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ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED LITTLETON WIND FARM, CO. TIPPERARY

VOLUME 2- MAIN EIAR

CHAPTER 5 - POPULATION AND HUMAN HEALTH

Prepared for:
Littleton Wind Farm DAC

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5. POPULATION AND HUMAN HEALTH

5.1 Introduction

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

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

The assessment presented in this chapter draws upon the findings of other EIAR chapters, such as Chapter 8 - Land, Soils and Geology, Chapter 9 – Hydrology, Hydrogeology and Water Quality, Chapter 10 – Air Quality and Climate, Chapter 11 – Noise and Vibration, Chapter 12 – Shadow Flicker, Chapter 13 - Landscape and Visual Impact, and Chapter 15 - Material Assets. In addition, other assessments are set out including those relating to potential effects on population statistics, socio-economics, changes to land use, facilities, human perception, and human safety.

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

- The 'Proposed Wind Farm' (also referred to in this EIAR as the '**Site'**);
- The 'Proposed Grid Connection' (also referred to in this EIAR as the **'GC'**);
- The 'Turbine Delivery Route' (also referred to in this EIAR as the **'TDR'**);
- The 'Biodiversity Enhancement and Management Plan Lands' (also referred to in this EIAR as the **'BEMP Lands'**).

The layout of the Site, TDR, GC, and Figures associated with this chapter are presented within EIAR Volume 4. The location of the Proposed Development is shown in Figure 4.1, the general layouts of the Proposed Wind Farm, GC route and TDR are presented in Figures 4.2 to 4.4.

Whilst consent is not being sought for the required GC within public roads to facilitate a proposed connection to the national transmission grid network at Ballyragget, Co. Kilkenny, it is assessed as part of this EIAR.

The proposed development consists of an 11 no. turbine wind farm and associated infrastructure including internal access tacks, hard standing, onsite 110kV substation and associated grid connection infrastructure, internal electrical and communications cabling, temporary construction compounds, drainage infrastructure, biodiversity management and enhancement measures, temporary accommodation works along the Proposed Turbine Delivery Route and all associated works related to the construction of the Proposed Development.

The proposed turbine is a conventional 3 blade design. Schematic drawings of the candidate turbine accompany the planning application. The plans and particulars are precise and provide specific dimensions for the proposed turbine. The turbine specification will have a hub height of 119m and a rotor diameter of 162m with a tip height of 200m.

The Draft Wind Energy Guidelines propose an increase in minimum turbine setback from nearby dwellings, requiring that a turbine should be located no closer than 500m from involved properties and a minimum setback of 4 times the turbine tip height from all third-party properties (800 m based on the proposed turbine tip height of 200 m). In this regard, the layout and design of the wind farm complies with the current Draft Revised Wind Energy Development Guidelines, 2019.

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 – Consideration of Reasonable 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.

5.2 Statement of Authority

This chapter has been prepared by Ida Wulff and reviewed by Conor Auld and Jim Hughes, all of Fehily Timoney and Company.

Ms. Ida Wulff is a Graduate Planner with Fehily Timoney and Company with 1 year's experience and holds a Masters' degree in Planning and Sustainable Development, and a Bachelor's degree in International Development from University College Cork.

Conor Auld is a Principal Planner with over 10 years' experience in professional planning practice. Conor holds a MSc in Urban and Rural Design and BSc in Environmental Planning from Queen's University Belfast. Conor also holds an advanced Diploma in Planning and Environmental Law from The Honourable Society of King's Inns. Conor has prepared several EIAR Chapters and assisted in EIAR management for wind farm developments throughout Ireland.

Jim Hughes holds a BA in Public Administration from the University of Limerick, an MSc in Town Planning from Queen's University Belfast and a HDip in Environmental Impact Assessment from University College Dublin. Jim has over 20 years professional experience and has led major Irish projects in the planning, environmental assessment and permitting disciplines including many wind farm developments.

5.3 Proposed Development Study Area

The Wind Farm Site is located within the jurisdiction of Tipperary County Council. The majority of settlements closest to the site are situated to the west of the site. Ballinunty is the nearest, c.2 km southeast of the proposed turbine array. The village of Gortnahoe lies c. 2.5 km northeast of the site at its closest point, while New Birmingham is situated c. 2 km to the east. The small centre of population of Ballysloe is also located to the east, at just over 3 km from the nearest turbine. Littleton and Twomileborris are the only settlements within the central study area situated to the west of the site, located c. 2.6 km and c. 2 km from the proposed turbine array, respectively. The village of Killenaule lies c. 4 km southeast of the site and Horse and Jockey is c. 4.7 km to the west.

Urlingford is located c. 6.8 km north of the site and Johnstown c. 10.5 km to the north.

The most notable settlements within the area are Thurles and Cashel. Thurles is located c. 9 km west of the site, while Cashel is c. 17 km to the southwest.

The TDR is located along long established national primary routes capable of accommodating large vehicles and heavy loads. No significant works are required other than hedge trimming on the approach to the site and temporary removal of signage, walls and temporary load bearing surfaces at some junctions on this TDR to facilitate delivery of the turbine components from Foynes Port to the final delivery point at the site in Littleton. Therefore, the TDR has not been considered in relation to Population and Human Health. The Electoral Divisions (ED) of the Proposed Development are all located within south County Tipperary.

The proposed TDR runs from Foynes Port along the N69, entering the N18 at Limerick, on to the M7 until Junction 17 where it re-enters the M7 in the other direction southbound. The TDR will then enter the M8 Motorway, exiting at Junction 4. Heavy loads will travel to site via the R693, through Urlingford to site entrance location at Longford Pass.

The proposed GC will exit Littleton Wind Farm, and traverse the following townlands within county Tipperary: Longfordpass East, Graiguepadeen, Longfordpass North, Fennor and Longfordpass South. The cable then enters County Kilkenny, and traverses the following townland within the public road, terminating at the Ballyragget 110kV Substation: Freshford Lots, Borrisnoe, Killawardy, Clomantagh Upper, Acragar, Moneenaun, Urlingford, Kilrush, Glenreagh, Kilduff, Borrisnafarney, Barnane, Sweethill, Ridge, Balief Lower, Bohernarude, Kilmacuddy, Killoskehan, Cloncannon, Grange, Moatpark, Barna, Ballybeg, Parksgrove, Baunaniska, Ballyconra, Stook, Graigueswood, Clone, Borrisbeg, Borrismore, Gortagarry, Clomantagh (Mt. Garret), Mountfinn, Barnagrotty, Balief Upper, Clomantagh Lower, Tobernapeastia, Darbyshill, Monabrika, Aghnameadle and Blakefield.

5.3.1 Defining the Study Area for analysis of the impact on Population and Human Health

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 Electoral Divisions (ED), which are the smallest legally defined administrative areas in the state. These ED's correlate to the townlands which the Proposed Development is located within, as defined above. However, as the statistical data from the Census (which is conducted by the Irish Government in conjunction with the Central Statistics Office) is presented in terms of ED rather than townlands, this approach has been adopted for this Chapter and all the sections outlined hereunder. This is considered best practice, and from the extensive professional experience of the EIAR team it is considered to be commonly used as part of the assessment on the human environment across Environmental Impact Assessment Reports as it provides the most reliable and accurate data pertaining to same.

The extent of the ED's considered for the purposes of this assessment are shown in Figure 5-1.

5.3.2 Cumulative Effects

In relation to cumulative effects for Population and Human Health, the cumulation of effects with other existing, approved and proposed projects (i.e. live planning applications) 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 planning search for proposed, consented and existing projects within 20km of the Proposed Development was conducted to identify development in proximity to the Proposed Development Site. Please refer to Appendix 1.2 - *Developments Considered for Cumulative Assessment* which contains the full list of developments considered in the Cumulative Assessment.

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 Proposed Development Site at Littleton 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 effects and the receiving environment of the wider area.

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

A final up-to-date planning search was conducted in March 2026 to identify significant projects in proximity to the Proposed Development Site and TDR. This included a search for major infrastructure projects; large residential, renewable energy or commercial developments; proposed or consented development; as well as an examination of relevant plans and policies for the area as detailed in EIAR Chapter 2 - Background to the Proposed Development / Need for the Proposed Development (to include Planning and Policy Context and a review of all current relevant legislation).

5.4 Consultation

Consultation was carried out with a number of stakeholders, including Tipperary County Council, Kilkenny County Council, An Coimisiún Pleanála (ACP), Government Departments, Non-Governmental Organisations, aviation organisations, and local residents. This is further detailed in Section 2.4 of Chapter 2, Volume 3 of this EIAR.

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 EIAR Chapter 2 - Background to the Proposed Development / Need for the Proposed Development (to include Planning and Policy Context and a review of all current relevant legislation).

5.5 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).

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:

- 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:

Table 5-1: Significance of Effect Matrix (EPA Guidance 2022)

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.

5.5.1 Population and Settlement Patterns

A desktop review of online data relating to the demographic information relating to the State, the county of Tipperary and the '*Study Area*' containing the Proposed Development at Littleton has been assessed to establish the existing demographic trends (www.cso.ie). The EDs relevant to the wind farm site are:

- Poyntstown,
- Littleton,
- Killenaule,
- Two-Mile-Borris,
- Buolick,
- New Birmingham,
- Longfordpass.

The Study Area including the Proposed Development area and GC is identified in Figure 5-1 Site Location, contained in Volume 4 of this EIAR. For this Proposed Development, only temporary accommodation works will be required at selected locations along the TDR. These works require temporary removal of obstacles at junctions such as signage etc., therefore, the TDR located along national primary routes have been screened out as effects are likely to be imperceptible due to the lack of, or the limited nature of, the proposed works along these routes. Please refer to Chapter 15 - Material Assets as well as Appendix 4.2 of Volume 3 for further information.

