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ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED DERRYNADARRAGH WIND FARM, CO. KILDARE, OFFALY & LAOIS

Volume 2 – Main EIAR

Chapter 6 – Population, Human Health & Material Assets

Prepared for:

Dara Energy Limited

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6. POPULATION AND HUMAN HEALTH

6.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) assess the likely indirect and direct significant effects of the Proposed Development 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 significant effects arising from the Proposed Development during construction, operation and decommissioning under the following elements:

- Population;
- 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 and Climate, Chapter 8 – Noise and Vibration, Chapter 10 – Soils, Geology and Hydrogeology, Chapter 11 – Hydrology and Water Quality, Chapter 12 Shadow Flicker, Chapter 14 – Traffic and Transportation, Chapter 15 – Landscape and Visual Impact, and Chapter 16 – 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 consists of three main elements:

- The 'Proposed Wind Farm' (consisting of 9 No. turbines, turbine foundations and hard standing areas, new access tracks, onsite substation, underground electrical and communications cabling, drainage, temporary site compound and associated works);
- The 'Proposed Substation' (110 kV substation) and associated grid connection route (GCR);
- The Turbine Delivery Route (referred to in this EIAR as the 'TDR').

The layout of the Proposed Development Site is presented in Figure 2.4, the Turbine Delivery Route (TDR) is presented in Figure 2.6, and the grid connection route is presented in Figure 2.5 of Volume II of this EIAR.

The development proposed by Dara Energy Limited (the Applicant), as described in Chapter 2, is a 9 no. turbine wind farm and associated infrastructure including internal access tracks, hard standings, onsite 110 kV substation and associated grid connection infrastructure, internal electrical and communications cabling, temporary construction compounds, drainage infrastructure, biodiversity enhancement measures, temporary accommodations works along the Proposed Turbine Delivery Route and all associated works related to the construction of the Proposed Development.

The turbine blades for the Proposed Development will comprise fibreglass reinforced epoxy, carbon fibres and solid metal tip. The Proposed Wind Farm consists of the erection of 9 of these turbines, which have the following key specifications:

- tip height of 186m, a hub height of 105m and a rotor diameter of 162m.

The turbines will have a cut-in wind speed of 3 m/s and a cut-out wind speed of 25 m/s. Turbine rotor rotation is in a clockwise direction. The turbine begins generating electricity at a wind speed of 3 m/s. This correlates well with the SEAI historic data.

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) 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 Proposed Development not be carried out.

6.1.1 Relevant Guidance

This chapter has been prepared in accordance with the following guidelines:

- Environment Protection Agency, Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022)
- Environment Protection Agency, Advice Notes for Preparing Environmental Impact Statements Draft (2015)
- European Commission (EC), Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (EU, 2017)
- Institute of Public Health (IPH), Health Impact Assessment Guidance: A Manual (2021)
- (EUPHA) Human Health: Ensuring a High Level of Protection. A reference paper on addressing Human Health in Environmental Impact Assessment
- Health Impact Assessment in Planning (IEMA 2020)
- Healthy Ireland - A Framework for Improved Health and Wellbeing 2013 – 2025 (the Healthy Ireland Framework) (Department of Health 2019)
- Environmental Noise Guidelines for the European Region (WHO 2018)
- Environmental Impact Assessment of Projects. Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission 2017)
- Health in Environmental Impact Assessment – A Primer for a Proportionate Approach (Cave et al. on behalf of Institute of Environmental Management and Assessment (IEMA)) (IEMA 2017).

6.1.2 Relevant Aims and Objectives Extracted from the Development Plans

This chapter follows these guidelines and will examine the relevant human health and population effects that have the potential to result from the proposed development as they relate to the relevant Study Area. A high level assessment of the relevant human health aims, policies, and objectives are extracted below. Further detail is provided on these policies is provided in Chapter 4: Planning Policy.

> *Kildare County Development Plan 2023 – 2029:RE O5 Ensure a high-quality living environment in Kildare which will help to retain the county's indigenous skilled population and to attract additional high skilled labour into the county, and seek to address any deficit in social infrastructure, which would act as an impediment to a high-quality living environment.*
>
> *Chapter 6 Infrastructure & Environmental Services - Aim: To create an environment characterised by high quality infrastructure networks and environmental services that complement the overall settlement and economic strategy and ensures the health and wellbeing of those who live and work in the County, also securing the economic future of the County.*
>
> *Chapter 13 Landscape, Recreation and Amenity - Aim: To provide for the protection, management, and enhancement of the landscape of Kildare to ensure that development does not disproportionately impact on the unique landscape character areas, scenic routes or protected views; and to support the provision of high quality and accessible recreational facilities, amenities and open spaces for residents and visitors to the County, in recognition of the contribution of all forms of recreation to quality of life, personal health and wellbeing.*

Offaly County Development Plan 2021-2027:

> *Strategic Vision To create a sustainable and competitive county that supports the health and wellbeing of our people and places, from urban to rural, with access to employment opportunities supported by high quality housing and physical, social and community infrastructure for all, in a climate resilient manner and with respect for our biodiversity.*

Laois County Development Plan 2021 – 2027:

> *Climate Mitigation Objectives - CM LU 1 Maintain a vibrant and healthy agricultural sector based on the principles of sustainable development whilst at the same time finding alternative employment in or close to rural areas to sustain rural communities;*
>
> *Self Sustaining Towns Policy Objectives CS 25 Promote commensurate population and employment growth in the designated Self- Sustaining towns, providing for natural increases and to become more economically self- sustaining, in line with the quality and capacity of public transport, services and infrastructure available.*
>
> *Chapter 9 Rural Laois - Aim: Support the role of rural areas in maintaining a stable population base through a strong network of villages and small towns and strengthening rural communities by supporting a resilient rural economy and the sustainable management of land and resources.*
>
> *Chapter 10 Infrastructure - Aim: To achieve a sustainable, integrated and low carbon transport system for the county and to protect, improve and extend water services and other enabling infrastructure in line with national, regional and local population and economic growth for the county*

6.2 Statement of Authority

This chapter has been drafted by Evan Rossiter. Evan is a Senior Project Planner with a BSc in City Planning and Environmental Policy and a Masters in Regional and Urban Planning (MRUP) from University College Dublin. Evan has prepared several EIAR Policy Chapters for multiple types of development, including wind farms, throughout Ireland.

Ms. Robyn Nicholl is a Principal Planner with Fehily Timoney and Company and holds a Masters' degree in Urban and Rural Design (MSc), and a Bachelor's degree in Environmental Planning (BSc) from Queens University, Belfast. She has worked in both public sector and private planning consultancy for over twelve years and has led many strategic projects both in the planning and environmental assessment disciplines, including a number of wind farm developments.

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 Proposed Development is located, as well as adjacent ED's which have the potential to be affected by the Proposed Development. Electoral Divisions are the smallest legally defined administrative areas in the state. ED's encompass small areas (which typically consist of 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. As summarised in Table 6-1 below, and as further detailed in Chapter 14 – Traffic and Transportation, there are various constraints and upgrade works required at certain points along the TDR which comprises, *inter alia*, installation of load bearing surface, construction of a new permanent access bridge, excavation of ground, and trimming of vegetation and trees. These areas where the works are located have been scoped in, whilst the remaining areas located along national primary routes have been screened out as effects are likely to be imperceptible due to the limited nature of the proposed works along these routes and the capacity of the routes to accommodate large vehicles and loads associated with the delivery of turbine components to the main wind farm site.

Table 6-1: Proposed Accommodation Works

Summary Description of Proposed Accommodation Works	Location of Proposed Accommodation Works	Electoral District which the Accommodation Works are located within	Details / Comments
Installation of Load Bearing Surface on southern verge of entry arm and the central reservation	M6 Slip Road / N52 Roundabout.	Kilbeggan	Loads will take the third exit at the roundabout to join the N52 southbound, undertaking a contraflow manoeuvre.
Installation of Load bearing Surface on the inside of the left turn	R420 / R402 Junction	Cappancur	Loads will turn left using the option area identified by the client. Will involve the removal of vegetation and pillars.
Installation of Load Bearing Surface on the western footway/verge, the northern footway/verge and the traffic island.	R402 St Joseph's National School	Geashill	Loads will turn right at the junction to head east, remaining on the R402.
Construction of new access bridge bypassing R402/R400 Junction.	R402 / R400 Junction & River Philipstown Bridge	Esker	Loads will turn right prior to the junction, through the field and rejoin the R400. Cut, Fill, Design and Construction of New Bridge.
Installation of Load Bearing Surface on the western verge.	R400 East of Mountlucas	Esker	Loads will continue on the R400 southbound. Significant vegetation clearance required due to level differences in this location and Utility Pole Removal.
Construction of new offline track to mitigate R400 bend.	R400 South of Enaghan	Esker	Loads will drive over a bridge, then continue straight at the junction through the field and rejoin the R400 following the right bend.

Summary Description of Proposed Accommodation Works	Location of Proposed Accommodation Works	Electoral District which the Accommodation Works are located within	Details / Comments
			Level Differences noted between existing road and identified field. New section of road required at this point.
Installation of Load Bearing Surface on the southeastern verge.	R400 / R419 Junction	Ballyshear	Loads will head east on the R400 through two right bends then turn left onto the R419 at the junction heading northeast. Require cut and stabilisation.

The proposed Derrynadarragh wind farm site is located across the jurisdiction of Kildare County Council and Offaly County Council, with the GCR running through the jurisdiction of Laois County Council. At its closest point, the turbine array is located c. 1.7km from the village of Bracknagh, Co. Offaly and c. 6.5km from Portarlington, County Laois.

Demographic data has been sourced from the Central Statistics Office (CSO)'s Census of Ireland (2011 to 2022) records. Demographic information relating to the State, County Kildare, County Offaly and the wider Study Area has been assessed to establish the existing demographic trends. The demographic analysis of the Study Area as set out in this Chapter is defined in terms of Electoral Divisions (ED's), within which is the Proposed Wind Farm; Proposed Substation and grid connection; and within which the TDR is contained. Therefore, for the purpose of this aspect of the assessment, there are three separate areas contained within the 'Study Area' as follows:

- The Proposed Wind Farm is located within the townlands of Clonsast Lower, Chevychase or Derrynadarragh, Cushina, Aughrim, and Derrylea, County Kildare and Offaly.

- The 'Proposed Substation' (110 kV substation) is located within the townland of Cushina, Co. Offaly and the associated grid connection route (GCR) will pass through the townlands of Cushina in County Offaly; Derrylea, and Inchacooly in County Kildare, and Coolnaferagh, Ullard or Controversyland, Clonanny, Lea, Loughmansland Glebe, and Bracklone in County Laois.

