (EHSRs) of EU supply law.

In all cases, the manufacturer or the manufacturer's authorised representative must compile information in a technical file confirming how the machine complies with these requirements. The maintenance of turbines and ancillaries will only be carried out by competent, trained and qualified personnel. The system of work for operation and maintenance will be planned, organised, maintained and revised to ensure the safety of personnel.

Potential catastrophic events associated with operational wind turbines include:

- Wind turbine toppling (due to foundation or tower failure);
- Wind turbine rotational failure in extreme wind conditions (due to control system or rotor break failure); and
- Fire.

The primary mitigation against a catastrophic event that may endanger the health and safety of the public has been implemented at design stage through adequate siting of wind turbines which provide sufficient set back distances from occupied buildings and other infrastructure to avoid the risk of negative impact in the event of wind turbine collapse.

The ground to blade tip height for wind turbines of 180 m. The wind turbines will have a rotor diameter ranging from 150m to 155m and a hub height ranging from 102.5m to 105m. The *Wind Energy Guidelines* 2006 propose a turbine setback from nearby dwellings, requiring that a turbine should be located no closer than 4 times the turbine tip height. The closest property to a turbine (Eircode H54 KH73) is located c. 357 m distance from Turbine T01, however this property belongs to a landowner involved in the project and is no longer in use as a residential residence, therefore, the layout and design of the wind farm complies with the current *Wind Energy Development Guidelines*, 2006.

Turbines have been sited with consideration for existing ground conditions to minimise the risk of turbine foundation failure, toppling and landslide. Intrusive site investigations have been conducted and significant Geo-technical work has been conducted with the findings informing the project design which confirm ground conditions at turbine locations as well as slope stability analysis for turbines located on sloped ground. Other design mitigation measures employed for the siting of wind turbines include the following:

- Areas mapped by GSI as having a high susceptibility to landslides have been avoided;
- Turbine locations have been assessed by site investigation and visually by geotechnical engineers prior to confirmation of final siting;
- Particular care has been taken in design of road and hard standing alignments, cutting and filling and drainage;
- Peat probing has been carried out at turbine locations. Locating turbines in peat has been carried out in accordance with best practice guidelines and standards as set out in Chapter 11 - Soils, Geology and Hydrogeology.
- Wind turbines are fitted with sophisticated remote monitoring and control systems to manage rotational speed. Turbines also have the capability to shut down in storm conditions through adjustment of blade pitch. Turbines are also fitted with emergency power supply (EPS) units to provide backup power in the event of a loss of mains power supply that could impact the control system.
- Wind turbines are fitted with fire suppression systems and will have emergency escape procedures in place for operational staff in the event of fire in a wind turbine. An emergency response plan is contained in the CEMP included in Appendix 2.1 of Volume 3 of this EIAR.

6.7.16.7 Landslides

Landslides pose a risk to a range of environmental receptors including human safety (including traffic), hydrology and water quality, biodiversity, land, soil, geology and hydrogeology, material assets and archaeological and cultural heritage. The negative impacts associated with landslides can have a significant to profound effect on environmental sensitivities, depending on the scale of the landslide and the receiving environment.

As detailed in Chapter 11 - Soils, Geology and Hydrogeology, a slope stability assessment was carried out at the Wind Farm site to investigate the lands for potential slope failure. Safety ratios for potential slope failures indicates that the slopes are considered stable in the long-term drainage conditions. Site investigation was conducted to investigate the presence of peat on site and in accordance with the Scottish Executive, *Best Practice Guide for Proposed Electricity Generation Developments* (2017), as peat deposits at the proposed turbine locations were <0.5m in depth a peat stability assessment was not undertaken. As such it is considered construction activities at these locations pose a potential risk to sensitive receptors from potential landslide/slope failures. However, results from the two site walkover surveys show no evidence of recent or historic landslides other than localized shallow peat failures.

No evidence of slope instability was observed at the site and there are no historical records of landslide activity within 1km of the site on the GSI database.

Mitigation by design has been incorporated into the Project to avoid potential effects from landslides. Mitigation measures for potential landslide/slope failure are set out in Chapter 11 - Soils, Geology and Hydrogeology. Mitigation measures relating to flood risk which could have a bearing on potential landslides are detailed in Chapter 12 - Hydrology and Water Quality & FRA.

During the construction phase of the Project, an emergency response plan will be in place as set out in Section 6 of the CEMP in the unlikely event of a landslide/slope failure.

In relation to potential vulnerability of the Project to major accidents and natural disasters it is concluded that the potential susceptibility of the Project to major accidents and or natural disaster of the proposed Shancloon Wind Farm is not significant/slight.

6.8 Mitigation Measures

6.8.1 Mitigation Measures - Population

As there are no significant impacts predicted on population trends and population density during the construction, operation and decommission phases, no mitigation measures are required.

6.8.2 Mitigation Measures – Socio-economics, Employment and Economic Activity

Given that potential effects of the Project at construction, operation and decommissioning phases are predominantly positive in respect of socio-economics, employment and economic activity, no mitigation measures are considered necessary.