A 20km distance from the Proposed Development is utilised when assessing potential visual impacts. This is considered a reasonable Zone of Influence (ZOI) 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 effects and the receiving environment of the wider area.

5.5.2 Employment and Economic Activity

A socio-economic profile of the existing environment was established using live register data (2016 to 2024) and Census (2016 - 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 Proposed Development, and the impact this employment will have on the study area.

5.5.3 Land Use of Proposed Development Area

Land use in the area was examined to determine potential effects on existing land use patterns which may arise because of the Proposed Development. Tailte Éireann (2025) was studied and observations were carried out throughout the ground-proofing survey to determine land uses in the study area. The impact of the Project was then considered with regard to these land uses.

Eircode data was reviewed in a radius of 2km around the RLB in August 2025, to determine the distance from the Proposed Development to the nearest receptors. Further, planning application data was retrieved to assess the cumulative impact of the Proposed Development and other large-scale developments and renewable energy projects within a 20km area.

5.5.4 Recreation, Amenity and Tourism

Fáilte Ireland's '*Guidelines on the Treatment of Tourism in an Environmental Impact Statement*' (2011) informed the methodology used in assessing potential effects on *Recreation, Amenity and Tourism* with the assessment complying with this guidance provided.

A profile of tourism in the region of county Tipperary and surroundings was established through examination of *Fáilte Ireland Statistics* in order to indicate the strength of *Recreation, Amenity and Tourism* in the area containing the Proposed Development at Littleton and within the surrounding region. Potential 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 Littleton and the wider hinterland.

A review of planning policy and strategies was carried out to identify core walking trails and cycling routes and other rights of ways within the study area. These are set out in EIAR Chapter 2, while a detailed assessment of visual amenity and scenic routes, including the N69, is contained in EIAR Chapter 13.

5.5.5 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 Proposed Development. 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.

The most up to date CSO data and Department of Health (2024), *Health in Ireland – Key Trends 2024* were examined to establish a baseline health profile of the study area. Criteria of potential effects on human health was extracted from this literature in order to assess potential effects on human health as a result of the Proposed Development.

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 8 – Land, Soils and Geology. Potential effects to human health as described throughout this EIAR are detailed 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.

5.6 Existing Environment

5.6.1 Population

This section provides an overview of the population profile for the Study Area containing the Proposed Development, County Tipperary and the State between the Census years of 2016 and 2022 to create a baseline demographic profile of the receiving environment, and identify potential effects on demographic trends arising as a result of the Proposed Development.

The Study Area for the purpose of assessing population has been chosen based on ED's within which the proposed Wind Farm Site, and GC are located. As described above, the TDR is located along long established national primary routes capable of accommodating large vehicles and heavy loads. No significant works are required other than hedge trimming on the approach to the site and temporary removal of signage etc.

As illustrated in Figure 5-2, included within EIAR Volume 4, this encompasses the ED's as set out in Table 5-1 and Table 5-2, below, which shows the population usually resident, and present in state, as included in the most recent 2016 to 2022 census.

In relation to population, housing and property values, data and analysis presented in this report show no evidence is found that home prices surrounding wind facilities are consistently, measurably, and significantly affected by either the view of wind facilities or the distance of the home to those facilities, which is outlined further in section 5.7.5.4, below.

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

5.6.1.1 Population Trends

As noted in Section 5.3, the majority of settlements closest to the site are situated to the west of the site. Ballinunty is the nearest, c.2 km southeast of the proposed turbine array. The village of Gortnahoe lies c. 2.5 km northeast of the site at its closest point, while New Birmingham is situated c. 2 km to the east. The small centre of population of Ballysloe is also located to the east, at just over 3 km from the nearest turbine. Littleton and Twomileborris are the only settlements within the central study area situated to the west of the site, located c. 2.6 km and c. 2 km from the proposed turbine array, respectively. The village of Killenaule lies c. 4 km southeast of the site and Horse and Jockey is c. 4.7 km to the west.

Urlingford is located c. 6.8 km north of the site and Johnstown c. 10.5 km to the north.

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

Eircode data reviewed in August 2025 showed there are 396 residential properties which includes proposed residential developments which have received/hold active planning consent within 2 km of the turbine array, of which 115 of these residential properties (or consented residential developments) within 1km of the turbine array. The closest residential receptor is 851 m south-west of T11 The closest residential receptor to the substation is approximately 540 m to the north.

Figure 5-2 *Receptors within 1km vicinity of the Wind Farm Site* (EIAR Volume 4) illustrates the residential receptors within the vicinity of the Wind Farm Site according to Eircode and Geodirectory data (2025). This information is supported by the ground proofing survey and planning application search last updated November 2025.

Population statistics for the State, County Tipperary and the '*Population of Study Area*' of Longfordpass, Two-Mile-Borris, Buolick, Poyntstown, Littleton, New Birmingham and Killenaule are shown in Table 5-1, below. The '*Population of Study Area*' are the EDs associated with the proposed wind farm site as the TDR has been screened out. Eds associated with the GC works are also included.

Table 5-2: Population of Study Area 2016 - 2022

State		County				Development Site		
Year	Total	Tipperary	Kilkenny (GC)	Limerick (TDR)	Laois (TDR)	Wind Farm Site ED's	GC	TDR
2016	4,761,865	159,553	99,232	194,899	84,697	Longfordpass (320) Two-Mile-Borris (877) Buolick (621) Poyntstown (176) Littleton (1102) Killenaule (1150) New Birmingham	Fennor (511) Longfordpass (320) Ballyragget (1,513) Balleen (459) Ballyconra (239) Clomantagh (327) Rathbeagh (283)	94,593

State		County				Development Site		
Year	Total	Tipperary	Kilkenny (GC)	Limerick (TDR)	Laois (TDR)	Wind Farm Site ED's	GC	TDR
						(432) Total = 4,678	Freshford (1,001) Tubbridbrittain (319) Urlingford (1,288) Total = 6,260	
2022	5,149,139	167,895	104,160	209,536	91,877	Longfordpass (326) (+1.9%) Two-Mile-Borris (828) (-5.6%) Buolick (697) (+12.2%) Poyntstown (162) (-8%) Littleton (1057) (-4.1%) Killenaule (1223) (+6.3%) New Birmingham (452) (+4.6%) Total = 4,745	Fennor (563) (+10.1%) Longfordpass (326) (+1.9%) Ballyragget (1,587) (+4.9%) Balleen (517) (12.6%) Ballyconra (239) (+/- 0%) Clomantagh (347) (+6.1%) Rathbeagh (287) (+1.4%) Freshford (989) (-1.2%) Tubbridbrittain (307) (-3.8%) Urlingford (1,453) (12.8%) Total = 6,615	103,353
2016-2022 (%)	+8.1%	+5.2%	+5%			+1.4%	+5.7%	+9.2%

The data presented in Table 5-1 above, demonstrates that the state population in the six years between the national 2016 Census and the 2022 Census has seen a national increase in population of + 8.1%, from 4,761,865 persons in 2016, to 5,149,139 by 2022. This is an upward continuation of the trend in national population which has been observed since the previous census in 2011, which showed 4,588,252 persons, an increase of 12.04%.

At a county level, in the 2016 Census, the total population of County Tipperary was 159,553 persons. However, according to the 2022 Census, the total population of County Tipperary was 167,895 persons, reflecting a 5.2% increase since 2016.

The most recent census in 2022 shows Killenaule ED has the largest population of the six ED's in the study areas. In the census of 2022, the Killenaule ED showed a population of 1223, Littleton having 1057, Poyntstown having 162, Buolick having 697, Two-Mile-Borris having 828, New Birmingham having 452, and Longfordpass having 326 persons. In the census of 2016, the Killenaule ED contained a population of 1150 persons, Littleton having 1102, Poyntstown having 176, Buolick having 621, Two-Mile-Borris having 877, New Birmingham having 432 and Longfordpass having 320 persons. Killenaule had a population increase of 6.3%, Buolick 12.2%, New Birmingham 4.6%, and Longfordpass 1.9%. Two-Mile-Borris had a 5.6% population decrease between 2016 and 2022, Poyntstown having a decrease of 8%, and Littleton having a population decrease of 4.1%. In total, this represents a population increase of 1.4% across the EDs within the study area.

5.6.2 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.

5.6.2.1 Employment and Economic Status

Live register data, accessed in August 2025 (Last updated in February 2026) and available through (https://data.cso.ie), provides information relating to the number of people registering for Jobseekers Benefit, Jobseekers Allowance, or for various other statutory entitlements. The figure is useful to gauge unemployment estimations for an area, however, it is noted that the Live Register data includes part-time workers (working up to three days per week), seasonal workers and casual workers who are entitled to Jobseekers Benefit or Jobseekers Allowance and therefore, cannot be relied upon entirely for conclusive employment data. Furthermore, there was a significant increase in unemployment throughout the country due to the COVID-19 pandemic, however, the effects of this have largely receded. Live register data is presented below in Table 5-2 for the State and County Tipperary.

In order to obtain the percentage of those unemployed in each month, a percentage of those on live register is taken from the total census 2022 figures for those aged 15-64. The figures are derived from reviewing the census returns showing those who are able to work aged 15+, those who are out of full-time education and not performing duties that prevent them from working. In the 2022 census, there were a total of 2,531,099 persons registered in the labour force in the State. Table 5-2 outlines the percentage of the total population of the State, county and the 6 no. ED's containing the Proposed Development and it also sets out those who were not in the labour force which includes students, retired people, those unable to work and persons performing home duties etc. The figures are useful to gauge unemployment estimations for an area.

