

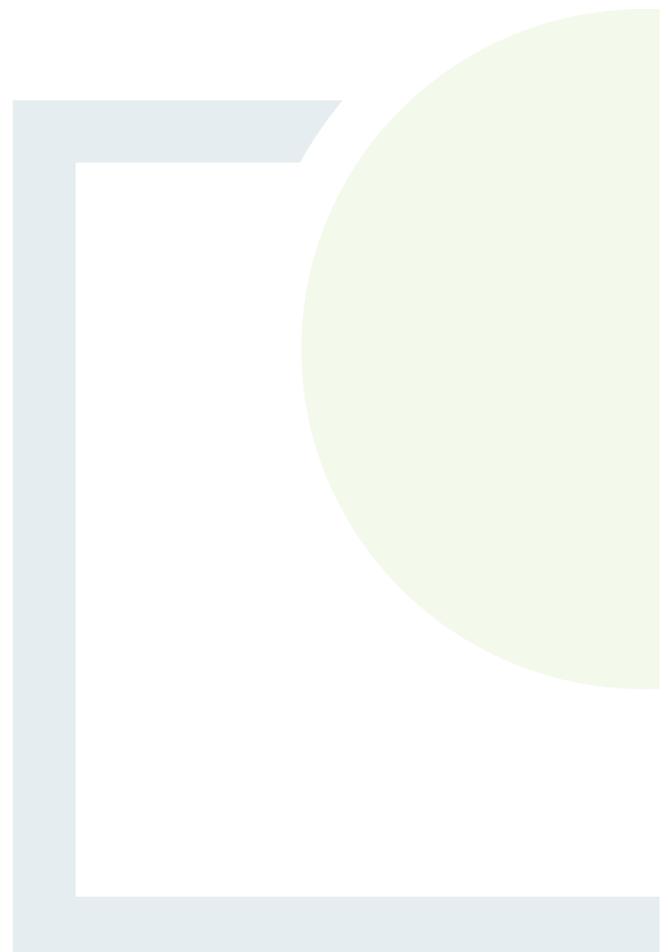


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**CONSULTANTS IN ENGINEERING,  
ENVIRONMENTAL SCIENCE  
& PLANNING**

# **APPENDIX 4.2**

EIA Scoping Report







CONSULTANTS IN ENGINEERING,  
ENVIRONMENTAL SCIENCE &  
PLANNING

# BARNADIVANE WIND FARM & SUBSTATION **SCOPING REPORT**

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**BARNADIVANE, COUNTY CORK**

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Prepared for: Barna Wind Energy (B.W.E.) Ltd. and Arran Wind Farm Ltd.

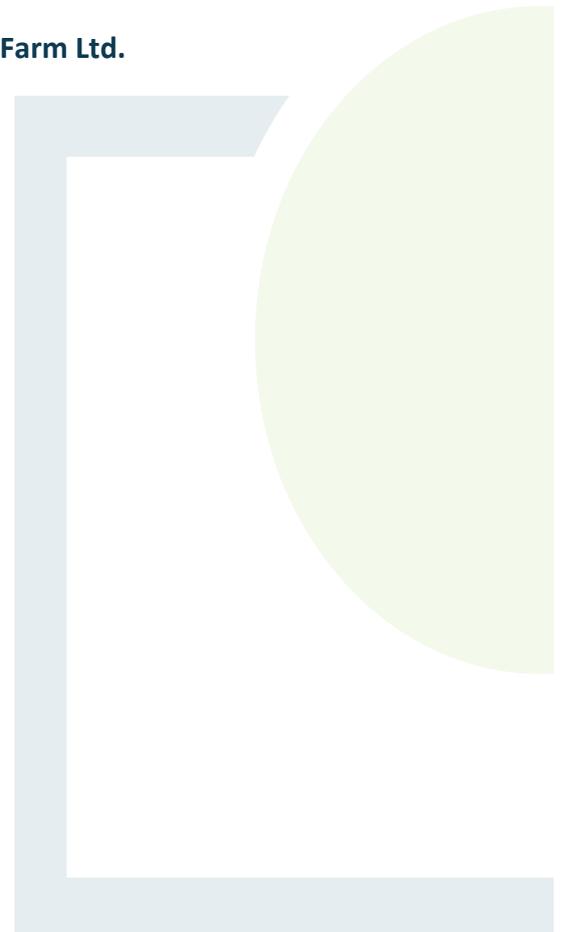
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## BARNADIVANE WIND FARM ENVIRONMENTAL IMPACT ASSESSMENT REPORT - SCOPING REPORT

### REVISION CONTROL TABLE, CLIENT, KEYWORDS AND ABSTRACT User is responsible for Checking the Revision Status of This Document

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**Client:** Barna Wind Energy (B.W.E.) Ltd. & Arran Windfarm Ltd.

**Keywords:** Wind Farm, Renewable Energy, EIA Scoping, Planning Application.

**Abstract:** This is a scoping report prepared for a proposed wind farm and substation development in Co. Cork. The purpose of the scoping report is to identify the content and extent of the information to be provided in the Environmental Impact Assessment Report for the proposed project. This report will be developed further at a later date to produce the final scoping report for the project.



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## 1. INTRODUCTION

### 1.1 General

#### 1.1.1 Introduction

This Environmental Impact Assessment Scoping Report seeks to assess both the proposed windfarm and 110kv substation at Barnadivane, County Cork near the town of Macroom. Both the windfarm and substation are the subject of concurrent appeal cases before An Bord Pleanála (ABP Ref. PL04.308208 & PL04.308210).

The proposed project includes lands contained within the following townlands: Lackareagh, Garranereagh and Barnadivane (Kneeves), near Teerelton, Co. Cork. An EIS was prepared in 2014 for this project and an application for consent submitted. However, given the passage of time since the preparation of the 2014 EIS, the Competent Authority, in this instance An Bord Pleanála has requested that the 2014 EIS be updated giving the passage of time since the preparation of the original EIS. Therefore it is now proposed to prepare a new EIAR for this project. For more information on the planning history of the site please refer to Figure 1.1 below.

A site location map is presented in Figure 1.2.

The Project for EIA purposes is made up of the proposed development which includes 6no. wind turbines and a 110kv substation, for which planning consent is sought and, other elements of the project for which permission has already been granted which includes enabling works to facilitate the delivery of turbines to site and if necessary, an alternative grid connection.

#### 1.1.2 The Proposed Development

The proposed development includes the proposed windfarm and the proposed substation consisting of 6 no. wind turbines with a maximum tip height of 131m, access tracks, hardstanding areas at each turbine location, temporary construction compound, drainage works, meteorological mast, underground electrical and communications cables between the turbines and an underground cable to connect to the proposed on-site 110 kV substation which forms part of the proposed Wind Farm.

The proposed substation will include 3 no. single storey control buildings, 2 no. steel lattice mast structures, electrical plant equipment, welfare facilities, car parking, security fencing, security cameras, external lighting, lightning protection and telecommunications masts, water and wastewater holding tanks and installation of a grid connection point from the proposed substation to the existing 110kV Macroom to Dunmanway overhead line.

A preliminary site layout is illustrated in Figure 1.3.

#### 1.1.3 The Applicants

The applicant for the proposed wind farm, Barna Wind Energy (B.W.E.) Ltd and for the proposed 110kV Substation Arran Windfarm Ltd., are associated companies of Enerco Energy Ltd., which is an Irish-owned, Cork-based company with extensive experience in the design, construction and operation of wind energy developments throughout Ireland, with projects currently operating or in construction in Counties Cork, Kerry, Limerick, Clare, Galway, Mayo and Donegal.



By the end of 2021, Enerco associated companies had over 625 Megawatts (MW) of wind generating capacity in commercial operation, 200MW in construction, with a further 400MW of projects at various stages in its portfolio to assist in meeting Ireland's renewable energy targets.

#### 1.1.4 Purpose of the Report

The purpose of the EIA scoping process is to identify the key points and issues which are likely to be important during the environmental impact assessment (EIA) and to eliminate those that are not. The scoping process identifies sources or causes of potential environmental effects, the pathways by which the effects can happen, and the sensitive receptors, which are likely to be affected. It defines the appropriate level of detail for the information to be provided in the EIAR. In essence, the primary focus of scoping is to define the most appropriate assessment of significant effects related to the proposed development.

A number of applications for consent were submitted on the subject site previously and an EIS was undertaken for a six turbine development on this site in 2014. The EIS undertaken in 2014 now needs to be updated given the passage of time and the fact that the application has been determined, quashed and remitted to An Bord Pleanála twice during this period.