6.8.3 Mitigation Measures – Land Use

Mitigation measures for land use are primarily related to preliminary design stage, which has allowed for the prevention of unnecessary or inappropriate ground works or land use alterations to occur. The construction and operational footprint of the Proposed Development has been kept to the minimum necessary to avoid impact on existing land uses as far as possible.

Existing tracks have been incorporated into the design to minimize the construction of new tracks and roads and minimize the removal of significant land uses such as cutover bogs. Where new access tacks are required, these have been sensitively designed in order to minimise impact on Cutover Bogs. Electricity cables will be installed underground in or alongside access tracks to avoid impact on forestry practices.

The construction and decommissioning works will be planned and controlled by a Construction and Environmental Management Plan (CEMP). The CEMP for the construction phase is included in Appendix 2.1 of Volume 3 of this EIAR. This provides details on day to day work and methodologies. As part of these works, the public and other stakeholders will be provided with updates on construction activities which will affect access to lands. This will be communicated to members of the public through a community liaison officer employed for the duration of the construction period, as set out in Chapter 14 - Traffic and Transportation.

Prior to the grid connection installation works within public roads, all access points (domestic, business, farm) are considered when finalising the temporary road closures and diversions, in order to maintain local access as much as possible and avoid impacts on various land uses. All proposed works and deliveries along the TDR route will also be controlled by a Construction and Environmental Management Plan to avoid undue impact to adjacent land uses.

6.8.4 Mitigation Measures – Recreation, Amenity and Tourism

Mitigation measures for recreation, amenity and tourism are primarily related to the preliminary design stage of the Shancloon Wind Farm, which has allowed for the prevention of unnecessary or inappropriate development to occur that would significantly affect any recreational or tourist amenity. In designing the Shancloon Wind Farm, careful consideration was given to the potential impact on landscape amenity. The magnitude of visual impact on the landscape is assessed in Chapter 16 – Landscape and Visual Impact.

Chapter 14 - Traffic and Transportation sets out mitigation measures for potential effects associated with increased traffic volumes of the construction and decommissioning phases of the Project which may have an indirect impact on recreation and amenity in the area of the wind farm site and potential indirect impact on town centre and village center facilities and services along the TDR during transportation of turbine components.

6.8.5 Mitigation Measures – Human Health & Safety

6.8.5.1 Mitigation Measures – Construction & Decommissioning

A Construction and Environmental Management Plan (CEMP) is included in Appendix 2.1, which details safety protocols and methodologies. This CEMP will be adopted and further developed in consultation with the local authority and other competent bodies prior to implementation. Furthermore, site investigation has been completed and mitigation has been proposed as detailed in Chapter 11 – Soils, Geology and Hydrogeology.

Public safety is addressed by restricting access to the public in the vicinity of the site works during the construction and decommissioning stage. The construction site will be closed to the public for the 24-month construction period as well as the decommissioning period. This measure aims to avoid potential injury to members of the public as a result of construction activities.

Appropriate warning signage will be posted at the construction site entrance during both the construction and decommissioning phases, directing all visitors to the site manager. Appropriate warning signage shall be provided on public roads approaching site entrances and along haul routes including clear signage relating to the development, both temporary and permanent will be provided for accessing the site.

In relation to the TDR, extra safety measures will be employed when large loads are being transported, for instance, Garda escort will be requested for turbine delivery and a comprehensive turbine delivery plan will be utilised to avoid potential impact to human safety for road users and pedestrians. A traffic and transport mitigation management plan has been completed and is detailed in Chapter 14 - Traffic and Transportation.

Once mitigation measures and health and safety measures are implemented and followed, the potential for impact on human health for members of the public during construction and decommissioning of the Project is expected to be not significant and temporary to short-term.

6.8.5.2 Mitigation Measures - Operational

For operation and maintenance staff working at the Project site, site safety procedures will be established and all employees will be obliged to comply with these. All personnel undertaking works in or around the turbines will be fully trained and will use appropriate Personal Protective Equipment (PPE) to prevent injury, and this is further detailed in the Safety & Health Management Plan detailing the work practices, procedures and management responsibilities relating to the management of health and safety during the design, construction and operation of the Shancloon Wind Farm and shall be read in conjunction with the Safety & Health Plan prepared for the Project by the Project Supervisor for the Design Process (PSDP). Some key mitigation measures that shall be implemented during the operation phase include:

- All personnel undertaking works in or around the turbines will be fully trained and will use appropriate Personal Protective Equipment (PPE) to prevent injury;
- Equipment within high voltage substations presents a potential hazard to health and safety. The proposed substation will be enclosed by palisade fencing and equipped with intruder and fire alarms in line with ESB and EirGrid standards;
- All electrical elements of the Project are designed to ensure compliance with EMF standards for human safety;
- All on-site electrical connections are carried by underground cable and will be marked out above ground where they extend beyond the track or hardstanding surface. Details of cables installed in the public road will be available from ESBN;
- Turbine design includes a glass fibre reinforced polyester hood covers the nacelle. The turbines will be equipped with a Lightning Protection System (LPS) earthing and isolation to help protect the wind turbine against the physical damage caused by lightning strikes. Additionally, the turbines will be equipped with a Fire Suppression System. Furthermore, the proposed wind farm will be remotely monitored, and potential accidents will be quickly identified and reported;
- Furthermore, a nominated competent person will carry out checks and routine maintenance work to ensure the reliability and safe operation of fire-fighting equipment and installed systems such as fire alarms and emergency lighting. A record of the work carried out on such equipment and systems will be kept on site at all times;
- In line with *WEI Health and Safety Guidelines for the Onshore Wind Industry* (2011), Emergency Response Plans will include emergency response procedures for initial actions in the event of a fire. Records will be kept for testing of fire alarms and drills and maintenance/inspection of fixed and portable firefighting equipment;
- Information will be provided to employees on fire safety and fire prevention, including risks of and control measures to prevent fire outbreak, evacuation procedures and those responsible for their implementation, and the use of firefighting equipment, in line with HSA guidance (Fire Prevention - Health and Safety Authority (hsa.ie). The wind farm system will include a kill switch that can be operated at any time with an overriding manual shutdown system in case of an emergency;
- During the construction phase of the Project, an emergency response plan will be in place as set out in the CEMP, included in Appendix 2.1 of Volume III of this EIAR;
- Turbines will be fitted with a Fire Suppression System. Additionally, each turbine will have a number shown in large print on the top of the nacelle which is intended to aid in any aerial fire support to control wildfires in the unlikely event once should occur in the area;

- Lightning conductors will be installed on each turbine as all structures standing tall in the sky require this protection. Turbines specifically require this to prevent power surges to electrical components;
- Turbines will be fitted with ice detection systems which will stop the turbine from rotating if ice is forming on a turbine blade. This prevents ice throw which can cause injury;
- 24-hour remote monitoring and fault notifications are included as standard in the Turbine Operations and Maintenance Contracts;
- Aviation lighting will be installed on the turbines which will be routinely maintained, with the precise location and detail such as height of turbines being sent to the Irish Aviation Authority;
- In addition to scheduled maintenance, the maintenance contracts will allow for call out of local engineers to resolve any issues as soon as they are picked up on the remote monitoring system;
- Access to the turbines inner structure will be locked at all times and only accessed by licensed employees for maintenance;
- Risk avoidance by design will be achieved through the preparation of a detailed design risk assessment at detailed design stage, a detailed method statement for all elements of the work, supervision by geotechnical personnel during excavation and avoidance of earthworks during severe weather conditions.

In line with the Health Service Executive's Emergency Planning recommendations, any incident which may occur at the site which requires emergency services, incident information will be provided in the 'ETHANE' format.

- Exact location;
- Type of incident;
- Hazards;
- Access and egress;
- Number of casualties (if any) and condition;
- Emergency services present and require.

The design of the Project has considered the susceptibility to natural disasters. The proposed site drainage will mitigate against any potential flooding risk, as described in EIAR Chapter 11 – Soils, Geology and Hydrogeology and EIAR Chapter 12 – Hydrology and Water Quality & FRA.

A nominated competent person shall carry out checks and routine maintenance work to ensure the reliability and safe operation of fire-fighting equipment and installed systems such as fire alarms and emergency lighting. A record of the work carried out on such equipment and systems will be kept on site at all times.

The wind farm system shall include a kill switch that can be operated at any time with an overriding manual shutdown system in case of an emergency.

6.9 Residual Impacts

6.9.1 Residual Impacts - Population

The residual effects of the Project with respect to population during the construction, operation and decomissioning phases are mainly associated with operation and maintenance jobs during the operational phase of the Shancloon Wind Farm. This is likely to result in a temporary, neutral impact on overall population in the area of the Wind Farm Site during working hours. As per the assessment of operational impacts, any impact to the population of the Wind Farm Site in terms of changes to population, there will be no effects on population as a result of the Project.

6.9.2 Residual Impacts – Socio-economics, Employment and Economic Activity

The residual effects of the development with respect to socio-economics during the construction, operation and decomissioning phase is considered to be slight positive effect with respect to employment. This is as a result of the employment opportunities associated with the operation and maintenance of the development. There will also be a temporary slight positive economic effect from income spent by construction workers in the local area.

As detailed in section 11.4.3.2, the *Community Benefit Fund* associated with the *Renewable Energy Support Scheme 4* (RESS 4) will provide a significant long-term, positive impact to socio-economic profile for the community and wider area.

The terms of the *Community Benefit Fund* will also promote social inclusion across the community as a minimum of 40% of the funds shall be paid to not-for-profit community enterprises, focusing on UN Sustainable Development Goals, 4, 7, 11 and 13 which include education, energy efficiency, sustainable energy and climate action.

Rates payments and development contributions have potential to improve service provision throughout County Galway and in the local area. This will likely have a slight positive, residual effect on resources of the Local Authority.

A positive residual effect is also envisaged in that wind energy decreases the cost of electricity. A cost benefit analysis of wind energy in Ireland was published by Baringa in association with IWEA in January 2019 (Baringa, 2019). The study indicates that the more renewable energy (low-cost) produced, the less dependency on fossil fuels is required which costs more per MW.