Table 5-3: Economic Status of the Total Population Ages 15+ in 2022

	Status	State	County Tipperary	Study Area
% of Population aged 15+, which are:	At Work	56.1%	54.4%	55.8%
	First time job seeker	0.8%	0.7%	0.8%
	Unemployed	4.3%	3.9%	3.9%
	Student	11.1%	10.1%	13.2%
	Home duties	6.6%	6.9%	6.3%
	Retired	15.9%	17.8%	14.6%
	Unable to work	4.6%	5.6%	4.6%
	Other	0.7%	0.5%	0.8%

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

5.6.3 Land Use

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

The Proposed Wind Farm Site boundary extends for approximately 12km from north to south and ranges between 1km (at north end) and 3km (at south end) from east to west. The elevation of the Site ranges from approximately 120-130m altitude above sea level. A large proportion of the Site is regenerating cutaway (heath, scrub, woodland) bog? but includes open areas with large bodies of open water. Areas of remnant high bog occur scattered along the boundaries.

The Site is located on 2 no. bogs, namely Littleton Bog and Ballybeg Lanespark Derryvella Bog? which covers an area of approximately 1,177 ha.

The Wind Farm Site is located in a sparsely populated rural context. There are 101 no. properties (80 no. residential, 16 no. mixed use, and 5 no. commercial) within 2 km of the turbine array, and 12no. within 1km as shown in Figure 4.5, Volume 4 of the EIAR. The closest residential receptor is 851 m south-west T11 The closest residential receptor to the substation is approximately 540 m to the north.

The Tailte Eireann Land Cover database for Ireland (based on interpretation of satellite imagery and national vector mapping data) identifies the following land cover types within and surrounding the Site: peat bogs, moors and heath, coniferous forestry, mixed forestry, land principally occupied by agriculture, non-irrigate land, pastures and transitional woodland scrub. Land use at the site is dominated by peat bog with smaller pockets of forestry and land used for agricultural purposes. Littleton is generally surrounded by farmland but there are extensive conifer plantations outside the eastern and western boundaries.

There is an extensive network of roads in the area. The M8 motorway and the R639 run to the northwest/west of Littleton bog. The R689 and R690 run to the east and the L4101 runs to the south. The main site access points are at the north and south ends of the bog adjacent to the railway line.

A detailed description of the history and background of the existing bog site and its associated historical operations is contained within Chapter 2, Volume 2 of the EIAR - Background to the Proposed Development.

The study area is within the catchments of the Nore and Suir river systems.

The surface water management system at the Site will ensure that there will be no increase in the risk of fluvial or surface water flooding downstream as a result of the Proposed Development.

There are 37 no. recorded archaeological sites located within the boundary of the Proposed Development Site, and a further 101 no. sites located within the surrounding 2km study area. These are further described and assessed within EIAR Chapter 14 – Archaeological, Architectural, and Cultural Heritage.

The layout of the Proposed Development has been designed to minimise potential environmental effects, while at the same time, maximising the energy yields of the wind resource passing over the Site. Available wind speed is a key factor in determining the economic viability of potential wind energy locations. The 2013 Sustainable Energy Authority of Ireland (SEAI) Wind Speed Atlas identifies the site as having an average wind speed of between 7.6 and 7.9 m/s at 100 m above ground level[2]. Wind speed monitoring from the site has recorded a long-term mean wind speed of 7.1 m/s at 100m above ground level at the existing temporary meteorological mast location.

The current *Wind Energy Development Guidelines* (2006) prescribes a 500m set back distance of turbines from properties. The *'Draft Revised Wind Energy Development Guidelines* (2019) outlines a minimum 500m or 4 times tip height set back. The Proposed Development will achieve a minimum separation, with the closest property to a turbine located c. 851 m south-west of T11, thus in excess of the prescribed 500m set back distance of turbines from properties.

There are a total of 2 no. unconsented (i.e. 'live' planning applications) and 3 no. permitted wind farm developments located within 20 km of the proposed Littleton Wind Farm, and a further 11 no. operational wind farm developments within the same radius. These are illustrated in Table 5-3 below.

[2] Sustainable Energy Authority of Ireland (SEAI), 2013. Wind Atlas. Available at: Wind Atlas

Table 5-4: Cumulative Energy Developments within 20km

Application Number	Development Name	Number of Turbines	Status	Approximate Distance & Direction from Nearest Turbine
Unconsented[3]				
ACP Ref. 322154	Brisklagh Wind Farm	7	Unconsented	15.4 E (T1)
Consented Wind Farm				
ACP Ref. 318704	Borrisbeg Wind Farm	10	Consented	21.25 NW (T1)
ACP Ref. 321454	Brittas Wind Farm	12	Consented	12.1km NW (T4)
ACP Ref. 315716	Knockroe Wind Farm	7	Consented	14.0 S (T11)
TCC Ref. 20972 which was subsequently amended by TCC Ref. 2360803	Farranrory Wind Farm	9	Consented	10.1 E (T6)
In Operation				
TCC Ref. 06/510773	Lisheen Wind Farm 1	18	In Operation	11.3 N (T1)
KCC Ref. 14//202, 15/629, 19/787, and 20/459 LCC Ref. 14/139 and 19/597 TCC Ref. 12/510275, 14/510138 and 15/6000924	Lisheen Wind Farm 3	8	In Operation	13.1 N (T1)

[3] Unconsented means a planning application which has not yet been determined.

Application Number	Development Name	Number of Turbines	Status	Approximate Distance & Direction from Nearest Turbine
TCC Ref. 10/510118 and KCC Ref. 10/145	Bruckana Wind Farm	14	In Operation	13.9 N (T1)
12/172	Lisdowney Wind Farm	4	In Operation	19.4 NE (T1)
KCC Ref. 1617	Foyle/Foyleature Wind Farm	4	In Operation	12.5 E (T1)
KCC Ref. 20281	Ballybay Wind Farm	5	In Operation	9.3 E (T1)
TCC Ref. 09/781 and ACP Ref. 237713	Knocknamuck/Cnoc Wind Farm	5	In Operation	7.9 E (T1)
TCC Ref. 09801 as extended by 15600723	Gurteen Wind Farm	1	In Operation	4.2 E (T6)
TCC Ref. 13/231 and 15600561 ACP Ref. 243357 and 245874	Ballincurry Wind Farm	2	In Operation	4.9 SE (T11)
ACP Ref. 245874	Kill Hills	16	In Operation	9.9 SW (T11)
09/510100	Lisheen Wind Farm 2	12	In Operation	7.5 N (T1)

As described within EIAR Chapter 15 - Material Assets, turbine component deliveries associated with this Proposed Development can navigate to the national road network without transport issues.

From the port of entry, it is proposed that the site shall be accessed via the following delivery route:

- Loads will exit the Port of Entry (PoE) of Foynes Port and join the N69 heading east;
- At Limerick, they will join the N18 heading northeast and merge onto the M7;
- Loads will exit at Junction 17 Portlaoise Interchange and perform a U-turn to re-join the M7 heading southwest;
- They will merge onto the M8 and continue southwest;
- At the M8 Junction 4 East Roundabout loads will turn left to join the R693;
- At the following roundabout loads will turn right onto the R639 then drive through Urlingford;
- To the southwest of Urlingford loads will turn left at the proposed site entrance.

A Traffic Management Plan (TMP) has been prepared as part of this EIAR (Refer to CEMP in Appendix 4.1 for details) A final construction stage TMP will be agreed with Tipperary County Council in advance of any works.

Temporary accommodation works will be required at selected locations along the TDR to facilitate the delivery of large components to the site. No permanent road widening or junction accommodation works are required along the turbine delivery route. Some temporary hardcore surfacing will be required at roundabouts or areas of oversail. All temporary accommodation works associated with the TDR will be fully reinstated following the construction stage.

Overhead utilities and obstructions will need to be removed at several locations to provide adequate overhead clearance. The removal of overhead utilities will be by either temporary disconnections or permanent re-routing. Such works will be carried out by the utility providers in advance of turbine delivery to site. Further details and assessment of these works are provided in EIAR Chapter 15 – Material Assets.

Temporary accommodation works will only be required during the operational phase in the unlikely event of a major turbine component replacement. The temporary accommodation works will not be required for the decommissioning phase as turbine components can be broken up on site and removed using standard HGVs.

The proposed GCR will be installed in the public road. Land use observed along the grid route consists of arable and pasture farmlands, one-off houses and farmsteads. The Corine Landover data shows the grid route extending over agricultural pastures (code 231). There are approximately 87 no. one-off houses along the be 10.612km grid route. The proposed point of connection to the national grid is the Ardnacrusha Substation which is a long-standing electricity substation and compound located adjacent to the Ardnacrusha hydro-station on the River Shannon.

5.6.4 Recreation, Amenity and Tourism

This section provides an overview of the existing recreation, amenity and tourism value for the Study Area within County Tipperary. 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 complied with Fáilte Ireland's '*Guidelines on the Treatment of Tourism in an Environmental Impact Statement*'. Consultation has taken place with local stakeholders, as detailed in Chapter 2 of this EIAR, in order to thoroughly understand potential effects to recreation activity in the area around Littleton and the wider hinterland of the site within county Tipperary.

The latest statistics from Fáilte Ireland for overseas tourism relates to 2024[4], and these latest available figures show that in the year ending 2024, overseas and Northern Ireland tourist expenditure in the Republic was an estimated €6.6 billion, with a further €1.5 billion spent by overseas visitors on fares to Irish carriers. Domestic tourism expenditure amounted to €3.6 billion, making tourism an almost €12 billion industry. Every €1m of tourist expenditure helps to support 20 employees in tourism industries, and it is estimated that for every euro spent by a tourist, 29c comes back to the Exchequer to pay for public services, once taxation from the wider impacts of tourism is taken into account.