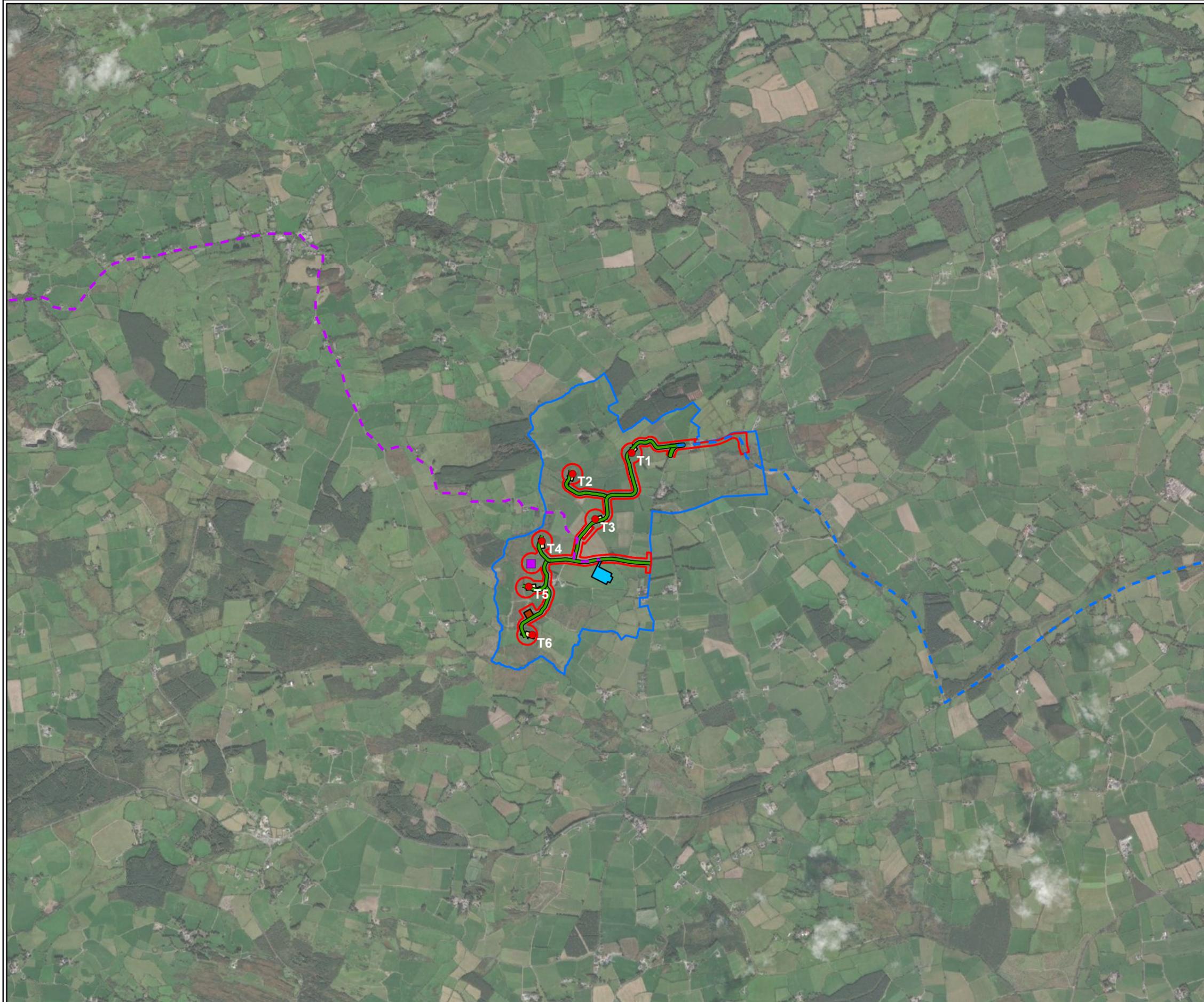
It is intended to use this Scoping Report to consult statutory and non-statutory consultees about the key points and issues that should be considered in relation to the preparation of a new EIAR for the development. This scoping consultation has been undertaken due to the passage of time since the original scoping consultation pre-2014.

Figure 1.1. illustrates the planning history of the site and the consultation carried out to date for the proposed project.



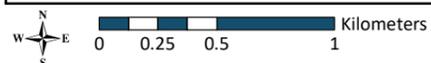
Figure 1-1: Planning History of site and history of previous consultation.



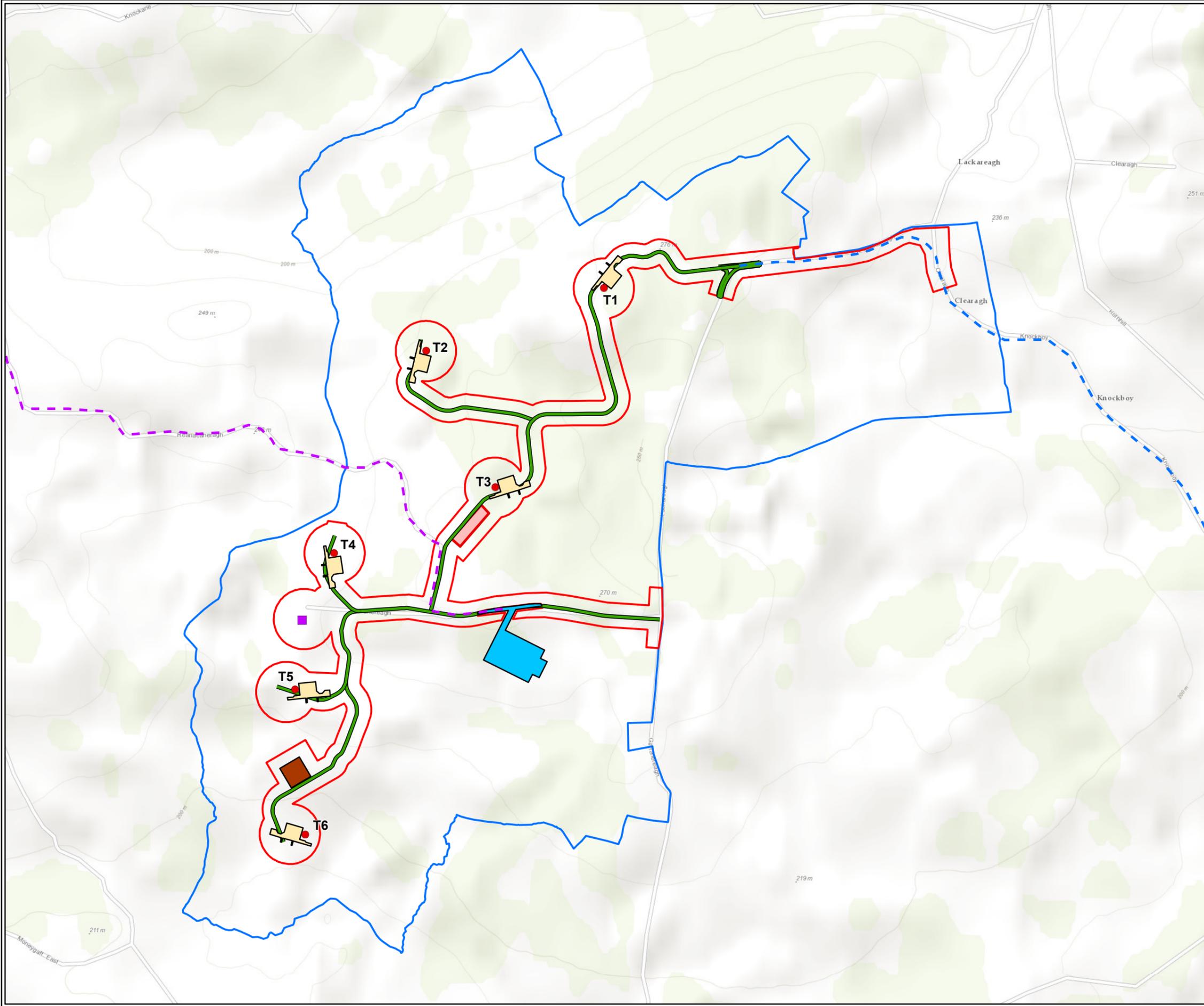


- Legend**
- Development Planning Boundary
  - Study Area Boundary
  - Proposed Substation
  - Turbine Hardstandings
  - Proposed Temporary Construction Compound
  - Proposed Borrow Pit
  - Proposed Met Mast
  - Proposed Turbine Layout
  - Alternative Grid Connection Route
  - Turbine Delivery Route
  - Roads - Proposed

<b>TITLE:</b>	Overview of Proposed Project		
<b>PROJECT:</b>	Barnadivane Wind Farm, Co.Cork		
<b>FIGURE NO:</b>	1-2		
<b>CLIENT:</b>	Barna Wind Energy Ltd.		
<b>SCALE:</b>	1:30000	<b>REVISION:</b>	0
<b>DATE:</b>	06/12/2022	<b>PAGE SIZE:</b>	A3







**Legend**

- Development Planning Boundary
- Study Area
- Proposed Substation
- Turbine Hardstandings
- Proposed Temporary Construction Compound
- Proposed Borrow Pit
- Proposed Met Mast
- Proposed Turbine Layout
- Roads - Proposed
- Alternative Grid Connection Route
- Turbine Delivery Route

<b>TITLE:</b>	Site Layout		
<b>PROJECT:</b>	Barnadivane Wind Farm, Co.Cork		
<b>FIGURE NO:</b>	1.3		
<b>CLIENT:</b>	Barna Wind Energy Ltd.		
<b>SCALE:</b>	1:10000	<b>REVISION:</b>	0
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## **1.2 Planning Process for the Proposed Development**

The updated EIAR for the proposed development (including the proposed windfarm and substation) will be submitted to An Bord Pleanála (ABP/The Board) in response to correspondence dated the 13th May 2021 requesting an update to the previous Environmental Impact Statement (EIS) and/or Environmental Report submitted for both the windfarm application (ABP Case reference: PL04.308210) and the onsite 110kV substation application (ABP Case reference: PL04.308208).

## **1.3 Environmental Impact Assessment and the Function of the EIAR**

Under Section 172 of the Planning and Development Act 2000 (as amended), as amended, a planning application for a development which comes within a class of development specified under Schedule 2 of Part 5 of the Planning and Development Regulations 2001 (as amended) must be accompanied by an Environmental Impact Assessment Report (EIAR) in accordance with the 2014 Directive. Accordingly, as the proposed development will have a generating capacity of greater than 5MW the EIAR will be prepared in accordance with the Planning & Development Act 2000 (as amended) and the Planning and Development Regulations 2001 (as amended).

The purpose of this updated EIAR, is that the proposed development complies with the latest Environmental Directives including the 2014 EIA Directive. Potential cumulative impacts with other plans or projects will also be assessed.

## **1.4 Purpose of Scoping**

The purpose of the EIAR scoping process is to identify the issues which are likely to be important during the environmental impact assessment and to eliminate those that are not. The scoping process will identify the sources or causes of potential environmental effects, the pathways by which the effects can happen, and the sensitive receptors, which are likely to be affected.

The issues identified in the scoping process will be examined in the EIAR, any potential impacts will be assessed, mitigation measures proposed as required, and residual impacts described. The scoping process will also identify the appropriate level of detail for the information to be provided in the EIAR. Scoping will be carried out through the issue of this report to statutory and non-statutory consultees listed in Section 1.6. Consultees are invited to contribute to the EIAR by suggesting baseline data, survey methodologies and potential impacts that should be considered as part of the impact assessment process and in preparation of the EIAR.

## **1.5 Contributors to the EIAR**

This Scoping Report has been prepared by Fehily Timoney & Company (FT) on behalf of Barna Wind Energy (B.W.E) Ltd. and Arran Wind Farm Ltd. FT is a planning, environmental and engineering consultancy based in Cork, Dublin and Carlow specialising in civil and environmental engineering, environmental science and planning, and is well established as a leading consultancy in wind farm development in Ireland. FT will prepare an updated Environmental Impact Assessment Report for submission to the planning authority, An Bord Pleanála.



