- To summarise the relevant projects which have a potential to create cumulative impacts.
- To identify the projects that hold the potential for cumulative interaction within the context of the Proposed Development and discard projects that will neither directly or indirectly contribute to cumulative impacts.

Assessment material for this cumulative impact assessment was compiled on the relevant developments within the vicinity of the Proposed Development. The material was gathered through a search of relevant online Planning Registers, reviews of relevant EIAR (or historical EIS) documents, planning application details and planning drawings, and served to identify past and future projects, their activities and their environmental impacts.

2.9.2 Cumulative Study Area

The geographical boundaries of the various zones of sensitivity of and to the Proposed Development from which there may be potential for cumulative impacts to arise relative to each individual EIAR topic, i.e each chapter, is presented below in Table 2-8. Following consultation with the EIAR team on each individual topic, the maximum geographical extent and justification for this extent was established and is presented below.

Table 2-7: Cumulative Study Areas and Justification

Individual Topic	Maximum Extent	Justification
Population & Human Health (including shadow flicker)	Proposed Development site Study Area for Population (Rathornan and Ridge) Shadow Flicker Study Area (10x RD buffer of the turbines RD from proposed turbine locations = 710m) Consideration for the P&HH cumulative extent is also given to Air Quality, Climate, Noise, and Landscape and Visual (i.e., Residential Visual Amenity) Cumulative study areas.	For the assessment of cumulative shadow flicker, any other existing, permitted or proposed wind farms are considered where their ten times rotor diameter shadow flicker study area are located within the Shadow Flicker Study Area of 710m (ten times the rotor diameter from proposed turbines) for the Proposed Development. As the nearest proposed, permitted or existing wind farms is 330m (Turbine 12 of Castledockrell Wind Farm) from the existing turbines, there is potential for cumulative shadow flicker effects. The Study Area for Population is identified in Section 5.3.1 in Chapter 5 as the District Electoral Divisions where turbines and associated infrastructure are located. The area encompassing the turbines and associated infrastructure Study Areas for Population identified are considered for cumulative effects on Population.
Biodiversity	EIAR Site Boundary	Given the nature of the Proposed Development - extension of life, with no alteration to existing infrastructure or newly proposed infrastructure (e.g. no potential for any change in baseline habitat loss, water quality impacts etc), there are no potential for cumulative impacts in relation to Biodiversity.

Individual Topic	Maximum Extent	Justification
Biodiversity (Bats)	10km from the Proposed Development turbine locations	A 10km buffer of the Proposed Development turbines is used as is recommended for the desktop study and cumulative assessment by NatureScot Guidelines 2021 (Section 4).
Birds	25km from the Proposed Development turbine locations	NatureScot guidance 'Assessing the Cumulative Impacts of onshore Wind Energy Developments' (SNH, 2012; 2018) was consulted while undertaking the cumulative assessment. SNH (2012; 2018) emphasises that its priority is to 'maintain the conservation status of the species population at the national level.' However, it is acknowledged that consideration should also be allowed for impacts at the regional level 'where regional impacts have national implications (for example where a specific region holds the majority of the national population)'. Following the guidance of SNH (2012), the cumulative impact assessment has been carried out at the scale of the importance rating of the receptor. A 25km radius of the Proposed Development was considered a reasonable approximation of the size of a county and a 5km radius of the Proposed Development was considered a reasonable approximation for the local level.
Land, Soils and Geology	EIAR Site Boundary	As there is no pathway for offsite cumulative impacts for Land, Soils and Geology, the cumulative study area is the EIAR Site Boundary.
Hydrology and Hydrogeology	The surface water sub-catchments in which the Proposed Development site is located	Given the nature of the Proposed Development (i.e. no proposals for construction or ground works), the potential for cumulative effects with other planned or permitted projects focuses on the surface water sub-catchment in which the site is located.
Air Quality	Air Quality Study Area is 1km from Wind Farm Site.	Given dust particles do not generally travel greater than 500m from source (*Guidance on the Assessment of Mineral Dust Impacts for Planning*, IAQM 2016) the geographical boundary for the cumulative dust impact is 500m. In line with the TII Publication Air Quality Assessment of Proposed National Roads – Standard PE-ENV-01107, December 2022, a

Individual Topic	Maximum Extent	Justification
		geographical boundary of 1km was used for cumulative air quality assessment.
Climate	The Climate assessment has been considered on a national basis and not confined to a specific study area.	The Climate assessment has considered the cumulative effects of the Proposed Developments with other developments on a national basis and within the context of the national Carbon Budget and relevant sectoral emissions ceiling.
Noise & Vibration	2km from Proposed Development turbine locations	Paragraph 5.1.4 of the IOA Good Practice Guide states, "During scoping of a new wind farm development consideration should be given to cumulative noise impacts from any other wind farms in the locality. If the Proposed Development produces noise levels within 10 dB of any existing wind farm/s at the same receptor location, then a cumulative noise impact assessment is necessary." Typically, this equates to a wind farm being located within 2km of the Proposed Development.
Cultural Heritage	20km from Proposed Development turbine locations	Given the nature of the Proposed Development, it was determined that this buffer was suitable for the cumulative assessment
Landscape & Visual	20km from Proposed Development turbine locations for visual and landscape effects. 15km from Proposed Development turbine locations for effects on landscape character.	The Wind Energy Development Guidelines (DoEHLG, 2006) require that "in areas where landscapes of national or international renown are located within 25 km of a proposed wind energy development, the Zone of Theoretical Visibility should be extended as far (and in the direction of) that landscape". The LVIA study area has been chosen as 20 kilometres for effects on landscape character, following the guidance on Appendix 3 of the WEDGs which provides that 'For blade tips in excess of 100m, a Zone of Theoretical Visibility radius of 20km would be adequate' (WEDGs Page 94, DoEHLG, 2006; Page 152, DoHPLG, 2019)
Material Assets	The list of wind farms and other projects which were initially considered in cumulative assessment extended to 25 km.	Given the nature of the Proposed Development (i.e. no construction or groundworks proposed), it was determined that this buffer was suitable for the cumulative assessment

To gather a comprehensive view of cumulative impacts within the cumulative study area and to inform the EIA process being undertaken by the consenting authority, each relevant chapter within the EIAR addresses the potential for cumulative effects where appropriate and within the context of their identified cumulative study area. A long list of projects considered (i.e. the largest cumulative study boundary of 25km list) across all disciplines in their cumulative impact assessment is included in Appendix 2-3. Smaller cumulative assessment studies have considered all projects within their specific boundary which fall within the long list in Appendix 2-3.

2.9.2.1 Other Developments/Land uses

The review of the relevant County Council planning registers documented relevant general development planning applications in the vicinity of the Proposed Development site, the majority of which relate to the provision and/or alteration of one-off rural housing and the provision of agricultural buildings. These applications and land uses have also been taken account in describing the baseline environment and in the relevant assessments.

Furthermore, the cumulative impact assessments carried out in each of the subsequent chapters of this EIAR consider all potential significant cumulative effects arising from all land uses in the vicinity of the Proposed Development. These include permitted and existing wind farms in the area, ongoing agricultural practices/forestry practices, quarries and extractive industries, intensive production/ processing industries, large infrastructure projects and other EIAR projects. The OPW (www.floodinfo.ie) does not record the presence of any Arterial Drainage Schemes or Benefited Lands within the proposed Wind Farm site or along the Grid Connection route.

Overall, the Proposed Development has been designed to avoid and mitigate impacts on the environment and a suite of mitigation measures is set out within the EIAR. The mitigation measures set out in this EIAR will ensure that significant cumulative effects do not arise during the construction, operational or decommissioning phases of the Proposed Development. Additional detail in relation to the potential significant cumulative effects arising and, where appropriate, the specific suite of relevant mitigation measures proposed are set out within each of the relevant chapters of this EIAR.

2.9.3 Summary

The cumulative impact assessments carried out in each of the subsequent chapters of this EIAR consider all potential significant cumulative effects arising from relevant projects, plans and land uses within the cumulative study area and within the vicinity of the Proposed Development. These include ongoing agricultural practices.

Overall, the Proposed Development will not have any additional impacts over and above what has been assessed and permitted previously, as there are no additional works proposed. Additional detail in relation to the potential significant cumulative effects arising and, where appropriate, the specific suite of relevant mitigation measures proposed are set out within each of the relevant chapters of this EIAR.

