MWP

Chapter 05 Population and Human Health

Ballinla Wind Farm

Ballinla Wind Farm Limited

July 2025

Contents

Tables

Figures

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5. Population and Human Health

5.1 Introduction

This Chapter considers any likely significant effects on population and human health arising from the Proposed Development. A full description of the Proposed Development, development lands and all associated development elements is provided in Chapter 2 Description of the Proposed Development of this EIAR. The Study Area for the purpose of the population and human health assessment focuses on the local receiving human environment in the vicinity of the Proposed Development site. The human environment is examined in terms of population and settlement, economic activity, employment, land use, tourism and amenities.

The chapter has been prepared having regard to information on the local population and land-use and in consideration of any human health impacts via environmental pathways from aspects such as soil, air, water or changes to material assets.

The assessment comprises:

- A description of the existing human environment.
- Prediction and characterisation of effects.
- Evaluation of effect significance.
- Consideration of mitigation measures, where appropriate.

Information has been gathered from publicly available sources, including Local Authority Plans (for OCC), the Central Statistics Office (CSO), Fáilte Ireland and the Met Éireann website.

5.1.1 Competency of Assessor

The assessment was completed by William Murphy MSc (Coastal and Marine Environments), BA Hon (Geography) and reviewed by Aileen O'Connor BSc Hons (Environmental Science), PGDip (Energy Management).

This EIAR chapter has been prepared by William Murphy MSc., BA (Hons), HDip, an Environmental Consultant at MWP. William has several years' experience in environmental consulting, and in this time contributed to various EIAR chapters, including Population and Human Health. William has also been involved in the preparation of numerous Construction and Environmental Management Plans (CEMPs), Resource Waste Management Plans (RWMPs), which also take consideration of the effects on population and human health. William has experience in a variety of projects including onshore wind, solar, marine, and large-scale strategic infrastructure development.

This assessment has been reviewed by Aileen O'Connor (MWP), BSc (Hons), PGDip, has over 13 years' experience in the environmental field both in industry and consultancy work. Aileen is a Senior Environmental Consultant and holds a BSc (Hons) in Environmental Science and PGDip in Energy Management. Aileen is an experienced and competent environmental professional with a background in contaminated land assessment, licence compliance and waste management. Aileen has prepared and peer reviewed chapters of EIARs and has coordinated and delivered many environmental assessment reports and consent applications for transmission and power generation projects including the preparation of Resource Waste Management Plans RWMPs and contributed to Material Assets Impact Assessments. More specifically, Aileen has worked on a wide variety of projects during her career to date including renewable energy, marine, quarries, industrial and commercial developments.

5.2 Scope of the Assessment

The assessment considers the entirety of the Proposed Development, including the wind turbines, associated infrastructure, access tracks, onsite substation, TDR and Proposed Grid Connection

The following legislation and published guidance have been complied with and consulted in undertaking this assessment:

- EU Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU (the "EIA Directive").
- EU (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018).
- Guidelines for Planning Authorities and An Bord Pleanála in carrying out Environmental Effect Assessment (Department of Housing, Planning and Local Government, August 2018).
- Planning Guidelines for Wind Energy, DEHLG 2006.
- Draft Revised Wind Energy Development Guidelines, DHPLG 2019.
- EPA Guidelines on the Information to be Contained in Environmental Impact Reports (EPA, May 2022).
- Revised (draft) EPA Advice Notes for Preparing Environmental Impact Assessments (EPA, September 2015).

The 2015 draft EPA Advice Notes state that:

> *'While most developments by people will affect other people, the section of an EIS dealing with this topic concentrates on those topics which are manifested in the environment, such as employment and housing areas, amenities, extended infrastructure or resource utilisation and associated emissions.'*

Issues such as commercial competition, zoning, property prices, agri-business and other social and economic issues are dealt with by more specific instruments (such as the Planning Acts). Table 5-1 outlines those issues which the EPA guidance suggests may be examined as part of this study.

Table 5--1: Issues relevant to Human Environment

Topic Area	Potential Issues
Employment	Will the development affect employment opportunities?
Settlement Patterns	Will the development change settlement patterns?
Land-Use Patterns	Will the development change land use patterns and types of activity?
Baseline Population	Will the development affect the current population?
Demographic trends	Will the development change concentrations of a particular ethic group or influence the movement of human populations?
Human Health	Vectors through which human health impacts could be caused e.g. water, air, soil, discomfort or nuisance?
Amenity	Will the development change site uses, loss of right of way or amenity?

Accordingly, the scope of this assessment is made with respect to these topic areas and considers the effects of the construction, operation and decommissioning of the Proposed Development in terms of how the proposal could affect:

- Land Use Change.
- Population and Settlement.

- Economic Activity and Employment.
- Tourism and Amenities.
- Human Health.

Shadow Flicker is briefly addressed in this chapter, with a full assessment found in Chapter 16 Shadow Flicker.

5.2.1 Methodology

The methodology used for this study included desk-based research of published information and site visits to assemble information on the local receiving environment.

5.2.1.1 Desk Study

A desk study was undertaken to identify potential impacts, either positive or negative, on the human environment that could cause change in the 'quality of life' as a consequence of construction, operation, and decommissioning of the Proposed Development.

The local human environment is made up of a number of groups. These include those who reside in, work in, visit, or use the local road networks in the area. Whilst no single set of persons can be discerned, the local residential population is deemed to be the most sensitive group in terms of those most likely to experience any identified impacts.

The desk study included the following activities:

- Review of the most recent CSO Census of Ireland data (2022) to establish settlement demographics and economic context of the study area.
- Review of Ordnance Survey Mapping and aerial photography to establish existing land use and settlement patterns within the study area.
- Review of local and regional development plans including Offaly County Development Plan (CPD 2021-2027) and planning policy in order to identify future development and identify any planning allocations within the study area.
- Review of OCCs and ABPs Planning Register to identify relevant development proposals currently under consideration by the Council, performed in December 2024 and April 2025.
- Review of planning policy and strategies to identify, way-marked walking and cycling routes and other Rights of Ways within the study area, and.
- Review of tourism data (tourism policies and local attractions) from Offaly CDP (2021-2027) and websites including Tourism Ireland, Fáilte Ireland and local websites to identify tourism data and visitor attractions within the study area.

The desk-based research also had regard to published information on public health and wind turbines including:

- Irish Health Service Executive (HSE) Position Paper on Wind Turbines and Public Health (2017).
- World Health Organisation (WHO) Regional Office for Europe, Night Noise Guidelines for Europe, (2009).
- Health Impacts of Wind Turbine Noise. The Public Health Wales Position Statement (2013).
- Australian Government National Health and Medical Research Council (NHMRC) Statement: Evidence on Wind Farms and Human Health (2015).

- The Potential Health Impact of Wind Turbines. Chief Medical Officer of Health (CMOH) Report (Ontario) (2010).
- Wind Turbine Health Impact Study: Report of Independent Expert Panel. Prepared for: Massachusetts Department of Environmental Protection, Massachusetts Department of Public Health (January 2012).
- WHO Environmental Noise Guidelines for the European Region (2018).
- ESB Electromagnetic Fields (EMF) and You Information about Electric and Magnetic Fields and the Electricity Network in Ireland (April 2017).
- European Commission Scientific Committee on Emerging and Newly Identified Health Risks (SCENIHR) Opinion on Potential Health Effects of Exposure to Electromagnetic Fields (2015).

Based on a review of the characteristics of the Proposed Development and according to the EPA guidance, *Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022)*, any potential negative impacts on the local human environment are considered to include the following human health/wellbeing and disturbance concerns:

- Dust emissions from construction activities.
- Noise emissions during the construction and operation.
- Public safety during construction activities and operations.
- Traffic disturbance during construction and operation, and.
- Visual impacts and shadow flicker operation.

Each of these concerns have been fully addressed and documented in various chapters of this EIAR as set out in Table 5-2. These assessments were reviewed to inform this study.

Table 5-2: Potential Disturbance & Health and Safety issues and Relevant EIAR Chapters

Development Phase	Potential Disturbance/ Health & Safety Issue	Addressed in EIAR Chapter
Construction Phase	Noise emissions and vibration	Chapter 10 Noise
	Dust emissions	Chapter 13 Air and Climate
	Public safety	Chapter 2 Description of the Proposed Development
	Traffic disturbance	Chapter 15 Material Assets – Traffic and Transport and Appendix 15C Traffic and Transport Assessment
Operational Phase	Noise emissions and vibration	Chapter 10 Noise
	Visual effects	Chapter 11 Landscape and Visual
	Air quality effects	Chapter 13 Air and Climate
	Shadow Flicker disturbance	Chapter 16 Shadow Flicker
	Telecommunications interference	Chapter 14 Material Assets – Built Services
	Public safety	Chapter 2 Description of the Proposed Development
Decommissioning	Traffic disturbance	Chapter 15 Material Assets – Traffic and Transport
	Noise emissions and vibration	Chapter 10 Noise

The following potential positive impacts were also identified during the review:

- Positive effect of local renewable energy, displacing 1.6 million tons of CO_2 over the 35-year lifetime of the Proposed Development.
- Positive effect on local and national targets in relation to renewable energy generation.
- Positive effect on air quality due to the displacement of fossil fuel generated electricity.
- Positive effect of creating local construction jobs for the duration of 18 to 24 months.
- Positive effect of significant commercial rates being paid over the 35-year lifetime of the Proposed Development to the local authority that will be utilised to fund services within the county.
- Positive effect of planning contribution fees that the local authority will utilise to fund services within the county, and.
- Positive effect of the community benefit fund to be established with the project.

5.2.1.2 Public Consultation

For the purposes of public engagement and consultation, Ballinla Wind Farm Limited set up a dedicated project website www.ballinlawindfarm.ie. Activities of public engagement carried out so far are detailed in Chapter 1 Introduction of this EIAR.

The consultation enabled the public to examine many aspects of the project in detail and then revert to the project team with any questions, comments, or suggestions. Refer to the Community Report in Volume III, Appendix 1A.

5.2.1.3 Assessment Criteria

Determination of the significance of an effect will be made in accordance with the terminology outline in the EPA *Guidelines on the information to be contained in Environmental Impact Assessment Reports (2002)*. This assessment criteria are set out in Table 5-3.