Specialist contributors to the EIAR include:

- Macro Works who will prepare the landscape and visual impact assessment;
- Tobar Archaeological Services who will prepare the Cultural Heritage assessment;
- Alan Lipscombe who will prepare the traffic and transport assessment; and
- TNEI who will prepare the Shadow Flicker Assessment.

## 1.6 Consultation

### 1.6.1 Public Consultation

The stakeholder consultation process is being carried out in accordance with the Code of Practice for Wind Energy Development in Ireland-Guidelines for Community Engagement (available at: [www.dcae.gov.ie](http://www.dcae.gov.ie)).

A Community Liaison Officer (CLO) has been nominated for the proposed development and will act as a key point of contact within the local community. The CLO has been resourced to deal with all queries and will conduct informal local community consultation in the area. Feedback from the CLO will be passed on to the project design team on an ongoing basis in order to allow the consultation process to inform the design process.

Comments on the scope of the EIAR can be submitted by email to [barnadivanewindfarm@ftco.ie](mailto:barnadivanewindfarm@ftco.ie) or returned by post to Fehily Timoney & Company, Core House, Pouladuff Road, County Cork. We ask all consultees to submit responses by the 3<sup>rd</sup> February 2023 to provide adequate time to consider all responses. It is envisaged that the responses from this consultation will inform the scope of the environmental assessments.

### 1.6.2 Statutory and Non-statutory Scoping Consultation

Following the initial design iteration for the proposed development, it is proposed to commence consultation with the bodies listed below:

Consultees
An Chomhairle Ealaíon (Arts Council)
An Garda Síochána - Macroom
Angling Council of Ireland
An Taisce
Biodiversity Ireland
Birdwatch Ireland
Butterfly Conservation Ireland
Commission for Regulation of Utilities (CRU)
Cork County Council, Environmental Department
Cork County Council, Heritage & Conservation Department



Consultees
Cork County Council, Planning & Development Department
Department of Housing, Planning and Local Government
Department of Culture, Heritage and the Gaeltacht (DAU)
Department of Agriculture, Food and the Marine
Department of Communications, Climate Action and Environment
Department of Transport, Tourism and Sport
Department of Defence
EirGrid
Environmental Protection Agency (EPA)
Environmental Sciences Association of Ireland
ESB Networks
Fáilte Ireland
Forestry Service
Gas Networks Ireland
Geographical Society of Ireland
Geological Survey Ireland (GSI)
Health Service Executive (HSE)
Inland Fisheries Ireland (IFI)
Irish Community Rapid Response (ICRR)
Irish Environmental Network
Irish Water
Irish Wildlife Trust
National Monuments Service
National Transport Authority
Office of Public Works (OPW)
Southern Regional Assembly
Sustainable Energy Authority Ireland (SEAI)
Teagasc
The Heritage Council
The Irish Meteorological Service (Met Eireann)
Transport Infrastructure Ireland (TII)

Aviation, telecom and internet providers have been consulted separately for this project.





## 2. PROJECT DESCRIPTION

The Project for EIA purposes is made up of the proposed development which includes 6no. wind turbines and a 110kv substation, for which planning consent is sought and, other elements of the project for which permission has already been granted which includes enabling works to facilitate the delivery of turbines to site and if necessary, an alternative grid connection.

### 2.1 Proposed Development

The proposed development will comprise of 6 no. wind turbines with a maximum tip height of 131m, access tracks, hardstanding areas at each turbine location, temporary construction compound, drainage works, meteorological mast, underground electrical and communications cables between the turbines and an underground cable to the proposed 110 kV onsite substation which forms part of the proposed Wind Farm.

The electricity generated by the proposed wind farm will be transmitted by a collector system comprising of an underground cable to the proposed on-site 110kV Substation.

The proposed substation will include 3 no. single storey control buildings, 2 no. steel lattice mast structures, electrical plant equipment, welfare facilities, car parking, security fencing, security cameras, external lighting, lightning protection and telecommunications masts, water and wastewater holding tanks and installation of a grid connection point from the proposed substation to the existing 110kV Macroon to Dunmanway overhead line.

### 2.2 Grid Connection

The proposed grid connection involves a Loop-in/Loop-out 110kV Substation proposed on the main wind farm site. The Turbines will be connected to the proposed 110kV substation via underground cables before looping into overhead lines traversing the site.

In the event that the proposed substation is not consented or not built out, an alternative grid connection via an underground connection to the adjacent Carrigierk Wind Farm is possible through an already consented grid connection pursuant to CCC Ref. 15/730/ABP Ref. PL04.246353. This consented grid connection will be considered in the EIAR cumulatively with the proposed development.

### 2.3 Turbine Delivery

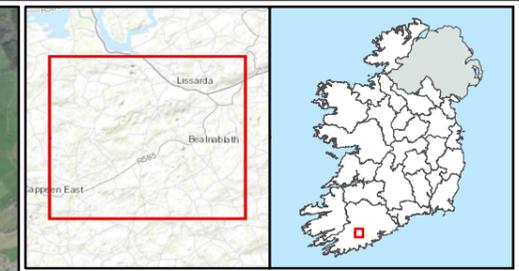
A number of components will enter the country through the ports including the blades, tower sections and the nacelles. These will be delivered to site by flatbed transport vehicles.

It is envisaged that turbines will be delivered via Cork Harbour. The likely delivery route includes loads arriving to Cork Harbour and travelling to the site along the national road network before entering the R585 and L6008. The turbine delivery route is subject to change pending a detailed engineer's assessment.



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An assessment has already been carried out which has indicated that offsite enabling works will be required along the public road at the intersection of R585 and L6008. These works have already been consented and will be considered in the EIAR cumulatively with the proposed development and grid connection.



- Development Planning Boundary
- Study Area
- Proposed Substation
- Turbine Hardstandings
- Proposed Temporary Construction Compound
- Proposed Borrow Pit
- Proposed Met Mast
- Proposed Turbine Layout
- Alternative Grid Connection Route
- Turbine Delivery Route
- Roads - Proposed

<b>TITLE:</b>	Turbine Delivery Route	
<b>PROJECT:</b>	Barnadivane Wind Farm, Co.Cork	
<b>FIGURE NO:</b>	2-1	
<b>CLIENT:</b>	Barna Wind Energy Ltd.	
<b>SCALE:</b>	1:35000	<b>REVISION:</b> 0
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## 3. STRUCTURE AND SCOPE OF THE EIAR

### 3.1 Contents of the EIAR – Statutory Requirements

The EIAR will be prepared in accordance with Schedule 6 of the Planning and Development Regulations 2001, as amended, which sets out the contents of an EIAR. In addition, the contents of Directive 2014/52/EU, which was adopted in the EU on 16 April 2014 will also be included in the preparation of this EIAR (the 2014 EIA Directive).

The purpose of the EIAR is to provide in particular:

- a) a description of the project comprising information on the site, design, size and other relevant features of the project;
- b) a description of the likely potential significant effects of the project on the environment;
- c) a description of the features of the project and/or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- d) 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;
- e) a non-technical summary of the information referred to in points (a) to (d); and
- f) any additional information relevant to the specific characteristics of the wind farm project proposed.

The EIAR will identify, describe and assess the direct and indirect significant effects of the project on the following factors:

- (a) population and human health;
- (b) biodiversity, with particular attention to protected species and habitats;
- (c) land, soil, water, air and climate;
- (d) material assets, cultural heritage and the landscape;
- (e) the interaction between the factors referred to in points (a) to (d).

and the expected effects deriving from the vulnerability of the project to risks of major accidents and / or disasters that are relevant to the project concerned.



## 3.2 EIAR Methodology

### 3.2.1 General

The EPA and the European Commission (EC) have published guidelines on the preparation of environmental impact assessment reports, namely:

- Guidance on the information to be contained in Environmental Impact Assessment Reports (Environmental Protection Agency (EPA), 2022);
- Environmental Impact Assessment of Projects - Guidance on Scoping (European Commission (EC), 2018);
- Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (EC, 2017);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018).

The EIAR team will have regard to these guidelines in the preparation of the EIAR.

The team will also have regard to best practice guidance for individual environmental topics. Regard will also be paid to the 'Best Practice Guidelines for the Irish Wind Energy Industry' published by the Irish Wind Energy association and the '*Wind Energy Development Guidelines*' published by the Department of Environment, Heritage and Local Government (2006) or the latest adopted revision at the time of application.

There are two different EIAR structures which are commonly used and which the EPA Guidelines accept as equally valid. The structure, which the EIAR team proposes to use for the EIAR for the proposed development, is the grouped format structure.

Using this structure there is a separate chapter for each topic, e.g. air quality, biodiversity, hydrology. The description of the existing environment, the proposed development and the potential impacts, mitigation measures and residual impacts are grouped in the chapter. The grouped format makes it easy to investigate topics of interest and facilitates cross-reference to specialist studies.

Given the need to ensure that the EIAR is readily accessible to the general public, as well as to the statutory authorities, the EIAR team has proposed to structure the EIAR as described below:

- Non-Technical Summary
- Introduction
- Description of the Proposed Development (incl. need and alternatives)
- Planning Policy
- EIA Scoping and Consultation
- Biodiversity
- Lands, Soils and Geology
- Hydrology, Hydrogeology and Water Quality
- Landscape & Visual Impact
- Noise and Vibration
- Population, Human Health and Material Assets (incl. Shadow Flicker)



- Traffic and Transportation
- Cultural Heritage
- Telecommunications and Aviation
- Air and Climate Change
- Interaction of the Foregoing

### 3.2.2 EIA Chapter Structure

The broad methodology framework used in each chapter will include the following:

- Introduction
- Methodology
- Existing Environment
- Potential Impacts
- Mitigation Measures
- Residual Impacts

#### *Introduction*

This section introduces the environmental topic to be assessed and the areas to be examined within the assessment.

#### *Methodology*

Specific topic related methodologies are outlined in this section. This will include the methodology used in describing the existing environment and undertaking the impact assessment. It is important that the methodology is documented so that the reader understands how the assessment was undertaken. This can also be used as a reference if future studies are required.