3. CONSIDERATION OF REASONABLE ALTERNATIVES

3.1 Introduction

Article 5(1)(d) of Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of effects of certain public and private projects on the environment (codification), as amended by Directive 2014/52/EU (the EIA Directive), requires that the Environmental Impact Assessment Report (EIAR) contains "a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment."

Article 5(1)(f) of the EIA Directive requires that the EIAR contains "any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected."

Annex IV of the EIA Directive states that the information provided in an EIAR should include a "description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects."

This section of the EIAR contains a description of the reasonable alternatives that were studied by the developer, which are relevant to the Proposed Development and its specific characteristics, in terms of site location and other renewable energy technologies as well as site layout incorporating size and scale of the project. It provides an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

It is important to note that the Castledockrell Wind Farm (the 'Proposed Development') is an existing wind farm, in operation since 2011, and this EIAR has been prepared for the proposal to extend the operational lifespan beyond 2025, for a further 20 years for the wind farm and the permanent extension of the onsite 110kV substation. No construction or groundworks are proposed as part of the Proposed Development.

The consideration of alternatives is an effective means of avoiding environmental impacts. As set out in the '*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (Environmental Protection Agency, 2022), the presentation and consideration of reasonable alternatives investigated is an important part of the overall EIA process. The factors of hierarchy, non-environmental factors and site-specific issues may be taken into account in the consideration of reasonable alternatives, as set out below.

Hierarchy

EIA is concerned with projects. The Environmental Protection Agency (EPA) *'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'* (EPA, May 2022), state that in some instances neither the applicant nor the competent authority can be realistically expected to examine options that have already been previously determined by means of a Strategic Environmental Assessment (SEA), the higher tier form of environmental assessment.

Non-environmental Factors

EIA is confined to the potential significant environmental effects that influence consideration of alternatives. However, other non-environmental factors may have equal or overriding importance to the developer of a project, for example project economics, land availability, engineering feasibility or planning considerations.

Site-Specific Issues

The EPA guidelines state that the consideration of alternatives needs to be set within the parameters of the availability of the land, i.e. the site may be the only suitable land available to the developer, or the need for the project to accommodate demands or opportunities that are site-specific. Such considerations should be on the basis of alternatives within a site, for example design and layout.

3.1.2 Methodology

The European Commission's ***Guidance on the Preparation of the Environmental Impact Assessment Report*** (EU, 2017) outlines the requirements of the EIA Directive and states that, in order to address the assessment of reasonable alternatives, the developer needs to provide the following:

- A description of the reasonable alternatives studied; and
- An indication of the main reasons for selecting the chosen option with regards to their environmental impacts.

There is limited European and National guidance on what constitutes a 'reasonable alternative' however the EU Guidance Document (EU, 2017) states that reasonable alternatives "***must be relevant to the proposed project and its specific characteristics, and resources should only be spent assessing these alternatives***".

The guidance also acknowledges that "***the selection of alternatives is limited in terms of feasibility. On the one hand, an alternative should not be ruled out simply because it would cause inconvenience or cost to the Developer. At the same time, if an alternative is very expensive or technically or legally difficult, it would be unreasonable to consider it to be a feasible alternative.***"

The current EPA Guidelines (EPA, 2022) state that ***"It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required."***

Consequently, taking consideration of the legislation and guidance requirements into account, this section addresses alternatives under the following headings:

- 'Do-Nothing' Alternative;
- Alternative Locations;
- Alternative Processes;
- Alternative Technologies;
- Alternative Mitigation Measures.

Each of these is addressed in the following sections.

3.2 'Do-Nothing' Alternative

Article IV, Part 3 of the EIA Directive states that the EIAR should include "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." This is referred to as the "do-nothing" alternative. EU guidance (EU, 2017) states that this should involve the assessment of "an outline of what is likely to happen to the environment should the Project not be implemented – the so-called 'do-nothing' scenario."

The 'Do-Nothing' alternative with regard to the Proposed Development, is to decommission the existing wind farm in 2025 when its current permission expires. As part of the decommissioning stage, the existing turbines would be dismantled, and the site reinstated; please see Section 4.6 in Chapter 4 of this EIAR for further details regarding decommissioning. The Proposed Development seeks to extend the operational life of the wind farm to 2045, at which stage the wind farm would be decommissioned.

In implementing the 'Do-Nothing' alternative however, i.e. decommissioning the existing wind farm in 2025, the opportunity to continue utilising the existing renewable energy infrastructure would be lost. So too would the opportunity to continue contributing to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas (GHG) emissions. The existing wind farm has a generating capacity of c.25.3 Megawatts (MW) which is capable of suppling approximately 19,710 households with electricity every year (see Section 4.3.1.5 in Chapter 4 of this EIAR for calculations).

The opportunity to continue to provide maintenance-related employment, local authority development contributions, rates and investment in the local area would also be lost. Further details on the current Community Benefit Fund, and the Fund associated with the Proposed Development can be found in Section 1.5.7 of Chapter 1: Introduction.

It is noted that the total current wind farm site, i.e. the EIAR Site Boundary as shown on figures, is approximately 97 hectares (ha). The existing development footprint therefore accounts for approximately 3.23 ha or approximately 3.3% of the total site area. The remainder of the site is used primarily for agricultural activities, split between pastural and arable land. These existing uses are compatible and will continue in conjunction with the proposed continued use of the development site for wind energy.

A comparison of the potential environmental effects of the 'Do-Nothing' Alternative when compared against the chosen option of extending the lifetime of the existing renewable energy project at this site are presented in Table 3-1 below. On the basis of the positive environmental effects arising from the Proposed Development, when compared to the 'Do-Nothing' scenario, the 'Do-Nothing' scenario was not the chosen option.

Table 3-1 Comparison of environmental effects of 'Do-Nothing' alternative when compared against the chosen option (maintaining the existing wind farm at this site)

Environmental Consideration	'Do-Nothing' Alternative i.e. decommissioning of the existing wind farm in 2025
Population and Human Health (including Shadow Flicker)	Short term increase in local employment due to decommissioning works, followed by long-term loss of maintenance related employment, and loss of long-term financial contributions towards the local community. No further potential for shadow flicker to affect sensitive receptors if the turbines were decommissioned.
Biodiversity and Ornithology	Neutral
Land, Soils and Geology	Neutral
Geotechnical	Neutral

Water	Neutral
Air and Climate	The decommissioning of the wind farm will prevent the extension of the opportunity for an increase in air quality or reduction of greenhouse gases. The decommissioning will also not assist in achieving the renewable energy targets set out in the Climate Action Plan 2024.
Noise and Vibration	Potential short-term, slight negative noise impacts on nearby sensitive receptors, associated with the decommissioning phase. No potential for further noise effects once the existing turbines are decommissioned.
Landscape and Visual	No further landscape and visual and visual effects related to turbines, once removed.
Cultural Heritage and Archaeology	Neutral
Material Assets	Likely greater traffic volumes during decommissioning phase. Potential generation of construction and demolition (C&D) waste.

3.3 Alternative Locations

3.3.1 Site Selection Process

It is considered appropriate to extend the operational phase of the existing wind energy development at the current site for the following reasons:

- Castledockrell Wind Farm has been operating successfully in its current location since 2011 when it was first commissioned. It has proven to have reliably good wind speeds and maintained good generating capacity.
- While the turbine technology on the site is dated, it has been demonstrated by the Applicant that the existing 11 no. Enercon E70 model turbines can continue to operate effectively for a further 20 years without a significant loss in total generating capacity of 25.3 MW. As outlined in Chapter 1 of this EIAR, 11 no. of the turbines which make up the existing Castledockrell Wind Farm are set to be decommissioned in August 2025, under its current permission. The turbines will have only been in operation for approx. 14 years by the decommissioning date, which is several years below their operational expectancy, which ranges between 25-30 years. A Lifetime Prediction Report was completed by Ingenieure BW GmbH in April 2024 to provide qualitative remaining useful life studies on the Castledockrell Wind Farm turbines, which concluded the minimum life of all wind turbine components is 26 years. This enables the Applicant to safely extend the lifetime of the turbine components from a mechanical and operational safety perspective. Further details on this can be found in the Lifetime Prediction Report included as Appendix 4-1 of this EIAR.
- The existing wind farm infrastructure on the site, including the control building and site roads, can continue to be used for the proposed 20-year extended operational period, which reduces environmental effects when compared to an undeveloped greenfield site, particularly in relation to landscape and visual effects and effects on locally important habitats.
- The existing wind farm site entrance can continue to be used without any alterations or upgrades needed.