Fáilte Ireland's 2024 survey results for overseas travellers indicate the top 5 most popular recreation activities for tourists in Ireland:

- Hiking and cross-country walking (2,001);
- Cycling (275);
- Golf (230);

[4] FI_Key-Tourism-Facts-2024_National-Summary.pdf

- Angling (77);
- Equestrian (78).

The most recent data regarding tourism is contained within Fáilte Ireland's '*Brand Regional Performance 2023'*, showing where tourists went and how much revenue they generated are set out in Table 5-5: Fáilte Ireland's 'Brand Regional Performance 2024', below. The Proposed Development Site at Littleton is situated within the '*Ireland's Ancient East*', with tourism numbers for the '*Ireland's Ancient East*' contributing significantly to tourism revenue of the region.

Table 5-5: Fáilte Ireland's 'Brand Regional Performance 2024'

Region		Britain	Mainland Europe	North America	Other Areas	All Overseas	Northern Ireland	Domestic Trips
Ireland's Ancient East	Tourists (000s)	729	551	336	98	1,714	202	5,281
Ireland's Ancient East	Tourist Revenue (€mn)	377	396	289	94	1,156	64	1,018

Thus, with the above figures in mind, tourism is considered a vital industry for county Tipperary. The Tipperary County Development Plan (CDP) 2022-2028, 'Chapter 9 - Tourism' identifies tourism as a key driver of sustainable socio-economic growth across the urban, rural, island and coastal settings of the County, with Objective 9-1 stating:

> *It is a policy of the Council to: Encourage and support tourism development, including accommodation and related facilities, to locate within existing settlements, subject to normal planning and environmental considerations, where they can support compact growth and regeneration, provision of services and the general economic vitality of settlements. New development will be required to relate sympathetically to the scale, capacity and level of development and facilities in the settlement.*

Table 5-6: Attractions and Amenities in County by distance from Proposed Development

Attraction / Destination	Distance/Direction from Proposed Development Site
Littleton Labyrinth	Partially within the Development Site
Midlands Trail Network *Planned amenity routes*	Partially within the Development Site
Lough Derryvilla	c. 150m from the Development Site
Grange Loop Walk	c. 6km East

The Littleton Labyrinth is an existing amenity route developed by Tipperary County Council which provides a shared walking and cycling route connecting the village of Horse and Jockey to Lough Derryvilla. From Horse and Jockey, it follows a mixture of public roads and the Derrynaflan greenway before joining 7.2km of newly constructed trail along the former Bord na Móna railway line between Derrynaflan and Derryvilla.

The route overlaps the proposed Wind Farm Site between the Former Bord na Mona Factory trailhead and Lough Derryvilla. An amenity car park was built as part of the Labyrinth on the proposed Wind Farm Site also at the Former Bord na Mona Factory trailhead.

There are two other car parks provided at Lough Derryvilla and Horse and Jockey.

The Midlands Trail Network amenity routes are proposed by Faillte Ireland and BnM with Decision to Grant received from An Coimisiún Pleanála dated 27th January 2026. The proposed trails link the Littleton Labyrinth and creates two new stretches of shared walking and cycling routes through the BnM peatlands, namely, between the Former Bord na Mona Factory, Lanespark and the L2111 road towards Littleton and between Lough Derryvilla and the L2111 towards New Birmingham. These routes are generally outside the proposed Wind Farm Site except for a very short stretch.

Two car parks are proposed as part of Midlands Trail Network project where the routes meet the L2111.

Tipperary County Council have also identified in their *Tourism Product Development Plan 2020 – 2030* potential for the further development of the Littleton Labyrinth network of walkways and cycleways which would link Twomileborris, Gortnahoo, Urlingford, Templetouhy and Littleton. If developed, these could cross the wider BnM land holdings and connect to the amenity tracks provided as part of the Proposed Wind Farm Project.

Please refer to Section 4.4.1.7 of Chapter 4 'Description of the Proposed Development' where the amenity proposed as part of this development is described in full.

5.6.4.1 Community Facilities & Services

Community facilities and services in proximity to the Proposed Development are centred on towns and villages in the area. The closest concentrated settlements to the Site are Urlingford (ca. 5 km to the north-east), Gortnahoe (ca. 2.5 km to the east), Twomileborris (ca. 2 km to the west), Littleton to the southwest and New Birmingham (ca. 2 km to the east). The town of Thurles is located approximately 9km to the west of the Site.

The proposed TDR and GC do not pass through or by any significant community facilities as it will remain within the public road network.

5.6.5 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 Littleton 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*, 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 5-7 below). Human health in relation to this assessment refers to the nature and possibility for adverse health effects on humans.

From analysis of the health statistics as returned with the 2022 census, Table 5-6 below, the majority of the general health of those within the Study Area recording their health as being 'Very Good' (52%), 'Good' (30.8%) and 'Fair' (9.2%). The census data indicates that the population of the Study Area as well as in county Tipperary and county Kilkenny in general is in alignment with the national averages.

Table 5-7: Population by General Health in the State, County Tipperary, and the Study Area (Census, 2022)

General Health (Census 2022)	State	County Tipperary	County Kilkenny	Proposed Development - ED's	Grid Connection – ED's	Turbine Delivery Route – ED's
Very Good	53.2%	52.2%	55.3%	52%	53.1%	53.2%
Good	29.7%	31%	30%	30.8%	30.1%	29.2%
Fair	8.6%	9.6%	8.5%	9.2%	8%	7.9%
Bad	1.4%	1.6%	1.3%	1.6%	1.5%	1.4%
Very Bad	0.3%	0.4%	0.3%	0.3%	0.4%	0.3%
Not Stated	6.7%	5.2%	4.5%	5.9%	5.3%	7.9%

5.7 Assessment of Likely Significant Effects

5.7.1 Potential Effects on Population - Construction

Based on employment and unemployment figures as shown in Table 5-*2: Economic Status of the Total Population Ages 15+ in 2022*, there is an available work force in the area for the construction phase 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 County Tipperary. Furthermore, due to the extensive transport infrastructure in proximity to Littleton providing access to the area, it is anticipated the workforce required will not be based in the locality, so having no impact on the local population growth except for during working hours.

There is no impact on population along the TDR from the Point of Entry to the site at Littleton.

The population of the Proposed Development EDs recorded in the 2022 Census was 4,293 persons, marginally up from 4,246 persons in the 2016 census. Workers that may be availing of temporary residence during the construction phase would be assessed as a population impact, but workers commuting daily and returning to their home residence are not considered as they have no impact on the local population during the construction phase. The population of the 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, some workers may choose to stay in accommodation in the larger settlements such as Thurles or Clonmel located outside the ED's which are accessible via national roads.

The construction works associated with the grid route will be undertaken on a rolling basis with short sections of road closed for short periods before moving onto the next section. It is expected that these works will be conducted over an approximate 12-18 month period. The population of the Grid Connection area will receive a slight increase in numbers during working hours. However, due to the transient nature of the grid route works, this is expected to have an insignificant temporary and neutral impact on the population of the Grid Connection area.

Overall, this will result in a slight, short-term increase in population resulting in a slight, short-term neutral impact.

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

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

Chapter 15 – Material Assets 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 TMP which is specific to the Proposed Development at Littleton, and is to be agreed with Tipperary County Council's road's authority and An Garda Siochána prior to commencing construction. With the application of mitigation measures outlined in Chapter 15, it has been concluded that there will be minimal impact on the population (local inhabitants) due to traffic disruption during construction.

5.7.2 Potential Effects on Population - Operational

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. The current Wind Energy Development Guidelines (2006) prescribes a 500m set back distance of turbines from properties. The 'Draft Revised Wind Energy Development Guidelines (2019) outlines a minimum 500m or 4 times tip height set back. The Proposed Development will achieve a minimum separation, with, the closest property located c. 851 m south-west of T11, thus, in excess of the prescribed 500m set back distance of turbines from properties. For further reference on any effects to receptors during the operational phase, please see Chapter 10 - Air Quality and Climate, Chapter 11 - Noise and Vibration and Chapter 12- Shadow Flicker.

It is unlikely that the population proximate to the Grid Connection and TDR will be impacted during the operational phase of the Littleton Wind Farm as further works and activities in these areas are not envisaged.

The likely effect on population is expected to be long-term positive and imperceptible.

5.7.3 Potential Effects on Population - Decommissioning

The decommissioning phase of the Proposed Development is described in Chapter 4 – Description of the Proposed Development of this EIAR, and provides for the removal of turbines and associated infrastructure from the Proposed Development Site. The potential effects 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.

During removal works, it is likely that some workers may stay in accommodation within the general area of Littleton or nearby towns accessible by the national road network such as Thurles or Clonmel, 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.

The grid route element of the project will remain in situ following decommissioning. There is no expected impact on population trends in the Grid Connection area as a result of the decommissioning phase. Similarly, there is no expected impact on population trends across the TDR as a result of the decommissioning phase.

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

The construction of the Littleton 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.

A projection of approximately 80 - 100 jobs could be created as a result of the construction of the Proposed Development, which is anticipated to have an installed capacity of 68.2 MW, depending on the turbine to be selected within the range proposed.

It is possible that there will be direct employment for people living in the Study Area who may be qualified for construction related roles. The employment of local construction workers and the use locally sourced materials will be encouraged. 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 effect on the employment profile of the area around Littleton, and a short-term slight, positive effect on local businesses and services in the nearby towns and villages of the Study Area.