#### *Existing Environment*

An accurate description of the existing environment is necessary to predict the likely significant impacts of a new development. Existing baseline environmental monitoring data can also be used as a valuable reference for the assessment of actual impacts from a development once it is in operation.

To describe the existing environment, desktop reviews of existing data sources will be undertaken for each specialist area relying on published reference reports and datasets to ensure the objectivity of the assessment. Desktop studies are also supplemented by specialised field walkovers or studies in order to confirm the accuracy of the desktop study or to gather more baseline environmental information for incorporation into the EIA.

The existing environment will be evaluated to highlight the character of the existing environment that is distinctive and what the evaluation of this is. The evaluation of a specific environmental aspect can be derived from legislation, national policies, local plans and policies, guidelines or professional judgements. The sensitivity of the environment will also be described.

#### *Potential Impacts*

In this section, individual specialists predict how the receiving environment will interact with the proposed development. The full extent of the proposed development's effects and emissions before the proposed mitigation measures are introduced is outlined.



Impacts from both the construction and operation phases of the proposed development are outlined. Interactions and cumulative impacts with other environmental topics are also included in this evaluation.

The evaluation of the significance of the impact is also undertaken. Where possible, pre-existing standardised criteria for the significance of impacts will be used in accordance with the guidelines set out in the EPA (2022) Guidelines on the Information to be contained in Environmental Impact Assessment Reports. Such criteria can include Irish legislation, international standards, European Commission and EPA guidelines or good practice guidelines. Where appropriate criteria do not exist the assessment methodology section states the criteria used to evaluate the significance.

#### *Mitigation Measures*

If significant impacts are anticipated mitigation measures will be devised to minimise impacts on the environment. Mitigation measures by avoidance, by reduction and by remedy can be outlined.

#### *Residual Impacts*

The assessment identifies the likely impact that will occur after the proposed mitigation measures have been put in place. These impacts are described in detail and assessment of their significance undertaken.

### 3.2.3 EIA Report Structure

The structure proposed for the EIA is as follows:

- Volume 1 – Non Technical summary
- Volume 2 – Main EIA
- Volume 3 – Appendices for the EIA
- Volume 4 – Photomontages and Visual Maps.



## 4. ENVIRONMENTAL ISSUES TO BE ADDRESSED IN THE EIAR

### 4.1 Introduction

The EPA Advice Notes provide guidance on the topics which would usually be addressed when preparing an EIAR for different classes of development. The Advice Notes highlight typical issues, which would arise for each development class. Project Type 33 is 'installations for harnessing wind power for energy production (wind farms)'. The scope of the EIAR will have regard to the guidance provided on the issues to be addressed for a Project Type 33.

The EIAR will summarise International, European, National and Local Energy and Planning Policy, the challenges associated with Climate Change and the related need for the proposed development.

### 4.2 Alternatives Considered

The alternatives, which were considered, when developing the overall configuration of the proposed development, will be described, and the technology options for the project will be outlined in Chapter 1 Introduction, Chapter 2: Description of the Proposed Development.

The principle alternatives studied with respect to the wind farm will be outlined under the following headings:

- *Locations* – This will include a discussion of the overall site selection process for the wind farm on a national, regional and local scale. It will include details of the criteria used to determine site suitability for wind energy development including:
  - Wind resource;
  - Proximity to residential dwellings;
  - Land Zoning in County Development Plans;
  - Established and Future Land-Use;
  - Ecological Conservation Designations;
  - Landscape Designations; and
  - Ease of Access etc.
- *Layout & Design* – Evolution of the design and how it responded to site constraints and consultation.
- *Access* – Details of the criteria used to select the network of access tracks that will provide access from the public road network to the site (and to each turbine within the site) in addition to those that will provide internal connections (as an alternative to using public roads) between turbines will be outlined. This will include information on the availability of existing track, suitable ground conditions, terrain, local road infrastructure etc.
- *Connection to the National Grid* – Details of the criteria used to select the proposed grid connection route will be provided. This will include an assessment of alternative grid connection route options.

The reasons, including environmental and plan-led considerations will be explained.



### 4.3 Scheme Description

The EIAR will describe each element of the project including the following:

- Existing Environment
- Landownership
- Community Benefit Scheme
- On Site Wind Resource
- Turbine Layout
- Power Output
- Turbine typical components
- Access Tracks and Hardstanding Areas
- Watercourse crossings
- Grid Connection
- Onsite substation
- Electrical cabling
- Traffic Management
- Tree felling
- Replant lands (if required)
- Wind farms in proximity
- Construction overview
- Operation and lifespan
- Decommissioning

In a judgement in 2014, *O’Grianna v. An Bord Pleanála, Cork County Council and Framore Limited*, it was ruled that all planning permission should not be granted for a wind farm project requiring a grid connection unless the grid connection details are provided in the Environmental Impact Assessment (EIA) process.

Arising from this it is essential that the details of this project and its proposed grid connection should be provided in the EIA process, this will be set out in the Description of Development in detail in Chapter 2.

The operating procedures and hours, staffing, monitoring, maintenance requirements, and the provision for decommissioning of the proposed Wind Farm will also be outlined.

If planning permission is secured for the proposed development, site preparation works, tree felling, and the provision of access tracks will precede all other activities. Drainage infrastructure will be constructed in parallel with the track construction. This will be followed by the construction of the turbine foundations and the provision of the hardstanding areas. In parallel with these works the on-site electrical works; sub-station and internal cable network; will be completed. Any works required to the public road network to facilitate turbine delivery will also be carried out.



## 4.4 Construction Activities

The wind farm site will have a defined planning boundary to include not only the turbines themselves but all ancillary infrastructure such as transformers and crane hardstanding areas at each turbine, borrow pits, site tracks, met mast, on-site underground cabling and an onsite substation with ancillary facilities. Details on all of these elements will be provided within the EIAR.

Information will be provided on the following aspects of the construction of the wind farm:

- Construction programme;
- Construction sequence and methodology;
- Drainage control measures;
- Temporary site facilities;
- Site preparation works;
- Access road construction;
- Borrow pits;
- Cable installation on site;
- Turbine foundation and associated hardstanding area construction;
- Turbine delivery and installation;
- Commissioning.

The control measures that will be implemented to manage the risk of soil and water pollution, emissions of dust and noise, construction waste management and traffic impacts will be explained.

## 4.5 Consultation Programme

Over the course of the final design and preparation of the EIAR, consultation will continue with the community, stakeholders and consultees. As part of the EIAR, full details of all consultation will be documented and assessed.

## 4.6 Environmental Aspect: Population, Human Health and Material Assets

### 4.6.1 Aspects to be addressed

The Population and Human Health Chapter of the EIAR will assess the likely significant effects of the proposed development on Population and Human Health with a particular reference to the topics listed below. This chapter will also consider impacts on material assets including renewable and non-renewable resources and utility infrastructure. Other potential impacts on material assets including traffic and transportation, telecommunications and aviation, and archaeological and architectural heritage are assessed in their own respective chapters.



### Population

The potential impacts of the proposed development on population trends and statistics (density, age) will be addressed in this chapter.

### Human Health & Safety

The potential impacts on human health from the proposed development will be assessed in terms of potential effects on human health and safety. Other relevant technical topics of the EIAR will be cross referenced in this Chapter as required.

### Socio-economic Activity

The potential impacts of the proposed development on employment and the main economic activities of the region as well as property values will be addressed in this chapter.

### Land-use

The assessment will address the potential impacts of the proposed development on existing and proposed land use.

### Recreation, Amenity and Tourism

The assessment will address the potential impacts of the proposed development on recreational facilities, tourism and amenities of the locality and region in the context of the receiving environment.

### Material Assets

The potential impact of the proposed development on renewable and non-renewable resources as well as physical infrastructure and utility infrastructure will be assessed.

## 4.6.2 Assessment Methodology

### Population

With the purpose of analysing population trends and statistics on the area of the proposed development, population data from the Central Statistics Office will be obtained for the study area defined by electoral division, including the area of the turbine delivery route. The statistics of this data are compared against county and state trends. Population data will be sourced from the CSO which will be analysed against population trends within the development area defined by electoral division which will include the turbine delivery route.

### Human Health & Safety

The assessment will contain a desk study review of the potential impacts of the construction, operation and decommissioning of renewable energy developments on human health and health and safety, using published and verified sources of information.

### Socio-economic Activity

Data from the Central Statistics Office will be used to define the socio-economic baseline. Desktop research and consultation will provide an indication of economic activity in the study area. The potential positive and negative impacts of the proposed development on employment and economic activity both directly and indirectly, will be assessed.

### Land-use

The main land uses in the area, which could potentially be affected by the proposed development, will be described using latest Corine land cover data.



This data will be verified by subsequent walkovers, drive-by surveys, planning searches and development plan research. Potential impact to existing and proposed land uses will then be assessed.

### Recreation, Amenity and Tourism

All areas of scenic beauty in addition to heritage, culture and leisure facilities and activities in the study area will be identified. Residential amenities and recreational facilities, such as forestry in public ownership, walking paths, sports facilities, will be recorded and potential impacts assessed.

An assessment will then be conducted for each element of the proposed development to ascertain any potential impacts that may arise which could directly or indirectly affect recreational activity or an amenity. This assessment will be prepared giving cognisance to other disciplines such as cultural heritage and archaeology, hydrology and ecology.

A review will be completed of several published studies and surveys which have been conducted both in Ireland by Fáilte Ireland and in the UK on the attitude of tourists to wind farms. A study of the potential impacts that the proposed development may have on the tourism of the region will be carried out by reviewing Fáilte Ireland surveys, appraising the existing patterns of the tourism within the county, and appraising the impacts that wind farms have on tourism in other counties and countries.

### Material Assets

Information on the existing material assets within the receiving environment will be obtained through consultation with utility providers as well as desktop studies to identify renewable and non-renewable resources. The potential impact will be assessed in the context of the proposed development. The wind farm will also be considered under the material assets section in its own right as it will be classed as a renewable resource.

## 4.6.3 Potential Impacts

### Population

The potential impacts arising from the proposed development on population numbers and density during construction operation and decommissioning will be assessed.

### Human Health & Safety

The potential affects arising from the proposed development which can impact on human health and human safety during construction, operational and decommissioning will be considered in this chapter.