- **The Proposed Development can comply with policies and principles outlined in Chapter 1: Introduction (of this EIAR) in terms of need for additional renewable energy in Ireland.**
- **The Proposed Development can contribute to the achievement of national energy targets and can continue to provide significant social and economic benefits for the local area (direct and indirect employment, community development fund, recreational amenity) and the wider region.**
- **Having been previously permitted, the principle for wind energy development on this site is already well established and has been proven to be in accordance with the proper planning and sustainable development of the area. Chapter 2, Section 2.4 of this EIAR outlines the strategic planning context and provides further details of the Proposed Development's alignment with national, regional, and local policies, frameworks, guidelines and plans.**

3.3.2 Review of Alternative Sites

The Applicant has undertaken a review of another of their operational wind farms, namely Bola More Wind Farm located 2.3km west of Castledockrell and commissioned at the same time, 2011, as the Proposed Development. The aim of this review was to determine if they should be decommissioned, the operational life extended, or if they are suitable for repowering. It was then decided which of the sites should first be selected for extension of operation. At this time, it was considered that, due to the length of duration remaining on the planning permission for the existing Castledockrell Wind Farm, it was more appropriate to consider this site for an extension of operational life.

The existing Castledockrell Wind Farm was considered suitable for extension of operation due to the success of the existing site, the good condition and performance of the existing turbines and site infrastructure (see Appendix 4-1 Lifetime Prediction Report for turbine performance assessment details), the wind regime on the site and the existing grid connection infrastructure. The turbines at Castledockrell Wind Farm have been operational since 2011 and are still in very good operational condition.

The Proposed Development is for an extension of life of the operational Castledockrell Wind Farm and therefore, further detailed assessment of alternative locations was not considered to be applicable in this instance.

3.4 Alternative Processes

The activities that effect the volumes and characteristics of emissions, reduces, traffic and the use of natural resources has formed part of the alternative's considerations through the development of the proposed extension of lifetime to the existing wind farm development.

During the operational phase the processes required at the site are relatively benign. There are no manufacturing processes per se with the potential for the generation of significant emissions to any environmental media, the use of finite natural resources or the generation of wastes or traffic volumes. On this basis, alternative processes designed to reduce emissions and use of resources during the operational stage are not required.

The low level of operation and maintenance (O&M) activities required at the site will require the use of relatively minimal quantities of raw materials in the form of energy to supply plant and machinery, standard building materials including stone, metals pipework, concrete, electrical and plumbing. Raw materials are also utilised in the manufacture of wind turbine components and electrical infrastructure that may require replacement. The use of these resources will be controlled by the employment of best practice O&M techniques including waste management practices.

The purpose of the Proposed Development is to generate electricity from an infinite renewable source which will offset the use of finite fossil fuels. The baseline scenario without implementation of the Proposed Development is not to provide a renewable energy source at this suitable location, therefore failing to contribute to climate change and energy policy objectives. Such an approach would neither be optimal nor appropriate.

3.5 Alternative Technologies

The Proposed Development is a wind farm capable of generating up to 25.3 MW of renewable energy. The Proposed Development, through extending the operational lifespan of the wind farm, will maintain this level of renewable energy generation with little additional capital investment required and no significant increase in current operating costs.

The existing site could potentially be redeveloped with an alternative renewable energy technology with solar photovoltaic (PV) array, or a solar/ wind energy mix deemed suitable to this location.

Redevelopment of this site as a large-scale solar farm capable of generating enough energy to be economically viable would drastically change the existing character of the land use, as it would have a significantly larger footprint. According to the Sustainable Energy Authority of Ireland (SEAI), approximately 1.6 – 2.0ha of solar array area is required for each Megawatt generated. Therefore, in order for a solar farm to deliver at least 25 MW (the current wind farm generating capacity) a footprint area of approximately 43.2 – 54 ha of solar array would be required. The current wind farm turbine footprint in comparison (turbines and hardstanding areas) is 3.04 hectares.

In addition, the construction of a solar development could have the potential environmental effect on Hydrology & Hydrology, Traffic & Transport (construction phase) and Biodiversity (habitat loss) at the site compared to extending the lifetime of the existing wind farm, due to the additional requirement for land. Furthermore, a potential solar development at the site would also require the taking of large areas of pastural and arable land to accommodate the additional land requirement.

Given the existing site constraints, significant capital investment required in order to redevelop the current wind farm site as a solar farm, the increased development footprint, and the ability of the existing wind turbines to perform for a further 20 years, it was not deemed suitable to further pursue this alternative land use option. Further assessment is provided in Table 3-2 below.

Table 3-2 Comparisons of environmental effects of Alternative Land Use of Solar Energy when compared against the chosen option (maintaining use of wind turbines)

Environmental Consideration	Solar PV Array (with a 25MW output)
Population & Human Health (incl. Shadow Flicker)	No potential for shadow flicker to affect sensitive receptors. Potential for glint and glare impacts to local residents and road users.
Biodiversity & Ornithology	No potential for collision risk for bats and birds Larger development footprint would result in greater habitat loss.
Land, Soils and Geology	Conversion of site to a solar farm would result in greater levels of disturbance to soils and geology in order to develop new site infrastructure suitable for a solar farm

Geotechnical	Excavations and piling involved in Solar PV array developments. More site disturbance due to construction works.
Water	Construction of a larger development footprint required, therefore increasing the potential for silt-laden runoff to enter receiving watercourses. Large-scale solar PV array has the potential to alter drainage patterns in the immediate vicinity.
Air and Climate	Reduced capacity factor of solar PV array technology would result in longer carbon payback period and a lower carbon offset.
Noise and Vibration	Lower potential for noise impacts on nearby sensitive receptors during the operational phase. Increased potential for noise impacts on nearby sensitive receptors during the construction phase of a new solar farm
Landscape and Visual	Potentially less visible from surrounding area due to screening from vegetation and topography Alters landscape character in which wind energy is well established
Cultural Heritage & Archaeology	Potential for negative effects on cultural heritage sites due to construction of larger development footprint of solar
Material Assets	Potential for greater traffic volumes during construction phase due to larger development footprint and requirement for more construction materials.

3.6 Alternative Mitigation Measures

Due to the nature of the Proposed Development (existing wind farm with no construction works, groundworks or land use change proposed), the greatest potential for environmental effects exists during the operational phase. During the operational phase, there are no significant ongoing emissions to any environmental media (water, air, soil, etc) and the general environmental risk associated with the existing infrastructure is low.

As detailed in Appendix 6-2 to Chapter 6: Biodiversity, canine-led carcass searches at the site identified (3) no. bat carcasses and (2) no. bird carcasses over the 1 year of searches. Mitigation has been put forward which aims to reduce this collision risk. 3 years of post-consent monitoring has also been proposed in order to ensure that the strategies put in place to mitigate against this risk are functioning. Please refer to Chapter 6 Appendix 6-2 for further detail on these mitigation measures.

The best practice mitigation measures set out in this EIAR will contribute to reducing any risks and have been designed to break the pathway between the site and any identified environmental receptors. The alternative is to either not propose these measures or propose measures which are not best practice and effective, and neither of these options are sustainable.

4. DESCRIPTION OF THE PROPOSED DEVELOPMENT

4.1 Introduction

This section of the Environmental Impact Assessment Report (EIAR) describes the development and its component parts which is the subject of a proposed application for planning permission to Wexford County Council ('the Proposed Development').