Table 5-3: Assessment Criteria

Quality of Effects	**Positive**	**A change which improves the quality of the environment.**
	Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/ adverse	A change which reduces the quality of the environment.
Significance of Effects	**Imperceptible**	An effect capable of measurement but without noticeable consequences.
	Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities (no direct impact).
	Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends (change is noticeable but reversible – site/feature can be integrated into development).
	Significant	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 alters most of a sensitive aspect of the environment.
	Profound	An impact which obliterates sensitive characteristics. Mitigation would be unlikely to remove adverse effects.

Extent and Context of Effects	**Extent**	Describe the size of the area, the number of sites and the proportion of a population affected by an effect.
	Context	Describe whether the extent, duration or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)
Probability of Effects	**Likely Effects**	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Duration and frequency of Effects	**Momentary**	Effects lasting from seconds to minutes.
	Brief	Effects lasting less than a day.
	Temporary	Effects lasting less than a year.
	Short-term	Effects lasting one to seven years.
	Medium-term	Effects lasting seven to fifteen years.
	Long-term	Effects lasting fifteen to sixty years.
	Permanent	Effects lasting over sixty years.
	Reversible	Effects that can be undone e.g. through remediation or restoration
	Frequency	How often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).
Types of Effects	**Indirect (a.k.a. Secondary or Off-site Effects)**	Impacts which are not a direct result of the project.
	Direct	For example, where an archaeological/heritage feature/site is physically located within the footprint of a proposed development whereby the removal of part or all of the feature or site is thus required.
	Cumulative	The addition of many minor or significant effects, including effects of other projects, to create a larger, more significant effect.
	'*Do-Nothing*'	The environment as it would be in the future should the subject project not be carried out.
	'*Worst-case*'	The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable	When the full consequences of a change in the environment cannot be described.
	Irreversible	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual	The degree of environmental change that will occur after the proposed mitigation measures have been implemented.
	Synergistic	Where the resultant effect is of greater significance than the sum of its constituents, (e.g. combination of SOx and NOx to produce smog).

5.2.2 Statement of Limitations and Difficulties Encountered

Tourism and amenity effects are interrelated with effects on landscape and visual amenity, archaeology and heritage interests, and transport. Each if these are addressed in other chapters of this EIAR and reference should therefore be made to Chapter 11 Landscape and Visual, Chapter 12 Cultural Heritage, and Chapter 15 Material Assets - Traffic and Transport.

While reference is made to these effects where relevant, this chapter does not re-evaluate these assessments. The focus of this assessment is primarily on physical disruption, severance, or exclusion of users' ability to continue existing activities or deterrence of additional further development of amenities and tourism potential.

5.3 Baseline Environment

5.3.1 Study Area

The Study Area for the purpose of this assessment on Population and Human Health primarily focuses on the local receiving human environment in the vicinity of the Proposed Development. These comprises those who reside, work, visit, or use the local road networks.

Electoral Divisions (EDs) are the smallest legally defined administrative areas in the State for which Small Area Population Statistics (SAPS) are published from the Census of Population. Therefore, in order to discuss the receiving human environment and other statistics in the vicinity of the Proposed Development site, the Study Area for this assessment has regard to EDs within or located close to the Proposed Development. The extent of the EDs and SAPS considered for the purposes of this assessment are shown in Figures 5-1 and 5-2 and set out in Tables 5-4 and 5-5.

Although this chapter predominantly describes the human environment in the vicinity of the Proposed Development, sensitive human receptors in the broader human environment are considered in the other specialised environmental topics, including the following.

- Air Quality and Climate (Chapter 13).
- Noise (Chapter 10).
- Landscape and Visual (Chapter 11).
- Cultural Heritage (Chapter 12).
- Material Assets - Built Services (Chapter 14).
- Material Assets - Traffic and Transport (Chapter 15).

Table 5--4: Study Area Electoral Divisions

Electoral Division
Monasteroris ED, Offaly
Edenderry Rural ED

Table 5-5: Study Area SAPs

Area Ref	CSO Small Area
1	A187017001
2	A187035001/01
3	A187035001/02
4	A187035002
5	A187063001
6	A187063002
7	A187063003
8	A187017001
7	A187063003