### Socio-Economics

The proposed development will have an impact on the local economy through job creation, local authority commercial rate payments and a Community Benefit Scheme. These will be developed in full and considered in the EIAR.

### Land Use

The proposed development will require land take for the access tracks, wind turbines bases and adjacent hard-standings and sub-station footprints. The current land uses will remain other than within this land take. Full details will be contained in this chapter of the EIAR.



## Recreation, Amenity and Tourism

The potential impact of the proposed development on the receiving environment for recreation, amenity and tourism will be assessed in this chapter in relation to the construction, operation and decommissioning phases. Potential construction impacts include full or partial closure of roads used within the area, for installation of cables and/or delivery of turbine components. There is potential for disruption to access routes and walking paths, however any disruption will be mitigated where possible by maintaining access for people throughout or rerouting paths, and where this is not possible, in minimising the impact, clearly communicating the timing and scope of works to the local community. This section will also cross reference other technical chapters of the EIAR, for example, to determine potential impact on cultural heritage assets and to determine potential visual impact to tourism or recreation assets during the operational phase. Possibilities for improvements to recreation facilities in the area will also be considered.

## Material Assets

The proposed development has potential to impact on nearby utility infrastructure and may also impact on renewable and non-renewable resources during the construction, operation and decommissioning of the proposed project. These impacts will be considered in the EIAR and mitigation proposed where required.

## **4.7 Environmental Aspect: Shadow Flicker**

### 4.7.1 Aspects to be addressed

This chapter will address the potential effects on human beings of shadow flicker, i.e. the moving shadows cast by the turbine blades in times of direct sunlight. Under certain combinations of geographical position, wind direction, weather conditions, times of day and time of the year, the sun may pass behind the rotors of a wind turbine and cast a shadow over the windows of nearby buildings. When the blades rotate and the shadow passes a window, to a person within that room the shadow appears to 'flick' on and off; this effect is known as 'shadow flicker'. The phenomenon occurs only within buildings where shadows are cast across a window aperture, and the effects are typically considered up to a maximum distance of 10 times the rotor diameter from each wind turbine.

### 4.7.2 Assessment Methodology

A shadow flicker assessment will be carried out using the latest software to predict the time and duration of shadow flicker on windows of habitable or permitted houses and commercial properties within 10 rotor diameters from a proposed turbine, as informed by the house and planning surveys.

The methodology used for the shadow flicker assessment will be performed in consideration of the "Wind Energy Development Planning Guidelines" DoEHLG (2006) and the Irish Wind Energy Association (2012) "Best Practice Guidelines for the Irish Wind Energy Industry". This methodology includes:

- Calculation of sunshine factor based on the historical measurements from the closest Met Éireann meteorology station;
- Calculation of shadow flicker levels for the final turbine layout;
- Where exceedances are predicted, detailed mitigation measures, including an outline potential turbine shut-down will be proposed.



Cumulative impacts of the proposed development and other third party schemes will be assessed. IWEA Best Practice Guidelines (2012, Section 6.3.4) states that “any such wind farm developments within 2 km of the proposed development should be considered in a separate cumulative shadow flicker assessment. The Garranereagh Windfarm located to the east of the proposed development is situated within 2km and will be cumulatively assessed in the shadow flicker assessment, as required above.

#### 4.7.3 Potential Impacts

In times of direct sunshine, wind turbine blades could occasionally cast moving shadows on residences in close proximity to the turbines. At certain times of the year, the moving shadows of the turbine blades can periodically reduce light to a room causing the light to appear to flicker. Shadow flicker would not generally have any effect on health or safety but could on limited occasions present a brief nuisance effect.

The effects of shadow flicker can be mitigated by incorporating a shadow flicker monitoring system that will temporarily shut down a turbine when shadow flicker effects are predicted to occur at a dwelling. Therefore, it is possible to eliminate the potential of shadow flicker occurring at dwellings and commercial properties.

### **4.8 Environmental Aspect: Noise and Vibration**

#### 4.8.1 Aspects to Address

This chapter will address noise and vibration impacts from the construction, operation and decommissioning of the proposed development.

#### 4.8.2 Assessment Methodology

The noise assessment will be carried out on each phase of the wind farm:

- Construction phase;
- Operational phase, including turbine and sub-station operations;
- Decommissioning phase, including dismantling the turbines, and related traffic.

The Wind Energy Development Guidelines (2006) are currently the statutory guidelines for carrying out noise assessments for wind energy development in Ireland. Draft Guidelines were published in December 2019, and these are currently being reviewed by the Department of Housing, Local Government and Heritage following a period of public consultation which concluded in February 2020. Until the 2019 Draft Guidelines are formally adopted the Wind Energy Development Guidelines (2006) remain the current statutory guidelines. The Wind Energy Development Guidelines (2006), and reference to the Institute of Acoustics (IOA) ‘A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise’ will be considered in developing the layout and design of the wind farm through the criteria for noise impact assessment.

The noise impact assessment will involve measurement of background noise levels and predicting noise impacts from the proposed development and nearby operational and consented developments. The background noise levels will be used to derive noise limits in accordance with relevant guidelines at the time the development is submitted for planning.



In the event that the predicted noise levels exceed the noise limits, mitigation measures will be outlined. Construction/decommissioning noise predictions will be carried out to determine the noise levels at the nearest noise sensitive locations. Noise prediction will be carried out using British Standard BS 5228-1:2009+A1:2014, Code of practice for noise and vibration control on construction and open sites – Part 1: Noise. Predicted construction noise levels will be compared against noise levels in BS 5228:2009+A1:2014 Part 1. Where the impact significance identifies a requirement for mitigation, mitigation measures will be outlined.

#### 4.8.3 Potential Impacts

Potential impacts of noise nuisance will be addressed at the design stage by locating turbines at sufficient separation distances or by employing reduced turbine noise modes to comply with the noise limits in force at the time of application.

### **4.9 Environmental Aspect: Traffic and Transportation**

#### 4.9.1 Aspects to be addressed

The traffic impact assessment will address the traffic impacts on the road network from the construction, operation and decommissioning of the proposed development. The assessment will include the supply of materials, plant and equipment, the turbine elements and the components of the substation. Traffic arising from the construction and operations workforce will also be addressed.

#### 4.9.2 Assessment Methodology

A traffic impact assessment will be conducted in accordance with the Transport Infrastructure Ireland (TII) Traffic and Transport Assessment (TTA) Guidelines, May 2014. Data collected from road traffic surveys along the delivery route will be used in the assessment.

A route survey will be carried out by a specialist transport consultant between N22 junction and proposed project entrance locations. This survey will identify potential pinch points and locations that may require off site temporary upgrades to facilitate the safe transport of the turbines to the development area.

Auto Track vehicle swept path analysis (SPA) will be conducted for all internal tracks to ensure that they are adequate to allow delivery of turbine components while also minimising the required land take where feasible. SPA will also be carried out on pinch points identified in the transport route survey report.

The methodology for the traffic impact assessment will include a review of the traffic volumes and impacts which will be generated by the construction, operation and decommissioning of the wind farm. The traffic generated by the construction workforce, by the transport of materials and equipment as well as future maintenance-related activities will be predicted.

The traffic distribution pattern on the local road network during construction will be examined and impacts determined. The potential disruption to the road network during the installation of the cables and the availability of alternative routes will be assessed, where required. Recommendations will be made to mitigate any potential traffic impacts on the road network.



### 4.9.3 Potential Impacts

A Traffic Impact Assessment will address the traffic impacts on the road network for the construction, operation and decommissioning of the proposed development. The assessment will include the supply of materials, plant and equipment, the turbine elements and the components of the substation. Traffic arising from the construction and operations workforce will also be addressed.

The traffic impact assessment will be conducted in accordance with the Transport Infrastructure Ireland (TII) Traffic and Transport Assessment (TTA) Guidelines, May 2014.

Data collected from road traffic surveys along the delivery route will be used in the assessment. The impact assessment will include a review of the traffic volumes and impacts which will be generated by the construction and operation of the proposed development. The traffic generated by the construction workforce, by the transport of materials and equipment as well as future maintenance-related activities will be predicted. The traffic distribution pattern on the local road network during construction will be examined and impacts determined. The potential disruption to the road network during the installation of the cables and the availability of alternative routes will be assessed, where required. Recommendations will be made to mitigate any potential traffic impacts on the road network.

The greatest potential for traffic impact from the proposed development is during the construction phase which will give rise to additional traffic on the road network.

The turbines will be delivered to the proposed site in separate parts, typically comprising of a number of loads for each of the towers, the rotor blades, the nacelle, the rotor hub, the turbine base and the electrical components. The delivery route from the port into which the components are shipped, to the proposed development will use the national primary route network as much as possible. Modifications may be required to the existing local road network to cater for the delivery of the oversized loads.

Stone aggregate will be required for the upgrading of existing tracks and construction of new roads as well as the construction of turbine bases and hardstands. All of these activities have the potential to generate significant local traffic numbers.

There will be an increase in local traffic during the construction of the wind farm; staff, including plant operators, electricians, engineers and trades people, will be commuting to and from the proposed project area each morning and evening. In addition, there is likely to be an increase in local traffic due to onlookers as the turbines are erected.

There will also be temporary traffic impacts from cable laying works on the public roads. These impacts will be managed to reduce the nuisance being caused to local road users.

## **4.10 Environmental Aspect: Air Quality and Climate**

The EIAR will address the potential impacts on air quality due to construction equipment and activities, and to emissions from traffic associated with the construction process. The potential impacts on air quality in the operational phase will also be addressed. The climate in the immediate local area of a proposed development is known as the micro-climate whereas the climate of a large geographical area (global) is the macro-climate. The potential impacts of the proposed development on micro-climate and macro-climate will be addressed.



#### 4.10.1 Aspects to be addressed

Air quality monitoring conducted by the EPA at a number of locations in the vicinity of the site will be reviewed and levels compared with the air quality standards. To assess the impacts of construction dust emissions, the approach and assessment criteria outline in the *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (NRA, 2008) will be used.

For the purposes of assessing the impact on air quality of emissions generated by construction traffic, the methodology described in the Design Manual for Roads and Bridges 2007a (UK Highways Agency, May 2007) will be used. Parameters to be assessed will include oxides of nitrogen, particulates PM10 and PM2.5, carbon monoxide and benzene.