Planning permission is being sought for the continued operation of 11 no. of the 12 no. turbines which make up the existing Castledockrell Wind Farm as permitted under 3 no. planning applications, as detailed fully in Chapter 1, Section 1.1.3. However, the Proposed Development relates to only 2 no. of these planning applications, as detailed below:

- 11 no. of the existing turbines, hardstands, foundations, onsite 110kV substation, internal site roads, and all ancillary infrastructure were permitted under planning reference WCC 2004/4702, which was subsequently appealed to An Bord Pleanála and permitted in 2005 under Planning Reference PL26.211725;
- Extension and modification to onsite 110kV substation (as permitted in the above planning applications) being permitted in 2005 by Wexford County Council under planning reference WCC 2005/3945,

It is proposed to extend the operational life of 11 no. of the existing turbines by 20 years from the date of their proposed decommissioning in August 2025, a per Condition 7 of the WCC 2004/4702 and ABP Ref PL26.211725 planning permissions. It is also proposed to permanently extend the operation of the existing onsite 110kV substation, which is also proposed to be decommissioned in August 2025. A full planning history of the Proposed Development site is provided in Section 2.6 in Chapter 2 of this EIAR

The Proposed Development does not comprise any alterations or modifications to the existing operational wind farm. The Proposed Development encompasses the continued operation of the wind farm, which comprises:

1. *11 no. existing 2.3 MW wind turbines with an overall tip height of 120m and associated hardstands;*
2. *1 no. existing 110kV Substation including 1 no. single story control building, all associated electrical plant and equipment, security fencing and all ancillary infrastructure;*
3. *All existing underground electrical and communication cabling connecting the existing wind turbines to the onsite Castledockrell 110kV Substation;*
4. *Existing internal access tracks; and,*
5. *All existing ancillary infrastructure.*

All elements of the Proposed Development are pre-existing and it is not proposed to make any alterations to the current site layout, wind turbines or associated infrastructure as part of this application.

Condition no. 7 of the existing permission for 11 no. of the turbines in the existing Castledockrell Wind Farm (WCC Ref 2004/4702 and ABP Ref PL26.211725) states that

> *"this permission is for a period of twenty years from the date of this order. The wind turbines and related ancillary structures shall then be removed unless, prior to the end of the period, planning permission shall have been granted for their retention for a further period."*

Permission was granted to the Castledockrell Wind Farm on the 16th August 2005, therefore 11 no. of the existing turbines are due to be decommissioned in August 2025.

By August 2025, the existing turbines will have been in operation for approximately 14 years, whereas the normal operational life of a turbine is 25 to 30 years. The wind farm operator has determined that the turbines at the existing Castledockrell Wind Farm have a remaining lifespan of at least 26 years; see Appendix 4-1 Lifetime Prediction Report for further details.

All elements of the existing wind farm have been assessed as part of this EIAR. The existing onsite substation was permitted under 2 no. separate planning applications, as detailed above. As detailed in Chapter 1 of this EIAR, it is the intention to apply to make the substation permanent infrastructure. Furthermore, the planning application for the existing wind farm's extension of operational period does not include the existing connection to the national electricity grid. The existing wind farm connects into the 220kV Lodgewood Substation, which feeds into the ESB National Grid Transmission and Distribution System. The existing grid connection is assessed cumulatively in this EIAR.

Further details on the planning history of the site are presented in Chapter 2: Background to the Proposed Development, of this EIAR.

It is considered that any continued routine maintenance works required as part of the extended operation of the existing wind farm will be similar to ongoing works and therefore minor in nature.

Details regarding the decommissioning stage of the existing wind farm, in the context of decommissioning in either 2025 under the current planning permission or as proposed under the scenario of a 2045 decommissioning date as part of the Proposed Development, are presented in Section 4.6 below.

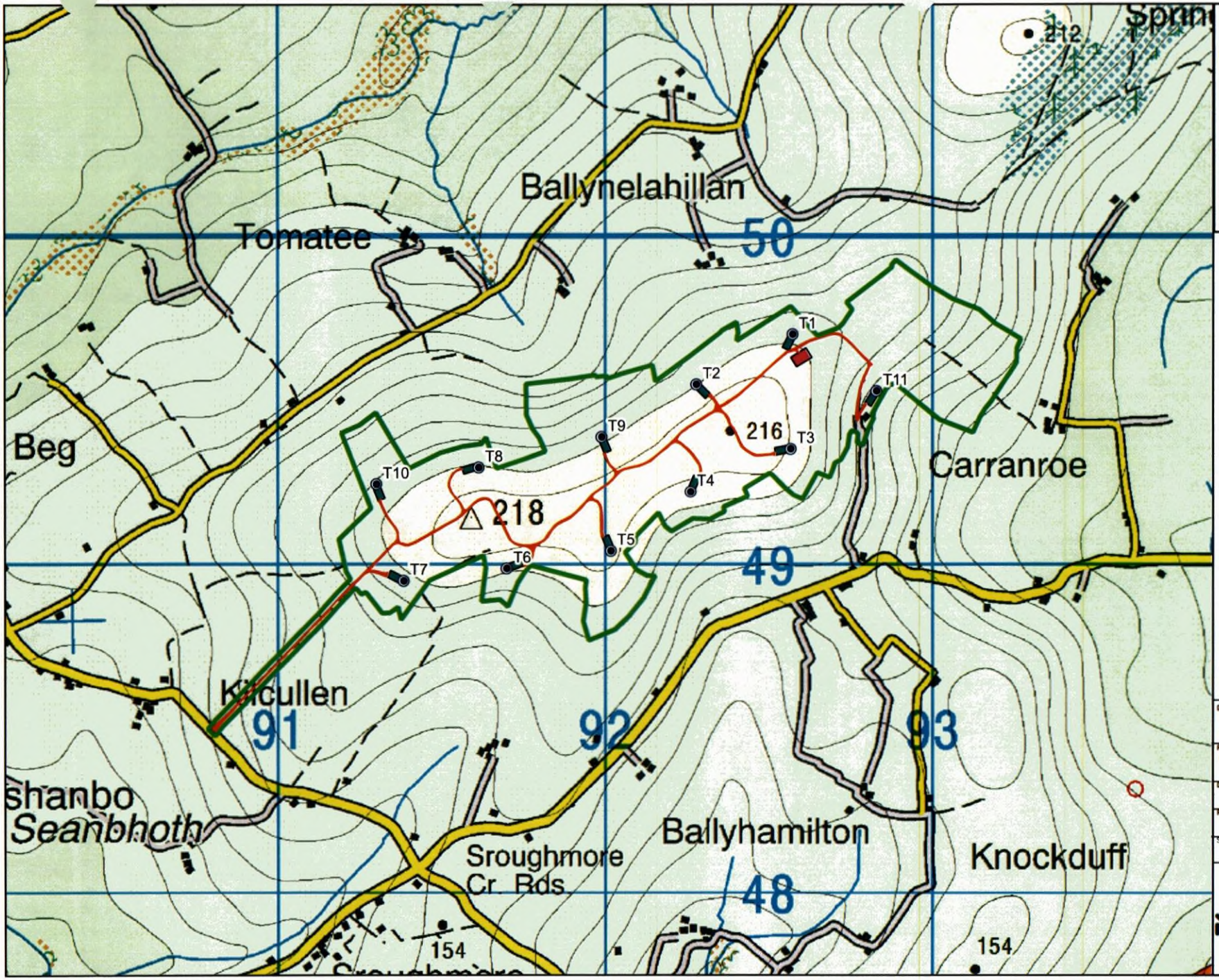
4.2 Proposed Development Site Layout

The layout of the Proposed Development (the existing Castledockrell Wind Farm) was originally designed to minimise the potential environmental effects of the wind farm, while at the same time maximising the energy yield of the wind resource passing over the site.

The existing Castledockrell Wind Farm site was chosen initially as being particularly suited to a wind energy development due to the favourable wind conditions. The prevailing southwesterly winds sweep across the island of Ireland providing one of the best wind resources in Europe. The upland, open landscape nature of the site also adds to its suitability for wind energy development. The estimated long-term mean wind speed at 100m on the site is c.6.8m/s, according to the SEAI Wind Atlas[1]

The EIAR layout of the Proposed Development is shown in Figure 4-1 which shows the locations of the existing wind farm infrastructure. Detailed site layout drawings of the existing development are included within Appendix 4-2 to this EIAR.

[1] *https://gis.seai.ie/wind/*



Map Legend

- EIAR Site Boundary
- Proposed Development Turbines
- Existing Substation
- Existing Hardstands
- Existing Site Roads

N

Drawing Title: Existing Castledockrell 11 Turbine Wind Farm Layout

Project Title: Castledockrell Wind Farm Extension of Operational Life

Drawn By	Checked By
EM	BT
Project No.	**Drawing No.**
210847	Figure 4-1
Scale	**Date**
1:15,000	2024-10-30

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4.3 Development Components

The Proposed Development components are listed under Section 4.1 above. Table 4-1 below provides a summary of the footprint of the main existing wind farm components, which are subject to this planning application.