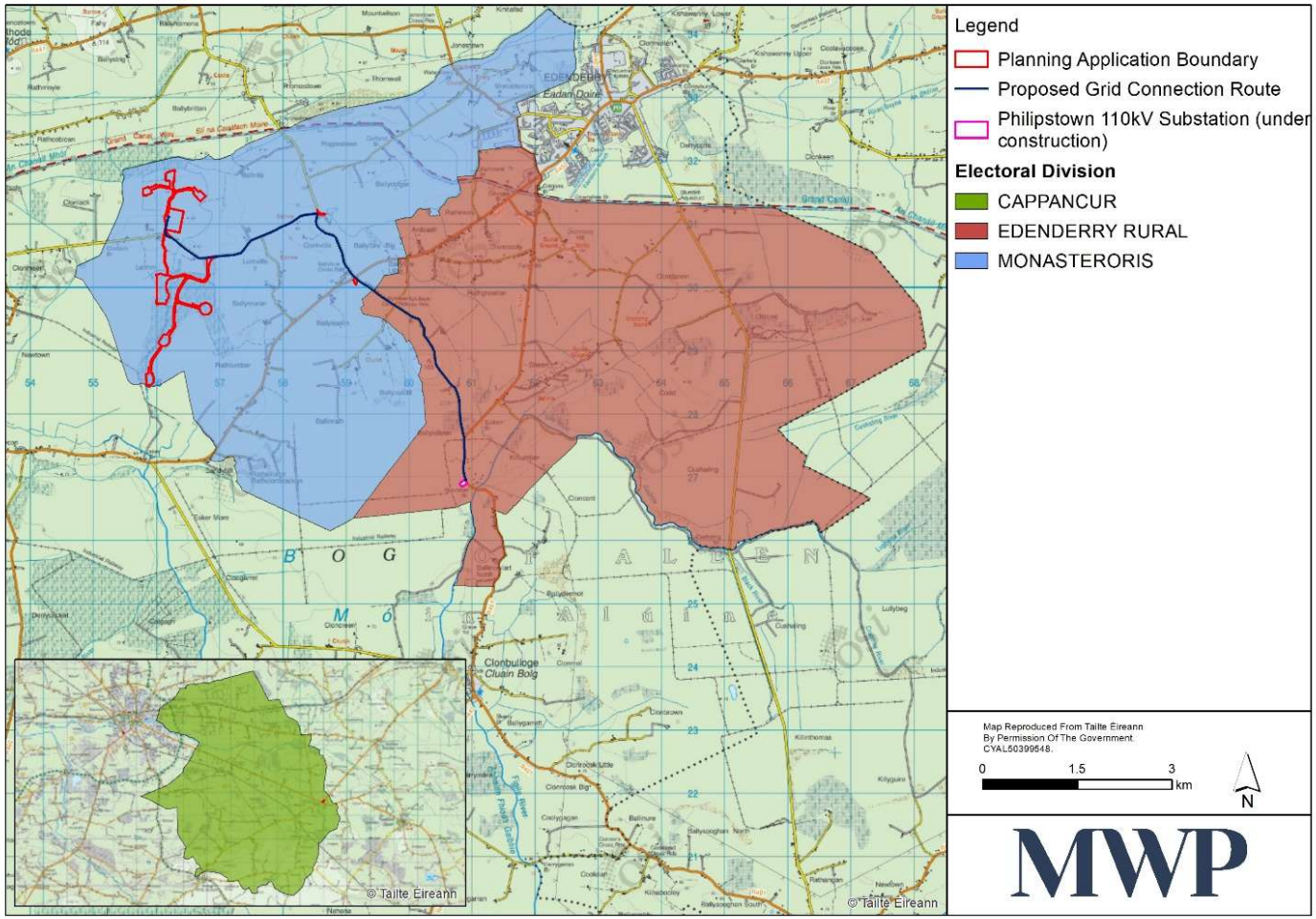

Figure 5-1: Electoral Divisions in the Study Area

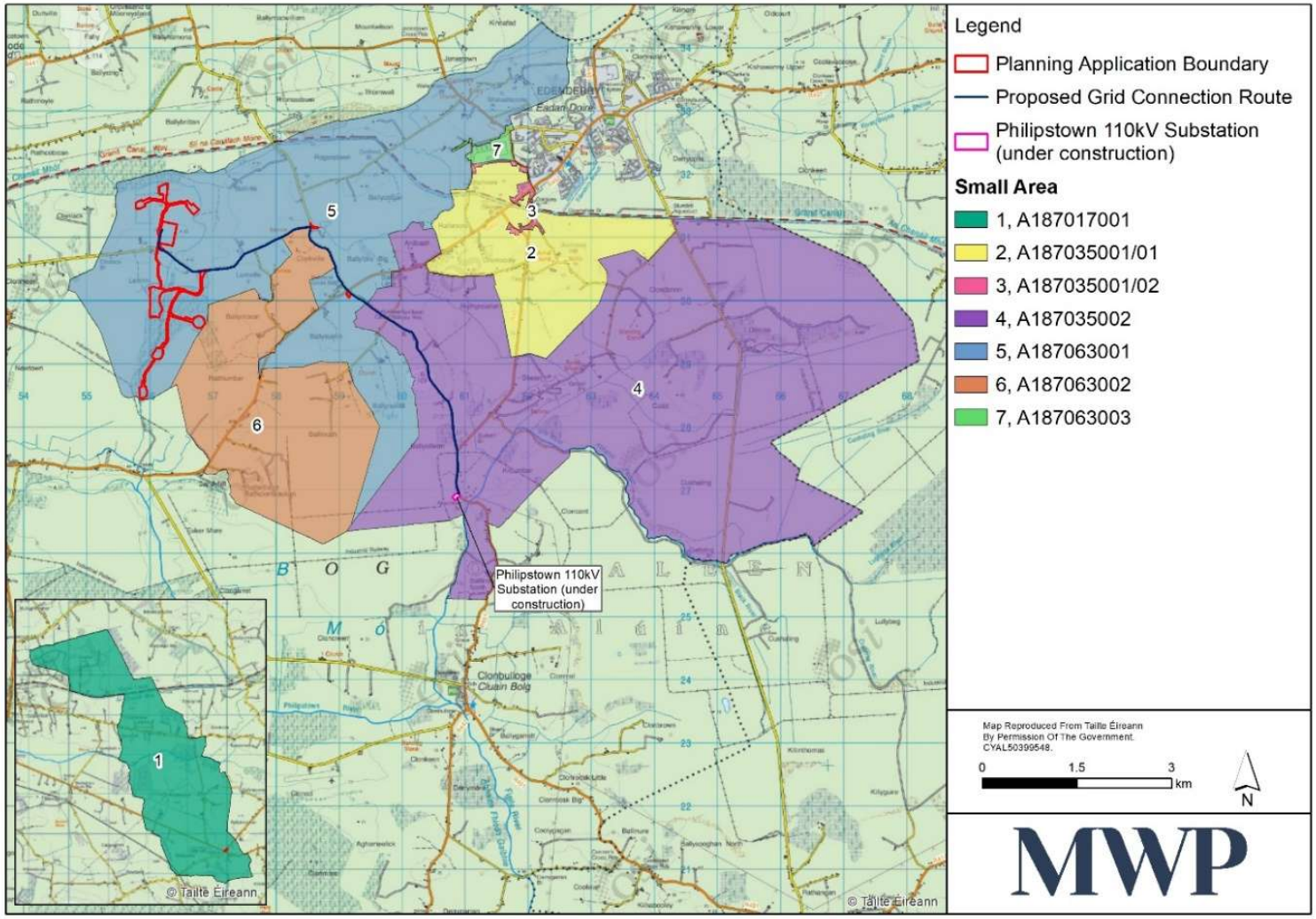

Figure 5-2: Study Area Small Area Populations Districts

5.3.2 Site Location and Description

The Proposed Development is located in a rural area of east Co. Offaly. The site is approximately 4km west of the Edenderry town boundary and 24km east of Tullamore. Figure 5-3 outlines the location of the Proposed Development with the townlands while Figure 5-4 outlines the layout of the Proposed Development included in the planning application. The area within this red line boundary is approximately 42ha. For EIAR purposes, the Proposed Development includes the Proposed Wind Farm, the Proposed TDR and the Proposed Grid Connection (which will be subject to a separate planning application).

The Proposed Ballinla Wind Farm is within the townland of Leitrim in the municipal district of Edenderry, Co. Offaly. The Proposed Grid Connection will be a linear development within the townlands of Leitrim, Lumville, Ballinla, Clarkeville, Ballyfore Big, Ballyfore Little, Ballyleakin and Ballykilleen, Co. Offaly. The 8km Proposed Grid Connection route is from the Proposed Wind Farm south along public roads to the existing Philipstown 110kV substation to the southeast and adjacent to the Edenderry Power Station.

The TDR location is outlined in Appendix 2-2. Temporary works required on the TDR are detailed in that report.

Existing land cover at the site consists of agricultural land in the northern section and coniferous commercial forest in the southern section. The northern and southern sections of the Proposed Development are split by the L5010 local road which travels in an east west direction bisecting the Proposed Development.

The Grand Canal is located to the north of the Proposed Development. The surrounding land includes agricultural fields, commercial forestry and cutover peatlands.

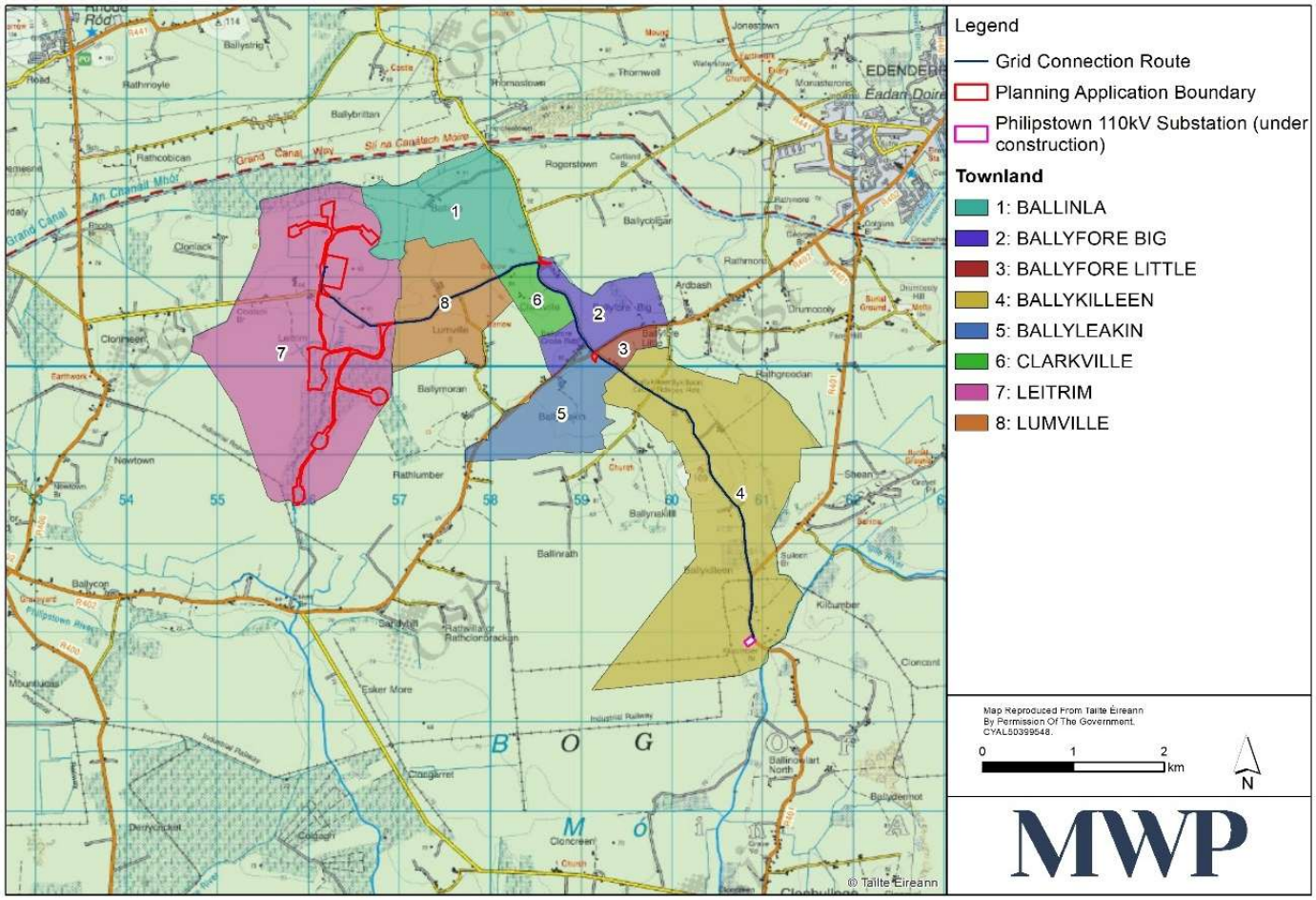

Figure 5-3: Proposed Development Land Townlands

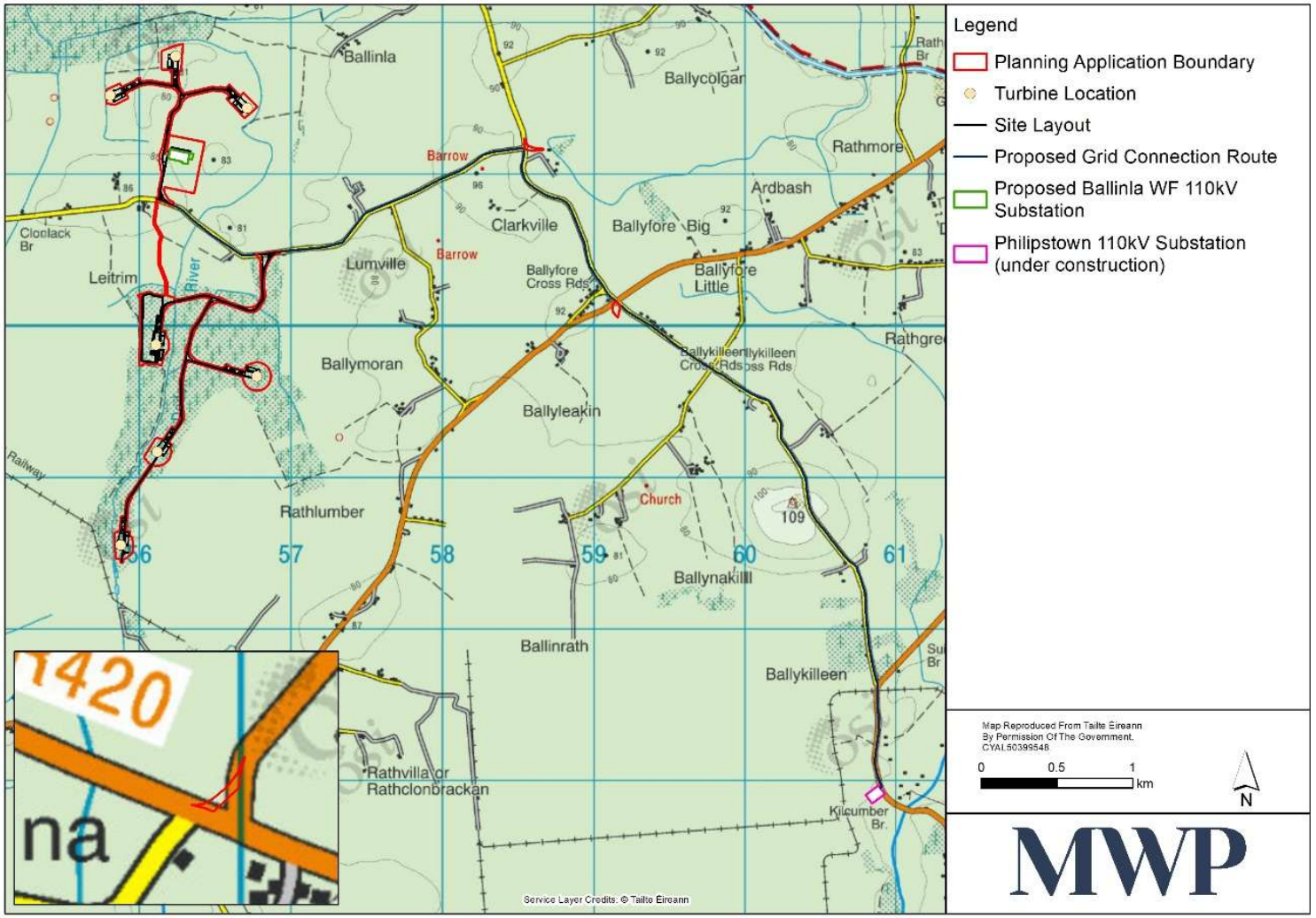

Figure 5-4: Proposed Development Layout

5.3.3 Settlement Patterns

Settlement patterns in the greater region are generally small cluster settlements of houses and farmsteads, and linear settlements along local and regional roads. Edenderry is the closest town (population 7,888, CSO, 2022) settlement to the Proposed Development, located *c.*7km to the east. One other settlement of note is Rhode (population 841, CSO, 2022) which is located *c.*7.5km northwest of the Proposed Development. Built up areas (BUAs) in the surrounding area of the Proposed Development are shown in Figure 5-5.