The report states that the savings involved with wind energy outweigh the amount of funding provided to support wind energy through the public service obligation levy, therefore the more wind power produced, the less electricity will cost. The Project will result in a slight long-term positive impact for electricity users throughout the country.

6.9.3 Residual Impacts – Land Use

Once mitigation measures are in place, and the appropriate design measures are incorporated during the construction, operation and decomissioning phase, there will be no significant adverse negative residual effects arising from the Project on land use due to the current low intensity land-use at the Project site, and much of the wider area which is also associated with agricultural upland grazing and forestry.

Following decommissioning, infrastructure that will remain in situ includes turbine foundations and hardstands which will be covered over and vegetated. The on-site substation will be taken in charge by EirGrid. The residual impact on land use as a result of the in-situ hardstands, foundations etc. following decommissioning is likely to be permanent, imperceptible and neutral due to the small extent of land affected.

6.9.4 Residual Impacts – Recreation, Amenity and Tourism

There are no expected significant, adverse impacts to recreation, amenity and tourism in the surrounding area as a result of the Project.

The community benefits gained during the operational phase due to the capital investment in the area are expected to last beyond the decommissioning phase resulting in a residual permanent significant, positive impact on the amenities of the area.

Residual Impacts – Human Health

Through various aspects of the design process for the Project, negative residual impact on human health during the construction, operation and decomissioning phases are expected to be imperceptible. This is due to the distance from nearby dwellings, the reduction of potential occurrence of shadow flicker on neighbouring dwellings through the use of shadow flicker detection systems, and noise control measures to reduce potential noise impacts on nearby receptors. Furthermore, the mitigation measures as set out throughout the EIAR will prevent any potential significant negative impacts on human health during the construction and decommissioning phases.

Long-term positive imperceptible residual impacts will occur due to the provision of clean, renewable electricity. The operation of the Shancloon Wind Farm will result in the net displacement of c. 80,079 to c. 94,379 tonnes of CO2 per annum, which would otherwise be emitted through the burning of fossil fuels.

6.10 Do-Nothing Scenario

In the event that the Project of Shancloon Wind Farm does not proceed, the existing land use on the site will continue in its present form consisting of improved agricultural land and bog for the foreseeable future.

In the absence of the renewable energy development, it is possible that there will likely be a continuance of excessive greenhouse gas emissions and consumption of fossil fuels. The opportunity to harness the wind energy capacity of the site would be lost, further constraining the State from achieving its renewable energy targets of 80% by 2030. Section 7.6.2 of EIAR Chapter 7 - Air Quality and Climate describes an estimated annual average output of 188,866 MWhr – 222,592 MWhr for the Project will result in the net displacement of c. 80,079 to c. 94,379 tonnes of CO2 per annum.

Overall, renewable energy supply was 14.6% of gross final consumption in Ireland in 2023 (SEAI, 2024) which shows that the remaining 85.4% of energy came from fossil fuels indicating Ireland's heavy dependency on the importation of fossil fuels to meet its energy needs in transport, heat and electricity. This dependency on energy imports leaves Irish consumers exposed to fluctuating international oil and gas prices. Harvesting renewable, indigenous resources such as wind will help diversify the Irish generation portfolio and reduce Ireland's dependency on imported fuel resources. In the do-nothing scenario, the proposed 61.6 MW to 72.6 MW wind farm will not contribute to reducing fossil fuel dependency.

It is also envisaged that if the Shancloon Wind Farm Project does not proceed, the opportunity for employment relating to the construction, operation and decommissioning of the will be lost, resulting in a lost opportunity for potential economic activity in the County Galway and Mayo Area. Development contributions and considerable commercial rates would not be made payable to both Galway and Mayo County Council by the developer, and no *Community Benefit Fund Scheme* will be put in place in the locality resulting in a lost opportunity for benefit to community infrastructure.

6.11 Cumulative Impacts

As part of the cumulative impact assessment included throughout this EIAR, proposed, consented and existing developments/projects in proximity to the Site and TDR were considered for potential cumulative impacts on the receiving environment.

As set out previously, a 20km distance was considered a reasonable zone of influence for the purpose of assessing potential cumulative impacts on population and human health, considering the limited size and extent of the Project, the nature of the impacts and the relatively non-sensitive receiving environment. Smaller projects were examined in closer proximity to the Project including developments within 500m of the Shancloon Wind Farm Site.

A review was conducted of all permitted and pending planning applications dating back 5 years between August 2024 and August 2019 with potential cumulative effects on the area. This review included the Galway County Council Planning Website, An Bord Pleanála Website and EIAR Portal Website. As listed in Appendix 2.4, permitted and pending developments within the vicinity of the wind farm site and TDR consist of housing and agricultural developments and were identified for potential cumulative assessment. All developments reviewed are small in scale, and will have an imperceptible cumulative impact with the construction, operation and decomissioning phase of the project in relation to population and human health. This is due to the significant setback of the proposed Project from nearby planned, proposed and existing projects and the brief, temporary nature, of the works associated with the TDR where cumulative impacts are considered to be imperceptible.