The Proposed Development is limited to an extension of the operational life of the existing wind farm. As such, there are no changes proposed to the existing development components. The various elements of the existing wind farm will remain in their current condition and will be subject to ongoing routine maintenance.

Table 4-1 Proposed Development Components Footprint

Component Description	Approx Area (hectares)
11 no. turbines and associated hardstandings	1.13ha
Internal site access roads (approximate 4.5m running width for site roads) and parking area located adjacent to the onsite substation	1.91ha
Onsite 110kv substation	0.19ha
Total	3.23ha

Further detail on each of the Proposed Development components are presented in Sections 4.3.1 to 4.3.4 below.

4.3.1 Wind Turbines

4.3.1.1 Turbine Locations

The existing wind turbine layout was optimised using industry-standard wind farm design software at the initial design stage in order to maximise the energy yield from the site, while maintaining sufficient distances between the proposed turbines to endure turbulence and wake effects did not compromise turbine performance. The Grid Reference coordinates for the turbine locations are listed in Table 4-2 below.

Table 4-2 Existing Wind Turbine Locations with Elevations

Turbine No.	Irish Transverse Mercator (ITM) Co-ordinates		Turbine Base Elevation (at top of foundation)(m OD)
	Easting (E)	Northing (N)	
1	692507	649745	197
2	692212	649592	202
3	692501	649395	208
4	692194	649264	207
5	691950	649084	212

Turbine No.	Irish Transverse Mercator (ITM) Co-ordinates		Turbine Base Elevation (at top of foundation)(m OD)
	Easting (E)	Northing (N)	
6	691633	649030	200
7	691319	648993	195
8	691548	649338	200
9	691922	649431	197
10	691236	649288	190.5
11	692763	649572	163

4.3.1.2 Turbine Type

Wind turbines use energy from the wind to generate electricity. A wind turbine, as shown in Plate 4-1 below, typically consists of four main energy components:

- Foundation
- Tower
- Nacelle (turbine housing)
- Rotor

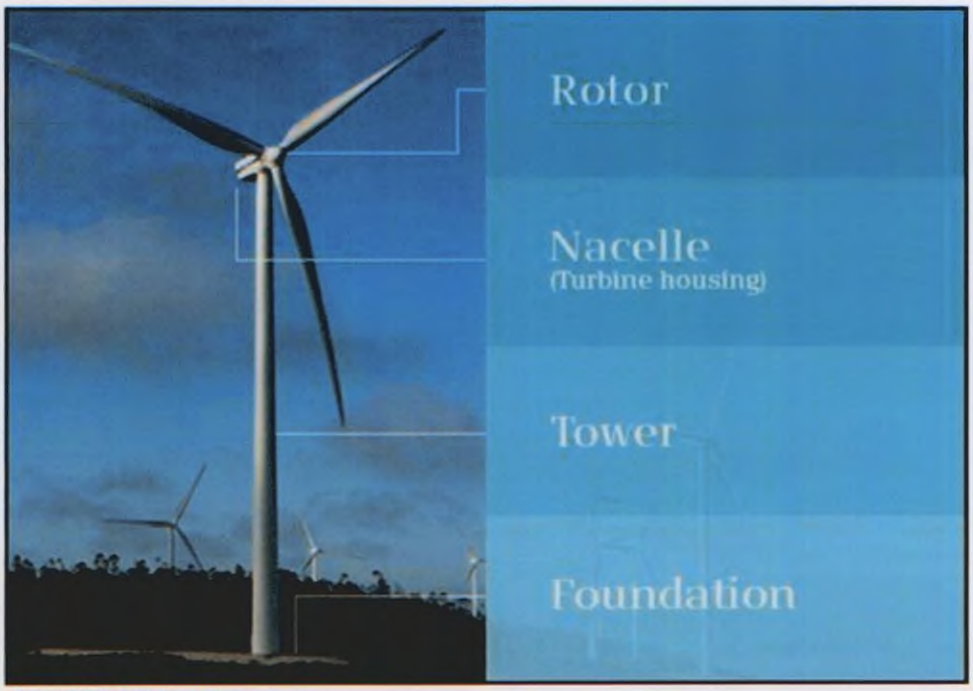


Plate 4-1 Wind Turbine Components

The existing wind turbines have a tip height of 120m, rotor diameter of 71m, a hub height of 84.5m and a lowest swept path of 49m. The wind turbines that are installed on the site are conventional three-blade turbines, that are geared to ensure the rotors of all turbines rotate in the same direction at all times.

The existing wind turbines at the Castledockrell Wind Farm were manufactured by leading turbine manufacturer, Enercon, with 12 no. E70 models installed at the existing Castledockrell Wind Farm (see Plate 4-2 and Plate 4-3 as references to existing turbines at the site). Each turbine is capable of producing 2.3MW of electricity.

Plate 4-2 Existing Castledockrell turbine and road infrastructure

Plate 4-3 Turbine Base infrastructure

Turbine design parameters have a bearing on the assessment of shadow flicker, noise, visual impact, traffic and transport, and ecology (specifically birds), as addressed elsewhere in this EIAR. Since there are no changes proposed to the existing turbines at the site, the parameters of the existing turbines have been used in each EIAR section that requires consideration as part of the impact assessment.

A drawing of the existing wind turbine model is shown in Figure 4-3. The individual components of a typical geared wind turbine nacelle and hub are shown in Figure 4-2 below.

Figure 4-4 shows a typical turbine base layout, including turbine foundation, hardstanding area, assembly area, access road and surrounding works area.