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

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

Based on an installed capacity of 68.2MW, the operational phase of the Proposed Development could create 2-3 long term jobs. These jobs include operations and maintenance, back-office support and indirect jobs created by other activities related to installed turbines including IPP/utilities, consultancy firms, research institutions, universities and financial services.

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

5.7.5.1 Economic Value

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

Wind Energy Ireland's (WEI) Annual Report 2023, last issued in January 2024, states that wind energy provided Ireland with 35% of its electricity in 2023, an increase of 1% on 2022. Provisional figures for 2024, issued in January 2025, showed in 2024, 32% of Irelands electricity came from wind, with 41% of Irelands electricity requirement provided by wind in December 2024. The most recent report from 2023 shows wind generated c. 13,725 gigawatt-hours (GWh) in 2023, which is equivalent to the electricity consumption of more than 3 million 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.

For the Proposed Development with 11 no. turbines assuming a turbine power rating of 6.2 MW, and operational period of 35 years, the payback time for the manufacture, construction and decommissioning phases (including carbon losses from soil, etc.) is estimated at approximately 2 years. Should further restoration measures be put in place, the total carbon emissions and carbon payback time would be reduced. In total, it is estimated that 2,787,319 tonnes of CO2 will be displaced over the proposed 35-year lifetime of the wind farm i.e. 79,638 tonnes of CO2 per annum.

The 2023 and 2024 Climate Action Plan's established a target of 6 GW of installed onshore wind capacity by 2025 and 9 GW by 2030, with c. 4.6 GW's of installed onshore wind capacity currently in the Republic of Ireland. This leaves a gap of c. 4.4 GW's to achieve the 2030 target.

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 Littleton 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. As such, the Proposed Development of Littleton Wind Farm has the potential to contribute c. 1.1% of the total additional onshore wind capacity required nationally.

These savings will continue to rise with the installation of further wind energy and other renewable energy developments, with provisional figures from WEI for 2024 issued in January 2025 showing c. 333MW of new wind farms being connected in 2024. 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.

In addition to the increased renewable electricity production nationally, the commercial rates of the electricity generated from the Proposed Development during the Operational Phase would contribute funds to the County Council, which may be used to support the provision of public services within the County. Employment Potential

Once the Proposed Development is constructed, there will be direct and indirect employment associated with the Operational Phase of the Proposed Development. Opportunities for mechanical/electrical contractors and craftspeople to become involved with the operation and maintenance of the Proposed Development will arise. Additionally, there will be ongoing requirement for Ecological Clerk of Works (ECoW)/ Ecologists to monitor and managed the BEMP in addition to the required bird and bat surveys.

As a result, the Operational Phase of the Proposed Development will have a short-term, significant positive effect on the employment profile of the area, and a short-term slight, positive effect on local businesses and services in the nearby towns and villages of the Study Area due to the skilled nature of the employees required for the operational lifetime of the Proposed Development.

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 are likely to represent a slight positive, long-term significant effect on resources of the Local Authority during the Operational Phase.

It is expected that the Proposed Development will have a significant positive effect on Socio-economics, Employment and Economic Activity in the area.

5.7.5.2 Proposed Community Benefit Scheme

In addition to employment during the construction and operational phases of the proposed development and annual rates that will be paid to the local authority by the developer**,** a Community Benefit Fund will be developed during the first year of operation of the wind farm.

A key criterion of the Department's Community Benefit Rulebook, as updated in 2025, is that the projects and initiatives will benefit the communities surrounding the wind farm. As part of this, a Fund Committee will be established and will consist of a number of volunteer community representatives, the project Developer and administrator (if applicable). The Fund Committee should aim to represent the widest cross-section of the community possible. The Fund Committee will then develop a strategy for the Community Fund. Both BnM and SSE have a long history of delivering local community funds, and have supported a number of strategic initiatives, including scholarships and major projects.

For example, SSE operates a Scholarship Fund for students living near Galway Wind Park, and BnM offers Scholarships across its Cloncreen, Derrinlough and Oweninny Phase 2 Wind Farms. These funds can provide a monetary grant to a number of successful applicants, for each year of study, up to a maximum of 4 years, for a number of students (including apprenticeships) living in the vicinity the proposed development. The Scholarship may be used towards course fees, accommodation, tools, transport costs, etc.

The Fund will also include a Near Neighbour Scheme which will offer principal primary residents within a prescribed distance of a wind turbine an annual financial payment, which could be used towards energy bills, home retrofits, or other energy efficiency measures. In addition to these payments, this Scheme may also offer participants a contribution towards the completion of energy measures on the property and/or education support.

The value of the Community Benefit Fund will be linked to the productivity of the wind farm and is calculated based on €2/MWh and the overall total generated by the wind farm. It is estimated that the proposed Fund could be in the region of circa €5.5 million over the first 15 years of the Fund, on the basis that the proposed project will generate 185,204 MWh of electricity produced per year.

5.7.5.3 Property Values

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

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

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

The main conclusion of this study is as follows:

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

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

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

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

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

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

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

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

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

The key findings from the study are:

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

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

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

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

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

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

The main conclusion of this study is as follows:

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

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

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

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

5.7.6 Potential Effects – Socio-Economics, Employment and Economic Activity – Decommissioning

The potential 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. During the decommissioning phase employment opportunities will be available at the Wind Farm Site. The influx of construction workers to the Wind Farm Site 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 effect 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.

5.7.7 Potential Effects – Land Use - Construction

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

TDR works along public roadways have potential to cause non-significant brief effects 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 15 – Material Assets.

Temporary effects on land use will arise as a result of the installation of the grid connection along the grid route which will be constructed within the public road corridor. Full road closures will be put in place to facilitate cabling works in combination with lane closures, partial road closures and stop/go systems. This will allow for the works to be completed efficiently and minimise disruption time for residents.

This is likely to have a temporary slight negative effect on residential land-use due to noise nuisance because of machinery. The effect of noise is further considered in EIAR Chapter 11 – Noise and Vibration.

5.7.8 Potential Effects – Land Use - Operation

The operational phase of the Proposed Development will occupy a small proportion of the Proposed Development Site area when operational, and it is anticipated that there will be minimal effect on existing land uses arising from the operational phase.

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

The operational phase of the Littleton Wind Farm will not negatively effect agricultural practices on lands adjacent to the site. There are no peer reviewed studies which indicate that wind energy development has a negative effect 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). As such, there will be no likely significant negative effect to existing agricultural land use as a result of the Project.

It is proposed to upgrade any existing agricultural and forestry 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.

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

During the operational phase, accidental pollution from spills and leaks of fuel, oil and chemicals from vehicles and maintenance works may occur. Additionally, transformer oil will be used in cooling the transformers associated with the sub-station which creates potential for oil spills during any oil replacement activity or leaks during the operational phase, although the likelihood of this is low. There is no significant risk of sediment release to cause increase suspended solids in surface waters during the operational phase as vegetation will not be disturbed during this phase, with further information contained within EIAR Chapter 9 – Hydrology, Hydrogeology and Water Quality.

Activity is not expected at the Grid Connection Route and TDR during the operational phase of the proposed project. There is potential for repair works along the Grid Connection Route to take place, however, these will likely be brief or temporary and insignificant. It is unlikely that the TDR route will be required during the operational phase of the project, unless in the unlikely event a turbine component requires to be transported for replacement or repair. In this case, there is potential for slight temporary negative effect on residential land-use due to noise nuisance as a result of machinery.

Biodiversity enhancement measures will be incorporated into the site. The works to re-wet this habitat, such as drain blocking and grazing management will not result in changes in ecological functions and/or features that are essential for the ecological requirements of habitats and species. The designation of an area for biodiversity will result in some loss of existing land use, which will have an overall positive effect on land-use by enhancing the biodiversity of the Project. A Biodiversity Enhancement Management Plan (BEMP) for elements of the Proposed Development such as the turbine, substation and TDR can be found in Chapter 6 - Biodiversity, Appendix 6.1: Biodiversity Enhancement and Management Plan (BEMP).

5.7.9 Potential Effects – Land Use – Decommissioning

The decommissioning phase of the Proposed Development is described in Section 4.7 of Chapter 4 of this EIAR and provides for the removal of turbines and associated infrastructure from the site. The potential effects associated with the decommissioning phase in relation to land use will be similar to those associated with construction phase but of a reduced magnitude.

Decommissioning works will include removal of all above ground structures including the turbines and met mast. The on-site substation will be under the management of EirGrid and ESB Networks 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 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. Impact to these land uses during the decommissioning phase is expected to be temporary to short-term slight, negative.

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

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

The underground Grid Connection will remain in situ following decommissioning and form part of the national grid. Therefore, impact to land use along the grid route is unlikely during the decommissioning phase.

5.7.10 Potential Effects – Recreation, Amenity and Tourism - Construction

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

The proposed works associated with the Proposed Development will avoid negatively effecting nearby community facilities, town centre services and amenities due to lack of proximity. The proposed works do not interact with nearby recreation and tourism amenities as listed in section 5.6.4 *Recreation, Amenity and Tourism*, and therefore there are no expected direct effects on these features.

During turbine delivery, there is potential for indirect impact to residential/commercial receptors due to the transportation of large and bulky loads on the public roadway, especially once the transportation vehicles travel from Junction 4 of the M8 Motorway to the Littleton Site. This will likely be as a result of traffic calming measures during the escorting of the turbine components. Temporary accommodation works will not be required in these settlements and therefore impact is likely to be temporary to brief, negative and not significant.

Mitigation is set out in Chapter 15 – Material Assets in order to avoid indirect effect as far as possible on town and village centre facilities and services during turbine delivery.