Table 6-6, identifies the relevant renewable energy developments within the wider 20km study area.

The Project, in combination with the Laurclavagh Renewable Energy Development, Cloonascragh and the Cloonlusk Wind Farm will have a cumulative impact on land use in the area considered, introducing additional renewable energy land use to an established area consisting of agricultural land and bog. This is expected to have a non-significant to slight long-term negative impact on agricultural land availability in the area of the wind farm site due to the nature of the surrounding landscape.

The cumulative impact of the proposed development in combination with the Laurclavagh Renewable Energy Development, Cloonascragh and the Cloonlusk Wind Farm within 20km, based on the selected Viewshed Reference Points (VRP's), as described in in EIAR Chapter 16: Landscape and Visual, Section 16.9.1, indicates that, in most instances, the proposed Shancloon turbines will generally not be viewed in combination with other existing, permitted or in-panning wind turbines. There are no other large-scale developments within the vicinity of the Site in terms of cumulative impacts with other forms of development. Overall, the Proposed Development will result in an intensification of wind energy development within this landscape context and within the surroundings of the planes of northeast Galway and south Mayo. Furthermore, existing wind energy development is an established feature within the wider Study Area (existing Cloonlusk Wind Farm).

There are no significant recreation, amenity and tourism attractions located in proximity to the proposed Shancloon Wind Farm site and TDR, and as such, the construction, operation and decomissioning phases of the Project are not expected to have a cumulative impact on major tourism attractions, tourism numbers or tourism revenue. Any identified impacts to local recreation and amenity during construction, operation and decomissioning are mitigated against by implementing a number of mitigation measures such as the implementing of a Traffic Management Plan during construction.

The cumulative effects of the Project would result in increased temporary employment figures to the local area, with an estimated 79 direct, and 112 indirect, jobs respectively could be created during the construction phase of the Project. It is possible that there will be direct employment for people living in the wider area containing the Project who may be qualified for construction related roles, with materials sourced in the general locality where possible, which will assist in sustaining employment in the local construction trade. Furthermore, local businesses in the nearby towns and villages will likely receive a slight indirect positive economic impact due to the influx of workers to the area who will require services such as shops during the construction, operation and decomissioning phase of the Project which will have a short-term, significant positive impact on the employment profile of the area and a short-term slight, positive impact on local businesses and services in the nearby towns and villages within the wider area.

Planning applications from the last 5 years between August 2024 to August 2019 on the Galway County Council Planning Website, An Bord Pleanála Website and EIAR Portal Website have been examined to identify proposed or permitted developments with potential cumulative effects on the area. Planning applications in proximity to the site consist of residential one-off dwellings and various agricultural developments. However, due to the nature of the surrounding area, it is unlikely that these proposed and consented developments will have a negative cumulative effect on population and human health in the area due to their size and nature.

Finally, the electricity generating capacity of the Project will have a long-term significant positive cumulative impact on utility infrastructure and renewable energy resources and will have a positive impact on national renewable energy resources as well as reduction in requirements for the use of non-renewable fossil fuels. This will increase national savings on fossil fuel imports.

6.12 Conclusion

The assessment of EIAR Chapter 6 - Population and Human Health has established the existing environmental conditions of the Project site which includes the turbine array, substation and TDR from Galway Port to Shancloon. Potential impacts were considered for the construction, operational and decommissioning phases of the Project, as well as potential residual and cumulative impacts, with the predicted residual effects being the same for all turbine permutations, with mitigation measures proposed where relevant.

Furthermore, the Project was considered in regard to the vulnerability of a project to major accidents and natural disaster as outlined within the *Vulnerability of the Project to Major accidents and Natural Disasters* (EU Directive 2014/52/EU). This considers the preparedness of the Project in case of accident, disaster or emergency, with the assessment of the Project's potential susceptibility to major accidents and natural disaster being considered negligible.

Chapter 6 - Population and Human Health has been subdivided into the following topics for the purpose of the assessment:

- Population Trends;
- Socio-Economics, Employment and Economic Activity;
- Land Use;
- Recreation, Amenity and Tourism;
- Human Health and Safety;

The population of the area containing the Project site and TDR were found to be of low density and dispersed when compared to averages of Galway City & County, County Mayo as a whole and the State. The construction, operation and decommissioning phases of the Project will result in no population growth during the construction, operation and decommissioning phases due to the temporary nature of the construction works.

The economic profile of the Project site and TDR does not show any major disparities when compared to the national and county-wide average socio-economic statistics. In general, the baseline conditions of the study area show healthy socio-economic characteristics, with these conditions predicted to continue.

Positive direct and indirect benefits to economic activity are identified during the construction, operation and decommissioning phases due to the creation of construction jobs based in the area which are likely to provide employment opportunities for those living in the study area and surrounding areas of County Galway and County Mayo for those living in nearby towns and villages. The construction, operational and decommissioning phases are likely to have a temporary positive economic impact on local businesses and services.