5.3.4 Shadow Flicker

The Study Area for the purpose of this assessment on Shadow Flicker primarily focuses on the local receiving human environment and residential properties in the vicinity of the Proposed Development site. In line with best practice, the scope of this assessment extends to a distance of 10 times the maximum rotor diameter, in this case 1.6km.

5.3.5 Population Density

The 2022 Census of Population provides population statistics for Small Area Populations (SAPs) and Electoral Divisions (EDs). A review of this data showed that population density is evenly spread among the SAPs and EDs, with the populations increasing when closer to the built-up areas in the area. These statistics are presented in Table 5-6 and Table 5-7. Housing in the area is cluster or ribbon settlements along local and regional roads.

Table 5-6: SAPs Populations

Area Ref	CSO Small Area	SAP Population
1	A187017001	316
2	A187035001/01	222
3	A187035001/02	186
4	A187035002	482
5	A187063001	369
6	A187063002	245
7	A187063003	278

Table 5-7: ED Populations

Electoral Division	ED Population
Monasteroris ED	892
Edenderry Rural ED	890
Cappancur ED	1,701

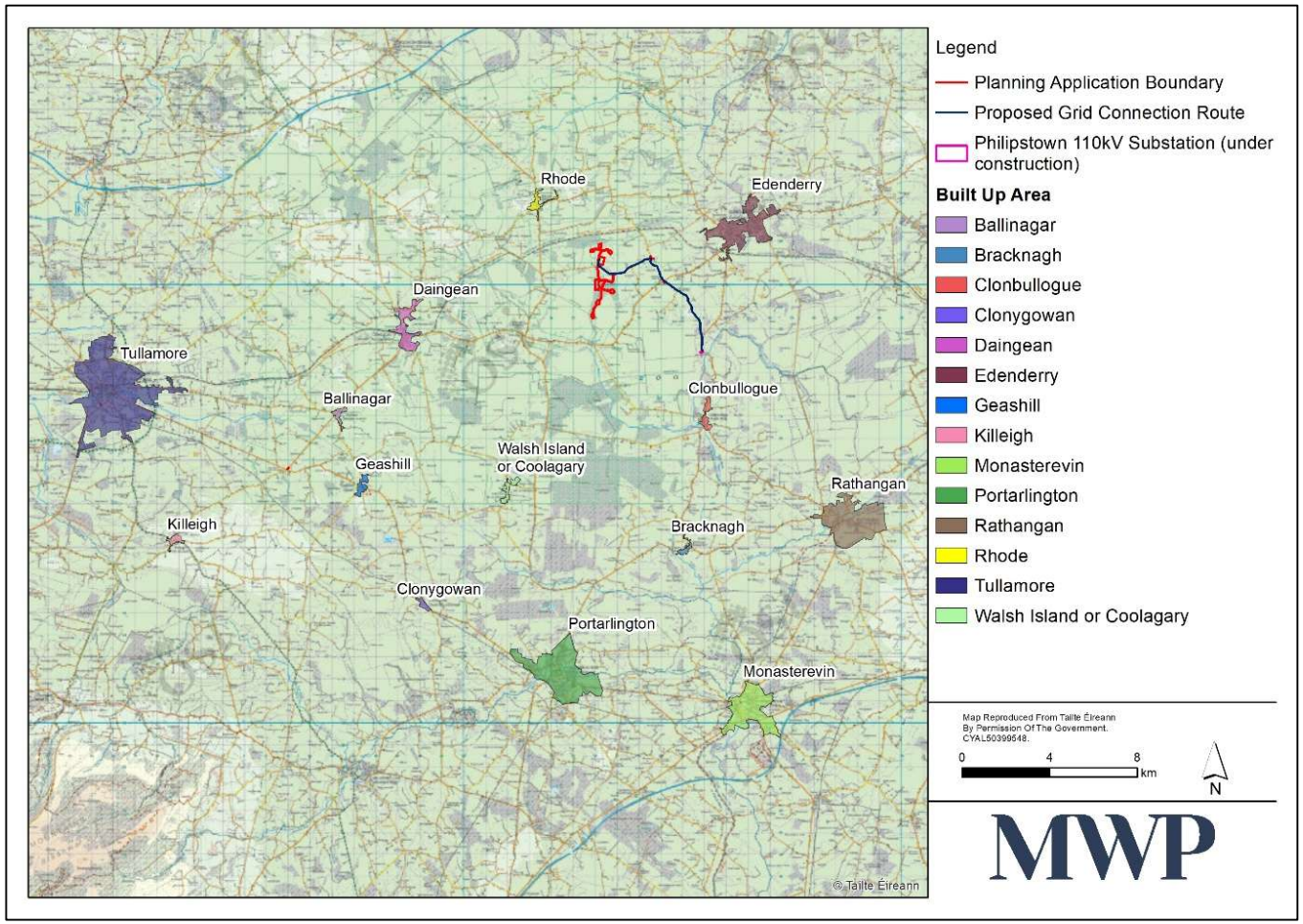

Figure 5-5: Built Up Areas (BUAs) in the vicinity of the Proposed Development

5.3.6 Population Trends

The available data on population trends for the period 2016 – 2022 indicates that all of the EDs shown in **Figure 5-1** of **Section 5.2.2**, experienced a population increase, as presented in **Table 5-8**.

Table 5-8: Population Trends

Electoral Division	2016 Population	2022 Population	% Change on Population 2016-2022
Monasteroris ED	806	892	+10.7%
Edenderry Rural ED	816	890	+9.0%
Cappancur ED	1,531	1,701	+11.1%

5.3.7 Public Health

The 2022 Census provided information on the general health profile of the population of each small area. The statistics showed that, overall, the majority of the local population are in 'good' or 'very good' health. Less than 4% in the Study Area were counted as 'bad' or 'very bad' health. A further breakdown is shown in **Table 5-9.**

Table 5-9: Health Statistics 2022

Area Ref	CSO Small Area	SAP Population	% Good to Very Good Health	%Bad to Very Bad Health
1	A187017001	316	88.3%	2.5%
2	A187035001/01	222	73.4%	1.4%
3	A187035001/02	186	76.9%	3.2%
4	A187035002	482	73.2%	1.7%
5	A187063001	369	85.6%	2.4%
6	A187063002	245	86.1%	1.2%
7	A187063003	278	79.5%	3.2%

The emergence of the Covid-19 virus in Ireland in the early part of 2020 presented a new human health risk and concern amongst the general public across Ireland including the area of the Proposed Development and surrounds. Currently, there are no Covid-19 restrictions in place and the introduction of vaccines have helped society gravitate towards living with Covid-19. The medium to long term effects of the virus on national and local human health, however, is not currently fully known.

5.3.8 Economic Activity

According to the 2022 census employment statistics for the region, the workforce is employed in a diverse range of industries, refer to **Table 5-10.** The statistics show that the highest level of employment is within the Professional Services category with 27.7% of the Study Area population employed in this sector. Commerce and Trade is the second highest employing sector and employs 20.3% of the Study Area workforce. Other key employment sectors include Manufacturing Industries (13.1%), Other (11%), Building and Construction (6.5%), Agriculture, Forestry and Fishing (7.2%).

The 2022 Census Commuter Flow data, **Table 5-11**, suggests that most workers (73.7%) are travelling by private vehicles, whereas 4.8% travel via bicycle or on foot. Only 4.6% use public transport, while 7.3% work mainly from home. The remaining commuters did not state their transport to work method.

Table 5-10: Workers by Industry

Area Ref	CSO Small Area	Agriculture, Forestry and Fishing	Building and Construction	Manufacturing Industries	Commerce and Trade	Transport/Communication	Public Admin	Professional Services	Other	Total
1	A187017001	13	10	17	26	10	14	43	20	***153***
2	A187035001/01	3	5	15	16	11	11	35	17	***113***
3	A187035001/02	4	5	4	16	6	8	20	12	***75***
4	A187035002	24	19	31	42	15	13	61	22	***227***
5	A187063001	13	12	29	39	16	10	45	14	***178***
6	A187063002	9	6	16	29	6	7	29	8	***110***
7	A187063003	4	6	15	28	6	4	35	13	***111***
	Total	***70***	***63***	***127***	***196***	***70***	***67***	***268***	***106***	***967***

Table 5-11: Methods of Commuting

Area Ref	Small Area Code	On Foot/Bicycle	Public Transport (Bus, Train, Dart, Luas)	Motorcycle/Scooter, Car Driver, Car Passenger, Van and Other (inc. Lorry)	Work Mainly from Home	Not Stated
1	A187017001	9	25	186	16	2
2	A187035001/01	1	2	76	4	28
3	A187035001/02	9	4	83	11	16
4	A187035002	10	4	159	17	37
5	A187063001	3	4	138	20	12
6	A187063002	1	2	93	9	3
7	A187063003	22	12	118	7	14
Overall Study Area		**55**	**53**	**853**	**84**	**112**

5.3.9 Land Uses

The land on which the Proposed Wind Farm is located is split as north and south by the local road L5010. The northern section of the Proposed Wind Farm is agricultural land and pastures, with commercial woodland to the north. The southern section of the Proposed Wind Farm is commercial coniferous and mixed woodland. The area is accessible by the L5010, and most residential dwellings are along this route in small ribbon developments. The R402 is southeast of the Proposed Development that provides access to Edenderry. There are three existing windfarms south of the Proposed Development. Cloncreen Wind Farm, which hosts 21 wind turbines, is located *c.* 2km southeast of the Proposed Development, Mount Lucas Wind Farm is located *c.* 4km south of the Proposed Development and contains 28 turbines and Cushaling Wind Farm *c.* 5km southeast with nine turbines. There is a windfarm currently under construction north of the Proposed Development, the Yellow River Wind Farm, *c.* 4km, which will contain 29 turbines and is due for completion in 2025. The land in the area is generally flat and low lying.