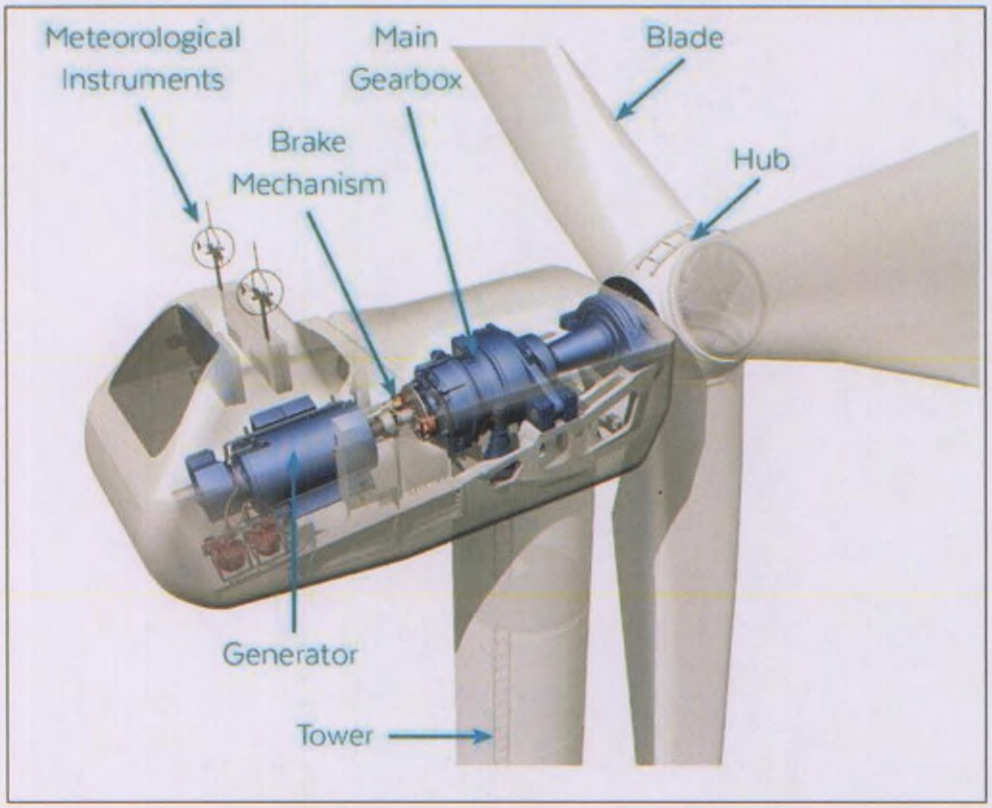
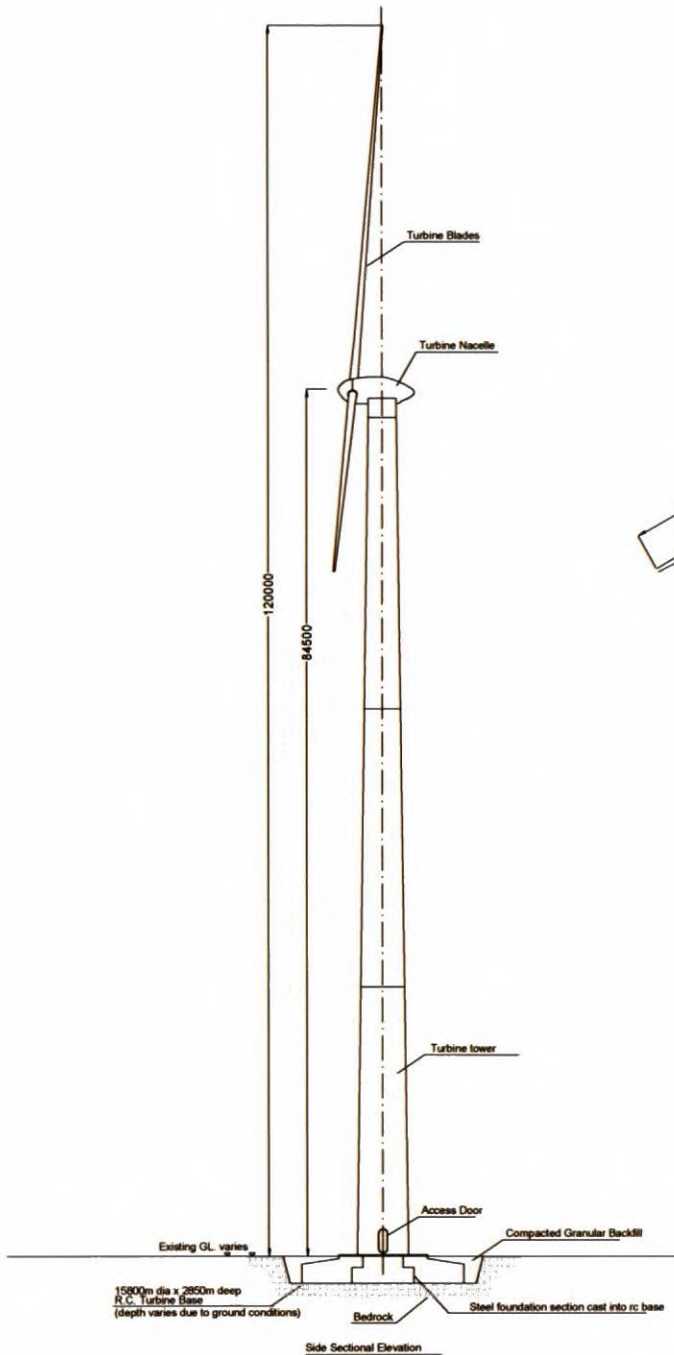
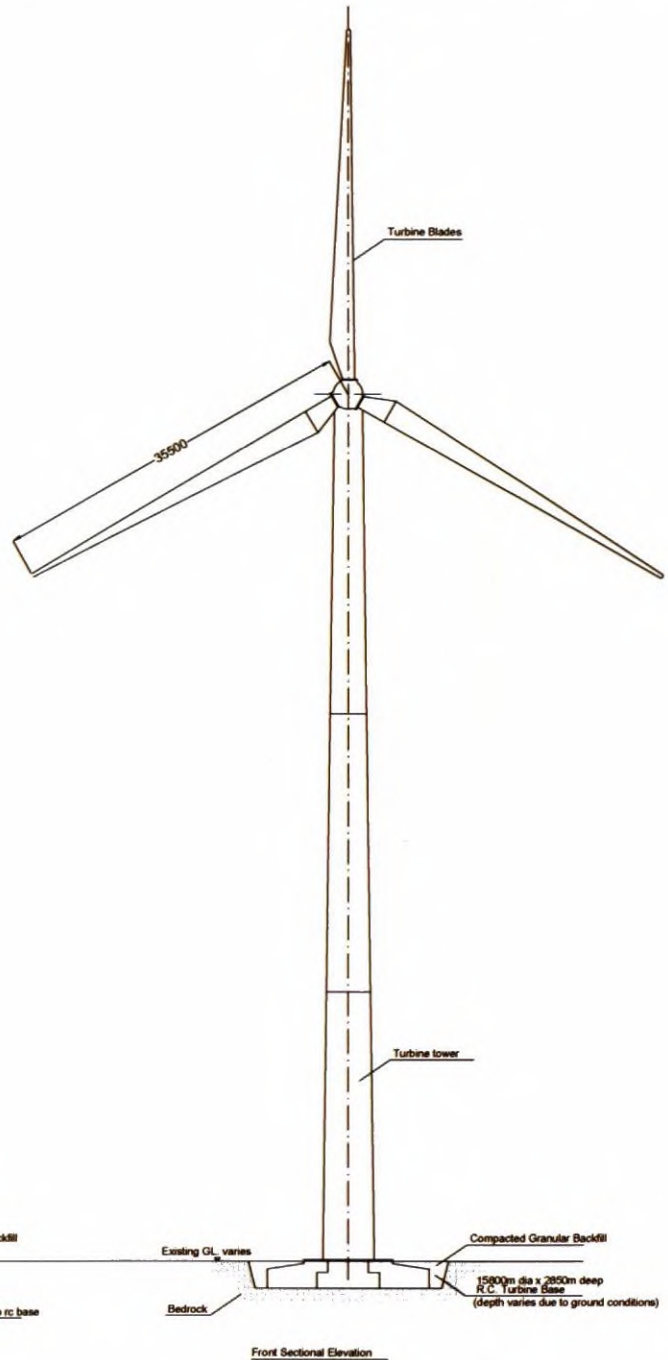


Figure 4-2 Turbine Nacelle and hub components



Side Sectional Elevation



Front Sectional Elevation

N

PROJECT TITLE
Castledockrell Wind Farm
Extension of Operational Life

DRAWING TITLE
Wind Turbine Elevations

PROJECT No	DRAWING No.	SCALE
210847	4-3	1:500 @ A3

DRAWN BY	CHECKED BY	DATE	REVISION
KD	JW	17.10.2024	P01

OS SHEET No

MKO
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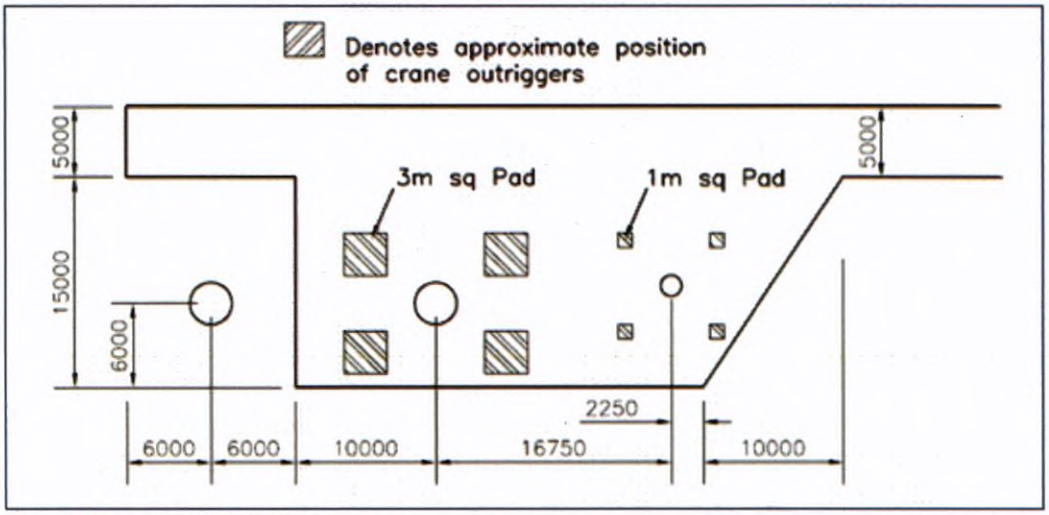