The operational phase of the Project has been identified as having a positive economic and social impact on the wider area with the provision of a Community Benefit Fund which will contribute to social infrastructure in the area and financially benefit those in closest proximity to the proposed wind farm. Other positive economic benefits as a result of the operational phase of the Project includes reducing the State's reliance on fossil fuels which will reduce electricity prices, economically benefiting the consumer in the long-term throughout the State. Rates and development contributions will also benefit the local authority.

The land use of the Project site consists mostly of agriculture and historic cutover bog, with the land use in proximity to the proposed TDR comprising agriculture/commercial forestry, town centre/village centre including residential and industrial premises. During the construction, operational and decommissioning phases of the Project, there will be slight, temporary impacts to the existing land use, with slight, temporary impacts along the TDR expected during the construction phase when turbine components are being delivered to Shancloon from Galway Port.

With respect to Recreation, Amenity and Tourism, there are no major tourist attractions in proximity to the site. It is expected that the construction, operational and decommissioning phases of the Project will have a non-significant neutral impact on local recreation and amenity in the area due to the mitigations put in place such as a Traffic Management Plan during the construction phase. At construction and decommissioning phases, it is considered that the proposal will have a modest physical impact, with a temporary and limited effect on the landscape within the site. Due to the mitigations already applied by virtue of avoidance and design and buffering of residential receptors, it is expected that the operational phases of the project will overall have an impact on amenity in the area ranging from High-Medium in the immediate environs, reduced to low and negligible beyond 5km.

The provision of the community benefit fund will likely have a moderate positive long-term impact on the amenities of nearby villages and the surrounding area.

Potential impacts on human health and safety have been identified for both construction workers and the general public as a result of the construction, operation and decommissioning of the Project. Best practice construction methods and improved safety measures on public roads have been identified as measures to prevent potential accidents during the construction, operation and decommissioning works. Potential health impacts from noise and electromagnetic fields during the operational phase are considered negligible.

Cumulative impacts have also been assessed in relation to proposed, consented and constructed projects located nearby the wind farm site and TDR. No significant in-combination impacts were identified in relation to aspects of population and human health assessed in this chapter which included, Population Trends, Socio-Economics, Employment and Economic Activity, Land Use, Recreation, Amenity and Tourism, Human Health and Safety.

In conclusion, once mitigation measures set out throughout this EIAR are implemented, no significant negative impacts on population and human health are predicted to occur as a result of the proposed development of the Project of Shancloon Wind Farm.

6.13 References

American Wind Energy Association and Canadian Wind Energy Association (2009). Wind Turbine Sound and Health Effects - An Expert Panel Review, available at: http://canwea.ca/pdf/talkwind/Wind_Turbine_Sound_and_Health_Effects.pdf

An Bord Pleanála (2024), Case Search (online). Available at: http://www.pleanala.ie (Accessed: August 2024)

Australian Government National Health and Medical Research Council (NHMRC) (2010), Information Paper Evidence on Wind Farms and Human Health, February 2015. Available at: https://www.nhmrc.gov.au/about-us/publications/nhmrc-statement-evidence-wind-farms-and-human-health

Baringa (2019), Wind for a Euro - Cost-benefit analysis of wind energy in Ireland 2000-2020. Available at: https://www.iwea.com/images/files/baringa-wind-for-a-euro-report-january-2019.pdf

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

Central Statistics Office, Small Area Population Statistics. Available from: https://www.cso.ie/en/census/census2016reports/census2016smallareapopulationstatistics/ (Accessed: July 2024)

Central Statistics Office (2021), Live Register Data. Available from: https://statbank.cso.ie/ (Accessed: September 2024)

Central Statistics Office, Census 2011, 2016, 2021. www.cso.ie (Accessed: September 2024)

Central Statistics Office (2021), Detailed COVID-19 Income Support and Live Register Tables. Available from: https://www.cso.ie/

Climate and Health Alliance (2012), Position Statement on Health and Wind Turbines. February 2012. Available at: https://www.lenus.ie/bitstream/handle/10147/621467/HSE+PHMEHG+Wind+Final+PP+Feb+2017.pdf;jsessionid=C98B9A0642F4FAB1EFB888DFF1FDFAE4?sequence=3

Deloitte, Irish Wind Energy Association (2009), Jobs and Investment in Irish Wind Energy. Available at: https://www.iwea.com/images/files/9660bd5e72bcac538f47d1b02cc6658c97d41f.pdf

Department of Communications, Climate Action & Environment (2019), Climate Action Plan 2019. Available at: https://www.dccae.gov.ie/en-ie/climate-action/publications/Documents/16/Climate_Action_Plan_2019.pdf

Department of Communications, Climate Action and Environment (2018), Renewable Energy Support Scheme – High Level Design Paper. Available at: https://www.dccae.gov.ie/documents/RESS%20Design%20Paper.pdf

Department of Communications, Climate Action and Environment (2020), Terms and Conditions for the First Competition Under the Renewable Energy Support Scheme – RESS 1: 2020. Available at: https://www.dccae.gov.ie/documents/RESS_1_Terms_and_Conditions.pdf