- For the purposes of this EIAR, the Turbine Delivery Route will begin at Galway Port and will exist the M6 at junction 5 and continue southbound passing through the following townlands to the Derrynadarragh Wind Farm Site: Acantha, Aghancarnan, Annagharvey, Ardan, Ballaghassaan, Ballina, Ballinagar, Ballybought, Ballycollin, Ballycon, Ballycue, Ballyknockan, Ballymooney, Ballynasrah or Tinnycross, Bunnagappagh, Cappancur, Castlebarnagh Big, Clonad, Cloncollog, Coolagary, Cushina, Derrycricket, Drumcaw or Mountlucas, Durrow Demesne, Enaghan, Esker Beg, Gormagh, Hallsfarm, Kilbeggan South, Killeen, Killoneen, Knockballyboy, Meelaghans, Moanvane, Pallas, Puttaghan, Raheenakeeran, Rostalla, Townparks, and Walshisland.

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 project within 20km of the Proposed Development was conducted to identify development that have the potential to give rise to cumulative effects with the wind farm site, GCR 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, a 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 20km radius for blade tips greater than 100m. This represents a visual Study Area for potential cumulative projects but is also best practice for use as a Study Area for other potential cumulative effects including traffic, noise, water quality and air quality. It is considered in our professional experience that there is no potential for likely significant population and human health effects beyond this distance.

A final up-to-date planning search was conducted in September 2025 to identify projects within the identified zone of influence for the Site, GCR and TDR. This included a search for major infrastructural 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.

It is of significance to note that existing, operational development form part of any baseline figure presented in this EIAR, thus, whilst these projects have been identified during the planning search, they do not form part of the discussion surrounding any potential cumulative impact.

6.4 Consultation

Consultation was carried out with key stakeholders, including Kildare / Laois / Offaly County Council, An Coimisiún Pleanála (formerly An Bord Pleanála), Government Departments, Non-Governmental Organisations, aviation organisations, and local residents.

Comments and feedback were incorporated into the Proposed Development design iterations and to the assessments conducted in the EIAR, with further details on all Scoping Consultation and Community Engagement provided in Table 5-2 – Summary of Scoping Consultation Responses in Chapter 5 – EIA Scoping & Consultation. No comments were received during the Scoping Consultation relating to Population and Human Health. Furthermore, the Applicant also conducted community engagement and consultations in relation the Proposed Development between 2023 and 2025, with further details provided in the aforementioned chapter.

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.

To ensure transparency and consistency in the assessment of potential environmental impacts, and in accordance with the EPA's Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (EPA, May 2022), the following methodology has been applied:

Magnitude of Impact

Magnitude describes the scale, extent, and duration of the potential impact. It is assessed based on:

- High Magnitude – large-scale, long-term or irreversible impacts.
- Medium Magnitude – moderate, short- to medium-term impacts.
- Low Magnitude – minor, temporary, or reversible impacts.
- Negligible – imperceptible or no measurable change.

Describing the Significance of Effects

It is determined based on:

- Imperceptible - An effect capable of measurement but without significant consequences.
- Not Significant - An effect which causes noticeable changes in the character of the environment but without significant consequences.
- Slight Effects - An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
- Moderate Effects - An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
- Significant Effects - An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
- Very Significant - An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
- Profound Effects - An effect which obliterates sensitive characteristics.

Significance of Effects

The significance of an effect is determined by combining the sensitivity of the receptor with the magnitude of the impact. This interaction is illustrated in the matrix below:

Description of Effect → Existing Environment Sensitivity ↓	**High**	**Medium**	**Low**	**Negligible**
High	Profound	Very Significant	Significant	Moderate
Medium	Very Significant	Significant	Moderate	Slight
Low	Significant	Moderate	Slight	Not Significant / Imperceptible

This matrix provides a structured and transparent approach to evaluating the significance of effects, ensuring that conclusions are evidence-based and consistent with EPA guidance.

No difficulties were encountered or identified in drafting this chapter.

6.5.1 Population and Settlement Patterns

In accordance with best practice, demographic data has been sourced from the Central Statistics Office (CSO)'s Census of Ireland (2011 to 2022) records. A desktop review of online data relating to the demographic information relating to the State, Counties Kildare, Offaly and Laois and the 'Study Area' has been assessed to establish the existing demographic trends (www.cso.ie). For the purpose of this aspect of the assessment, the demographic analysis of the Study Area (identified in Figure 6-1), is defined in terms of Electoral Divisions (ED's) within which the Proposed Wind Farm, Grid Connection, and Turbine Delivery Route Nodes are contained. Therefore, for the purpose of this aspect of the assessment, there are three separate areas contained within the 'Study Area', as follows:

- The Proposed Wind Farm site is located within the ED's of Quinsborough and Bracknagh
- The Grid Connection is located in the ED's of Bracknagh, Quinsborough, Lackagh, Monasterevin, Kilmullen, Portarlington South.
- The areas of the TDR which require significant works is contained within the ED's of Bracknagh, Raheenakeeran, Ballaghassaan, Durrow (Offaly).

Areas of the TDR located along national primary routes have been screened out as effects are likely to be imperceptible due to the limited nature of the proposed works along these routes and the capacity of the routes to accommodate large vehicles and loads associated with the delivery of turbine components to the main wind farm site.

Eircode data (2025), Geodirectory data, and planning application lists sourced from Kildare County Council, Offaly County Council, Laois County Council, An Coimisiún Pleanála and the Department of Housing and Local Government's EIA Portal have been assessed to identify any commercial or residential receptors in proximity to the Proposed Development. These sources were assessed in 2025 Eircode and Geodirectory data provides locations (geographic coordinates) for registered addresses. This information was ground-proofed with a house survey where a surveyor travelled to the site of the Proposed Development and identified locations of all residential receptors in proximity to the Proposed Development. A desktop house survey was carried out for the TDR where temporary works are proposed. A planning search was conducted to identify permitted unbuilt dwellings and planned dwellings which do not appear on Eircode or Geodirectory Databases and are not visible from ground proofing exercises.

The data gathered has informed the consideration of impacts on the existing population within the immediate environs of the proposed development and allows for a comprehensive assessment of the potential effects on population trends which may occur during the construction, operational, and decommissioning phase of the proposed development.

6.5.2 Employment and Economic Activity

A socio-economic profile of the existing environment was established using live register data (2016 to 2025) and Census (2022) data to outline an employment profile of the area containing the Proposed Development. 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 Proposed Development 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 likely indirect and direct significant effects on existing land use patterns which may arise because of the Proposed Development. Tailte Eireann (2023) was studied, and observations were carried out throughout the ground-proofing survey to determine land uses in the Study Area. The likely significant effect of the Proposed Development was then considered with regard to these land uses.

The Site is located in the jurisdictions of Kildare County Council, Offaly County Council, and Laois County Council, with the turbine array located approximately 1.7km south of Bracknagh, 5.24km north-west of Monastervin and 6.5km north-east of Portarlington. Land use within the site is mainly dominated by agriculture, with areas of turbary activities located outside of, but adjacent to, the site boundary to the centre and south (Derrylea Bog). Furthermore, there is an area of forestry land within the northern portion of the site.

The settlement patterns in the area consists of one-off rural housing fronting onto the road network in a linear rural settlement pattern. There are approximately 208 no. residential and commercial properties within 2km of the site. The closest property to a turbine is located ca. 740 m distance and is roughly equidistant north between turbines T2 and T3. Bracknagh village is the most proximate settlement located 2km to the north-east.

The Site is located within the lowland topography with predominantly flatlands. Red Hill (194m), Dunmurry Hill (234m) and Grange Hill (223m) are located within 10km to the east of the site. The site is located on the Derrylea Bog which is connected to Clonsast Bog to the north and Derryounce Bog to the west.

6.5.4 Recreation, Amenity and Tourism

With regards to Recreation, Amenity and Tourism, Fáilte Ireland's '*EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects*' (2023) 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. Likely significant effects as a result of the Proposed Development were then considered in relation to the tourism profile, amenity and recreation facilities and attractions of the area around Derrynadarragh and the wider hinterland within counties Kildare, Offaly and Laois.

A review of planning policy and strategies was carried out to identify recreation and amenity features, monuments, attractions, walking trails and cycling routes and other rights of ways within the study area of 15km.

6.5.5 Human Health & Safety

The assessment on human health and safety has regard to the *Environmental Protection Agency's* (EPA US) Human Health Risk Assessment process[1] 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 Proposed Development 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 Proposed Development.

A desktop examination of Tailte Eireann (2023) 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 for the Study Area, Counties Offaly, Kildare and Laois 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, Proposed Grid Connection, and Turbine Delivery Nodes are located, as set out in Table 6-1 below.

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

Table 6-2: Electoral Divisions Associated with the Study Area

Electoral Division of the Study Area (2022)		
Wind Farm	**Grid Connection**	**Turbine Delivery Nodes**
Bracknagh (County Offaly)	Bracknagh (County Offaly)	Bracknagh (County Offaly)
Quinsborough (County Kildare)	Quinsborough (County Kildare)	Raheenakeeran (County Offaly)
	Lackagh (County Kildare)	Ballaghassaan (County Offaly)
	Monasterevin (County Kildare)	Durrow (County Offaly)
	Kilmullen (County Laois)	
	Portarlington South (County Laois)	

6.6.1.1 Population Trends

Context

The Proposed Windfarm located within both the jurisdictions of Kildare County Council and Offaly County Council, approximately 1.7km south of the village of Bracknagh, 6.5km northeast of Portarlington, and 3.9km northwest of Monasterevin.

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 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 this distance.

According to Eircode data reviewed in April 2025, there are 246 residential receptors/properties within 2km of the turbine array, and 12 residential properties (or consented residential developments) within 1km of the turbine array. The closest property to a turbine (Eircode W34 CY63) is located c. 745 m distance from Turbine 2.

The on-site substation is located within the western portion of the site and is c. 900m from the nearest residential neighbour. Figure 6.2 and Figure 8.1, Volume 4 illustrates the residential receptors within the vicinity of The Proposed Development according to Eircode and Geodirectory data (April 2025). This information is supported by the ground proofing survey and planning application search.

Population statistics for the State, County Offaly, Kildare and County Laois and the 'Population of Study Area' (ED's) associated with the proposed Wind Farm Site are shown in Figure 6-1 below.

Table 6-3: Population of Study Area

State		County			Proposed Development		
Year	Total	Kildare	Offaly	Laois	Wind Farm Site ED's	TDR	GCR
2011	4,588,252	209,955	76,806	80,458	1157	2,618	13,397
2016	4,761,865	222,504	77,961	84,697	1,210	2,682	14,668
2022	5,149,139	247,774	83,150	91,877	1,307	2,862	16,555
2011-2016 (%)	+3.8%	+5.9%	+1.5%	+5.2%	+4.58%	+2.45%	+9.5%
2016-2022 (%)	+8.1%	+11.3%	+6.6%	+8.4%	+8.01%	+6.71%	+12.9%

The data presented in Table 6-3, above, demonstrates that the state population in the six years between the 2016 Census and the 2022 Census has seen a national increase 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 Kildare and Laois.

Of the ED's associated with the site, Bracknagh has the largest population in 2022 with a population of 1,141 persons which is higher than the population of Quinsborough with a population of 166 persons.