There is no recreational land use designated in the area of the Proposed Development. The closest recognised recreational route is the Grand Canal Walkway north of the Proposed Development. The closest school is Ballybryan National school, *c.* 3.8km north of the Proposed Development. Other education facilities within the vicinity are Scoil Bhríde Primary School Edenderry (*c.* 6km), Oaklands Community College (*c.* 6km), Gaelscoil Éadan Doire (*c.* 6.1km), all located east of the site in Edenderry, and Rhode National School (*c.* 7.1km), northwest of the Proposed Development. Ballyfore GAA Club is located east of the southern section of the Proposed Development, *c.* 2km.

The nearest town to the Proposed Development is Edenderry, *c.* 4km east of the Proposed Development. Within the town is a number of retail, commercial, and community facilities. The town is accessed from the Proposed Development via the R402. The town itself is accessible via a number of regional roads, and the M4 Motorway is *c.* 10km north of the town. The town has several bus routes that service it, the 120, 120C, AI05, 120D and 120X. Tullamore is the closest 'large town' (population 23,494, CSO 2022), which is *c.* 32km west of the Proposed Development mainly via the R402.

5.3.10 Tourism and Amenities

There are no tourist attractions or amenities within the Proposed Development site. The nearest attraction is the Grand Canal Walkway, *c.* 500m north of the site. Blundell Castle is located in Edenderry, *c.* 6.5km to the east of the Proposed Development and is a ruin castle. Carbury Castle and Motte is east of the proposed site *c.* 15km. Killinthomas Wood is located *c.* 20km southeast of the site. Lullymore Heritage and Discovery Park is also southeast of the Proposed Development, *c.* 28km. Coolcarrigan House and Estate is *c.* 26km to the east of the Proposed Development. The Tullamore Dew Distillery experience is *c.* 35km west of the proposed site. Mountlucas cycle and walkway is located *c.* 12.5km south of the site and hosts events such as VHI Parkrun weekly. The Hilltop Farms Alpaca Attraction is *c.* 20km west of the Proposed Development.

The Proposed Development is located away from any major tourist attraction or recreational activity facilities, which ensures that users and visitors to the area are not directly impeded from the greater area during the operational phase. The Proposed Development may be visible during operation from some of these locations, and this is further discussed in Chapter 11 Landscape and Visual.

5.4 Assessment of Effects

5.4.1 Construction Phase

5.4.1.1 Land Use Change

All new development proposals have the potential to affect the local area character and human environment by introducing a new incompatible land use activity which could result in physical disruption, severance or exclusion of user's ability to continue existing activities or the sterilisation of lands thus preventing any additional further land-use potential.

During construction, there will be a level of effect on existing land-uses within the development site. Existing agricultural and forestry activities (apart from felling required for the Proposed Development) will cease within the footprint for the duration of the construction works. Public access within the site will also be prohibited during construction, operation and decommissioning, however as the lands are under private ownership public access is not available. Outside of the development footprint, it is not envisioned that land use activities would be adversely affected.

The areas surrounding the turbines, hardstands, blade set down areas, substation, and site compound will be securely fenced for the duration of the 18–24-month construction period for health and safety purposes. In terms of effects to neighbouring lands and land-use, it is considered that the wind farm development does not pose a risk to either existing or future land-use. All existing land-use practices can co-exist with the proposed windfarm.

Access may be restricted to landowners at times of heavy site activity such as component deliveries and concrete foundation pouring. Traffic procedures and effect mitigations within, through and around the development site at these times will be implemented. Prior to commencement of the works the applicant will engage with all stakeholders to minimise disruption and to provide any alternative access where possible.

The land-use along the Proposed Grid Connection comprises mainly of public local roads along its 8km length.

The active construction area for the grid connection will be small, ranging from 100m to 200m in length at any one time, and it will be transient in nature as it moves along the route. There are residential properties along the route. It is envisaged that a system of single lane closures will be implemented along the grid connection cable route in the public roadway. There will be restricted access to the local road for a period of 1-2 days during these works resulting in a **negative**, **brief** to **temporary** effect on local residents accessing the road. All works will be planned and undertaken in full consultation with OCC, in particular the Roads Department/Roads Engineer for the area. A construction stage TMP will be developed with OCC in advance of works. A **TMP** is included in **Appendix 15** of this **EIAR**.

Outside of the Proposed Development footprint, it is not envisioned that land use activities would be adversely affected. The delivery of turbine components to the Proposed Development will require temporary works on sections of the public road network along the delivery route including relocation of powerlines/poles, lampposts, signage and temporary local road widening. Such works will be temporary in nature and reinstated following turbine component delivery.

Overall, it is considered that during the construction phase there is likely to be a **direct**, **short-term**, **slight** to **moderate, negative** and **localised** effect on land use within the wind farm site and along the Proposed Grid Connection.

The requirement to replant land taken out of forestry would be an indirect effect of the Proposed Development. The total replanting requirement for the Proposed Development is *c.* 18ha. It should be noted that the clear felling of trees in the State requires a felling licence. The associated afforestation of alternative lands equivalent in area to those lands being permanently clear felled is also subject to licensing ('afforestation licensing'). The Forest Service of the Department of Agriculture, Food & the Marine is Ireland's national forest authority and is responsible for all forest licensing. The Applicant commits to not commencing the project until both felling and afforestation licences are in place, and this ensures the afforested lands are identified, assessed and licensed appropriately by the relevant consenting authority.

5.4.1.2 Population and Settlement

It is envisaged that 60 jobs will be created during the construction phase of the project, a period of 18-24 months. It is expected that the majority of construction personnel will primarily be local to the region. A minor number of key employees involved in the construction, may decide however to temporarily re-locate to the area in the short-medium term. Any direct and indirect jobs created or supported during the 18 to24 month construction phase will be temporary in nature.

Residential dwelling patterns in the area are standalone residential dwellings along the L5010 road. These dwellings may experience some disturbance during the construction phase due to haulage and construction vehicle traffic, and general noise created during the construction phase. However, noise from these sources is predicted to be temporary. All best practice guidelines will be followed during the construction works to minimise

the impact on the dwelling in the Proposed Development's receiving area. The 8km grid connection route will follow the road network in the area to the newly constructed Philipstown 110kV substation, located southeast of the Proposed Development, following the L5010 to the L5006 before joining the R401. The Proposed Grid Connection will have some localised and temporary disruption during its construction to local residents. Chapter 10 Noise and Vibration and Chapter 15 Material Assets – Traffic and Transportation provide further information on these topics.

In the absence of any substantive, peer reviewed Irish studies on the effect of wind farms on property values, recent studies from the United States and Scotland are considered. The largest study of the impact of wind farms on property values was carried out in the United States. '*The Impact of Wind Power Projects on Residential Property Values in the United States: A multiSite Hedonic Analysis*', December 2009, was carried out by the Lawrence Berkley National Laboratory (LBNL) for the U.S Department of Energy. It concluded that "no evidence was 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".

The study was updated by Lawrence Berkeley National Laboratory (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*", in August 2013. It concluded that no statistical evidence was found that "home prices near wind turbines were affected in either the post-construction or post announcement/pre-construction periods".

A more recent study published by Climate exchange in October 2016 titled '*Impact of wind Turbines on House Prices in Scotland*' concluded that there was "no evidence of a consistent negative effect on house prices".

Taking these studies into consideration, it is not anticipated that the Proposed Development will have any detrimental effect on the local property values.

The Proposed Development is deemed likely to have **neutral, localised, short-term effects** in the area of the Proposed Development with **imperceptible significance** to population and settlement patterns during the construction phase.

5.4.1.3 Economic Activity and Employment

During the construction phase, it is anticipated that resources and labour will be sourced in the region where possible. Aggregates and concrete supply track construction and foundations will be obtained from local quarries and suppliers operating in the area, which will support the local economy. Local suppliers of other materials and equipment will also be engaged when necessary, extending the economic reach of the Proposed Development into the local economy. It is the intention of the developer to require the main contractor to use local sub-contractors, drivers, suppliers and materials where possible.

The construction phase is estimated to take between 18 to 24 months, which is envisaged to create 60 direct jobs during this phase. Additional services required in engineering, consultancy, site investigation, surveying, and environmental assessment and monitoring will provide further short-term employment opportunities. It is expected that there will be additional indirect employment opportunities for the many retail and service establishments in the nearby towns and settlements.

Therefore, it is considered the construction stage of the Proposed Development will likely have a **direct, short-term, localised,** and **positive** effect on the employment profile of the study area, and a **short-term slight positive effect** on local businesses and services in the nearby towns and villages in the study area during the construction stage.

5.4.1.4 Tourism and Activities

While tourism is a major economic driver in Co. Offaly, no significant economic benefits of this industry are directly associated with the Proposed Development. The Proposed Development is not currently used as a forest park or recreation site. There are no picnic facilities near the site or any direct tourist attractions or services at the site.

There are important tourist and amenity attractions within the study area of the Proposed Development, as identified in Section 5.3.10. Construction personnel in the area travelling to and from site, and the delivery of supplies and materials will see an increase of vehicle use on the local road network. However, given that the turbines won't be erected until the final phase of construction, the effect of the Proposed Development during the construction phase is considered localised, neutral, short-term and of imperceptible effect on the receiving environment. Further information regarding visual impact in the area and traffic management are found in Chapter 11 Landscape and Visual Impact Assessment and Chapter 15 Material Assets – Traffic and Transportation.

5.4.1.5 Human Health

While there is the potential for construction related hazards, serious risks to human health and safety are not envisioned. Should a major accident or natural disaster occur, the potential sources of pollution onsite during both the construction and operational phases are limited. Sources of pollution with the potential to cause significant environmental pollution and associated negative effects on health such as bulk storage of hydrocarbons or chemicals, storage of wastes etc. are limited.

There is limited potential for significant natural disasters to occur at the Proposed Development site. Ireland is a geologically stable country with a mild temperate climate. The potential natural disasters that may occur are therefore limited to flooding and fire. The risk of flooding is addressed in Chapter 08 Water. It is considered that the risk of significant fire occurring, affecting the wind farm and causing the wind farm to have significant environmental effects is limited. As described earlier, there are no significant sources of pollution in the wind farm with the potential to cause environmental or health effects. Also, the spacing of the turbines and distance of turbines and substation from any properties limits the potential for effects on human health.

Major industrial accidents involving dangerous substances pose a significant threat to humans and the environment. such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident. The Proposed Development is not regulated or connected to or close to any site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations i.e. SEVESO sites and so there are no potential effects from this source.