The potential micro-climatic impacts of proposed development will be assessed in relation to the micro-climatic baseline, the scale of the elements of the project and the nature of use of the surrounding environment. For the assessment of macro-climatic effects, the emissions of carbon dioxide (CO<sub>2</sub>) and other greenhouse gases from fossil fuel power generation, which will not be required should the proposed Wind Farm become operational, will be quantified and assessed in terms of Ireland's commitments under EU and international climate change treaties and protocols.

In terms of carbon losses and savings, the Scottish Windfarm Carbon Assessment Tool. will be used to estimate carbon savings as a result of the proposed construction and operation of the wind farm.

#### 4.10.2 Assessment Methodology

Air quality monitoring conducted by the EPA at a number of locations in the vicinity of the site will be reviewed and levels compared with the air quality standards. To assess the impacts of construction dust emissions, the approach and assessment criteria outline in the *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (NRA, 2008) will be used.

For the purposes of assessing the impact on air quality of emissions generated by construction traffic, the methodology described in the Design Manual for Roads and Bridges 2007a (UK Highways Agency, May 2007) will be used. Parameters to be assessed will include oxides of nitrogen, particulates PM10 and PM2.5, carbon monoxide and benzene.

The potential micro-climatic impacts of the proposed development will be assessed in relation to the micro-climatic baseline, the scale of the elements of the project and the nature of use of the surrounding environment. For the assessment of macro-climatic effects, the emissions of carbon dioxide (CO<sub>2</sub>) and other greenhouse gases from fossil fuel power generation, which will not be required should the proposed Wind Farm become operational, will be quantified and assessed in terms of Ireland's commitments under EU and international climate change treaties and protocols.

In terms of carbon losses and savings, the Scottish Windfarm Carbon Assessment Tool. will be used to estimate carbon savings as a result of the proposed construction and operation of the wind farm.

#### 4.10.3 Potential Impacts

The assessment will address the potential impacts on air quality due to construction equipment and activities and to emissions from traffic associated with the construction process. The potential impacts on air quality in the operational phase will also be addressed.



The construction phase of the proposed development has the potential to generate dust emissions, which could give rise to nuisance for local residents. To assess the impacts of construction dust emissions, the approach and assessment criteria outlined in the *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes* (National Roads Authority, 2008) will be used.

Construction plant and equipment, and the traffic generated by the construction process, have the potential to give rise to emissions of oxides of nitrogen, benzene and particulates, which could impact on local air quality. The operation of the proposed development is not expected to have a negative impact on air quality. The proposed Wind Farm is expected to have a positive impact in terms of the nett reduction in emissions of CO<sub>2</sub> and other greenhouse gases as a result of the proposed development. For the assessment of macro-climatic effects, the reduction in emissions of CO<sub>2</sub> and other greenhouse gases from fossil fuel power generation when the proposed Wind Farm is operational, will be quantified and assessed in terms of Ireland's commitments under EU and international climate change treaties and protocols.

## 4.11 Environmental Aspect: Biodiversity

### 4.11.1 Aspects to be addressed

This chapter of the EIAR will address the terrestrial and freshwater aquatic habitats and species, including those of conservation concern within and in close proximity to the proposed development; including along and in close proximity to the on-site cable routes; on and in close proximity to the sub-station, tree felling and any required replanting.

It will also address the potential impacts on ecology from the alternative underground cable route between the wind farm and the Carrigdangan substation consented as part of the Carrigarierk Windfarm, as well as any proposed alterations to the public road network required for the delivery of turbine components.

In particular, the assessment will focus on:

- Natura 2000 sites i.e., Special Areas of Conservation designated under the EU Habitats Directive (Council Directive 92/43/EEC) and Special Protection Areas designated under the EU Birds Directive (Directive 2009/147 EC), within 15km of the proposed project and routes.
- Other designated sites such as Natural Heritage Areas, proposed Natural Heritage Areas, Nature Reserves and Refuges for Fauna or Flora;
- Habitats listed in Annex I of the Habitats Directive;
- Birds listed in Annex I of the Birds Directive;
- The impact on any flight paths of bird and bat species;
- Species protected under the Wildlife Acts;
- Protected flora under the Flora Protection Order (2015);
- Habitats that can be considered as corridors for the purposes of article 10 of the Habitats Directive;
- Red data book species;
- And biodiversity in general.



#### 4.11.2 Assessment Methodology

Desk studies will be undertaken in which ecological databases, such as those of the National Parks and Wildlife Service (NPWS), EPA and NBDC will be consulted. The NPWS, Inland Fisheries Ireland and the main environmental and non-governmental organisations have been or will be consulted.

Bird survey methods have been selected following a review of best practice guidelines as detailed in Scottish Natural Heritage (SNH 2017) and following consultation with NPWS. Bird surveys commenced in November 2013 and are ongoing at the project site.

The scope of the bird survey includes vantage point surveys (from 3 locations), transect surveys, point counts, breeding raptor surveys, wintering water birds.

Habitats shall be appraised and evaluated according to their occurrence as protected habitats under Annex I of the EU Habitats Directive (92/43/EEC) and for their capacity to support rare, threatened and endangered species. The methodology used to assess the impact on habitats is based on NRA guidelines (2009<sup>1</sup>), CIEEM guidelines and EPA guidelines. The habitat mapping exercise had regard to the 'Best Practice Guidance for Habitat Survey and Mapping' (Smith et al., 2011<sup>2</sup>) published by the Heritage Council. In addition to habitat identification, each habitat will be assessed for its ecological significance, based on the National Roads Authority (NRA) Site Evaluation Scheme (NRA, 2009).

Bat surveys are being undertaken in accordance with Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation (Scottish Natural Heritage, 2019<sup>3</sup>). Winter and breeding roost surveys will be required. Activity surveys will also be required during the bat activity season April to September as per Bat Conservation Ireland and Bat Conservation Trust Guidelines.

Aquatic ecology surveys of adjacent watercourses and those in the downstream receiving environment are required to examine the potential occurrence of protected species, and to determine water quality (Q values).

The proposed project will require surveying for terrestrial mammal species including inter alia Badger, Red Squirrel and Otter. A targeted Marsh Fritillary Survey is recommended due to the potential for habitat on-site and records within the study area, to assess the distribution of the species within the project area and also the extent of suitable habitat for the species. During the course of ecological surveys of the project area, other species of fauna shall be noted and considered in the ecological appraisal.

#### 4.11.3 Potential Impacts

This chapter of the EIAR will address the nationally designated sites, terrestrial and freshwater (aquatic) habitats and species, including those of conservation concern on and in close proximity to the proposed development and including along and in close proximity to the proposed cable route and proposed haul route.

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<sup>1</sup> NRA (2009). Environmental Assessment and Construction Guidelines. Published by the National Roads Authority.

<sup>2</sup> Smith, G.F., O'Donoghue, P, O'Hora K., and Delaney, E. (2011). Best Practice Guidance for Habitat Survey and Mapping. Published by the Heritage Council.

<sup>3</sup> Scottish Natural Heritage, Natural England, Natural Resources Wales, Renewable UK, Scottish Power Renewables, Ecotricity Ltd, the University of Exeter and the Bat Conservation Trust (2019): Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.



The ecological evaluation of the project area and its' Biodiversity will be assessed according to NRA (2009). Once the value of the identified ecological receptors (features and resources) is determined, the next step will be to assess the potential impact and resulting effect of the proposed development on the identified key ecological receptors.

This will be carried out with regard to the criteria outlined in various impact assessment guidelines (NRA, 2009; CIEEM, 2016). The impacts will be assessed under a number of parameters such as magnitude, extent, timing, frequency, duration and reversibility. The impact significance criteria detailed in the EPA guidelines (EPA, 2002) will be used where applicable.

Potential impacts of the wind farm on Biodiversity include:

- Direct loss of habitat due to the footprint of the area;
- Damage to adjacent habitats during construction which could potentially be affected by construction activity;
- Impacts during construction on the hydrology of water dependant habitats
- Impacts on water quality both at a local level and regional level due to pollution run-off whether during or post construction;
- Impacts on downstream aquatic species during construction or due to pollution events etc.;
- Disturbance to local wildlife, including loss of habitat, disturbance and displacement;
- The potential collision risk to birds and bats;
- Damage to or habitat loss of important wildlife corridors or stepping-stones during construction. Fragmentation of same at a larger more regional level as a result of habitat loss;
- The introduction of alien invasive species during construction;
- Displacement of bird species from limited breeding areas;
- Displacement or disturbance to breeding waders from areas within the proposed wind turbine envelope;
- Barrier effect on migrating birds, whereby individual species' dispersal or migration routes are affected by the placement of turbines which effectively cause a barrier;
- Impacts on the conservation status or constituent parts of designated sites.
- Potential impacts associated with tree felling and any required replanting on designated sites, habitats, Biodiversity.

Potential impacts on European (Natura 2000) sites as a result of the proposed development will be assessed though the appropriate assessment process.

#### 4.11.4 Appropriate Assessment

An Appropriate Assessment Screening Report and if required a Natura Impact Statement will be prepared in respect of the proposed development, so as to enable the competent authorities to carry out an Appropriate Assessment as required by Article 6(3) of Council Directive 92/43/EEC ("the Habitats Directive") and section 177U of the Planning and Development Act 2000, as amended ("the Planning Act"). The potential impact to European sites due to tree felling and any proposed replanting shall also be considered.



In compliance with the aforementioned provisions of Article 6(3) of the Habitats Directive and section 177U of the Planning Act, a Screening Appropriate Assessment of an application for consent for proposed development shall be carried out by the competent authority or authorities to assess, in view of best scientific knowledge, if that proposed development, individually or in combination with another plan or project is likely to have a significant effect on a European site, in view of the site's conservation objectives.

Where negative impacts on a Natura 2000 site cannot be discounted during Stage 1 Screening for Appropriate Assessment, the Assessment must proceed to Stage 2 and a Natura Impact Statement prepared at which point a detailed, targeted assessment of the nature and potential significance of direct and indirect impacts arising from the proposed development must be completed and an assessment as to whether the integrity of the Natura 2000 site would be adversely affected.