Similarly in 2016, Bracknagh had a larger population of 1,050 persons which was higher than the respective population of Quinsborough. Likewise, 2011 shows that Bracknagh has the highest population of all site ED's. Overall, the reason behind the larger population of Bracknagh is due to its connectivity (such as a better route connection to Portarlington via the R419, and a more developed road network throughout the ED) and the availability of amenities such as a school, church, post office and bar.

6.6.1.2 Population Density

The population density recorded within the State, Counties Kildare, Offaly, Laois and the Proposed Development 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 that from 2011 to 2022 the Proposed Development Area especially the Site ED's have low population density compared to state, county and TDR / GCR population density. Higher figures for the TDR may be attributed to a growth of the towns falling within the TDR EDs.

The high population density in Kildare is reflective of its status as among one of the most densely populated counties in the country which is likely attributed due to their proximity to Dublin and location within the Greater Dublin Metropolitan Area. A number of towns especially in the east of the counties act as commuter towns to those working in Dublin and numerous rail and transport links to Dublin.

Laois and Offaly have a lower population density as compared to Kildare and the State. As highlighted above, Kildare's density is influenced by its location in the commuter belt around Dublin, with towns like Naas, Newbridge, and Celbridge growing rapidly. In contrast, Laois and Offaly have more dispersed populations and larger rural areas.

Compared to the overall population density of the County, the relatively low population density at the Proposed Development site highlights the suitability for a wind farm development at this location.

Table 6-4: Population Density between 2011-2022 (Persons per square kilometre)

State		County			Proposed Development		
Year	Total	Kildare	Offaly	Laois	Site ED	TDR	GCR
2011	67	123.8	38.9	46.7	20.7	99.9	141.87
2016	70	131.2	38.9	49.2	21.5	98.07	139.06
2022	73.3	150	42	53	34	100	1,008

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 April 2025 (Last updated in April 2025 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, it 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 6-4 for Counties Kildare, Offaly, Laois and the State.

The figure is useful to gauge unemployment estimation 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 works who are entitled to Jobseekers Benefit or Jobseekers Allowance and therefore, cannot be relied upon entirely for conclusive employment data. Furthermore, 2020 to 2023 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 County Kildare, Offaly, Laois and the State.

Table 6-5: Total Population aged 15+ in Counties Kildare, Offaly, Laois and the State (2022)

	Total Population Aged 15+ 2022
Kildare	194,397
Offaly	65,983
Laois	71,469
State	3,065,070

Table 6-6: Population aged 15+ within the State, County and Proposed Development Site in 2022

	Status	State	County Kildare	County Offaly	County Laois	Wind Farm Site ED's %	
						Quinsborough (County Kildare)	Bracknagh (County Offaly)
% of Population aged 15+, which are:	At Work	56.1%	59.1%	54.9%	55.9%	63.8%	56.6%
	First time job seeker	0.8%	0.8%	1.0%	1.0%	0.0%	0.3%
	Unemployed	4.3%	3.9%	4.6%	4.4%	1.6%	2.4%
	Student	11.1%	11.8%	10.3%	10.8%	7.9%	11.6%
	Home duties	6.6%	6.9%	8.0%	7.9%	7.9%	8.0%
	Retired	15.9%	13.1%	16.0%	13.6%	13.4%	15.2%
	Unable to work	4.6%	3.9%	5.9%	5.3%	4.7%	5.5%
	Other	0.7%	0.7%	0.8%	1.1%	0.8%	0.4%

https://census.geohive.ie/

As shown above, the principal employment status in 2022 across the State, County and the Proposed Development Site ED's is '*at work*', and the percentage of the population spread across the employment categories (status) generally align across the State, County and Study Area.

Table 6-7: Live Register Data for Kildare, Offaly, Laois and the State between Jan. 2022 and Jan. 2025

	Jan. 2025	Jan. 2024	Jan. 2023	Jan. 2022
Kildare	6,392	6,281	6,362	6,263
Offaly	3,061	3,208	3,146	2,968
Laois	3,077	3,372	3,264	3,079
State	165,235	177,264	184,180	162,578

Between January 2022 and January 2025, unemployment trends in Kildare, Offaly, Laois and the State experienced fluctuation, where numbers recorded on the live register for Kildare increased by c. 2% throughout Kildare, c. 3.1% throughout Offaly, whilst Laois had a very small decrease.

In terms of the State, it has fluctuated greatly over the entire time period from January 2022 to January 2025. Overall, there was a small increase of c. 1.63% noted, however, since January 2023 there has been a significant decrease of c. 10.3%, illustrating positive progression.

6.6.3 Land Use

This section provides an overview of the existing land use for the Study Area. The determination of the potential effects on existing land use is assessed for the construction, operation and decommissioning phases of the Proposed Development, with the potential impact on sensitive land uses in the area of the Proposed Development also examined in this section.

Land use within the site is mainly dominated by agriculture, with areas of turbary activities located outside of, but adjacent to, the site boundary to the centre and south (Derrylea Bog). Furthermore, there is a small area of forestry land within the northern portion of the site.

The settlement patterns in the area consists of one-off rural housing fronting onto the road network in a linear rural settlement pattern. There are approximately 208 no. residential and commercial properties within 2km of the site. The closest property to a turbine is located ca. 740 m distance and is roughly equidistant north between turbines T2 and T3. Bracknagh village is the most proximate settlement located 2km to the north-east.

The Site is located within the lowland topography with predominantly flatlands. Red Hill (194m), Dunmurry Hill (234m) and Grange Hill (223m) are located within 10km to the east of the site. The site is located on the Derrylea Bog which is connected to Clonsast Bog to the north and Derryounce Bog to the west.

The Corrine Land Cover database for Ireland (based on interpretation of satellite imagery and national vector mapping data) identifies Quaternary deposits present at the site mostly comprise cut over raised peat. There are sections in the north and west of the site that are underlain by till derived from limestones, while the eastern section of the site is underlain by lake marl. The site is predominantly underlain by the Lucan Formation (dark limestone and shale) with a section in the north of the site underlain by the Ballyadams Formation (crinoidal wackestones/ packstone limestone).

The National Catchment Flood Risk Management (CFRAM) Programme has examined the flood risk, and possible mitigation measures to address flooding, in 300 communities throughout the country at potentially significant flood risk. These communities were identified through the Preliminary Flood Risk assessment (PFRA), which was a national screening assessment of flood risk. The communities recognized as being at a significant flood risk are called Areas for Further Assessment (AFA). For the AFAs a detailed hydraulic modelling has been carried out to produce indicative flood maps (CFRAM Maps). The subject site and the TDR watercourse crossing are within an AFA and therefore, flooding maps have been produced as part of the CFRAM mapping. The CFRAM Programme extends to the subject site and the TDR watercourse crossing showing that both locations are vulnerable to fluvial flooding. With regards to the wind farm site, the following turbine positions would be potentially affected by flooding – T04, T05, T08 and T09. Please refer to Chapter 12 – Hydrology and Water Quality for further details on flooding at the site.

There is 1 no. European site designated for nature conservation within a 5km radius of the potential wind farm site, which is the River Barrow and River Nore Special Areas of Conservation (SAC) (Site code: 002162). The Grand Canal Proposed Natural Heritage Area (pNHA) (Site code: 002104) is located approx. 4km to east of subject site.

The proposed wind farm site contains a number of habitats that are of ecological importance including treelines to the west of the site, woodland to the south-west and lowland rivers within the Cushina River. The proposed wind farm site also has designation for a number of fauna on site which include records of hare, a moderate-high value of Irish bat species, otter associated with the Cushina River and a number of identified badger setts within the site. The proposed site also has a number of river catchments located within the proposed site including the River Barrow Watercourse, River Figile Watercourse and the River Cushina Watercourse which are all dominated by coarse fish species.

Based on the National Monuments Service database map-viewer, 1 no. recorded monument is located within the proposed site within County Kildare. (A circular Enclosure Site Code KD021-009) approximately 0.4km from T04 on the south-eastern Boundary. There are no recorded monuments within the proposed site within County Offaly.

There are a number of sites in close proximity including a number of Record of Monuments and Places (RMPS) to the south. Within a wider 2km radius, there are approximately 13 no. RMP's. The most proximate recorded monuments are located approximate 800m south-east of the site in County Kildare, there are 5 RMP sites located in the townland of Derrylea approximately 800m south of the site (KD021-010: Enclosure, KD021-00805: Enclosure, KD021-00801: Enclosure, KD021-00804: Enclosure and KD021-00803: Enclosure). These 5 no. sites are linked small enclosures visible as cropmarks with no visible surface trace of the features.

There are several archaeological features located adjacent to the GC and TDR, including ringforts and enclosures – please refer to EIAR Chapter 15 – Archaeology and Cultural Heritage for further details on features. The GC will be predominantly contained within the public road corridor throughout its length with the exception of the start and finish points where the cables will be terminated in the proposed network substation at Bracklone, and the proposed onsite substation which is located within the Site.

Similarly, the TDR will be confined to the public road corridor with the exception of locations where accommodation works (mainly comprising laying of load bearing surface, verge widening and furniture/pole removal) will be required in private lands to facilitate the delivery of abnormal loads.

A total of two TDR Nodes involves the crossing of private lands at R402/R400 Junction at Philipstown Bridge and R400 South of Enaghan. Please refer to Chapter 14 – Traffic and Transportation, and the accompanying Appendix 2.2 Turbine Delivery Route Assessment, for further details of the TDR node works we are seeking planning permission for.

There is a total of 5 no. permitted and operational wind farm developments located within 20 km of the proposed Derrynadarragh Wind Farm. Figure 2.2 illustrates the location of existing wind farms within 20 km of the Site. The closest operational wind farm is Cloncreen Wind Farm, Co. Offaly, located c.10.6km to the north of the site which has been in operation since 2022.

Table 6-8: Wind Energy Developments within 20 km of the Proposed Wind Farm Site

Wind Farm Name	Number of Turbines	Distance and Direction from Proposed Site	Status
Cloncreen Wind Farm	21	10.6km to the north of the site	Operational since 2022.
Mount Lucas Wind Farm	28	11.1km to the north of the site	Operational since 2015.
Cushaling Wind Farm	9	12km to the north-east of the site	Permitted since 2020 & construction started in 2022.
Moanvane Wind Farm	12	18.6km to the west of the site	Permitted since 2018 & construction started in 2022.
Yellow River Wind Farm	29	c.19km to the north of the site	Permitted since 2022 & construction began in 2022, with an expected completion date in 2025.
Dernacart Wind Farm	8	c.15km west of the site	High Court Ruled in favour of this development in June 2025. An Bord Pleanala (now An Coimisiun Pleanala) approved the development in January 2024 (Appeal Case Ref: 310312)
Clonarrow Wind Farm	4	c.12km to the north of the site	Currently in Planning and awaiting decision (Planning Ref: 2560189)
Ballydermott Wind Farm	47	c.7.7km to the southeast of the site	Pre-Application Stage
Cushina Wind Farm	11	c.4.3km northwest of the site	Pre-Application Stage

As described within EIAR Chapter 14-Traffic and Transportation, loads associated with this Proposed Development can navigate to the national road network without transport issues. Large components associated with the wind farm construction e.g. turbine blades and tower sections, will be transported to site via the identified TDR which travels from Junction 5 of the M6 and continues southbound on the N52 National Road, and the R420 Regional Road to the Proposed Wind Farm site entrance on the R419.