During construction and decommissioning the site will be managed in accordance with the following safety and health regulations and guidelines which will ensure a high standard of safety both for workers on site and the general public.

- Safety, Health & Welfare at Work (Construction) Regulations 2013.
- Safety, Health & Welfare at Work Act 2005.
- Safety, Health & Welfare at Work (General Applications) Regulations 2007 to 2020.
- Irish Wind Energy Association Best Practice Guidelines.

The provision of underground electric cables of the capacity proposed is common practice throughout the country and installation to the required specification does not give rise to any specific health concerns. A Safety and Health Plan covering all aspects of the construction process will be prepared in advance of construction and will comprehensively deal with safety and health related issues.

It is not anticipated that the workings of the turbines will present any danger to the public. There are rigorous safety checks imposed on the turbines during design, construction, commissioning, and operation ensures the risks to humans are negligible.

Construction works and new development not only can pose safety risks but can also give rise to potential effects on general amenity affecting health and wellbeing. General amenity relates to the pleasant, amenable qualities of a place as it is used and perceived by the people who reside, frequent, or view it. There are a number of general elements that contribute to, or detract from, the amenity of an area. Disturbances such as noise, dust and traffic are potential factors for the devaluation of amenity. The potential wellbeing and disturbance effects of the proposed wind farm scheme on the local human environment have been identified as follows:

- Dust emissions from construction activities.
- Noise emissions during the construction and operation.
- Public safety during construction activities and operations.
- Traffic disturbance during construction and operation.
- Visual impacts and shadow flicker operation.

Each of these effects has been fully assessed and are documented in other chapters of the EIAR as set out in Table 5-12. These assessments were reviewed to inform this study, and it is concluded having regard to these environmental factors, under which human health effects might occur, there will be no significant effects on human health as a result of the Proposed Development expected.

Table 5-12: Potential Issues

Development Phase	Potential Nuisance/Health & Safety Issue	Addressed in EIAR Chapter
Construction Phase	Noise emissions and vibration	Chapter 10 Noise
	Dust emissions	Chapter 13 Air and Climate
	Traffic disturbance	Chapter 15 Material Assets - Traffic and Transport
Operational Phase	Noise emissions and vibration	Chapter 10 Noise
	Visual quality effects	Chapter 11 Landscape and Visual
	Air quality effects	Chapter 13 Air and Climate
	Shadow Flicker disturbance	Chapter 16 Shadow Flicker
	Telecommunications interference	Chapter 14 Material Assets - Built Services
	Public safety	Chapter 2 Description of the Proposed Development
Decommissioning	Traffic Disturbance	Chapter 15 Material Assets - Traffic and Transport
	Noise emissions and vibration	Chapter 10 Noise

Traffic and Road Usage

Potential effects on the surrounding road network will arise principally during the construction phase. Peak daily construction traffic is predicted to be 198 HGV movements (99 each way) with the predicted highest peak hourly HGV traffic volumes to be approximately 21 deliveries per hour. Peak construction traffic would principally occur during turbine base pours and therefore arise on seven occasions.

Traffic studies carried out for the Proposed Development indicate that while there will be an increase of traffic volume on the local public road network during the construction phase, this increase will be well within the carrying capacity of the local public road network. However, the existence of additional traffic, especially heavy

goods vehicle traffic, associated with the construction phase has the potential for local residents and users of these roadways to experience minor disturbances and/or be inconvenienced on encountering site related traffic. There will be a **slight**, **short-term negative effect** on traffic over the 18–24-month construction programme with isolated, **localised** peaks of brief but **moderate effects**.

The Proposed Grid Connection will follow the road network in the area. The 8km route will go from the proposed Ballinla Wind Farm 110kV substation to the under construction Philipstown 110kV substation. The Proposed Grid Connection goes east from Ballinla along the L5010 to the L5006. The route then goes south to meet the R401 before connecting to the Philipstown substation. The works will be brief and appropriate traffic control and management systems will be in place to minimise as far as possible traffic disruption to road users. Once the works are complete, the road will be reinstated. A full assessment of can be found in **Chapter 15** Material Assets – Traffic and Transport of this **EIAR**.

Noise

The construction phase has the potential to generate noise emissions which has the potential to cause disturbance to local noise sensitive areas. The results of the construction noise predictions indicate that noise generated during the construction phase will not exceed the noise limits in the BS5228 Construction Noise Guidelines at any dwelling location, for the duration of the construction phase. The noise assessment proposes recommendations regarding measures of reducing the amount of noise reaching the noise sensitive areas in accordance with BS5228-1&2 +A1 2014, *Code of Practice for the Control of Noise and Vibration on Construction and Open Sites*. A full assessment of can be found in **Chapter 10** Noise of this **EIAR**.

Air Quality

There is the potential for temporary adverse effects in terms of dust emissions during the construction phase of the development.

Vehicle and fugitive dust emissions would occur primarily during Proposed Development construction. Dust generated during the construction phase is not likely to significantly affect the local air quality. Given the distances to the nearest sensitive receptors, dust levels will not exceed the recommended TA Luft 350mg/m3/day guide-limit. There is, however, the possibility of dust occurring in the vicinity of the site entrances and along the local public road which could affect road users. This is considered a temporary minor adverse effect and mitigation will be implemented.

With the effective implementation of standard dust management measures to control and reduce dust, no significant adverse effect, in terms of a community disturbance is likely to occur. A full assessment of can be found in **Chapter 13** Air and Climate of this **EIAR**.

Shadow Flicker

As the turbines will not be commissioned until the end of the construction phase, no construction phase shadow flicker impacts will occur. The potential impacts of shadow flicker are only applicable during the operational phase.

5.4.2 Operational Phase

5.4.2.1 Land Use Change

During operational phase it is considered that the Proposed Development would not constitute significant negative effects in terms of land-use considerations for the following reasons:

- The Proposed Development does not conflict with any planning policies or zoning provisions for this area.

- The Proposed Development will not introduce any activities or features which are otherwise currently unusual to the area. There are therefore no changes to the patterns and types of activity in the area as a result of the proposed project.
- There will be no loss of rights of way or amenities as a result of the Proposed Development.
- In terms of effects to neighbouring lands and land-uses it is considered that the Proposed Development does not pose a significant risk to either existing or future land-uses. All existing land-use practices can co-exist with the development.

Once operational, conventional agricultural and forestry activities will continue to take place at the site independent of the wind farm proposal. Only a relatively small area of commercial forestry, approximately 18ha of the forestry resource in the area locally, will be permanently displaced in the footprint of the wind farm infrastructure. This loss of land use would not be significant.

In terms of effects to neighbouring lands and land-uses it is considered that the wind farm development does not pose a significant risk to either existing or future land-uses. All existing land-use practices can co-exist with the proposed wind farm. The Proposed Development is **likely** to have a **direct**, **long-term**, **neutral**, and **localised** effect on land use.

5.4.2.2 Population and Settlement

During the operational phase of the Proposed Development, it is envisaged that any operators and maintenance personnel will be sourced locally. A change to population and demographic trends of the study area during the operation stage is not expected as there would not be any in-migration associated with the Proposed Development. Throughout the operation phase, it is considered that the effects on population and settlement patterns are likely to be **neutral, localised, long-term** with **imperceptible significance.**

5.4.2.3 Economic Activity and Employment

During the operational phase, the Proposed Development is likely to have a minimal effect on employment. It is envisaged that any operators and maintenance personnel will be sourced locally. There is no known direct or indirect development likely to result from the Proposed Development. The effect during the operational phase is therefore considered likely to be **imperceptible, neutral, long-term** and **localised** on employment.

The Proposed Development will establish a Community Benefit Fund to support local community groups and local educational funds. The concept of directing benefits from wind farms to the local community is promoted by the Department of Environment, Climate and Communications (DECC), the Sustainable Energy Authority of Ireland (SEAI), the National Economic and Social Council (NESC) and the Wind Energy Ireland (WEI) among others.

As set out in the terms of the Renewable Energy Support Scheme (RESS), all renewable energy projects must establish a Community Benefit Fund prior to commercial operations of the Proposed Development. RESS requires a contribution of €2/MWh for all projects. Furthermore, the Community Benefit Fund will provide a minimum payment of €1,000 to all dwellings located within a one-kilometre radius from the project and sets out that a minimum of 40% of the funds shall be paid to not-for-profit community enterprises, whose primary focus or aim is the promotion of initiatives towards the delivery of the UN Sustainable Development Goals.

The total fund per annum will depend on the power output of the Proposed Development overall which may vary due to the installed turbine output and the number of permitted/constructed turbines

The development of renewable energy to replace conventional fossil fuels is considered essential and represents a positive move for Ireland given the role that it plays in effective climate action. The Applicant also believes that it is important to provide the positive benefits of renewable energy to local communities. The Proposed Development Community Benefit Fund will provide a meaningful new investment into the local community

directly targeting and passing on the benefit of renewable energy development to those in the immediate locality. This in turn will result in **positive, moderate, long term** economic benefits to the local area.

5.4.2.4 Tourism and Activities

It is not considered that the Proposed Development will affect any tourism infrastructure in the wider area during the operational phase. Within the Offaly County Development Plan, it is an objective to create more transport links using greenways, blueways and peatways. The Grand Canal Way already links with Lough Boora Discovery Park's walking and cycling routes, and there is potential to extend and connect to the Barrow blueway. The Proposed Development does not infringe or encroach on these existing routes.

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 indicated that most visitors were 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.

The nearest tourist amenity to the Proposed Development is the Grand Canal walkway, which is approximately 500m south from the closest turbine. They are seen oblique to it in a scenario that does not unduly draw from the view of the canal itself. Indeed, in the context of a journey scenario along the Canal they are likely to be perceived as brief way-markers that do not draw from the experience. They will contribute to an increase in the scale and intensity of development visible from this section of the canal, and the proposed turbines could be a focal point along the route, melding the historic industrial nature of the Grand Canal with the modern presence of the turbines along the route.

It is unlikely that works will be required on the Proposed Grid Connection during the operational phase of the Proposed Development with exception for potential repair works if needed. There will be a visual impact associated with the Proposed Development during the operational phase, which is assessed in **Chapter 11** Landscape and Visual. The Proposed Development will therefore have a **long-term** and **slight** effect on tourism, but **not significant**.

5.4.2.5 Human Health

During the operational phase, potential electrical risks are associated with turbine transformers, switches and cabling. It is not envisioned that these will however pose any significant risk as these will fully meet health and safety regulations relating to high voltages. The turbines will prevent access to the public through the erection of steel palisade fencing.