Figure 4-4 Typical Turbine Base Layout

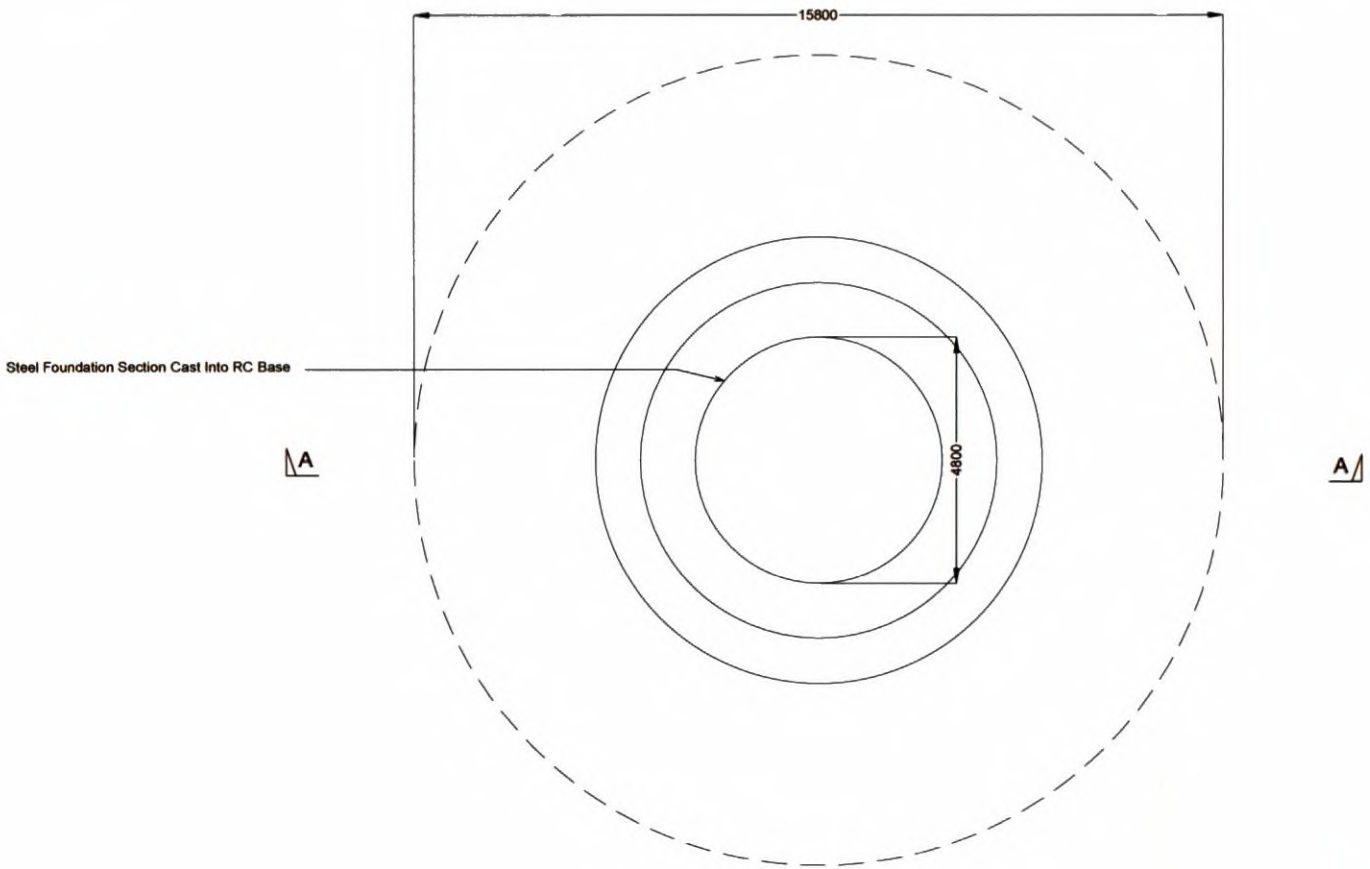
4.3.1.3 Turbine Foundations

Each wind turbine is secured to a reinforced concrete foundation that has been installed below the finished ground level. The turbine foundation transmits any load on the wind turbine into the ground.

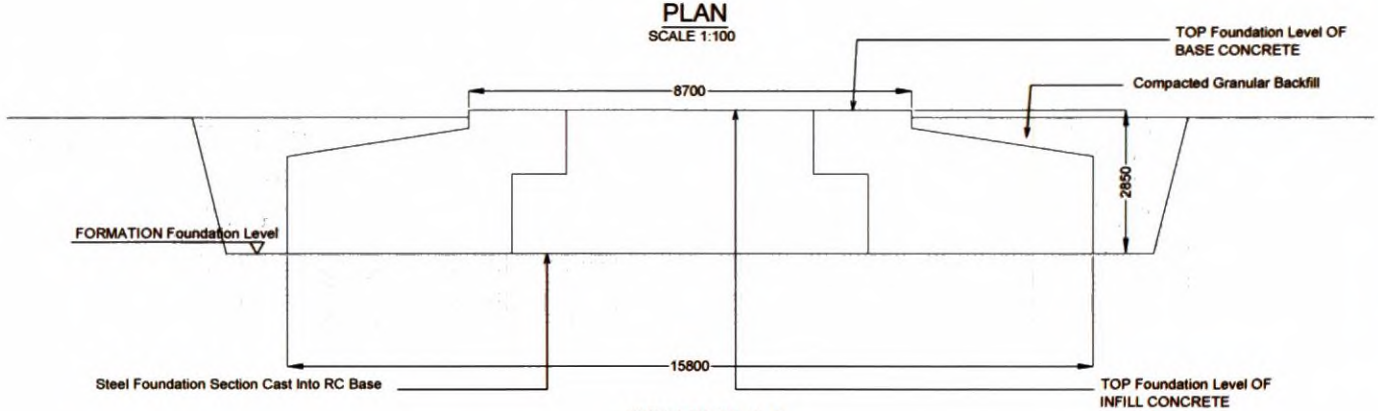
The existing turbine foundations are typically circular in plan with an average area of 227m^2. The existing turbine foundations as designed for the Castledockrell Wind Farm are shown in Figure 4-5. There are no changes proposed to the existing turbine foundations as part of the Proposed Development.

NOTE:

1. ALL DIMENSIONS IN mm UNLESS NOTED



PLAN
SCALE 1:100



SECTION A-A
SCALE 1:100

PROJECT TITLE
Castledockrell Wind Farm Extension of Operational Life

DRAWING TITLE
Turbine Foundation

PROJECT No	DRAWING No	SCALE
210847	44	1:100 @ A3
DRAWN BY KD / CHECKED BY JW	DATE 17.10.2024	REVISION P01

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4.3.1.4 Hard Standing Areas

Hard standing areas consisting of levelled and compacted hardcore are required around each turbine base when constructing a wind farm, to facilitate access, turbine assembly and turbine erection. The hardstanding areas provide a safe, level working area around each turbine position. The hardstanding area is also intended to accommodate a crane during turbine decommissioning and disassembly, and if necessary, during maintenance works.

There will be no changes to the existing hardstanding areas as part of the Proposed Development. The existing hardstanding areas vary slightly at each of the 12 no. turbines, with an average area of approximately 815m^2. Plate 4-4 below depicts a typical hardstand at the site. The existing hardstanding areas shown on the detailed layout drawings included in Appendix 4-2 to this report will be maintained.

Plate 4-4 Existing hardstand within the site

4.3.1.5 Power Output

The existing wind turbines have a rated power output in the range of 2.3 megawatts (MW) per turbine, resulting in an estimated installed capacity of 25.3 MW. The wind farm therefore has an average annual power output of 66,490 Megawatt hours per year (MWh/yr), 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 30% is applied here for the existing Castledockrell Wind Farm.

C = Rated output of the wind farm: 25.3MW

It is anticipated that this power output would continue for the extended 20-year operation of the Proposed Development, subject to planning permission.