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. The preparation of this section complies 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 around Derrynadarragh and the wider hinterland of the site within Counties Offaly, Kildare and Laois.

The tourism industry is still in the process of recovering from the unprecedented negative impact of the COVID-19 pandemic, which severely affected international tourism from 2020 until May 2023 when the World Health Organisation declared that it was no longer a Public Health Emergency of International Concern. The latest statistics for overseas tourism relate to 2024.

Fáilte Ireland's 2024 survey results indicate the top 5 most popular recreation activity for tourists in Ireland are:

- Hiking and cross country walking;
- Cycling;
- Golf;
- Equestrian; and
- Angling.

All recreation and tourism amenities located within 15km of the site located in both Kildare, Laois and Offaly have been reviewed and are summarised with their approximate distance to site noted at Table 6-9 below.

Table 6-9: Tourism and Amenities within 15km of the Proposed Development

Tourism and Amenities within 15km of the Proposed Development	Approximate Distance from the proposed development
Barrowline Cruisers	Approximately 13km away as the crow flies from the Proposed Development in a south direction
Bog of Allen Nature Centre	Approximately 15km away as the crow flies from the Proposed Development in a northeast direction
CaToCa Fine Food and Giftware	Approximately 10.9km away as the crow flies from the Proposed Development in a southwest direction
Cill Dara Golf Club	Approximately 14.8km away as the crow flies from the Proposed Development in an east direction
De Bruir Design Ltd.	Approximately 13.7km away as the crow flies from the Proposed Development in a southeast direction

Tourism and Amenities within 15km of the Proposed Development	Approximate Distance from the proposed development
Emo Court Gardens	Approximately 10.85km away as the crow flies from the Proposed Development in a southwest direction
Emo Court	Approximately 10.85km away as the crow flies from the Proposed Development in a southwest direction
Gordon Bennett Driving Route	Approximately 14.45km away as the crow flies from the Proposed Development in a southeast direction
Irish Parachute Club	Approximately 6.5km away as the crow flies from the Proposed Development in a north direction
Jennifers Travels	Approximately 6.3km away as the crow flies from the Proposed Development in a southeast direction
Kildare Farm Foods	Approximately 12.9km away as the crow flies from the Proposed Development in a southeast direction
Kildare Town Heritage Centre	Approximately 14.3km away as the crow flies from the Proposed Development in a southeast direction
Kildare Village Shopping Destination	Approximately 14km away as the crow flies from the Proposed Development in a southeast direction
Lullymore Heritage & Discovery Park	Approximately 14km away as the crow flies from the Proposed Development in a northeast direction
Moore Abbey Wood	Approximately 7.9km away as the crow flies from the Proposed Development in a southeast direction
Mountlucas Wind Farm	Approximately 10km away as the crow flies from the Proposed Development in a northwest direction
Portarlington Golf Club	Approximately 9.5km away as the crow flies from the Proposed Development in a southwest direction
Redhills Adventure	Approximately 10.3km away as the crow flies from the Proposed Development in an east direction
Silken Thomas	Approximately 14.4km away as the crow flies from the Proposed Development in a southeast direction
Solas Eco Garden Centre	Approximately 5.6km away as the crow flies from the Proposed Development in a southwest direction
St Brigid's Cathedral & Round Tower	Approximately 14.2km away as the crow flies from the Proposed Development in a southeast direction

Tourism and Amenities within 15km of the Proposed Development	Approximate Distance from the proposed development
The Heath Golf Club Portlaoise	Approximately 15km away as the crow flies from the Proposed Development in a southwest direction
The Heritage Golf Parkland	Approximately 7km away as the crow flies from the Proposed Development in a south direction
The Heritage Spa	Approximately 6.9km away as the crow flies from the Proposed Development in a south direction
The Irish National Stud & Gardens	Approximately 15km away as the crow flies from the Proposed Development in a southeast direction
Thoroughbred Country	Approximately 15km away as the crow flies from the Proposed Development in a southeast direction
Treacy's Bar & Restaurant	Approximately 15km away as the crow flies from the Proposed Development in a south direction
Wellness Adventures Ireland	Approximately 10km away as the crow flies from the Proposed Development in a west direction
Wild Food Ways	Approximately 6km away as the crow flies from the Proposed Development in a southeast direction

6.6.4.1 Community Facilities & Services

Community facilities and service in proximity to the Proposed Development are centred on town and villages in the area. The closest settlement is the village of Bracknagh which is located 1.7km to the north of the site. Facilities and services within the village include a shop, bar, post office, church and graveyard, school and recycling centre.

The next closest settlement is Portarlington c. 3.5km south of the Site. This offers a range of amenities catering to residents and visitors alike. Facilities and services within the town include supermarkets, shops, cafes, and restaurants for everyday needs and leisure. There are several schools, sports clubs (including GAA, soccer, and golf), community centre, leisure centre with a swimming pool and scenic walking routes along the River Barrow. The town also benefits from good transports links, including a train station providing services to Dublin.

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

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 effects arising from the proposed Derrynadarragh 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.

An analysis of the general health statistics for the area encompassing the wind farm site and the TDR reveals that the **majority of the population reports their health as 'Very Good'**. While this is a positive indicator, the proportion in the Site EDs (**53.75%**) is **slightly higher than the State and County averages**, which range from **53.2% (State)** to **56.81% (Kildare)**.

The second most reported category is **'Good' health**, where figures across the State (**29.7%**) and Counties (**29.24% in Kildare**, **31.2% in Offaly**, and **30.43% in Laois**) are **closely aligned**, with a **maximum variation of just under 2%**. The Site EDs report **27.71%**, which is **at least 1.5% lower** than the County and State averages, indicating a **modest deviation in perceived health quality**.

In the **'Fair' health** category, the Site EDs report **7.87%**, which is **generally consistent** with the State (**8.6%**) and County averages (ranging from **7.73% to 9.4%**), suggesting a **stable middle-ground in health perception** across jurisdictions.

For the **'Bad' and 'Very Bad' health** categories, proportions are low across all areas. The Site EDs report **1.39% (Bad)** and **0.52% (Very Bad)**, which are **slightly higher than the State averages** of **1.4% and 0.3%**, and marginally above County figures. The overall effect is limited due to the small proportions. Notably, the **TDR EDs report lower figures** in these categories (**1.48% Bad**, **0.32% Very Bad**), indicating a **better health profile** in that sub-region.

The **'Not Stated'** category presents a **notable contrast**. The Site EDs report **8.75%**, which is **significantly higher** than the State (**6.7%**) and County levels (**4.7% to 5.6%**), with a **difference of up to 5.6%**. This could reflect either **lower census engagement** or **reluctance to disclose health status**.

Overall, the census data suggests that the general health condition in the Site EDs is slightly below that of the State and County averages. In contrast, the TDR EDs demonstrate a slightly better health profile, particularly in the lower incidence of poor health and higher rates of 'Very Good' health. These insights are valuable for understanding community wellbeing and informing future planning and development in the region.

Table 6-10: Population by General Health (Census, 2022)

General Health (Census 2022)	State	County Kildare	County Offaly	County Laois	Site EDs	TDR	GCR
Very good	53.2%	56.81%	51.7%	53.34%	53.75%	54.44%	56.06%
Good	29.7%	29.24%	31.2%	30.43%	27.71%	28.18%	28.65%
Fair	8.6%	7.73%	9.4%	8.82%	7.87%	10.52%	8.21%
Bad	1.4%	1.22%	1.7%	1.5%	1.39%	1.48%	1.33%

General Health (Census 2022)	State	County Kildare	County Offaly	County Laois	Site EDs	TDR	GCR
Very Bad	0.3%	4.74%	0.36%	0.32%	0.52%	0.32%	0.38%
Not stated	6.7%	4.7%	5.6%	5.6%	8.75	7.76%	6.58%

An assessment to identify potential hazardous land uses in the study area was carried out, and the vulnerability of the Proposed Development to natural disaster was informed by field surveys and slope stability assessment which were completed as part of the EIA process, which are contained within **EIAR Chapter 11 – Soils, Geology and Hydrogeology**. Potential effects to human health as described throughout this EIAR are summarised in this Chapter, including potential effects on air quality, noise and traffic and potential effects on human safety including potential for flood risk and slope failure.

A shadow flicker assessment has been undertaken to identify all sensitive receptors within the 10 rotor diameter study area, and to assess potential shadow flicker effects at the 52 receptors identified within the calculated area theoretically susceptible to shadow flicker.

A "zero shadow flicker" strategy will be implemented using turbine control software to cease turbine operation during periods when shadow flicker is predicted to occur. If this mitigation strategy is adopted, then minimal (near zero hours a year) shadow flicker would occur at any relevant receptors with habitable rooms and windows within 10 rotor diameters of the wind farm.

No cumulative impacts with other proposed or operational wind farms in the area are predicted to occur on any receptors in the study area.

As such, no likely significant effects of shadow flicker are predicted at nearby receptors following implementation of mitigation measures such as a shadow flicker control system.

A noise assessment was undertaken as part of the EIAR. Construction and decommissioning on-site activities with a duration longer than one month will be below the construction noise limit of 65 dB $L_{Aeq,1hr}$ at noise sensitive locations. As a result, residual construction and decommissioning impacts range between not significant to slight impact with the duration of impact described as temporary.

There is potential for elevated noise levels due to the grid connection works and TDR accommodation works resulting in a temporary significant impact during the construction stage. However, these works will be for a short duration at any particular property (i.e. typically less than 3 days) and where the works are to occur over an extended period at a given location, a temporary barrier or screen will be used to reduce noise level below the noise limit and reduce any potential impact resulting in a moderate short-term residual impact.

The predicted operational wind farm noise levels meet the daytime and night-time noise limits derived using the Wind Energy Development Guidelines 2006 at all noise sensitive locations. As detailed in the criteria section, this is considered to be a current best practice approach. The predicted noise levels from the proposed substation are below the noise limits at all noise sensitive locations.

For some receptors at the site, a new source of noise will be introduced into the local soundscape, and it is expected that there will be a slight to moderate long-term effect at dwellings closest to the Proposed Development. As such, no likely significant effects of noise are predicted.

6.7 Assessment of Likely Significant Effects

6.7.1 Likely Significant Effects on Population – Construction

During the construction phase of the Proposed Development, employment and unemployment figures as shown in Table X-X Live Register Data for Kildare, Laois, Offaly County and the State between Jan. 2022 and Jan 2025 above indicates that there is an available work force in Counties Kildare, Offaly and Laois due to the number of large and medium sized settlements in proximity of the Proposed Development. Therefore, it is expected that workers required for the construction phase of the Proposed Development will be drawn from settlements within the surrounding counties and will not be based in the locality so having no effect on the local population growth.