Department of the Environment, Heritage and Local Government (2006), Wind Energy Development Guidelines for Planning Authorities. Available at: https://www.gov.ie/pdf/?file=https://assets.gov.ie/111145/93cd5b8e-e0d5-4369-8d41-45b9738a7b4d.pdf#page=null

Department of Health (2022), Health in Ireland – Key Trends 2022. Available at: 8a6472b4-83cf-45ec-88c9-023e0c321d8c.pdf (www.gov.ie)

Department of Housing, Local Government and Heritage (2021), EIA Portal (Online). Available at: https://gov.ie/ (Accessed August 2024)

Department of Housing, Planning and Local Government (2018), Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. Available at: https://www.housing.gov.ie/sites/default/files/publications/files/guidelines_for_planning_authorities_and_an_bord_pleanala_on_carrying_out_eia_-_august_2018.pdf

Department of Housing, Planning and Local Government (2019), Draft Revised Wind Energy Development Guidelines. Available at: https://www.housing.gov.ie/sites/default/files/public-consultation/files/draft_revised_wind_energy_development_guidelines_december_2019.pdf

Department of Trade and Industry (UK) (2006), The Measurement of Low Frequency Noise at Three UK Windfarms. W/45/00656/00/00.

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

Eirgrid (2019), The Electricity Grid and Your Health

Environmental Protection Agency (2017), Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. Available at: https://www.epa.ie/pubs/advice/ea/EPA%20EIAR%20Guidelines.pdf

ESB (2017), EMF and You: Information about Electric & Magnetic Fields and the electricity network in Ireland, April 2017. Available at: https://esb.ie/docs/default-source/default-document-library/emf-public-information_booklet_v9.pdf?sfvrsn=0

European Union (2011), DIRECTIVE 2011/92/EU. Official Journal of the European Union L 26/1.

European Union (2014), DIRECTIVE 2014/52/EU. Official Journal of the European Union L 124/1

European Union (2017), Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report. Available at: https://ec.europa.eu/environment/eia/pdf/EIA_guidance_EIA_report_final.pdf

European Wind Energy Association (EWEA) (2009), Wind at Work, - Wind Energy and Job Creation in the EU available at: http://www.ewea.org/fileadmin/files/library/publications/reports/Wind_at_work.pdf

Fáilte Ireland (2008, 2012), Wind Farms – Visitor Attitudes on the Environment, National Tourism Development Authority, 2012/No.1

Fáilte Ireland (2011), Guidelines on the Treatment of Tourism in an Environmental Impact Statement

Fáilte Ireland (2022), Visitor Numbers to Attractions Dashboard available at:

Failte Ireland - Visitor Numbers to Attractions Dashboard | Activities and Attractions | Tourism Research & Statistics

Fáilte Ireland (2019), Key Tourism Facts 2018. Available from:

https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/Key-Tourism-Facts-2018.pdf?ext=.pdf

Fáilte Ireland (2021), Preliminary Key Tourism Facts 2019. Available from:

https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/4_Visitor_Insights/KeyTourismFacts_2019.pdf?ext=.pdf

Front Public Health (2014), Wind Turbines and Human Health. Available at:
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4063257/

Galway County Council (2024), Galway County Development Plan 2022-2028. Available at:
https://consult.galway.ie/en/consultation/adopted-galway-county-development-plan-2022-2028

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

Health and Safety Authority (2021), Fatal Workplace Injuries by Economic Sector 2021 (NACE Revision 2). Available at:

https://www.hsa.ie/eng/Topics/Statistics/Fatal_Injury/

Health Canada (2014), Wind Turbine Noise and Health Study: Summary of Results.

Health Service Executive (2017), Position paper on wind turbines and public health.

Heblich, et al, (2016) Impact of wind Turbines on House Prices in Scotland. Climate Exchange. University of Sheffield 2016.

Hoen, et al. (2009), The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis. Journal of Real Estate Research, Vol. 33, 2009.

Hoen, et al. (2013), A Spatial Hedonic Analysis of the Effects of Wind Energy Facilities on Surrounding Property Values in the United States. Office of Energy Efficiency and Renewable Energy (Wind and Waterpower Technologies Office) of the U.S. Department of Energy

Institute of Sustainable Futures (2015), Calculating Global Energy Sector Jobs. Available at: https://opus.lib.uts.edu.au/bitstream/10453/43718/1/Rutovitzetal2015Calculatingglobalenergysectorjobsmethodology.pdf

International Commission on Non-Ionising Radiation Protection (ICNIRP) (2010), Guidelines for limiting exposure to time varying electric and magnetic fields (1Hz–100kHz) Health Physics 99(6):818-836; 2010. Available at: https://www.icnirp.org/cms/upload/publications/ICNIRPLFgdl.pdf

International renewable Energy Agency in 'Measuring the Socio-Econimics of Transition: Focus on Jobs (2020). Available at: Measuring the socio-economics of transition: Focus on jobs irena.org

Irish Wind Energy Association (2012). Best Practice Guidelines for the Irish Wind Energy Industry. Available at: https://www.iwea.com/images/files/9660bdfb5a4f1d276f41ae9ab54e991bb600b7.pdf

Knopper and Ollson (2011). Health effects and wind turbines: A review of the literature.