The extremely low frequency (ELF) and EMF associated with the operation of the proposed cables fully comply with the international guidelines for ELF-EMF set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), a formal advisory agency to the World Health Organisation, as well as the EU guidelines for human exposure to EMF. Accordingly, there will be no operational effect on properties (residential or other uses) as the ICNIRP guidelines will not be exceeded at any distances even directly above the cables.

The EirGrid document '*EMF & You: Information about Electric & Magnetic Fields and the electricity transmission system in Ireland*' (EirGrid, 2014) provides further practical information on EMF.

Blades can potentially fail through damage sustained in severe weather mainly through lightning strike or due to inadequate upkeep and maintenance. This is extremely rare, and the developer undertakes to operate and maintain all plant safely and in good working order on the site. Modern wind turbine design incorporates a fail-safe mechanism that comes into play under extreme weather conditions. This mechanism causes the turbines to automatically shut down in periods of excessively high wind-speeds. The separation distances of turbines from

public roads and residences are well beyond the turbine falling over distance that would present a risk of significant accidents.

It is not expected that the Proposed Development will result in significant effects resulting in the risk of major accidents and disasters, nor is the project considered vulnerable to risks of major accidents and disasters.

Several topics related to human health at the operational phase are discussed in the following subsections.

Traffic and Road Usage

Once operational, the development will for the most part be monitored remotely with only occasional trips generated by maintenance and monitoring personnel. This would generate a relatively low volume of vehicles. Therefore, there will be negligible operational stage traffic impacts associated with the Proposed Development. Hence, the proposed operational phase would have **imperceptible to not significant** traffic effect.

Noise

Potential sources of noise during the operation phase of the Proposed Development include mechanical noise from the gearbox or generator, aerodynamic noise from the rotor blades, and noise from the transformers and cooling fans in the substations.

Advances in the development of commercial wind turbines has led to mechanical noise being significantly reduced during operation. In relation to aerodynamic noise, noise predictions were undertaken at identified receptor locations closest to the turbines and substations. For the transformers and cooling fans, the noise is generally recognisable as a steady hum which arises from electric and magnetic forces within the transformer. Given the separation distance between the windfarm and the nearest and nearest residential receptors and with adherence to the national guide limits, **no significant noise effect** on the local population is envisaged. No operational noise impacts will be generated from the underground grid cable.

The noise assessment undertaken demonstrates the noise limits can be achieved at all 3rd party local residential dwellings. It is considered that the effects of noise and vibration during the operation phase will be **not significant** and **long term.**

Chapter 10 Noise of this **EIAR** considers the effects of noise emitted for the Proposed Development at operational phase.

Shadow Flicker

Shadow flicker is defined as the alternating light intensity produced by a wind turbine as the rotating blade casts shadows on the ground and stationary objects, such as the window of a residence.

The HSE position paper (2017) states that, "There is insufficient direct evidence to draw any conclusions on an association between shadow flicker produced by wind farms and health effects. Flashing lights can trigger seizures among people with a rare form of epilepsy called photosensitive epilepsy. The risk of shadow flicker from wind farms triggering a seizure among people with this condition is estimated to be extremely low".

The study area for shadow flicker is 1.62km, which is 10 times the rotor diameter. There was no identified dwelling within 500m of any turbine at the Proposed Development. Of the 141 dwellings within the study area, shadow flicker was assessed to potentially impact 111 during the operational phase.

Shadow Flicker Control Modules (SFCM) are a standard element of commercial wind turbine packages which requires the identified dates and times of day of potential occurrence of shadow flicker at dwellings within the shadow flicker study area to be inserted into the SFCM computer program. This software considers factors such as weather conditions, which will then automatically stop each wind turbine at times when shadow flicker could otherwise occur within any of the houses within the study area. Once the conditions for shadow flicker to occur

no longer apply (e.g. when the sun has passed the relevant position in the sky or once it has been clouded over), the wind turbine is restarted.

With the implementation of the SFCM in the Proposed Development, the effects of shadow flicker will change from negative to **neutral** and the significance of the effects will be **imperceptible**, with the probability of the effect occurring being **unlikely**. A full assessment of shadow flicker is found in **Chapter 16** of this **EIAR**.

Air Quality

The Proposed Development will make a positive contribution to air quality once operational, displacing greenhouse gas emissions which would otherwise be emitted by fossil fuel powered electricity. **Chapter 13** Air and Climate of this **EIAR** presents a full assessment on the effects of air quality from the Proposed Development. The operational phase will have significantly less impact on air quality, with lower vehicle and dust emissions when compared to the construction phase. Emissions will arise from maintenance vehicles (light goods vehicles) estimated at 1-2 visits per month. The additional traffic generated during the operational phase will be negligible therefore the overall potential impact from dust and vehicle emissions during the operational phase will be **long-term**, **imperceptible** and have a **positive** impact on air quality, with a reduction of electricity generation from fossil fuel sources. Over the 35-year lifespan of the Proposed Development, approximately 1.6 million tonnes of CO_2 will be offset.

5.4.2.6 Climate Change

The proposed wind farm project will facilitate decarbonisation objectives at local and national levels as set out in the 2023 National Climate Action Plan and the 2021 - 2027 Offaly County Development Plan which states that Offaly County Council will facilitate and support the development of renewable energy sources which will aid in achieving national targets and a reduction in fossil fuel dependency and greenhouse gas emissions.

The project is estimated to offset approximately 1.6 million tonnes of CO_2 during its 35-year operational lifespan. The payback from emissions generated during the construction of the Proposed Development is estimated to be 1.7 years, with total losses approximately 86,911 tonnes of CO_2. The remaining 33.3 years of operation of the Proposed Development will see a positive offset of emissions, and will therefore have a **long-term**, **direct, slight, positive** and **extensive** effect on climate change. A full assessment of climate change effects and impacts related to the Proposed Development is found in **Chapter 13** of this **EIAR**.

5.4.2.7 Visual Elements

A landscape and visual impact assessment was carried out in relation to the Proposed Development. A total of 29 viewpoints were used to determine the visual presence of the proposed wind farm. From these viewpoints photomontages were prepared and an assessment completed.

The turbine structures and their proposed position in a relatively flat, low-lying area, will have a visual consequence that is unavoidable. However, the extent of intrusion will vary in degree and significance according to viewing distance, the numbers and parts of turbines visible, the number of viewers affected and of course public perception.

Chapter 11 of the EIAR sets out the potential landscape and visual impacts of the Proposed Development and describes the setting of the Proposed Development Site in relation to tourism features. The assessment concludes that there will be no significant effects as a result of the Proposed Development.

The visual impact assessment also assessed the cumulative effect of the Proposed Development along with other planned or operating wind turbines in the area. The cumulative effect was not considered significant owing to the limited number of turbines and compact layout.

5.4.3 Decommissioning Phase

Once the operational period is complete, a Decommissioning Plan will be drawn up to ensure the safety of the public and workforce and the use of best available techniques at the time. The Decommissioning Plan will be agreed with the competent authority at that time.

The Proposed Wind Farm has been designed to have an operational life of 35 years, after which it will be decommissioned. The site will be reinstated with all wind turbines and towers removed. Upon decommissioning, all that will remain will be the access tracks. The substation will remain in place as part of the permanent electrical infrastructure.

When the site is to be decommissioned, cranes of similar size to those used for construction will disassemble each turbine. The towers, blades and all components will then be removed. The turbines will also be removed from site. It is likely that turbine components where possible will be reused as they have a life well in excess of the wind farm proposal i.e., greater than 35 years. Wind farm components may also be recycled.

Wastes generated during the decommissioning phase will be taken off site and disposed of appropriately by a licensed waste operator. Any potential waste soil will be notified under Article 27 (European Communities (Waste Directive) Regulations 2011) or treated to comply with Article 28 (European Communities (Waste Directive) Regulations 2011) if practicable. Any materials containing invasive species will be appropriately managed and sent to authorised facilities.

Underground cables will likely be cut back and left underground as removal may do more harm than leaving them *in situ* after the operational lifespan of the Proposed Development.

Hardstand areas will be remediated to match the existing landscape thus requiring revegetation or reforestation. Access tracks will be left for use by the landowner. The current view is that the disturbance associated with the removal and disposal of the elements (hard core and sediment) would be more deleterious than leaving them in place. Any structural materials suitable for recycling will be disposed of in an appropriate manner.

Potential effects and consequential effects from the decommissioning phase will be similar to those from the construction phase but reduced in magnitude. Given that there will be no significant groundworks required from the decommissioning phase, effects or associated effects will be materially less than the construction phase of the Proposed Development. The decommissioning phase will have no significant effects once mitigation measures prescribed for traffic, noise and dust effects are implemented as described in their EIAR relevant chapters.

5.4.4 Do Nothing

An alternative to the Proposed Development of the Proposed Ballinla Wind Farm is to leave the site as it is currently being utilised for agricultural and forestry purposes. There will be no changes to the baseline environment of the site and existing activities such as agricultural activities and periodic tree felling will continue.

There will be no increases in local employment and the economic benefit via the community benefit fund will not be realised.

The potential emissions from the construction phase will not be created and there will be no noise, shadow flicker or visual effects which are associated with wind farms. However, the local, regional and national benefits which accompany the Proposed Development associated with the replacement of fossil fuels with renewable energy will be lost.

5.4.5 Cumulative Effects

The list of all projects considered for the cumulative assessment are included in **Section 2.3.19.1** of **Chapter 02** of this **EIAR.** Each of the projects listed were considered with respect to potential cumulative effects on population and human health**.**

Small scale projects listed in **Chapter 02** will not result in cumulative effects and can be discounted from the impact assessment.

The neighbouring windfarms in the area of the Proposed Development are listed and shown in **Figure 5-7**.

- Cushaling Wind Farm (9- turbine) (Permitted and under construction).
- Cloncreen Wind Farm (21 - turbine) (existing).
- Mountlucas Wind Farm (28 - turbine) (existing).
- Yellow River Wind Farm (29 – turbine) (existing).
- Moanvane Wind Farm (12 – turbine) (Permitted and under construction).
- Dernacart Wind Farm, Co. Laois (8 – turbine) (Permitted)

The closest constructed windfarm is the Cloncreen windfarm, *c.* 2km south of the Proposed Development. The Yellow River Wind Farm is currently under construction, and due for completion in early 2025.