There is no effect on population along the TDR to the site at Derrynadarragh.

The population of the Proposed Development ED's recorded in the 2022 Census was 1,307 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 effect on the local population during the construction phase. The population of the Proposed Development 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 Proposed Development ED's. However, it is likely that some workers may stay in accommodation in the larger settlements surrounding the site such as Portarlington or Monasterevin located outside the ED's. Overall, this will result in a slight, short-term increase in population resulting in a slight, short-term neutral effect.

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.

6.7.2 Likely Significant Effects on Population – Operational

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 wind farm maintenance.

Furthermore, as previously described elsewhere in this EIAR, there are no residential receptors within the Site and the Proposed Development has been designed to minimise potential effects on residential receptors. In line with the appropriate legislation and guidelines, a minimum set back distance of a 4 times turbine tip height to the closest residential receptor is achieved, meaning that operational effects on receptors are aimed to be minimised. The ground to blade tip height for wind turbines is 186 m. The wind turbines will have a rotor diameter of 162m and a hub height of 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 properties to a turbine (Eircode H54 W34CY63) are located c. 774 m distance from Turbine T01 and Eircode R32 KD79 is located c. 777 m distance from Turbine T02, therefore, the layout and design of the wind farm comply with the current *Wind Energy Development Guidelines*, 2006. For further reference on any effects to receptors during the operational phase, please see Chapter 7- Air and Climate, Chapter 8 - Noise & Vibration and Chapter 12- Shadow Flicker.

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

6.7.3 Likely Significant Effects on Population – Decommissioning

The decommissioning phase of the Proposed Development is described in Chapter 2 - Development of Proposed 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 works 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 Likely Significant Effects – Socio-Economics, Employment and Economic Activity – Construction

The construction of the Derrynadarragh 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, *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 a maximum export capacity of 64.8 MW, this provides an estimate of between 77.76 and 110.16 jobs associated with the construction stage of the Project (anticipated to be 24-month period).

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 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 Likely Significant Effects – Socio-Economics, Employment and Economic Activity – Operational

6.7.5.1 Economic Value

The Proposed Development at Derrynadarragh will contribute to achieving Ireland's energy targets as set out in the Climate Action Plan 2024 and the subsequent Climate Action Plan 2025, 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 Derrynadarragh 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 Proposed Development is estimated to be up to 64.8 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 Proposed Development, it would be expected the Proposed Development will result in the net displacement of 65,461 to 76,019 tonnes of CO2 per annum.

The 2023, 2024 and 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 Proposed Development has the potential to contribute c. 1.47% 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 Proposed Development at Derrynadarragh 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 and CAP25.

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 Proposed Development 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.

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 Proposed Development, 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.

6.7.5.2 Employment Potential

Once the proposed Derrynadarragh 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.

Although only a small proportion of operational jobs are likely to be directly based at the Derrynadarragh Wind Farm Site, it is likely that the indirect jobs for the operational phase, such as consultants, research institutions, universities and financial services, will provide a slight effect to the employment profile of the wider economy of Counties Kildare and Offaly. It is not expected that these jobs will be based at the wind farm Site, however, the employment of tradespeople, labourers, and specialised contractors for the operation phase in the form of maintenance will have a direct, short-term significant, positive impact on employment in the Study Area.

6.7.5.3 Proposed Community Benefit Scheme

As part of this Development Proposal, an amenity space is being proposed to be located to the south of the wind farm site. This amenity space will include a grassed area with picnic benches, and 2 no. dedicated car parking spaces for visitors.

The Applicant will set up a community benefit fund which will allocate funds from the Proposed Development to community groups in the area should the Proposed Development be granted planning permission, and be successful under the Government's RESS support programme. If consented, the Proposed Development will apply for the RESS 4 supports and will therefore provide €2 per MWh to the Community Benefit Fund, which is calculated in accordance with the '*Terms and Conditions for the Fourth Onshore Competition under the Renewable Electricity Support Scheme* (RESS 4)'.

In line with *Community Benefit Fund Guidelines*, as governed by the *Sustainable Energy Authority of Ireland* (SEAI), and based on the current project scope, Dara Energy Ltd will generate a *Community Benefit Fund* estimated at over €3.9 million over the lifetime of the project, estimated at c. €260,000 per annum. The actual fund will vary around this average from year to year, depending on each year's wind conditions. 40% of the fund, totalling c. €116,000, will be allocated to initiatives and projects that support Sustainable Development goals within the area, with 50% of the fund, c. €145,000, allocated to local clubs, societies and near neighbours.

If consented, the Proposed Development will provide sustainable, low carbon energy generation infrastructure in County Kildare, Offaly and Laois to meet Ireland's growing demand. The development benefits to the local community would include significant investment in local infrastructure and electrical systems, local job creation over the project lifetime of 35 years.

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 in 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 conclusion based on the available national and international literature that the provision of a wind farm at the proposed location would not have an adverse effect on the property values in the area and will therefore have a long-term imperceptible and not likely significant effects.

6.7.6 Likely Significant Effects – Socio-Economics, Employment and Economic Activity – Decommissioning

The likely significant effects 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 fewer construction workers will be required for this phase. During the decommissioning employment opportunities will be available at the Wind Farm Site and outlying areas. This will have a temporary to short-term indirect positive effect 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 Likely Significant Effects – Land Use - Construction

The existing land-uses in proximity to the proposed Derrynadarragh 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 boglands where turbines and associated infrastructure are proposed.

There are 1 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 6.01 ha of forestry is required to accommodate Turbine 2 and an access track running in an west to east direction. Additional felling of trees and vegetation will also be required at various points along the TDR. 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 Proposed Development. 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 Proposed Development. In advance of other construction works, clearance felling will commence on site. 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 short-term impacts to moderate significant impacts. The TDR will require the construction of new sections of road through agricultural fields and a temporary bridge crossing point, in order to facilitate the delivery of oversized loads to the site. The construction of a temporary bridge will remove portions of agricultural land from production, and will cause short-term noise disturbance during construction of the wind farm. The primary potential impacts will be the associated noise disturbance and loss of agricultural productivity, with subsequent impacts including, soil compaction from heavy machinery, and disruption of drainage patterns.

Further TDR works 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.

A substation transformer unit will be transported to the site which will be categorised as an abnormal load. As a result, an abnormal load permit will be sought for this movement. This load shall follow the same route to the site as the TDR. This is likely to have a temporary slight adverse effect on residential land-use due to noise nuisance because of machinery; the significance of the effects from noise is discussed in EIAR Chapter 8 – Noise and Vibration.

Based on the findings of the noise assessment undertaken as part of the EIAR, the likely significant effects on population and human health are expected to be limited and manageable. During the construction and decommissioning phases, on-site activities with durations exceeding one month are predicted to remain below the construction noise threshold of 65 dB LAeq,1hr at noise-sensitive locations. Consequently, the residual impacts during these phases are assessed as ranging from not significant to slight, with the duration of impact described as temporary.

There is potential for elevated noise levels associated with grid connection works and TDR accommodation works, which may result in a temporary significant impact during the construction stage. However, these works are expected to be of short duration at any individual property—typically less than three days. Where works extend over a longer period at a given location, temporary noise barriers or screens will be employed to reduce noise levels below the prescribed limits, thereby mitigating the impact to a moderate short-term residual level.

During the operational phase, predicted noise levels from the wind farm and associated substation are within the daytime and night-time limits set out in the Wind Energy Development Guidelines (2006), which are considered current best practice. While some receptors may experience the introduction of a new noise source into the local soundscape, the long-term effects are expected to be slight to moderate at dwellings closest to the proposed development.

The proposed development is not anticipated to result in significant adverse effects on population or human health due to noise, provided that the recommended mitigation measures are implemented. The impacts are generally temporary, localized, and within acceptable regulatory limits, with long-term effects limited to minor changes in the acoustic environment for a small number of receptors.

6.7.8 Likely Significant Effects – Land Use – Operational

The operational phase of the Derrynadarragh Wind Farm will have minimal adverse effects on existing land use.

The operational phase of the Derrynadarragh Wind Farm will result in a change of land use in areas where access tracks, wind turbine bases, hardstanding areas, substation, grid connection 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 Derrynadarragh Wind Farm will not adversely affect 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 significant adverse effects to existing agricultural land use as a result of the Proposed Development.

It is proposed to upgrade sections of existing agricultural tracks where possible, to avoid additional land take for internal access tracks. 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 effect on these land uses through provision of upgraded or new access tracks across the site.

Minimal activity is likely for maintenance and repairs so the TDR will continue to be used, although at a much reduced scale during the operational phase of the Proposed Development. 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 very low because the substation will confirm to EirGrid's standard specifications and design principles (see Chapter 2 and Appendix 2.1 CEMP).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, also the SWMP provides for long-term site drainage, incorporating SUDs design. Further information is contained within EIAR Chapter 2 Description of the Development, Chapter 12 – Hydrology and Water Quality and Appendix 12.1 SWMP.

Wetland Surveys have been commissioned by the Client to prepare a Biodiversity Enhancement Management Plan (BEMP) as part of the Proposed Development. All lands identified for biodiversity enhancement fall within the red line boundary of the application site – refer to letters of consent from landowners.

The BEMP provides an overview of the important habitats and species within the site and collates all relevant information on the proposed enhancement, management and monitoring measures in relation to biodiversity within the site, aiming to promote a multi-faceted approach to creating a landscape-scale framework for maximum BNG within the site over the lifetime of the Proposed Wind Farm (35 years).

The BEMP has subsequently been divided into the following sections to provide targeted plans for specific Important Ecological Features (IEFs) outlining the feature-specific aims and objectives, current threats under the 'do-nothing' scenario, proposed management and enhancement measures as well as the proposed ecological monitoring for each feature included within the BEMP:

- Riparian buffer– habitat enhancement and protection of water quality. Installation of new in-ditch wetlands to catch sediment from existing exposed cut over bog adjacent to the site.
- Removal of invasive species habitat enhancement
- Planting of new Hedgerows and replanting of new hedgerows.
- Woodland bog protection area

The goal of the BEMP is to ensure that biodiversity at the proposed wind farm site is in a better condition post-development than it is currently within the 'do-nothing' scenario, by implementing the proposed measures during both the construction and operational phases.

The BEMP can be found in Appendix 2.2 in Volume III.

6.7.9 Likely Significant Effects – Land Use – Decommissioning

The decommissioning phase of the Proposed Development is described in Section 2.8 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. 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. Therefore, some effects to the land use in such areas during the decommissioning phase are expected to be temporary to short-term slight, adverse but not significant effects.

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

The BEMP lands are contracted for the duration of the project.

6.7.10 Likely Significant Effects – Recreation, Amenity and Tourism – Construction

There are no significant tourism attractions located in proximity to the proposed Derrynadarragh 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.