5.7.11 Potential Effects – Recreation, Amenity and Tourism - Operation

In relation to tourism and wind energy development, the Wind Energy Development Guidelines for Planning Authorities (2006) state 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 effects 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 effect 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 produced its guidelines on tourism and environmental impacts. This document titled '*EIAR Guidelines for the Consideration of Tourism and Tourism Related Projects*' states that whilst tourism projects may be diverse, the projects which can impact tourism are considerably more wide ranging, from large infrastructural developments to local energy developments. Disruption to or suppression of a tourist resource or amenity can have very local or more strategic effects, 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 effects occurring during construction or operational periods.

Conducted between 23rd and 8th December 2022, the '*Public Attitudes Monitor*' document produced by Wind Energy Ireland (WEI) surveyed a total of 1,017 people to evaluate "*public perceptions and attitudes around wind energy amongst Irish adults*". Of specific relevance to our study of the site at Littleton, and it being located in a rural area of county Tipperary, this study also included 201 participants who resided in rural Ireland. In general, the survey reported that 4 in 5 (80%) of the participants are in favour of wind power, which sees a 6% increase on the previous survey results. Furthermore, amongst those surveyed in Rural areas, 4 in 5 (85%) were recorded as having favourable attitudes towards wind generation, with 55% of those are strongly in favour, 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 Littleton Wind Farm is described in Chapter 13 – Landscape and Visual Impact.

An assessment of the cumulative impacts on visual amenity is described in in EIAR Chapter 13 - Landscape and Visual Impact, Section 13.9, assesses cumulative impacts. This confirms that the proposed Littleton Wind Farm would have very limited potential to be viewed in isolation, and that the proposed Littleton Wind Farm would contribute to a cumulative impact of Medium magnitude in the context of the current cumulative scenario. Overall, the Proposed Development will result in an intensification of wind energy development within this landscape context and within the surroundings of county Tipperary as existing wind energy development is an established feature within the wider Study Area.

Long term positive effects are expected to result from the proposed amenity plans within the Proposed Development, which will link into the wider existing and proposed amenity networks.

5.7.12 Potential Effects – Recreation, Amenity and Tourism - Decommissioning

The decommissioning phase of the Proposed Development is described in Chapter 4 – Description of the Proposed Development of this EIAR, and provides for the removal of turbines and associated infrastructure from the site.

The decommissioning phase will have similar temporary effects 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 Project, 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 Littleton Wind Farm, it is expected to have an insignificant and temporary effect on recreation, amenity and tourism.

5.7.13 Potential Effects – Human Health & Safety - Construction

With respect to health and safety, the Health and Safety Authority (HSA) of Ireland monitor fatal workplace injuries throughout Ireland. In January 2025, the HSA confirmed 33 people lost their lives in work-related incidents during the year ending 2024, which was a reduction of almost a quarter on the number of fatalities in 2023. The HSA also confirmed the construction sector saw a decline in fatalities from 10 in 2023 to 5 in 2024. Though this figure shows a decline of 50% on fatalities from 2023, it still indicates the danger levels which workers are exposed to on construction sites when compared to other economic sectors.

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

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

Construction works associated with the GC have potential to effect nearby dwellings with regard to air quality. Due to the nature of construction along the proposed grid route, which works as a "rolling" construction site, meaning that these works will not be concentrated in any one area of the route, these effects are considered to be brief to temporary slight, negative. Therefore, the construction phase of the Littleton Wind Farm will not have a significant effect on human health and safety.

The Noise Assessment contained within Chapter 11 – Noise and Vibration contains the estimated noise outputs during the construction phase of the Proposed Development in Section 11.4.2.1. The noise assessment of the borrow pit focuses on the two closest noise sensitive locations, location R302, north east of the borrow pit and location R303 south of the borrow pit. The borrow pit construction activity is expected to have a **significant negative** effect that is **temporary** in duration.

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

The delivery of turbines will require transport of heavy/bulk from Junction 4 of the M8 Motorway to the Proposed Wind Farm Site entrance on the R639 at Longford Pass on approach to the proposed wind farm site in Littleton. Due to the abnormality of the turbine components, there is potential human safety risks associated with their delivery including traffic safety and pedestrian safety at special manoeuvring points. This has potential for temporary significant, negative effects to human safety during the delivery of turbine components if unmitigated.

Potential effects on air quality have the potential to affect human health. This has been assessed in Chapter 10 - Air Quality and Climate.

Following the implementation of the mitigation measures, the Proposed Development 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.

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

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

Cumulative construction noise is predicted to be below the daytime noise limit of 65 dB $L_{Aeq, 1hr}$. Therefore , no specific mitigation is required, beyond that specified in Section 11.6.1 of Chapter 11, Noise and Vibration. With the borrow pit works, there is potential for cumulative noise from the north west section of the borrow pit and the main borrow pit affecting properties north east of the borrow pit. Therefore borrow pit activities at these locations should not occur simultaneously to prevent potential cumulative impacts.

Potential effects on human health associated with Land, Soil and Geology 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. The Site and proposed infrastructure locations are exclusively within an area mapped as having a 'Low' landslide susceptibility, and the risk of landslide within the Site is considered 'Negligible and Insignificant'. Considering the mitigation measures as set out in Chapter 8 - Land, Soils and Geology, the effect on human health during construction works over a 24-month period is expected to be temporary, negligible and imperceptible.

Potential effects on human health associated with hydrology during the construction period relate to run-off associated with activities that change the land cover to less permeable surfacing all have the potential to contribute to the increase in runoff due to changes in the finished surfaces. Planned project components such as, the construction of new access tracks, turbine foundations, hardstanding areas, the onsite substation and associated compound will increase surface runoff if unmitigated.

Overall, the residual and cumulative effects of the Proposed Development are Not significant. The engineering solutions, and inclusion of proper construction and safety protocols, as shown in the TMP, demonstrate the effects 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 effects to human health and safety during the 24-month construction period is considered low.

5.7.14 Potential Effects – Human Health - Operation

During the operation phase of the Project, potential effect on human health and safety are unlikely following assessments and appropriate mitigation against through proper engineering design and the development of mitigation strategies.

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

Potential effects 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."*

There are no expected works to take place along the grid route or TDR during the operational phase of the proposed development. If maintenance works are required in these areas or bulk equipment is required to be delivered, proper safety protocols will be put in place in line with the mitigation measures set out in section 11.5. Therefore, impact to human safety on public roads during the operation phase is unlikely.

The Noise Assessment contained within Chapter 11 – Noise and Vibration contains the estimated noise outputs during the operational phase of the Proposed Development in Section 11.4.3. Based on the predicted noise levels, a new noise source will be introduced into the acoustic environment and it is expected that there will be a **long term slight** to **moderate** effect for dwellings within the 35 dB L_{A90} study area with a **moderate significance** of effect on the closest dwellings to the Proposed Wind Farm. The substation predicted daytime and night time noise levels are **below the level** that would lead to an **adverse effect**

5.7.15 Potential Effects – Human Health – Decommissioning

The decommissioning phase of the Proposed Development, as described in Section 4.7 of Chapter 4 of this EIAR, provides for the removal of turbines and associated infrastructure from the site. The potential effects associated with decommissioning phase in relation to human health will be similar to those associated with construction phase as detailed in Section 5.7.2.

Potential effects to human health and safety on-site will be prevented through best practice methods as per the construction phase Construction and Environmental Management Plan and will include staff training and knowledge of the site-specific decommissioning plan. Once mitigation measures and best practice construction site methods are followed, potential negative effect on human health and safety is expected to be imperceptible and temporary.

During the decommissioning works, there is potential for negative effect on health and safety of the public. Similar to Section 5.7.2, effects are associated with the presence of a construction crew, increased traffic, presence of heavy goods vehicles and machinery, potential obstructions on the public road and potential obstruction to recreation and amenity trails. Potential impact to public health and safety during the decommissioning phase is considered temporary moderate and negative.

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

5.7.16 Health and Safety Standards and Procedures

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

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

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

'*Infrasound & Low Frequency Noise'* has been cited as a cause of potential health effects as a result of wind turbine development. This is discussed in detail in Chapter 11 - Noise and Vibration, Section 11.2.4, where it states the definition of low frequency noise can vary, but it is generally accepted that low frequency noise is noise that occurs within the frequency range of 10 Hz to 160 Hz as defined in NANR45: Procedure for assessment of low frequency noise, Salford University Report.

Infrasound is noise occurring at frequencies below that at which sound is normally audible, that is, less than about 20 Hz, owning to the significantly reduced sensitivity of the ear at such frequencies. In this frequency range, for sound to be perceptible, it must be at very high amplitude, and it is generally considered that when such sounds are perceptible then they can cause considerable annoyance. However, wind turbines do not produce infrasound at amplitudes capable of causing annoyance as outlined in the following paragraphs.

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

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

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

In terms of perceived effects from shadow flicker and noise, a shadow flicker assessment has been conducted and is included in Chapter 11 of this EIAR, and a Noise and Vibration assessment is included in Chapter 11.

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 residential receptor is 851 m to T11, and the closest residential receptor to the substation is approximately 475m away. Therefore, the layout and design of the wind farm complies with the current Wind Energy Development Guidelines, 2006, and therefore, the operational wind farm noise levels meet the derived night and daytime noise limits at all residential properties surrounding the proposed Littleton 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 effects and responsible wind turbine development. The operational phase will therefore likely have a long-term, imperceptible, neutral effect on human health in proximity to the wind farm site.

With respect to safety, only trained and licensed 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 Project will have a negligible effect on public health and safety.