European sites, as defined in the Planning Act, comprise both Special Protection Areas (SPAs) for birds and Special Areas of Conservation (SACs) for habitats and other species, and are designated by Member States pursuant to the requirements of Council Directive 79/409/EEC, now Directive 2009/147/EU, on the conservation of wild birds ("the Birds Directive") and the Habitats Directive, respectively.

Article 6(3) of the Habitats Directive envisages a two-stage assessment process, which is implemented into Irish law (with some additional requirements) by the provisions of sections 177U and 177V of the Planning Act. Screening for AA in accordance with section 177U is the first stage of the AA process ("Stage One"), in which the possibility of there being a significant effect on a European site is considered. Plans or projects that have no appreciable effect on a European site are thereby excluded, or "screened out", at this stage of the process. Where, however, the competent authority's screening assessment concludes that there is potential for significant effects, then it is necessary to carry out an Appropriate Assessment (AA) ("Stage Two") for the purposes of Article 6(3), and a Natura Impact Statement (NIS) is prepared and submitted to the competent authority.

The first step in the screening process is to develop a list of European sites which may have the potential to be affected by the proposed development. Each relevant European site is reviewed to establish whether or not the proposed development is likely to have a significant effect on the European site. The development area of the proposed development is not located within a designated nature conservation site, however there are a number of designated sites within 15km which will need to be considered.

For each European Site, the qualifying interests or special conservation interests of each European site will be identified, and the potential effects summarised under the following headings for the purposes of the screening process:

- Direct impacts refer to habitat loss or fragmentation arising from land-take requirements for development or agricultural purposes. Direct impacts can arise as a result of a change in land use or management, such as the elimination of agricultural practices that prevent scrub encroachment.
- Indirect and secondary impacts may arise, for example, when a development alters the hydrology of a catchment area, which in turn affects the movement of groundwater to a site, and the qualifying interests that rely on the maintenance of water levels. Deterioration in water quality could occur as both an indirect and direct consequence of a particular development, which in turn changes the aquatic environment and reduces its capacity to support certain plants and animals. The introduction of invasive species can also be defined as an indirect impact, which results in increased movement of vectors (humans, fauna, surface water), and consequently the transfer of alien species from one area to another.
- Disturbance to fauna can arise directly through the loss of habitat (e.g. otter holts) or indirectly through noise, vibration and increased activity associated with construction and operation.



In the event that significant effects cannot be ruled out during the Stage 1 Screening for Appropriate Assessment, the process proceeds to Stage 2 Appropriate Assessment and a Natura Impact Statement is prepared. During Stage 2 AA, the effect of the project on the integrity of the European site(s), as defined by its structure and function, and its conservation objectives is appraised. Potential impacts on species or habitats will be evaluated with respect to the scale, extent and nature of the impact, for example the area of habitat affected, changes in hydrodynamics, the percentage reduction in species density, potential changes in species distribution. The duration of the impact will be determined in terms of the duration of the works and also the amount of time required for the species and / or habitat to be replaced or to recover from the impacts. Information on the main alternatives studied by the developer and why they were excluded will also be provided within the AA process.

During Stage 2 of the AA process, mitigation measures can be developed to minimise effects on European Sites.

Mitigation measures will follow the mitigation hierarchy:

- Avoidance;
- Reduction;
- Remedy.

For each mitigation measure the following will be provided:

- Details of how the mitigation will be secured and implemented;
- Evidence of the degree of confidence in their likely success;
- A timescale of when they will be implemented;
- Details of how the mitigation measures will be monitored and how any mitigation failure will be addressed where practical.

## **4.12 Environmental Aspect: Soils, Geology, Hydrogeology**

### 4.12.1 Aspects to be addressed

The assessment will address soils, bedrock and groundwater underlying the wind farm.

### 4.12.2 Assessment Methodology

The methodology for the soils and geology assessment will be in accordance with the guidelines published by the Institute of Geologists of Ireland in 2013, 'Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements'.

At this stage, it is envisaged that the Preliminary Site Investigation (Phase 1) will consist of peat probing at turbine locations and along access road routes to identify whether roads are likely to be floated or founded and trial pits at borrow pit locations to confirm the depth of overburden at borrow pit locations and potentially log the upper weathered rock deposits.



The data gathered will be used to inform the final location of all turbines and associated infrastructure. An earthworks balance calculation will be prepared for the overall development to assess where excavated material can be beneficially re-used.

#### 4.12.3 Potential Impacts & Mitigations

The potential impacts of the development of the wind farm on the geology, hydrogeology and slope stability are:

- The excavation and removal of soil and rock and interference with any existing site drainage is a potential direct permanent effect that, without mitigation, could alter the existing hydrogeological balance of the site;
- The construction of the turbines, hardstanding areas, access tracks, and cable trenches has the potential to cause hydrogeological impacts by modifying the natural groundwater levels adjacent to the excavation. This in turn may deprive ditches and streams of their natural supply of water which may lead to reduced base flow and recharge to the bedrock aquifer;
- Areas which are underlain by peat deposits are susceptible to slope stability issues, including peat slides and bursts, when changes are made to topography, hydrogeology and hydrology of the site;
- The use of granular fill and other materials for the construction of the access tracks has the potential to have a permanent impact on the source quarries or borrow pits;
- Excavations have the potential to increase erosion and sediment release that could also have additional impacts on water quality due to sedimentation of water courses;
- Soil compaction may occur due to movement of construction and maintenance traffic;
- Removal of sub soils may result in the exposure of the underlying rock to sources of contamination and may increase the vulnerability of the aquifer, whether or not the rock is exposed;
- Chemical pollution may occur as a result of an accidental spillage or leakage of chemicals, runoff from vehicle washing facilities, unset concrete, storage of fuels or refuelling activities, etc. Chemical pollutants may enter the groundwater and have implications for ecology and any wells in the area, particularly those located down-gradient of the site;
- Sanitary waste arising from temporary construction compounds could lead to contamination of groundwater.

At the sub-station, the potential impacts are the pollution of groundwater from an oil or fuel spillage during construction. The sub-station and the construction compound will have staff welfare facilities. As the site is relatively flat, it is envisaged slope stability issues including peat slides and burst would typically not be an issue.



## 4.13 Environmental Aspect: Water Quality and Hydrology

### 4.13.1 Aspects to be Addressed

The assessment will address impacts on hydrology and water quality. The aspects of the hydrological environment that could be affected by the activities associated with the proposed development will also be addressed.

### 4.13.2 Assessment Methodology

The emerging design layout will consider the sensitivities of the environmentally designated areas in the proximity of the site. A preliminary site visit will be undertaken to establish the constraints relating to hydrology and noting any hydrological features.

The desk study will involve setting out the principles for surface water management, attenuation and treatment for the site specific land use at the site. Once the design layout is fixed, a further site visit will be scheduled in to undertake a walkover of the site, to identify all the streams crossed by the proposed layout and examine how overland flow will be accommodated and to identify suitable locations for the treatment of discharges.

Cumulative impacts will be addressed to assess the hydrological impact of neighbouring sites. Taking account of the sensitivity of the receiving environment, the treatment of the surface water run-off will concentrate on Silt Protection Controls (SPCs). Measures will also be considered to avoid any increase in flooding downstream.

The methodology will include the following:

- Study of existing surface water/drainage features in the vicinity;
- Study of development plans;
- Study of the sections of forestry, examining details of planting and existing forestry drainage systems;
- Study of planning documents for adjacent developments;
- Catchment mapping and delineation of catchment boundaries;
- Establish constraints;
- Examine grid connection route options;
- Assessment of the turbine delivery route (TDR);
- Liaison with in-house Geotechnical department for details on soil conditions on the site;
- Consult with interested bodies, Inland Fisheries Ireland and relevant Local Authorities;
- Existing Water Quality assessment;
- Forestry felling assessment relevant to hydrology and water quality;
- Site drainage investigation will involve identification of drainage sub-catchments, studying the requirement(s) of cross-drainage works, if any, exploring the infiltration potential of the soils in the area, etc.;
- Design of site appropriate erosion and sediment control measures, development of erosion and sediment control procedures for implementation on site;



- Preparation of Flood Risk Assessment in accordance with The Planning System and Flood Risk Management Guidelines for Planning Authorities, DoEHLG and OPW, November 2009, including a cumulative assessment with adjacent developments and Surface Water Management Plan in accordance with Greater Dublin Strategic Drainage Study (GSDSDS) and the CIRIA SuDS Manual (C753) including the design of stream crossings;
- History of flooding and status of drainage in the neighbourhood;
- Design of site specific surface water drainage system and drainage infrastructure – to control flow of surface water on site during construction, Sustainable Drainage Systems (SuDs);
- Potential impacts of the proposed development on hydrology and water quality;
- Outline of mitigation measures for flooding and pollution of receiving waters;
- Outline of residual impacts.

#### 4.13.3 Potential Impacts

The main potential impact from the construction of the wind farm development is the potential sedimentation of watercourses. Rainfall runoff containing silt could potentially lead to siltation and consequent physical effects on flora and fauna in aquatic habitats.

Sediment has the potential to arise from:

- Temporary spoil heaps from the excavations for the turbine bases; if left exposed, the spoil heaps could lead to an increase in silt-laden run-off draining off site.
- Haulage roads passing close to watercourses could allow the migration of silt-laden run-off into watercourses (crushable stone in site access roads could lead to heavy vehicles creating fines in the stone with a subsequent loss of sediment in the surface water run-off).
- Construction of new bridges, culverts and roads
- Silt carried on the wheels of vehicles leaving the site could be carried onto the public road.
- Tree felling could lead to an increase in sediment in the surface water run-off.
- While the cable trench is open adjacent to a watercourse and at stream crossings, this could lead to an increase in the concentration of suspended solids in the watercourse.

In addition, possible impacts on water quality during construction activity include:

- Concrete operations could contaminate receiving waters.
- Runoff from vehicle washing facilities could lead to contamination of receiving waters.
- Refuelling activities could result in fuel spillages.
- At the temporary compound, the potential impacts are the pollution of surface water from an oil or fuel spillage during construction.

The potential impacts on hydrology and drainage that may arise from the proposed development of the wind farm site include impacts on localised flooding patterns and downstream structures as well as cumulative hydrological impacts with neighbouring developments.