As effectively illustrated in Table 6-1 : Tourism and Amenities within 15km of the Proposed Development, the dispersed nature of the surrounding amenities, combined with their distance from the site, ensures that the development will not interfere with the operation, accessibility, or visitor experience of these locations.

The works associated with the Proposed Development will avoid adverse effect on nearby community facilities, town centre services and amenities due the distance of the Site from such amenities. The proposed works, including the construction haul routes do not interact with any recreation and tourism amenities as listed in 6.6.4 *Recreation, Amenity and Tourism*, and therefore there are no expected direct or significant on these features.

The TDR to Site is as follows:

- For the purposes of this EIAR the turbine delivery route starts at Galway Port;
- At Junction 5, loads will exit the M6 and continue south on the N52;
- Loads will depart the N52 to the east of Tullamore and turn left onto the R420, eastbound;
- Loads will turn left onto the R402 northbound;
- Continue north and then east on the R402 through Ballinager and Daingean;
- Loads will then turn right from the R402 onto the R400 travelling south; and
- Remain on the R400 until reaching Corbetstown where loads would keep left at the junction to join the R419, then proceed northeast towards the site entrance.

During turbine delivery, there is potential for indirect effects 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 adverse effects are likely to be temporary to brief, and not significant.

Mitigation is set out in Chapter 14 - Traffic and Transportation in order to avoid indirect effects on towns and village centre facilities and services during turbine delivery.

6.7.11 Likely Significant Effects – Recreation, Amenity and Tourism - Operational

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 Derrynadarragh Wind Farm EIAR Chapter 5 - Scoping and Consultation, titled '*Project Factors Affecting Tourism*'. The 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 Derrynadarragh Wind Farm is described in Chapter 16 – Landscape and Visual Impact.

The most proximate significant tourist attractions to the proposed development is Emo Court House (c. 10km Northwest). 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 16.10.3.2, indicates that, the proposed Derrynadarragh turbines is considered to generate Operational Phase landscape effects that are not likely to be significant. There are no other large-scale developments within the vicinity of the Site in terms of cumulative impacts with other forms of development. Please refer to the accompanying Appendix 1.3 for the list of developments considered for the Cumulative Assessment.

Cushina presents the greatest potential for cumulative visual effects because of its closer proximity to the proposed Derrynadarragh Wind Farm site. The nine turbine Cushina Wind Farm is located 4.3km to the northwest of the proposed Derrynadarragh site. This scheme would include turbines with a tip height of 185m, arranged in a similarly staggered layout to the Proposed Development. As illustrated by the cumulative ZTV, in Chapter 16. – Landscape and Visual, there is potential for intervisibility between the two schemes, reflective of the flat, lowland landscape setting. At a distance of just over 3km, there will be a clear spatial separation between the developments, avoiding any sense of visual tension (as shown in the wirelines of VP16, VP7 and VP6). However, at greater distances (i.e. >10km), where intervisibility is present, the two developments may be perceived as being closely related to one another. There is a reasonable degree of cohesion between these two developments where they either appear as a single larger entity or two clusters of a single development, but seldom with clutter or scale confusion or a sense of being surrounded by turbines.

The 47-turbine Ballydermot Wind Farm wind farm is located approximately 7.7km northeast of the Proposed Development at its nearest point. The proposed turbines are expected to have an overall blade tip height ranging from 200 to 220 metres. Whilst there is theoretical potential for intervisibility, at a distance of over 10km to the northeast f the Proposed Development, it is unlikely that any notable intervisibility will occur except from elevated hills and in the context of vast views across the midlands plains where other wind farms will be much closer to Ballydermot Wind Farm.

On balance of the reasons outlined above, it is considered that the proposed Derrynadarragh Wind Farm development has a **Low** magnitude contribution to cumulative effects with other existing, permitted and proposed wind farms in the Study Area.

Overall, the Proposed Development will result in an intensification of wind energy development within this landscape context. Furthermore, existing wind energy development is an established feature within the wider Study Area (existing Mount Lucas, Moanvane and Cloncreen Wind Farms).

Based on the information provided, we can reasonably conclude that **significant effects on tourism are unlikely** as a result of the proposed Derrynadarragh Wind Farm development

6.7.12 Likely Significant Effects – Recreation, Amenity and Tourism – Decommissioning

The decommissioning phase of the Proposed Development is described in Chapter 2 - Description of Proposed Development of this EIAR and provides for the removal of turbines and some of the 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 Derrynadarragh Wind Farm, it is expected to have a non - significant and temporary adverse effect on recreation, amenity and tourism.

6.7.13 Likely Significant 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 2025, the HSA stated the construction sector reported a total of 5 work-related fatalities for 2024, marking the sectors lowest ever rate of work-related fatalities which was a stark contrast to 2023 in which it accounted for the second highest fatalities reported in 2023, with 11 reported work-related fatalities. This is below average in relation to most other economic sectors with: agriculture, forestry and fishing (12 fatalities); vehicle related incidents (10 fatalities); and heavy/falling objects (6 fatalities) accounting for higher work-related fatalities in 2024. Whilst this is a significant improvement on the previous year, consistent data from the previous decade illustrated that the number of fatalities can be significantly higher and in the top percentiles in comparison to other economic sectors (for instance it was the second highest sector for fatalities, behind only agriculture, forestry and fishing). 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 constructed in accordance with national legislation including Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) and another other current regulations published at the time of construction.

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, adverse effect to public safety along the TDR route during the construction phase.

The Proposed Development will 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 necessary will be required to 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 Síochána 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 Galway Port to the site via the M6 at junction 5, and N52 before entering the local roads on approach to the proposed wind farm site. Due to the large size 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. Please refer to the CEMP for further details included in Appendix 2.1 of Volume 3 of this EIAR.

Following the implementation of the mitigation measures as set out in the CEMP included in Appendix 2.1 of Volume 3 of this EIAR, 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 phase of the Proposed Development will not have a significant effect on air quality. Furthermore, a preliminary Safety & Health Plan prepared by the PSDP will be further developed by the PSCS before the commencement of the construction work and updated on a regular basis during the construction phase of the project.

It is concluded that there will not be any likely significant effects with respect to human health arising from the construction phase of the Proposed Development. The construction activities are not expected to result in any significant impact on air quality, and appropriate mitigation measures will be in place to manage potential emissions and dust. In addition, a preliminary Safety and Health Plan has been prepared by the PSDP, which will be further developed by the PSCS prior to the commencement of construction works. This plan will be regularly reviewed and updated throughout the construction phase to ensure the ongoing protection of human health and safety on site and in the surrounding area.

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. Please refer to the CEMP for further details included in Appendix 2.1 of Volume 3 of this EIAR.

Based on the assessment of noise impacts associated with the construction, decommissioning, and operational phases of the Proposed Development, it is concluded that there will not be a likely significant effect on population and human health.

Construction and decommissioning activities, although extending beyond one month, are predicted to remain below the construction noise limit of 65 dB LAeq,1hr at noise-sensitive locations. These impacts are considered temporary and range from not significant to slight.

While certain short-term activities such as grid connection and TDR accommodation works may result in temporary significant impacts, these are of very limited duration (typically less than three days per property). Where longer durations are required, mitigation measures such as temporary barriers or screens will be implemented to reduce noise levels below the prescribed limits, resulting in moderate short-term residual impacts.

Operational noise levels from both the wind farm and substation are predicted to comply with the relevant daytime and night-time noise limits as outlined in the Wind Energy Development Guidelines (2006), which represents current best practice. Although a new source of noise will be introduced into the local soundscape, the long-term residual impact is expected to be slight to moderate and confined to dwellings closest to the development.

Given the temporary nature of construction-related impacts, the implementation of mitigation measures, and compliance with operational noise standards, the overall effect on population and human health is not considered likely to be significant.

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 for the 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). 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 period is expected to be temporary, negligible and imperceptible.

Potential effects 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. As a result, the Proposed Development is expected to not have any adverse effects on flood risk in the surrounding area of the wind farm site or along the TDR. The likely impact of flooding on human health and safety as a result of construction activities therefore will not pose any adverse effects. The Flood Risk Assessment for the Proposed Development (Appendix 12.1) has identified that the Proposed Development will not result in a significant increase in flood risk to the locality. Additionally, the drainage design at the Site will ensure that there will be no increase in the risk of surface water runoff as a result of the windfarm development.I

To mitigate against the increased vulnerability of the underlying aquifer to groundwater pollution, all excavations will be constructed and backfilled as quickly as possible. Excavations will stop during or prior to heavy rainfall events (status orange or higher). Details of mitigation measures related to spills and fuel storage are outlined in Chapter 12 - Hydrology and Water Quality.

As a result of the design of the proposed development and prevention and mitigation measures that will be adopted, there will be no significant adverse effect on the environment and on hydrology and water quality as a result of the proposed development on its own or in combination with other plans and projects.

As a result of the design of the project and the prevention and mitigation measures to be taken the proposed development will not directly or indirectly alone or in combination with other projects, cause a deterioration in the status of any waters or impair the ability of any waters to meet the objectives of the Water Framework Directive or those set for them in the Water Action Plan 2024.

It will not cause or permit any direct or indirect discharge or entry of priority substances or priority hazardous substances or any toxic/dangerous substances to any waters. The proposed development will not adversely affect the integrity of any European or protected site or NHA, pNHA in view of its water related conservation objectives and will not impair the objectives for any protected site and will comply with all relevant standards and will comply with Priority Pathway Action Plans (PPAP) relating to invasive species and soils and spoil when appropriate.

The design of the proposed Directive therefore complies with the objectives of the WFD. The proposed development will also lead to an overall improvement in the status of waters by ensuring better monitoring of waters by the project ecologist. To conclude, there will be no likely significant effects on population and human health.

6.7.14 Likely Significant Effects – Human Health & Safety – Operational

6.7.14.1 Site access and usability of lands

During the operational phase of the Proposed Development, potential adverse effects on human health and safety are unlikely, and any such effects are further avoided through appropriate mitigation through proper engineering design and the development of mitigation strategies.

Potential human safety issues can occur due to falling ice from turbine blades in cold weather conditions. However, this is unlikely for the proposed development because modern wind turbines are fitted with anti-vibration sensors. These sensors detect any imbalance caused by the ice on the blades and will trigger the shutdown of turbines until the blades are clear of iced.

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."*

6.7.14.2 Air and Climate and Shadow Flicker

As outlined in Chapter 7 - Air and Climate, following the implementation of the mitigation measures, the Wind Farm, GCR and TDR work areas will result in slight to moderate residual effects 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 effects.

Effects related to vehicle emissions and dust will reduce significantly following construction and no significant effects are anticipated. There will be a low level of maintenance traffic during the operational period, which will have an imperceptible effect.

Effects on air quality due to vehicle emissions and dust during the decommissioning phase are expected to be similar in nature to the construction phase but of a smaller magnitude. They will be temporary in nature and result in slight to moderate residual effects. There will be no permanent residual effects due to the decommissioning phase.