5.7.16.1 Potential Health and Safety effects from Proposed Cables and Electromagnetic Interference

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

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

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

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

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

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

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

In 2010, ICNIRP issued updated guidelines, which reviewed the research since the 1998 report and replaced previous recommendations given by ICNIRP for this frequency range. The revised range is detailed in Table 5-8. 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 5-8: 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 at Littleton, there will be no effect 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."*

The proposed on-site substation is located within the Proposed Development Site, and is connected to the wind turbines via internal network cables, all contained with in the Site. The on-site substation is connected to the grid via cables predominantly in the public road way to the Ballyragget 110 kV substation.

The cable fully complies with the ICNIRP and EU guidelines on exposure of the general public to ELF EMF. The potential effects on human health as a result of electromagnetic interference associated with the operational phase of the Littleton 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 effect on human health on employees at the Littleton 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 effect on public health and safety.

5.7.16.2 Vulnerability of the Proposed Development to Major Accidents, Natural Disasters and Climate Change

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

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

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

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

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

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

A future scenario influenced by climate change and resultant extreme weather events may increase the likelihood of flooding, fire and landslides. The following sections assess the Proposed Developments vulnerability to this further.

5.7.16.3 Flooding

The Online Office for Public Works (OPW) flood mapping does not show any recorded historical flooding events within the Site, with the closest being an area with recurring flooding at the Ballymureen Bridge Littleton located approximately 3 km west of the Site. As this is at a significantly lower elevation than the Site area, it is not considered that the Site area was affected by this flooding event.

The OPW flood mapping shows that are no recurring flood incidents or instances of historical flooding were identified within the Site on historic OS maps. Identifiable map text on local available historical 6" or 25" mapping for the Site does not identify any lands that are "liable to flood".

In relation to the Proposed Grid Connection route, the GSI's Winter 2015/2016 Surface Water Flood Map records fluvial flooding along the River Nore to the east of the N77, west of Ballyragget. The National Indicative Fluvial Flood Mapping for the Present Day Scenario shows fluvial flooding along many of the watercourse mapped in the vicinity of the Proposed Grid Connection route. NIFM fluvial flood zones are mapped along the R694 to the north of Freshford and along the Nuenna River to the west of Freshford. Fluvial flood zones are also mapped along the R693 at Urlingford over the Goul River, the Ardreagh Stream and further to the east over the Borrisbeg Stream. Fluvial flood zones are also mapped along the Black River (Drish River) within the River Suir surface water catchment. Existing roads and watercourse crossings exist at all of these locations.

The Site Specific Flood Risk Assessment (Appendix 9-1 of Volume 3) considers flood risk at the site in a climate change scenario. This concluded that flood zones at the Site and along the proposed GC route are unlikely to be significantly impacted by future climate change.

5.7.16.4 Fire

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

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

A peatland site may be more vulnerable to fires in a climate change scenario. On the Proposed wind farm site Phase 1 rehabilitation was carried out between 2018-2021 in accordance with condition 10.2 of the IPC Licence. This will reduce its vulnerability to climate change associated fires.

5.7.16.5 Major Incidents Involving Dangerous Substances - SEVESO

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.

As shown in the Tipperary County Development Plan, Section 8.3.6 '*SEVESO SITES'*, there is one site in County Tipperary where the occupier has notified the Health and Safety Authority (HAS) that they meet a specified threshold for quantities of hazardous substance as outlined in the regulations, and therefore within the remit of the SEVESO III Directive. The aim is to prevent major accidents and/or limit their consequences ensuring high levels of protection for the community in a consistent and effective manner.

The SEVESO site in County Tipperary is located at Ballydine, Kilsheelan, and is the pharmaceutical facility Merck Sharp and Dohme. This is ca. 32km South of the Proposed Development Site.

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

5.7.16.6 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, as far as reasonably practicable, that the wind farm does not pose a risk to those working there or to anyone not employed there but who may be affected by activities on the wind farm.

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

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

Potential catastrophic events associated with operational wind turbines include:

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

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

The ground to blade tip height for the wind turbines will be 200m. The wind turbines will have a rotor diameter of 162m and a hub height of 119m. 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 residential receptor is 851 m to T11, and the closest residential receptor to the substation is approximately 475m away. 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 Proposed Development design which confirm ground conditions at turbine locations as well as slope stability analysis at proposed turbine and access track locations.

Other design mitigation measures employed for the siting of wind turbines include the following:

- 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 8 – Land, Soils and Geology.
- 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 4.1 of Volume 3 of this EIAR.

5.7.16.7 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 effects 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 outlined in EIAR Chapter 8 – Land, Soils and Geology, the Proposed Development is not a sensitive site in terms of land, soil hydrogeology & geology and poses a low risk for landslide.

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

The findings of the Geotechnical and Peat Stability Assessment Report (Appendix 8.1) showed that the proposed development site has an acceptable margin of safety and is suitable for the proposed development.

The site is not expected to result in any significant, negative cumulative effects with other existing or permitted developments in the vicinity.

With mitigation measures, outlined in Section 8.8 of Chapter 8, put in place during construction, operational and decommissioning stage the proposed development will have imperceptible significance on the land, soils, hydrogeology and geology. The site is not susceptible to landslides, this will not change in the climate change scenario.

5.8 Mitigation Measures

5.8.1 Mitigation Measures - Population

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

5.8.2 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.

5.8.3 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 at Littleton have been kept to the minimum necessary to avoid effects on existing land uses as far as possible.

Existing tracks and access paths have been incorporated into the design to minimize the construction of new tracks and roads and minimize the removal of significant land uses such as cutover bogs. Where new access tacks are required, these have been sensitively designed in order to minimise impact on Cutover Bogs. Electricity cables will be installed underground in or alongside access tracks to avoid effects 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 4.1 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 15 – Material Assets, which includes information on traffic and Transportation.

Prior to the grid connection installation works within public roads, all access points (domestic, business, farm) are considered when finalising the temporary road closures and diversions, in order to maintain local access as much as possible and avoid effects 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 effects to adjacent land uses.

5.8.4 Mitigation Measures – Recreation, Amenity and Tourism

Mitigation measures for recreation, amenity and tourism are primarily related to the preliminary design stage of the Proposed Development at Littleton, 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 Littleton Wind Farm, careful consideration was given to the potential effects on landscape amenity. The magnitude of visual impact on the landscape is assessed in Chapter 13 – Landscape and Visual Impact.

Chapter 15 – Material Assets 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 effects on recreation and amenity in the area of the wind farm site and potential indirect effects on town centre and village centre facilities and services along the TDR during transportation of turbine components.

5.8.5 Mitigation Measures – Human Health & Safety

5.8.5.1 Mitigation Measures – Construction & Decommissioning

A Construction and Environmental Management Plan (CEMP) is included in Appendix 4.1, which details construction 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 8 – Land, Soils and Geology.

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

Specific mitigation measures for the borrow pit are outlined in Chapter 11, Noise and Vibration.

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

In relation to the TDR, extra safety measures will be employed when large loads are being transported, for instance, Garda escort will be requested for turbine delivery, and a comprehensive turbine delivery plan will be utilised to avoid potential effects on human safety for road users and pedestrians. A Construction Traffic Management Plan is included in the CEMP in Appendix 4.1 of this EIAR.

Once mitigation measures and health and safety measures are implemented and followed, the potential for 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.

5.8.5.2 Mitigation Measures - Operational

To ensure health and safety of both the public and staff throughout the operational phase of the Proposed Development, access to the Site shall be restricted during the Operational Phase. 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 detailing the work practices, procedures and management responsibilities relating to the management of health and safety during the design, construction and operation of the Littleton 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 are carried by underground cable and will be marked out above ground where they extend beyond the track or hardstanding surface. Details of cables installed in the public road will be available from ESBN;
- Turbine design includes a glass fibre reinforced polyester hood covers the nacelle. The turbines will be equipped with a Lightning Protection System (LPS) earthing and isolation to help protect the wind turbine against the physical damage caused by lightning strikes. Additionally, the turbines will be equipped with a Fire Suppression System. Furthermore, the proposed wind farm will be remotely monitored, and potential accidents will be quickly identified and reported;
- Furthermore, a nominated competent person will carry out checks and routine maintenance work to ensure the reliability and safe operation of fire-fighting equipment and installed systems such as fire alarms and emergency lighting. A record of the work carried out on such equipment and systems will be kept on site at all times;
- In line with *WEI Health and Safety Guidelines for the Onshore Wind Industry* (2011), Emergency Response Plans will include emergency response procedures for initial actions in the event of a fire. Records will be kept for testing of fire alarms and drills and maintenance/inspection of fixed and portable firefighting equipment;

- Information will be provided to employees on fire safety and fire prevention, including risks of and control measures to prevent fire outbreak, evacuation procedures and those responsible for their implementation, and the use of firefighting equipment, in line with HSA guidance (Fire Prevention - Health and Safety Authority (hsa.ie). The wind farm system will include a kill switch that can be operated at any time with an overriding manual shutdown system in case of an emergency;
- During the construction phase of the Proposed Development, an emergency response plan will be in place as set out in the CEMP, included in Appendix 4.1 of Volume 3 of this EIAR;
- Turbines will be fitted with a Fire Suppression System. Additionally, each turbine will have a number shown in large print on the top of the nacelle which is intended to aid in any aerial fire support to control wildfires in the unlikely event once should occur in the area;
- Lightning conductors will be installed on each turbine as all structures standing tall in the sky require this protection. Turbines specifically require this to prevent power surges to electrical components;
- Turbines will be fitted with ice detection systems which will stop the turbine from rotating if ice is forming on a turbine blade. This prevents ice throw which can cause injury;
- 24-hour remote monitoring and fault notifications are included as standard in the Turbine Operations and Maintenance Contracts;
- Aviation lighting will be installed on the turbines which will be routinely maintained, with the precise location and detail such as height of turbines being sent to the Irish Aviation Authority;
- In addition to scheduled maintenance, the maintenance contracts will allow for call out of local engineers to resolve any issues as soon as they are noticed the remote monitoring system;
- Access to the turbines inner structure will be locked at all times and only accessed by licensed employees for maintenance;
- Risk avoidance by design will be achieved through the preparation of a detailed design risk assessment at detailed design stage, a detailed method statement for all elements of the work, supervision by geotechnical personnel during excavation and avoidance of earthworks during severe weather conditions.