The nearest proposed solar farms to the Proposed Development are listed as follows:

- Kilcush Solar Farm (21/598) – c. 117.47ha to include PV panels mounted on metal frames, 22 No. MV power stations (Permitted by Offaly County Council but not yet constructed).
- Obton Limited Oldcourt Solar Farm (22/327) – c. 121.55ha of solar panels on ground mounted frames and other ancillary works (Permitted by Kildare County Council)

Kilcush Solar farm is located approximately 7km south of the Proposed Development while Oldcourt is located approximately 10km east. The Highfield Solar Farm is located near Rhode, northwest of the Proposed Development. Planning permission was granted, with conditions, by ABP on 11/03/2021 (Planning Ref. 304925), and consists of 15ha of solar panels and related works such as invertors, transformers, access and connection points. The potential for cumulative effects is considered in the relevant chapters of this **EIAR.**

Assessment of cumulative effects regarding shadow flicker are presented fully in **Chapter 16** of this **EIAR**. The only windfarm in the vicinity with potential cumulative effect regarding shadow flicker is Cloncreen. The inclusion of SFCM, as is standard practice for commercial windfarms, will mitigate this cumulative impact. Refer to **Chapter 16** of this **EIAR** for more detail regarding the cumulative assessment for shadow flicker.

In considering cumulative effects with other planned or approved projects, construction effects will have a cumulative impact on the receiving environment, only if other reasonably foreseeable proposals are constructed in close vicinity to the Proposed Development construction and at the same time.

Therefore, cumulative noise, air quality, and traffic impacts have the potential to arise locally when construction activities associated with the Proposed Development take place at the same time as other developments in a specific location. These effects are considered to be **temporary, short-term** and of **slight significance** when assessed cumulatively with the Proposed Development. Refer to **Chapters 10, 13** and **15** of this **EIAR** or the full assessment of the cumulative impacts regarding noise, air quality, and traffic impacts.

Chapter 11 of this **EIAR** considers the cumulative impact in the area of the Proposed Development with other existing windfarms on landscape and visual. The receiving landscape is considered to have 'Medium-Low'

sensitivity, and that the addition of the Proposed Development in the area will have a 'Medium-Low' cumulative impact. Overall, the cumulative impact is deemed to be **slight** to **moderate** and **long-term**. **Chapter 11** provides a full cumulative impact assessment regarding landscape and visual effects.

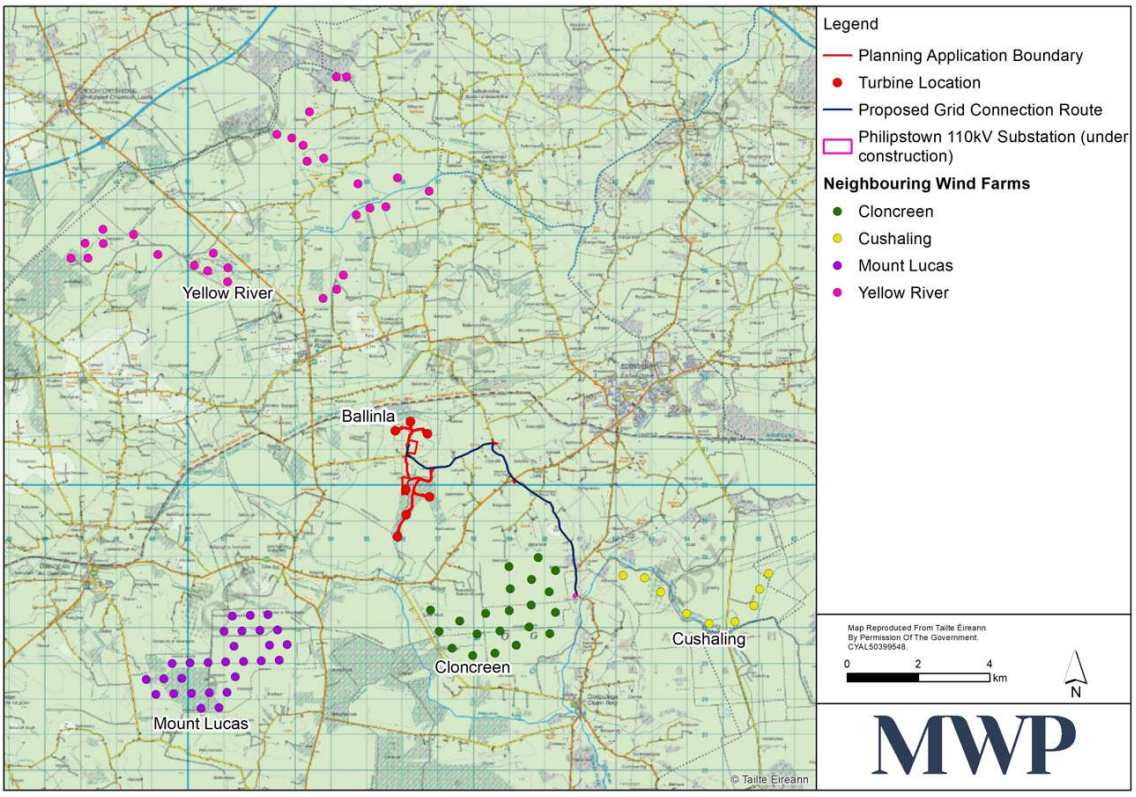

Figure 5-6: Neighbouring Wind Farms

5.5 Mitigation and Monitoring Measures

5.5.1 Mitigation Measures

The potential for significant effects on the human environment will principally arise during the construction phase from traffic, noise and dust effects and during the operational phase from noise and shadow flicker effects. Mitigation in relation to these issues are outlined in their respective Chapters of this **EIAR** (**Chapter 10** Noise, **Chapter 16** Shadow Flicker, **Chapter 11** Landscape and Visual, **Chapter 13** Air and Climate, **Chapter 15** Material Assets Traffic and Transport).

As there will be no significant effects, no additional mitigation measures are required for population and human health.

5.5.2 Monitoring Measures

As with mitigation, monitoring is prescribed in relevant Chapters of this **EIAR** where required. No additional monitoring is proposed here for those particular aspects.

5.6 Residual Effects

With the mitigation measures in place, no significant residual effects on the human environment will occur in relation to dust, traffic, noise and shadow flicker as a result of the following:

- With the implementation of mitigation measures, noise disturbances will be kept to a minimum and within acceptable noise limits.
- With the implementation of mitigation measures, shadow flicker effects will be eliminated at receptors.
- With the implementation of standard traffic management measures, traffic disturbances will be kept to a minimum.
- With the implementation of mitigation measures, significant health and safety implications are not envisaged.
- With the implementation of standard best management construction activities, dust levels will remain within recommended acceptable guide-limits.

Overall, there will be no significant residual effects on population and human health as a result of the Proposed Development.

5.7 Conclusion

This chapter has assessed the potential effects on population and human health on the Proposed Development, and it is not anticipated to have any significant effects on population, employment, economic activity, tourism, land use and human health.

The assessment considered the existing baseline environmental conditions of the Proposed Development which included the demographics and socioeconomics in the electoral divisions. In addition, potential effects during the construction phases, operational phase and decommissioning phase were considered as well as cumulative and residual effects. Finally, where effects were unavoidable but manageable, mitigation measures are to be implemented where relevant.

Regarding the local population and settlement patterns, no significant impacts are considered to occur due to the Proposed Development. Personnel will be recruited from the local area where possible for construction, operation and decommissioning phases. There may be some experienced employees that may temporarily relocate during the phase of the lifespan relevant to their experience, but this impact is negligible, and overall, no negative effects are associated with the Proposed Development regarding population and settlement patterns.

As mentioned regarding employment in the preceding paragraph, workers needed for the phase of the Proposed Development will be sourced locally, having a direct and positive impact in the area. Indirect positive impacts during the construction and decommissioning phase will affect the smaller towns, with an increase in business, particularly for food and beverage operators being utilised by construction personnel.

The Proposed Development has been designed to keep land take to a minimal, reducing the impact on land use in the vicinity, and no negative effects are considered in relation to land use and social considerations related to the Proposed Development. There will be no severance, loss of rights of way or amenities as a result of the Proposed Development.

It was concluded that while there would be no significant effect on tourism infrastructure in the vicinity of the Proposed Development.

Health and Safety guidelines will be followed throughout construction to ensure no serious accidents occur. There is no public access available to the area of the Proposed Development, and it will be closed to the public

throughout its lifespan. Shadow flicker impacts during the operation phase have also been considered with the potential effect on nearby sensitive receptors, and it was concluded that there are likely to be no significant impacts on human health and safety related to the Proposed Development. A similar conclusion can be considered for Climate, as the project over its lifespan will offset approximately 1.6 million CO_2 and is considered to also have a positive effect on climate overall.

The main disturbance during the construction phase of the Proposed Development will be the generation of additional traffic on the local road networks which may present noise and safety implications as a concern. The disturbances associated with additional traffic volumes will however be confined to the construction phase of the Proposed Development and will not be a concern once works are complete. The construction phase will be managed so that effects to the human environment and local residents are managed. Mitigation measures outlined in the relevant Chapters 10 and 15 will be implemented and therefore, no significant negative effects on the local human environment are expected.

The operational phase of the Proposed Development is not expected to present any adverse effects on the human environment. The production of electricity by wind energy is environmentally friendly and reduces national dependency on fossil fuel production and its use in electricity generation. This reduction in demand for electricity from fossil fuel resources has a positive long-term effect on human health.

Noise effects are not considered to be significant. The noise assessment demonstrates that the proposed wind farm will operate within the recommended noise limit criteria in the *Draft Revised Wind Energy Development Guidelines* (2019) for all noise sensitive receptors surrounding the development and thus will not cause an adverse effect on the quality of life of local residents and the existing relatively tranquil environment in which they live.

The shadow flicker assessment demonstrates that while there may be potential for a number of dwellings to experience shadow flicker effects within the shadow flicker study area of 1.62km, the operational mitigation measures, SFCM, will be implemented to ensure that shadow flicker will be eliminated at all residential receptors.

Cumulative effects were considered in relation to proposed, consented and constructed projects located nearby the Proposed Development. No significant in-combination impacts were identified in relation to population and human health.

Once mitigation measures set out throughout this EIAR are implemented, it is unlikely that significant negative impacts to population and human health will occur as a result of development of the Proposed Development. This is also similar to residual effects, with no significant residual effects to the population and human health associated with the Proposed Development.

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