During operations, the Proposed Development will result in the avoidance of emissions from fossil fuel generators which is a positive effect on air quality. Therefore, will not result in any likely significant effect.

Furthermore, as outlined in Chapter 8 - Noise & Vibration, residual construction and decommissioning effects range between not significant to slight effects with the duration of effect described as temporary.

Within the existing environment, there is already background sound level. In relation to the Proposed Development, noise is generated from the construction of the turbine foundations, the erection of the turbines, the excavation of trenches for cables, and the construction of associated hardstandings and access tracks, and construction of the substations. Noise from vehicles on local roads and access tracks is also generated from the delivery of the turbine components and construction materials, notably aggregates, concrete and steel reinforcement.

There is potential for elevated noise levels due to the grid connection works and TDR accommodation works resulting in a temporary significant effect during the construction stage. However, these works will be for a short duration at any particular property (i.e. typically less than 3 days) and where the works are to occur over an extended period at a given location, a temporary barrier or screen will be used to reduce noise level below the noise limit and reduce any potential effect resulting in a moderate short-term residual effect.

The predicted operational wind farm noise levels meet the daytime and night-time noise limits derived using the Wind Energy Development Guidelines 2006 at all noise sensitive locations. As detailed in the criteria section, this is considered to be a current best practice approach. The predicted noise levels from the proposed substation are below the noise limits at all noise sensitive locations.

For some receptors at the site, a new source of noise will be introduced into the local soundscape, and it is expected that there will be a slight to moderate long-term effect at dwellings closest to the Proposed Development.

Lastly, as outlined in Chapter 12- Shadow Flicker, the results of the shadow flicker assessment predict that the Proposed Wind Farm has the potential to introduce shadow flicker at up to 47 receptors surrounding the site. The implementation of a scheme of mitigation to cease operation of the turbines during periods of potential shadow flicker events will ensure that the potential for shadow flicker effects to occur is minimised through the implementation of a "zero shadow flicker" strategy for all relevant receptors within 10 rotor diameters of a turbine.

It is therefore considered that the Proposed Wind Farm complies with the shadow flicker policy as set out in the Wind Energy Development Guidelines 2006.

6.7.15 Likely Significant Effects - Human Health & Safety – Decommissioning

The decommissioning phase of the Proposed Development, as described in Section 2.8 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. Once mitigation measures and best practice construction site methods are implemented, potential adverse effects on human health and safety is expected to be imperceptible, temporary and not significant.

During the decommissioning works there is potential for adverse effect 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. 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 adverse effects on public health and safety will be temporary and not significant.

The decommissioning phase works will be completed to approved standards, which include specified materials, standards, specifications and codes of practice (at the time decommissioning takes place).

An experienced main contractor will be appointed to undertake the of the decommissioning of the wind farm development. The main contractor will comply with the Construction and Environmental Management Plan (CEMP) prepared for the construction phase and the Operation and Environmental Management Plan (OEMP) implemented during operation and any revisions made to those documents throughout the phases in which they were adopted. The contractor will produce a detailed and site-specific Decommissioning Plan prior to commencement of decommissioning.

6.7.16 Health and Safety Standards and Procedures

As part of the human health assessment of the proposed Derrynadarragh 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 human 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.

Considering the curtilage of the nearest sensitive receptor is over 730m from the nearest turbine, the level of vibration from the candidate turbine (Vestas V162 7.2MW with a 105m hub height) is significantly below any thresholds of perceptibility. Vibration from the turbines is too low to be perceived at neighbouring residential dwellings.

Vibration levels will also be significantly below levels that would result in damage to the nearest buildings (including farm buildings). Therefore, operational vibration associated with the Proposed Development has been scoped out of this assessment.

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 Noise, on decommissioning, cranes will disassemble the above ground turbine components which would be removed off site for recycling. All the major component parts are bolted together, so this is a relatively straightforward process. The foundations will be covered over and allowed to re-vegetate naturally.

Grid connection infrastructure including substations and ancillary electrical equipment shall form part of the national grid and will be left in situ.

Decommissioning activities will be undertaken during daytime hours, and noise, which will be of a lesser impact than for construction, will be controlled through the relevant guidance and standards in place at the time of decommissioning. A decommissioning plan is contained in the Construction Environmental Management Plan (CEMP) in Appendix 2.1. As a result, there will be no likely significant effects of noise during decommission phase on population and human health.

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 W34 CY63) is located c. 745 m distance from Turbine 2. 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 calculated night and daytime noise limits at all residential properties surrounding the proposed Derrynadarragh Wind Farm.

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 electrical cables. 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.

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

Wind turbines, like all electrical equipment, produce electro-magnetic radiation. Underground electricity cables with similar capacity to the proposed installation are commonly used across Ireland, and when installed to the required standards, they do not pose any health risks. 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 that have carried out these studies 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) publication 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 6-11: 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 Proposed Development, there will be no impact on residential properties at any distance from the Proposed Development 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 Derrynadarragh Wind Farm and the on-site substation and the proposed grid connection point at the existing Bracklone 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 Derrynadarragh 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 Derrynadarragh 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

Directive 2011/92/EU as amended by Directive 2014/52/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 vulnerability of the Proposed Development to major accidents and natural disasters and considers the preparedness 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 proposed development are limited. The primary sources with the potential to cause significant environmental pollution and associated adverse effects on human health and the environment include the storage of hydrocarbons, chemicals and wastes. As discussed in Appendix 2.1 CEMP, all vehicles will be refuelled off-site. However, for construction plant/machinery that will be based on-site continuously, a limited amount of fuel will be securely stored on site (Appendix 2.1 CEMP; Appendix 11.1 SWMP).

There is limited potential for significant natural disasters to occur at the Proposed Development at Derrynadarragh, 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 / spills;
- Catastrophic events (e.e. storms); and
- Landslides.

Based on the above and taking the Irish context into account, there are no likely significant effects on human health/population arising from a major accident/natural disaster affecting the Proposed Development.

6.7.16.3 Flooding

As outlined in Chapter 12 – Flooding, Hydrology and Water Quality, and Appendix 12.1 Site Specific Flood Risk Assessment, the proposed wind farm infrastructure, such as certain access tracks and turbines, is located within Flood Zones A and B. To minimise any impact on existing flood levels, the access tracks and hardstanding areas within these zones will be constructed at ground level. For turbines located within or very close to flood zones—such as T1, T4, T5, T8, and T9—the plinths to which the towers will be bolted will be raised above the design flood levels with a minimum clearance of 500 mm. This will guarantee that the critical electrical and mechanical components housed in the base of the turbine tower will be protected.

The proposed bridge that crosses the Cushina River has been designed with a minimum freeboard of 300 mm between the 1% AEP +CC flood level and the bridge deck to reduce the likelihood of debris blockage and also allows for uncertainties in hydrological and hydraulic design calculations. Sufficient span has been designed to minimise the afflux.

- The proposed bridge for the section of the TDR crossing the Daingean River has been designed following the same principles as the other on-site bridge (noted above); however, flood relief culverts have also been included, as the TDR crosses a floodplain in this area.

The proposed drainage design for the various elements of the wind farm aims to replicate the existing hydrological regime of the catchment as closely as possible. The proposed outfalls will discharge to the same catchments or watercourses as they would have prior to the development. On one hand, overland flow is collected by interceptor drains and discharged to the nearest watercourse or over the ground through outfall diffusers. Check dams are also incorporated into the interceptor drains where required on steep slopes to slow down velocities, and the outfall diffusers help distribute and slow down the discharge. On the other hand, surface water from the access tracks and other hardstanding areas will be collected by a swale and conveyed to settlement ponds, with an outfall diffuser to discharge into the nearest watercourse or over the ground. Although the primary function of the settlement ponds is to separate particles and reduce pollution, the settlement ponds along with the outfall diffuser will also help slow down velocities and provide some attenuation.

A Surface Water Management Plan for the construction, operation and decommissioning stages of the Proposed Development is presented as Appendix D of the CEMP (Appendix 2.1).

The Surface Water Management Plan will ensure that there is no likely significant effect on water quality as a result of operation of the Proposed Development. The proposed drainage system will provide several stages of treatment to surface water runoff from constructed areas, which follows the concept of a multi-stage SuDS ‘treatment train’.

6.7.16.4 Fire

In order to avoid adverse effects from potential wildfires 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 and substation is 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 Derrynadarragh 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. Please see Section 6.7.16.6 which illustrates the mitigation against a catastrophic event.

The magnitude of these consequences has potential to be significant and adverse, 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 Derrynadarragh Wind Farm will have an adverse, significant effects on noise, vibration, telecommunication, and aviation.

Fire can be classified as a non-significant negative impact for the Derrynadarragh Wind Farm.

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 Derrynadarragh 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. Given the nature of the Proposed Development, coupled with the lack of proximity to established Seveso sites, there is a negligible potential risk of adverse effect 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 adverse effects in the event of wind turbine collapse.

The ground to blade tip height for wind turbines is 186 m. The wind turbines will have a rotor diameter of 162m and a hub height of 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 properties to a turbine (Eircode H54 W34CY63) are located c. 774 m distance from Turbine T01 and Eircode R32 KD79 is located c. 777 m distance from Turbine T02, 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 3.1 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, the assessment of Land, Soils, Geology and Hydrogeology has established a baseline for the receiving environment for the impact assessment. Potential impacts were considered for the construction, operational and decommissioning phases of the Proposed Development as well as potential residual and cumulative impacts. Mitigation measures have been proposed where relevant.

The Proposed Development site is not a sensitive site in terms of land, soil, geology and hydrogeology, and poses a low risk for landslide.

Findings from the site walkover surveys indicates no visual evidence of historic or contemporary landslides or ground instability at or adjacent to the proposed infrastructure locations.

A number of potential impacts have been identified associated with the excavation of soil and rock on the site. The significance of these potential impacts is assessed as being '**imperceptible**' to '**moderate/slight**' significance prior to mitigation.

The Proposed Development is not expected to result in any significant, negative cumulative impacts with other existing, permitted or proposed developments in the vicinity.

With mitigation measures, outlined in Section 11.7, put in place during construction, operational and decommissioning stage the Proposed Development will have an '**imperceptible**' impact on the Site's geological and hydrogeological receptors.

In relation to potential vulnerability of the Proposed Development to major accidents and natural disasters it is concluded that the potential susceptibility of the Proposed Development to major accidents and or natural disaster of the proposed Derrynadarragh Wind Farm is not significant/slight and there are no likely significant effects on population and human health.

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 Proposed Development 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 bogland. Where new access tacks are required, these have been sensitively designed in order to minimise impact on the sites existing environs. 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 3.1 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 and the Traffic Management Plan (TMP).

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 and the Traffic Management Plan (TMP).