The 66,490 MWh/yr of electricity produced by the Proposed Development would be sufficient to supply approximately 15,830 Irish households with electricity per year, based on the average Irish household using 4.2MWh of electricity. The 2022 Census of Ireland recorded a total of 59,389 occupied houses in Co. Wexford. Per annum, based on the current average power output of 66,490 MWh/yr, the Proposed Development would therefore produce sufficient electricity for the equivalent of approximately 27% of all houses in Co. Wexford.

4.3.2 Site Roads

During initial construction of the existing wind farm, existing tracks were upgraded, and new roads were constructed to provide access within the wind farm site and to connect wind turbines and associated infrastructure. Site roads were constructed of consolidated gravel with an average running width of 4.5m and a total length of c. 3.8km. All site roads will continue to be subject to maintenance, this includes surfacing works to maintain operational site access. A typical section through an excavated site road is shown in Figure 4-6.

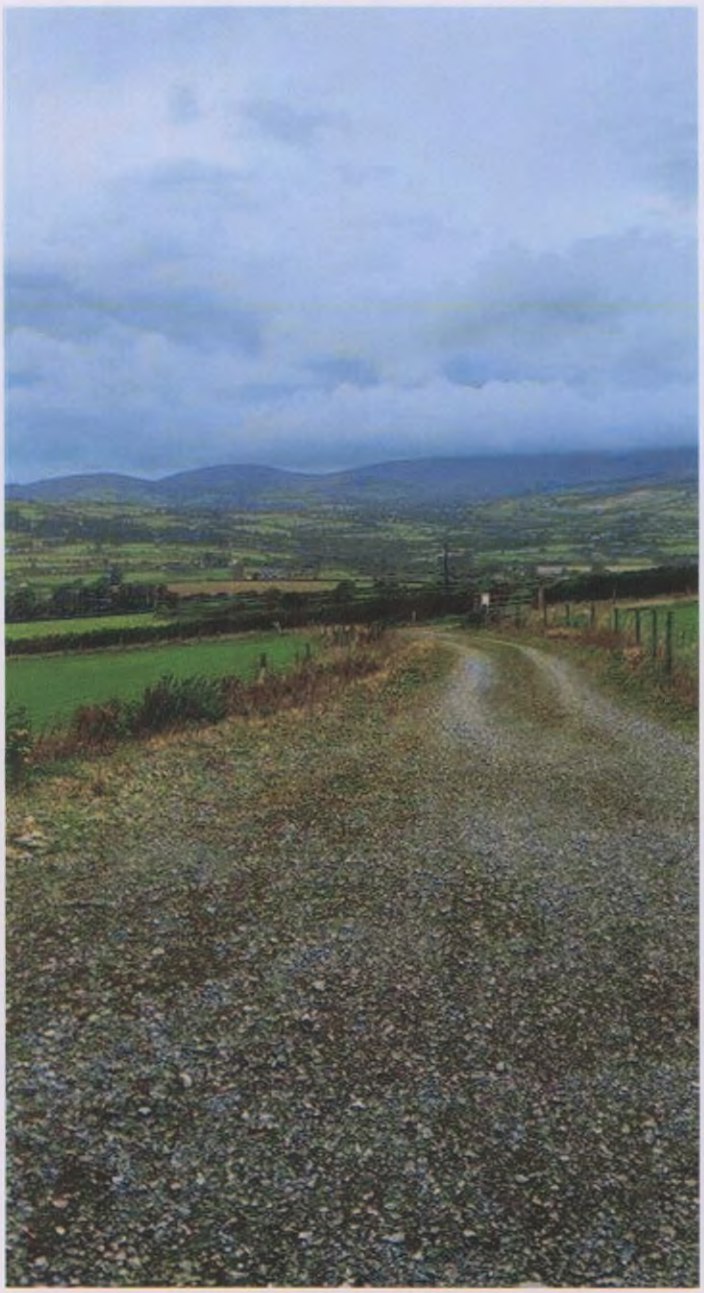
Imagery of the existing site roads can be seen below in Plate 4-4 and Plate 4-5.

Plate 4-5 Existing internal site access road

Plate 4-6 Existing Internal Site Access Road - Paved

A photograph of a typical turbine access road is also included as Plate 4-7. There will be no changes to the existing site roads required as part of the Proposed Development.

Plate 4-7 Existing Access road to T7 facing northwest



4.3.2.1 Site Access

Access to the site is from the L2012 Local Road, running in a north-south direction along the western boundary of the site. The L2012 Local Road connections to the R745 Regional Road at the Monalee Cross Roads and to the L2007at Bola Beg.

4.3.3 Site Drainage

There are no groundworks involved in the operational phase of the Proposed Development, and therefore no existing natural drainage features will be altered and there will be no direct or indirect discharges to natural watercourses.

During decommissioning of the wind farm, it is intended to limit groundworks other than to rehabilitate constructed areas such as turbine bases and hardstanding areas. this will be done by covering with topsoil to encourage vegetation growth and reduce runoff and sedimentation. Electrical cabling connecting the site infrastructure to the onsite substation will be removed, while the ducting itself will remain in-situ instead of excavating and removing it. The turbines components will be removed and transported offsite, and the turbine concrete bases will remain in the ground and backfilled. With the implementation of the decommissioning phase drainage measures as outlined in Chapter 9: Hydrology and Hydrogeology, the residual effects will be negative, imperceptible, indirect, short-term, temporary, likely effects on downstream water quality.

Further details on the site hydrology are provided in Chapter 9: Hydrology and Hydrogeology of this EIAR.

4.3.4 Substation and Grid Connection

The existing Castledockrell Wind Farm is connected to the National Grid via the existing onsite 110kV substation, which connects via underground 110kV cable to Lodgewood 220kV Substation, which is located approx. 6.3km southeast of the Proposed Development. The length of the cable connecting the onsite 110kVsubstation to Lodgewood 220kV Substation is approximately 8km long. The underground grid connection travels mostly through the public road network, with smaller sections of the cable travelling through private farm access roads and agricultural fields. The existing underground 110kV underground electrical cabling travels from the existing onsite 110kV internal substation off-road through agricultural land for approximately 640m, then along the L2009 Local Road for approx. 2.8km, before going off-road again through agricultural lands, crossing the River Slaney, and joining the R745 for approx. 1.7km. The underground electrical cabling then travels down the L6072 Local Road for approx. 960m, before entering Lodgewood 220kV Substation.

As detailed in Section 2.6 of Chapter 2: Background to the Proposed Development, the onsite substation was permitted under 2 no. separate planning permissions, WCC Ref 2004/4702 and ABP Ref PL26.211725, and subsequently amended under another application to WCC, Ref 2005/3945. The existing substation was constructed in 2010 and commissioned alongside the rest of the wind farm in 2011. As the substation was originally permitted under WCC Ref 2004/4702 and ABP Ref PL26.211725, it is also bound by Condition 7 of the grant of permission. The existing substation measures approx. 1,860.0 square metres (m^2)

Imagery of the existing 110kV onsite substation can be seen in Plate 4-8 and Plate 4-9 below:

Plate 4-8 Existing onsite 110kV Substation

Plate 4-9 Existing onsite 110kV substation and Control Building

There are no changes to the existing substation, control buildings or grid connection proposed as part of the Proposed Development.

4.4 Construction Stage

No construction activities, groundworks or alterations to the existing wind farm are proposed as part of the Proposed Development.

4.5 Operational Stage

The Proposed Development is expected to have a lifespan of c. 20 years, commencing from the date of expiration of the permission for 11 no. of the existing turbines in August 2025.

During the operational period, on a day-to-day basis the wind turbines will operate automatically, responding by means of anemometry equipment and control systems to changes in wind speed and direction.

The monitoring of the turbine output, performance, wind speeds and responses to any key alarms will continue to be monitored. All operational works in-site will be carried out in strict adherence with the Applicant's Health and Safety Policies and Procedures.

Each turbine will continue to be subject to a routine maintenance programme involving monthly checks and intermittent changing of consumables, including oil changes. In addition, there will be a requirement for unscheduled maintenance, which could vary between resetting alarms to major component changes requiring a crane. All site roads will continue to be subject to maintenance, this includes surfacing works to maintain operational site access. Typically, maintenance traffic will consist of four-wheel drive vehicles or vans. The wind farm manager will continue to attend the site regularly to perform inspections and oversee maintenance works.

An Operation and Environment Management Plan (OEMP) has been prepared for the Proposed Development and is included as Appendix 4-3 of this EIAR.