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

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

The design of the 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 8 – Land, Soils and Geology and EIAR Chapter 9 – Hydrology, Hydrogeology and Water Quality.

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

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

During the Operational Phase of the Proposed Development, public access will be restricted to recreational amenity routes only. Fencing shall be used to prevent public access to critical wind farm infrastructure as well as other restricted areas of the Site such as biodiversity enhancement areas.

5.9 Residual Effects

5.9.1 Residual effects - Population

As described above, effects on population will be long-term positive and imperceptible. There are no mitigation measures proposed, and therefore the residual effects will be long-term positive and imperceptible. 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 5.7.5.3 earlier in this Chapter, the *Community Benefit Fund* associated with the *Renewable Energy Support Scheme 4* (RESS 4) will provide a significant long-term, positive effects on socio-economic profile for the community and wider area.

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

Rates payments and development contributions have potential to improve service provision throughout County Tipperary and in the local area around Littleton. 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.

It is considered that the Proposed Development will not be negatively impacted by climate change, nor will it have a negative impact on climate change over its 35- year design horizon.

5.9.2 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. This is 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.

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.

5.9.3 Residual effects – Recreation, Amenity and Tourism

There are no expected significant, adverse effects to recreation, amenity and tourism in the surrounding area as a result of the Proposed Development at Littleton.

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 effects on the amenities of the area.

5.9.4 Residual effects – Human Health

Through various aspects of the design process for the Proposed Development, negative residual effects 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 mitigation measures (i.e once mitigation is in place for borrow pit, the construction noise from borrow pit will be reduced below threshold and effect will be reduced to 63 dB at the closest receptor, which is below the daytime construction noise limit of 65 dB) to reduce potential noise effects on nearby receptors. Furthermore, the mitigation measures as set out throughout the EIAR will prevent any potential significant negative effects on human health during the construction and decommissioning phases.

Long-term positive imperceptible residual effects will occur due to the provision of clean, renewable electricity. The operation of the Littleton Wind Farm will result in the reduction of c. 79,638 tonnes of CO2 per annum, which would otherwise be emitted through the burning of fossil fuels.

5.10 Do-Nothing Scenario

In the event that the Proposed Development of Littleton Wind Farm does not proceed, the existing land use on the site will continue in its present form.

Please note that irrespective of the consenting of the Proposed Wind Farm the remaining measures outlined in the Rehabilitation Plans, i.e. monitoring of the Littleton, Longfordpass and Lanespark Phase 1 measures and enhanced Phase 2 measures at nearby Ballybeg and Derryvella bogs, will continue to be implemented by BnM in agreement with the EPA. Please see Appendix 2.1 (Volume 3 of the EIAR) and Section 2.2.1 of Chapter 2 of the EIAR for further detail.

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. The Proposed Development will have an Export Capacity (MEC) of 68.2 MW, depending on final turbine technology installed. This range of generation capacity has been used to calculate the power output of the proposed Wind Farm based on the following calculation:

A x B x C = Megawatt Hours of electricity produced per year where:

A = The number of hours in a year: 8,760 hours

B = The capacity factor, which takes into account the intermittent nature of the wind, the availability of wind turbines and array losses etc. A capacity factor of 35 % is applied here.

C = Rated capacity of the wind farm: 68.2 MW

The proposed wind farm has the potential to produce c. 185,203.92 MWh (megawatt hours) of electricity per year and over 6,482.14 GWh of electricity over the 40-year lifetime of the Proposed Development.

The electricity produced by the proposed wind farm would be sufficient to supply c. 44,906 Irish households using an average of 4.2 MWh of electricity pear year each per annum.

5.11 Cumulative Effects

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 effects on the receiving environment. Please refer to Appendix 1.2 - *Developments Considered for Cumulative Assessment* which contains the full list of developments considered in the Cumulative Assessment.

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 Littleton Wind Farm Site.

A review was conducted of all permitted and pending planning applications dating back 5 years between March 2026 and March 2021 with potential cumulative effects on the area. This review included the Tipperary County Council Planning Website, Kilkenny County Council Planning Website, 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 Proposed Development in relation to population and human health. This is due to the significant setback 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 effects are considered to be imperceptible.

The Proposed Development will have a cumulative impact on land use in the area considered, introducing additional renewable energy land use to an established area consisting of peat bog and commercial forestry. This is expected to have a non-significant impact on agricultural land availability in the area of the wind farm site due to the nature of the surrounding landscape.

As described within EIAR Chapter 13 Landscape and Visual Impact, the cumulative impact of the Proposed Development, in combination with the existing wind farms within 20km, and based on the selected Viewshed Reference Points (VRP's), consider that the Proposed Development will contribute to a cumulative landscape and visual impact in the order of Medium-low in respect of the current cumulative scenario. Despite the existing wind farm developments within the 20km radius of the Proposed Development, the Proposed Development is principally viewed distinctly separate to these. Therefore, it is considered that the proposed Littleton Wind Farm will generate cumulative effects that are not significant.

There are no significant recreation, amenity and tourism attractions located in proximity to the proposed Littleton 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 80-100 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.

Planning applications on the Tipperary County Council Planning Website, An Coimisiún Pleanála Website and EIAR Portal Website have been examined to identify proposed or permitted developments with potential cumulative effects on the area. Planning applications in proximity to the site consist of residential one-off dwellings, residential property upgrades and various agricultural related developments. However, due to the nature of the surrounding area, it is unlikely that these proposed and consented developments will have a negative cumulative effect on population and human health in the area due to their size and nature.

Finally, the electricity generating capacity of the Proposed Development at Littleton 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.

5. CONCLUSION

The assessment of EIAR Chapter 5 - Population and Human Health has established the existing environmental conditions of the Proposed Development site at Littleton which includes the turbine array, substation and TDR from Junction 4 of the M8 Motorway to Littleton. 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 of a project to major accidents and natural disaster as outlined within the *Vulnerability of the Project to Major accidents and Natural Disasters* (EU Directive 2014/52/EU). This considers the preparedness of the 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.

Chapter 5 - Population and Human Health has been subdivided into the following topics for the purpose of the assessment:

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

The population of the area containing the 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 effect on local businesses and services.

The operational phase of the Proposed Development has been identified as having a positive economic and social effects 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 including residential and industrial premises. 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 Littleton.

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 effect 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 effect, 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 effect 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 effect 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.

It is considered that the Proposed Development will not be negatively impacted by climate change, nor will it have a negative impact on climate change over its 35- year design horizon.

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 Littleton Wind Farm.

5.1 References

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

An Bord Pleanála (2024), Case Search (online). Available at: http://www.pleanala.ie (Accessed: March 2026)

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

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

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

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

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

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

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

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

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

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

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

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

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

Department of Health (2024), Health in Ireland – Key Trends 2024. Available at:
https://www.gov.ie/en/department-of-health/collections/health-in-ireland-key-trends-2024/

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

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

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

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

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

Eirgrid (2019), The Electricity Grid and Your Health

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

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

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

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

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

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

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

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

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

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

Fáilte Ireland (2025), Key Tourism Facts 2023. Available from:
https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/Research/Key%20Tourism%20Facts%20and%20Figures%202023/FI_Key-Tourism-Facts-2023_National-Summary_FINAL.pdf?ext=.pdf

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

Tipperary County Council (2025), Tipperary County Development Plan 2022-2028. Available at:
https://www.tipperarycoco.ie/planning-and-building/development-plan-consultation/tipperary-county-development-plan-2022-2028

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

Health and Safety Authority (2021), Fatal Workplace Injuries by Economic Sector 2021 (NACE Revision 2). Available at:
https://www.hsa.ie/eng/Topics/Statistics/Fatal_Injury/

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

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

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

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

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

Institute of Sustainable Futures (2015), Calculating Global Energy Sector Jobs. Available at:

https://opus.lib.uts.edu.au/bitstream/10453/43718/1/Rutovitzetal2015Calculatingglobalenergysectorjobsmethodology.pdf

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

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

Irish Wind Energy Association (2012). Best Practice Guidelines for the Irish Wind Energy Industry. Available at:

https://www.iwea.com/images/files/9660bdfb5a4f1d276f41ae9ab54e991bb600b7.pdf

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

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

Massachusetts Departments of Environmental Protection and Public Health (2012). Wind Turbine Health Impact Study - Report of Independent Expert Panel. available at:

http://www.mass.gov/eea/docs/dep/energy/wind/turbine-impact-study.pdf

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

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

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

Renewable UK (2010). Wind Turbine Syndrome – An Independent review of the state of knowledge about the alleged health condition. Available at:

http://www.burnley.gov.uk/attachments/APP20130381_013%200381%20Renewable%20Energy%20Paper%20on%20Wind%20Turbine%20Syndrome.pdf

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

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

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

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

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

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

Safety, Health & Welfare at Work Act 2005.

Safety, Health & Welfare at Work Act 2005.

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

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

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

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

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

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

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

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

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

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

Sustainable Energy Ireland (SEI) (2003), Attitudes towards the Development of Wind Farms in Ireland. Available at: https://mosart.ie/wp-content/uploads/2016/02/Attitudes-Towards-Wind-Farm-Development-Ireland.pdf

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

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

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

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