The Proposed TDR to Site is as follows:

- At Junction 5, loads will exit the M6 and continue south on the N52;
- Loads will depart the N52 to the east of Tullamore and turn left onto the R420, eastbound;
- Loads will turn left onto the R402 northbound;
- Continue north and then east on the R402 through Ballinager and Daingean;
- Loads will then turn right from the R402 onto the R400 travelling south; and
- Remain on the R400 until reaching Corbetstown where loads would keep left at the junction to join the R419, then proceed northeast towards the site entrance.

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 Derrynadarragh 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 Derrynadarragh Wind Farm, careful consideration was given to the potential impact on landscape amenity, and this is reflected in the iterative design approach that was carried out and which is described in the Alternatives chapter. The magnitude of visual impact on the landscape is assessed in Chapter 16 – Landscape and Visual Impact. As outlined in Chapter 16 – Landscape and Visual Impact, it is considered that the proposed Derrynadarragh Wind Farm development has a Low magnitude contribution to cumulative effects with other existing, permitted and proposed wind farms in the Study Area.

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 Proposed Development 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 centre facilities and services along the TDR during transportation of turbine components.

Furthermore, A Traffic Management Plan (TMP) is provided specifying details relating to traffic management (see CEMP Appendix 2.1, Volume III). Prior to the commencement of the construction phase of the Proposed Development a detailed Traffic Management Plan will be prepared by the Contractor for agreement with the relevant local authorities and An Garda Síochána.

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 10 – 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 have measures to protect surface waters etc closed to the public for the 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.

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

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 delivery of turbine and substation components and a comprehensive delivery plan for bulky/abnormal loads will be utilised to avoid potential adverse effects to human safety for road users and pedestrians. A traffic and transport management plan is included in EIAR Volume III, Appendix 14.1.

Effects on hydrology and water quality will be mitigated with measures outlined in Section 1.8 as detailed in Chapter 10: Hydrology and Water Quality. This will ensure that the residual impacts of the construction stage are Not significant and there will be no perceivable impact on the Cushina River and the downstream Figile River, and Barrow SAC which is a highly sensitive receptor that is hydrologically connected to the Site. Furthermore, the Proposed Development will not result in the deterioration of the status of any waterbody under the Water Framework Directive 2000/60/EC or jeopardise the achievement of waterbody objectives (good / high status) of any such waterbody.

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 construction period is considered low.

Once mitigation measures and health and safety measures are implemented and monitored, the potential for adverse effects on human health for members of the public during construction and decommissioning of the Proposed Development is expected to be not significant and temporary to short-term.

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, as outlined in Section 4.3.1 of the CEMP.

6.8.5.2 Mitigation Measures - Operational

For operation and maintenance staff working at the Proposed Development 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 in Section 5 of the CEMP. The Safety & Health Management Plan details the work practices, procedures and management responsibilities relating to the management of health and safety during the design, construction and operation of the Derrynadarragh Wind Farm and shall be read in conjunction with the Safety & Health Plan prepared for the Proposed Development 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 Proposed Development are designed to ensure compliance with EMF standards for human safety;
- All on-site electrical connections will be 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;
- 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. 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;
- 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.

In line with *WEI Health and Safety Guidelines for the Onshore Wind Industry* (2011), Emergency Response Plans as outlined Section 6 of the CEMP 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 Proposed Development, 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;
- 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 have ice detection systems that automatically stop the turbine if ice forms on the blades. 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.

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. 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 Proposed Development 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 & Appendix 12.1 Site-Specific Flood Risk Assessment.

6.9 Residual Effects

6.9.1 Residual Effects - Population

The residual effects of the Proposed Development with respect to population during the construction, operation and decommissioning phases are mainly associated with operation and maintenance jobs during the operational phase of the Derrynadarragh 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 Proposed Development.

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

The residual effects of the development with respect to socio-economics during the construction, operation and decommissioning 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,* the applicant plans to establish a Community Benefit Fund funded by the Proposed Development if it receives planning approval and qualifies under Ireland's RESS support scheme. The scheme would contribute €2 per MWh generated, amounting to an estimated €3.9 million over the project's 35-year lifespan, with an annual average of about €260,000. The fund's yearly amount may vary depending on wind conditions.

Funds will be allocated as follows: approximately 40% (€116,000 annually) to initiatives supporting Sustainable Development goals in the area, and about 50% (€145,000 annually) to local clubs, societies, and nearby residents.

The development aims to provide sustainable, low-carbon energy across County Kildare, Offaly, and Laois, bringing benefits such as infrastructure investment, electrical system upgrades, and local job creation over the project's duration.

Rates payments and development contributions have potential to improve service provision throughout County Kildare, Offaly, Laois 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 Proposed Development will result in a slight long-term positive effect for electricity users throughout the country.

6.9.3 Residual Effects – Land Use

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

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 Effects – 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 Proposed Development.

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 Effects – Human Health

Through various aspects of the design process for the Proposed Development, negative residual impact on human health during the construction, operation and decommissioning 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 Derrynadarragh Wind Farm will result in the net displacement of 65,461 to 76,019 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 Proposed Development of Derrynadarragh 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 and Climate describes an estimated annual average output of 55.8 MW – 64.8 MW for the Proposed Development will result in the net displacement of 65,461 to 76,019 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 64.8 MW wind farm will not contribute to reducing fossil fuel dependency.

It is also envisaged that if the Derrynadarragh Wind Farm Project does not proceed, the opportunity for employment relating to the construction, operation and decommissioning of the Derrynadarragh Wind Farm Project will be lost, resulting in a lost opportunity for potential economic activity in the County Kildare, Offaly and Laois area. Development contributions and considerable commercial rates would not be made payable to all three Councils 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.

Overall, the failure to proceed with the Proposed Development would hinder progress toward national climate goals and have lasting negative effects on population health, energy resilience, and community development.

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. The nature of the impacts and the relatively non-sensitive receiving environment. Projects were examined in closer proximity to the Project including developments within 500m of the Derrynadarragh Wind Farm Site.

A review was conducted of all permitted and pending planning applications dating back 5 years between 2025 and 2019 which in conjunction with the Proposed Development have the potential to give rise to cumulative effects on the area. This is illustrated in the Appendix 1.3. This review included the Kildare, Offaly and Laois County Council Planning Websites, An Coimisiún Pleanála Website and EIAR Portal Website. As listed in Appendix 1.2, 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 decommissioning phase of the project in relation to population and human health. This is due to the significant distance of the Proposed Development 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.

As illustrated below, and shown in Table 6-11, there are 5 no. relevant operational and permitted renewable energy developments within the wider 20km Study Area. The closest operational wind farm is Cloncreen Wind Farm, Co. Offaly, located c.10.6km to the north of the site which has been in operation since 2022.

Table 6-12: Cumulative Energy Developments within 20km

Wind Farm Name	Number of Turbines	Distance and Direction from Proposed Site	Status
Cloncreen Wind Farm	21	10.6km to the north of the site	Operational since 2022.
Mount Lucas Wind Farm	28	11.1km to the north of the site	Operational since 2015.
Cushaling Wind Farm	9	12km to the north-east of the site	Permitted since 2020 & construction started in 2022.
Moanvane Wind Farm	12	18.6km to the west of the site	Permitted since 2018 & construction started in 2022.
Yellow River Wind Farm	29	c.19km to the north of the site	Permitted since 2022 & construction began in 2022, with an expected completion date in 2025.
Dernacart Wind Farm	8	c.15km west of the site	High Court Ruled in favour of this development in June 2025. An Bord Pleanala (now An Coimisiun Pleanala) approved the development in January 2024 (Appeal Case Ref: 310312)
Clonarrow Wind Farm	4	c.12km to the north of the site	Currently in Planning and awaiting decision (Planning Ref: 2560189)
Ballydermott Wind Farm	47	c.7.7km to the south east of the site	Pre-Application Stage
Cushina Wind Farm	11	c.4.3km north west of the site	Pre-Application Stage

The Proposed Development, in combination with the identified development outlined above, will have cumulative impact on land use in the area considered, introducing additional renewable energy land use to an established area consisting of agriculture, forestry 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.

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

A review was conducted of all permitted and pending planning applications dating back 5 years between from 2018, which in conjunction with the Proposed Development have the potential to give rise to cumulative effects on the area. This review included the Kildare, Offaly and Laois County Council Planning Websites, An Coimisiún Pleanála Website and EIAR Portal Website. As listed in Appendix 1.2, 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 have been assessed, and this has concluded that these will have an imperceptible cumulative impact with the construction, operation and decommissioning phase of the project in relation to population and human health. This is due to the significant distance of the Proposed Development 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.

The Proposed Development, in combination with the renewable energy development illustrated in Table 6.11, 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, commercial forestry 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.

There are no significant recreation, amenity and tourism attractions located in proximity to the proposed Derrynadarragh Wind Farm site and TDR, and as such, the construction, operation and decommissioning phases of the Proposed Development are not expected to have a cumulative impact on major tourism attractions, tourism numbers or tourism revenue. Any identified effects to local recreation and amenity during construction, operation and decommissioning 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 Proposed Development would result in increased temporary employment figures to the local area, with up to 77.76 long term jobs created during the construction phase of the Proposed Development. It is possible that there will be direct employment for people living in the wider area containing the Proposed Development who may be qualified for construction related roles, with indirect benefits 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 decommissioning phase of the Proposed Development 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.

Finally, the electricity generating capacity of the Proposed Development 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 provided an overview of the Proposed Development which includes the turbine array, Grid Connection (i.e. new on-site substation) and TDR from Port to Site. Potential effects were considered for the construction, operational and decommissioning phases of the Proposed Development, as well as potential residual and cumulative effects, with the predicted residual effects being the same for all turbine permutations, with mitigation measures proposed where relevant.

Furthermore, the Proposed Development was considered in regard to the vulnerability 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 Proposed Development in case of accident, disaster or emergency, with the assessment of the Proposed Developments potential susceptibility to major accidents and natural disaster being considered negligible.

The population of the area containing the Proposed Development Site and TDR were found to be of low density and dispersed within a rural landscape dominated by agriculture and areas of commercial forestry and cutover bog. The construction, operation and decommissioning phases of the Proposed Development 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 Proposed Development 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 and 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 Proposed Development 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 Proposed Development 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 Proposed Development Site consists mostly of agriculture, commercial forestry and historic cutover bog, with the land use in proximity to the proposed TDR comprising agriculture/commercial forestry, town centre/village centre. During the construction, operational and decommissioning phases of the Proposed Development, there will be slight, temporary effects to the existing land use, with slight, temporary effects along the TDR expected during the construction phase when turbine components are being delivered to the site from Galway Port.

With respect to Recreation, Amenity and Tourism, there are no major tourist attractions in proximity to the Proposed Development Site. It is expected that the construction, operational and decommissioning phases of the Proposed Development 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 Proposed Development 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 effects 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 Proposed Development. 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 effects from noise and electromagnetic fields during the operational phase are considered negligible.

Cumulative effects have also been assessed in relation to proposed, consented and constructed projects located nearby the wind farm site and TDR. No significant in-combination effects 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 effects on population and human health are predicted to occur as a result of the proposed development of the Proposed Development of Derrynadarragh Wind Farm.

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