Marshall Day Acoustics (2014). Summary of research of noise effects on animals.

Mayo County Council (2024), Mayo County Development Plan 2022-2028. Available at: https://www.mayo.ie/getmedia/d6847b84-8c8a-4ee4-bbb4-0360884f207a/VOL-1-Book_2.pdf

Massachusetts Departments of Environmental Protection and Public Health (2012). Wind Turbine Health Impact Study - Report of Independent Expert Panel. available at: http://www.mass.gov/eea/docs/dep/energy/wind/turbine-impact-study.pdf

Massachusetts Institute of Technology (2014). Wind Turbines and Health, A Critical Review of the Scientific Literature. Journal of Occupational and Environmental Medicine, Vol. 56, Number 11, November 2014.

National Trails Office (2010), Setting New Directions – A Review of National Waymarked Ways in Ireland. Available at: https://www.sportireland.ie/sites/default/files/2019-10/setting_new_directions.pdf

Renewable Electricity Support Scheme 4 (RESS 4). Available at: https://www.gov.ie/en/publication/36d8d2-renewable-electricity-support-scheme/

Renewable UK (2010). Wind Turbine Syndrome – An Independent review of the state of knowledge about the alleged health condition. Available at: http://www.burnley.gov.uk/attachments/APP20130381_013%200381%20Renewable%20Energy%20Paper%20on%20Wind%20Turbine%20Syndrome.pdf

Renewable UK & Cebr (2014), The Effect of Wind Farms on House Prices

Rutovitz, J. and Harris, S. (2015). Calculating Global Energy Sector Jobs: 2015 Methodology Update. Prepared for Greenpeace International by the Institute for Sustainable Futures, University of Technology, Sydney.

Safety, Health & Welfare at Work (Construction) Regulations 2013.

Safety, Health & Welfare at Work (Construction) Regulations 2013.

Safety, Health & Welfare at Work (General Applications) Regulations 2007.

Safety, Health & Welfare at Work (General Applications) Regulations 2007.

Safety, Health & Welfare at Work Act 2005.

Safety, Health & Welfare at Work Act 2005.

Scientific Committee on Emerging and Newly Identified Health Risks (2015), Opinion on Potential health effects of exposure to electromagnetic fields (EMF)

Siemens & IWEA (2014), An Enterprising Wind – An economic analysis of the job creation potential of the wind sector in Ireland. Available at:
https://www.esri.ie/publications/an-enterprising-wind-an-economic-analysis-of-the-job-creation-potential-of-the-wind-sector-in-ireland

Sustainable Energy Authority Ireland (SEAI) (2013), Wind Atlas. Available at: https://www.seai.ie/

Sustainable Energy Authority Ireland (SEAI) (2015), A Macroeconomic Analysis of Onshore Wind Deployment to 2020. Available at:
https://www.seai.ie/publications/A-Macroeconomic-Analysis-of-Onshore-Wind-Deployment-to-2020.pdf

Sustainable Energy Authority Ireland (SEAI) (2017). Energy in Ireland 1990-2016: 2017 Report. Available at:
https://www.seai.ie/publications/Energy-in-Ireland-1990-2016-Full-report.pdf

Sustainable Energy Authority Ireland (SEAI) (2019), Renewable Energy in Ireland – 2019 Report. Available at:
https://www.seai.ie/publications/Renewable-Energy-in-Ireland-2019.pdf

Sustainable Energy Authority of Ireland (SEAI) (2020), Renewable Energy in Ireland – 2020 Update. Available at:
https://www.seai.ie/publications/2020-Renewable-Energy-in-Ireland-Report.pdf

Sustainable Energy Authority of Ireland (SEAI) (2020), Energy-Related CO2 Emissions in Ireland 2005 – 2018 – 2020 Report. Available at: https://www.seai.ie/publications/Energy-Emissions-Report-2020.pdf

Sustainable Energy Authority Ireland (SEAI) (2020), Energy in Ireland 2020 Report. Available at:
https://www.seai.ie/publications/Energy-in-Ireland-2020.pdf

Sustainable Energy Authority of Ireland (SEAI) (2024), *First Look: Renewable Energy in Ireland 2023 Visualising renewable energy data from SEAI's national energy balance.* Available at: https://www.seai.ie/data-and-insights/seai-statistics/key-publications/renewable-energy-in-ireland/First-Look-Renewable-Energy-in-Ireland-Report.pdf

Sustainable Energy Ireland (SEI) (2003), Attitudes towards the Development of Wind Farms in Ireland. Available at:

https://mosart.ie/wp-content/uploads/2016/02/Attitudes-Towards-Wind-Farm-Development-Ireland.pdf

The Global Wind Energy Council (2021). Available at: Jobs-Note-April-2021-2.pdf (gwec.net)

Tailte Eireann (2023), https://www.tailte.ie/en/ (Accessed November 2023)

UK Department of Trade and Industry (2006). The Measurement of Low Frequency Noise at Three UK Windfarms, Department of Trade and Industry, W/45/00656/00/00

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