During the operational phase of the wind farm, potential impacts on water quality will primarily arise from the use of lubricants, coolants and hydrocarbons in the operations of the turbine transformers as well as routine maintenance of all plant and equipment.

## 4.14 Environmental Aspect: Archaeological, Architectural and Cultural Heritage

### 4.14.1 Aspects to be Addressed

The assessment will address features and sites of archaeological, architectural and cultural heritage significance. The purpose of the study will be to assess the significance of the receiving cultural heritage environment and to identify and evaluate the magnitude of the impact of the proposed development on the sensitivity of each cultural heritage feature within this environment and on the broader historic character of the landscape. Measures will be proposed to mitigate effects (where possible) so as to allow a fully informed decision to be made by the adjudicating authority.

### 4.14.2 Assessment Methodology

The content of the cultural heritage assessment will be based on current EPA guidelines and relevant national and international best practice guidelines. The assessment will identify the recorded and potential elements of the cultural heritage resource (including archaeology, built heritage, history and folklore) within a study area encompassing the proposed development areas, grid connection, borrow pits and site access routes.

The EIAR assessment will also include an assessment of any surviving vernacular structures within the site, such as the remains of farm buildings and other structures/features. While not designated as Protected Structures or included in the NIAH, these may form elements of the local cultural heritage resource worthy of preservation by record or preservation in situ.

It is envisioned that site surveys will be undertaken following an initial programme of desk-based research and once a preliminary outline for the proposed development layout has been made available. The design team will be promptly informed of the location, nature and extent of any cultural heritage features of significance identified during the site survey and will be consulted in relation to assessment of potential impacts and detailed design responses.

### 4.14.3 Potential Impacts

The predicted impacts of the proposed scheme on either the recorded and potential elements of the cultural heritage resource within and around proposed development areas will be identified and clearly defined based on EPA criteria. The assessment will also address cumulative impacts and potential inter-visibility and sensitivity analyses of cultural heritage sites within the surrounding landscape.

Appropriate mitigation measures to minimise impacts on the cultural heritage resource will be formulated where required following consultation with both the client and the relevant local and national authorities. These may involve (1) the preservation in situ of identified sites within protected buffer zones and (2) undertaking pre-development site investigations and/or the supervision of ground works during the construction phase. While details on any required mitigation measures will await assessment, it is envisioned that potential impacts will be subject to constant assessment as the design and consultation process progresses.



As statutory consultees the National Monuments Service (NMS) (via the Development Applications Unit) and Cork County Council (CCC) will be consulted in relation to required mitigation measures as part of the formal EIAR consultation process.

## 4.15 Environmental Aspect: Aviation and Telecommunications

### 4.15.1 Aspects to be Addressed

An evaluation of the possible effects that the proposed windfarm could have on aviation and existing telecommunications networks will be conducted. A study will be undertaken to analyse the impact of the turbines on telecommunications operator's point-to-point microwave radio links. This evaluation will include the generation of GIS based telecommunications constraints mapping for the areas affected.

The purpose of this mapping is to identify potential negative impacts on the telecommunications network and facilitate the selection of optimum sites and turbine locations by avoiding telecommunication links where possible, and thereby limiting any potential negative impacts on service providers in the area.

### 4.15.2 Assessment Methodology

The proposed assessment methodology will include:

- Consultation with Irish Aviation Authority, Commission for the Regulation of Utilities, and emergency services.
- Consultation with telecommunications operators to gather the necessary data.
- Preparation of constraint mapping.
- Analyses of the impact of the turbines on telecommunications operators' point-to-point microwave radio links and apply appropriate buffer distances around links and masts where required.
- Discussions with telecommunications operators identifying potential clashes. Operators to provide feedback on initial assessment and to provide information on the importance of the links identified.
- Further specialist investigations will be carried out if the telecommunications operators identify potential impacts.

Where necessary, mitigation measures to be agreed with operators including:

- Turbine relocation.
- Telecommunications link relocation.
- Underground fibre optic cables to replace microwave link.
- Submission of final detailed layout to telecoms operators.
- Agree any layout alterations following final detailed assessment by telecoms operators, or agree suitable mitigation measures if necessary.

Impacts on aviation will be addressed following detailed discussions with the Irish Aviation Authority.



### 4.15.3 Potential Impacts

An evaluation of the possible effects that the proposed development could have on aviation and existing telecommunications networks will be conducted. A study will be undertaken to analyse the impact of the turbines on telecommunications operator's point-to-point microwave radio links. This evaluation will include the generation of GIS based telecommunications constraints mapping for the areas affected.

The purpose of this mapping is to identify potential negative impacts on the telecommunications network, and facilitate the selection of optimum sites and turbine locations by avoiding telecommunication links where possible, and thereby limiting any potential negative impacts on service providers in the area.

The Irish Wind Energy Association 2012 guidelines, "Best Practice Guidelines for the Irish Wind Energy Industry", indicate that wind turbines within 20 km of a radio navigation aid have the potential to cause electro-magnetic interference with these signals. It is possible that houses in the immediate vicinity of the turbines could require some remedial measures in relation to television reception. In practice, such measures are not difficult to implement, are relatively inexpensive and if necessary, will be undertaken by the developer in conjunction with RTÉ.

## **4.16 Environmental Aspect: Landscape and Visual Impact**

### 4.16.1 Aspects to be Addressed

The landscape and visual assessment report will appraise the existing landscape character of the site and its wider setting in order to assess the likely landscape, visual and residential amenity impacts arising from the proposed development. Aspects to be addressed in the report entail the following:

- Receiving environment, covering details on:
  - Wider landscape context
  - Localized site context
  - Landform, landcover, land use patterns and trends
  - Key/unique landscape elements and features
  - Defining attributes of the wider landscape
- Landscape character, covering details on:
  - Character as outlined in CDP
  - Associated landscape values
  - Sensitivity levels within the landscape
  - Statutory designations
  - Landscape designations
  - Scenic/amenity routes
  - Views and prospect
  - Features of natural and built heritage



- Landscape Policy Context
  - Relevant policy objectives within Cork CDP
  - Relevant policy objectives within neighbouring counties within a prescribed study area
- Visual context
  - Zone of Theoretical Visibility
  - Viewshed Reference Points
  - Route Screening Assessment

Assessment of these aspects will ultimately inform potential landscape, visual and amenity aspects, residual impacts, and in turn appropriate mitigation measures to ensure impacts are not significant.

#### 4.16.2 Assessment Methodology

##### *Baseline Studies*

Baseline studies will involve a comprehensive review of the Cork County Development Plan, policy documents and map data. In terms of the landscape baseline, this will principally focus on the Cork County Landscape Character Assessment, which will be used as the basis for a project specific LCA. Visual baseline studies will focus on designated scenic views, settlements, transport routes and amenity areas / walking routes. An online and literature review of the area will also be undertaken in order to identify important tourist and amenity features within the area. This will include the provision of the likes of way-marked walking trails and tourist facilities.

##### *Constraints Studies*

Early stage constraints and feasibility studies for wind energy project are one of Macro Works' Specialties. For both constraints studies it is proposed to prepare comparative ZTV maps to investigate differences in the quantum of visual exposure for each option and whether this brings key sensitive receptor locations into play compared to other options. Though slightly less relevant to the turbine type options than the scheme layout options, wireframe images will be prepared from approximately five important receptor locations where base photography will have already been captured. Non-rendered (coloured) versions of the turbines will be used to examine the potential visual impacts of each of the options taking into consideration both 'visual presence' (prominence) and 'aesthetic impacts' (visual irritation, clutter, scale confusion, harmony / disharmony etc.). Concise and graphics-led constraints report/s will summarise findings of the studies and make recommendations regarding optimal turbine types and layouts from and LVIA perspective.

##### *Photomontages*

Photomontages are the cornerstone of the LVIA process and not all photomontages are created equal. Macro Works produce industry-leading photomontages that are fully compliant with the most recent SNH guidelines (2014). Macro Works staff also attended the practitioners' workshop for these guidelines in Edinburgh, October 2014. Furthermore, our terrain and turbine modelling techniques ensure that we surpass the graphic quality required by the guidelines. Our turbine models have been found to be extremely accurate in terms of positioning and dimensions when verified in the field against their constructed counterparts.

We consider that the number of photomontages required to complete a robust LVIA in this instance will be at least 20. It is imperative that baseline photography is captured in the clearest of viewing conditions, especially where existing turbines may be contained within the view.



### *Assessment and Reporting*

In accordance with the Guidelines for Landscape and Visual Impact Assessment (GLVIA-2013), which is the industry standard, Macro Works will provide a separate appraisal of landscape impacts and visual impacts. We also recognise that, more than any other chapter, the Landscape and Visual Chapter needs to be supported by a wealth of in-text maps, graphics and images to aid the understanding of the reviewer. Where a project such as this requires the assessment of a considerable number of viewpoints, Macro Works provide the individual assessments as a separate appendix in order that the EIAR Chapter does not become unwieldy and remains focused on the key findings of the appraisal.

Cumulative impacts will be assessed in accordance with the SNH guidance note for 'Assessing the cumulative impact of onshore wind energy developments' (2012) taking account of 'Combined Views' 'Succession Views' and 'Sequential Views'. Macro Works use our own on-line viewer (see detailed description below) to compare 360° photography against corresponding 360° cumulative Wireframe images to aid the cumulative impact assessment.

#### 4.16.3 Potential Impacts

In the European Landscape Convention, landscape is defined as 'an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors'. The term "landscape" is thus defined as a zone or area as perceived by local people or visitors, whose visual features and character is the result of the action of natural and/or cultural factors. Recognition is given to the fact that landscapes evolve through time and are the result natural and human activities.

A Landscape and Visual Impact Assessment has two separate but closely related aspects. The first is visual impact, i.e. the extent to which the wind turbines in the landscape can be seen. The second is landscape character impact, i.e. effects of the wind turbines on the fabric or structure of the landscape as perceived by people. Landscape character is derived from the appearance of the land, and takes account of natural and man-made features such as topography, landform, vegetation, land use and built environment and their interaction to create specific patterns that are distinctive to particular localities.

The proposed wind turbines will be large structures with the potential to have significant landscape and visual impacts. The development of wind farms, including associated infrastructure such as tracks and ancillary buildings, may have a major impact on the surrounding landscape.

Key to the development of the project will be the need for clear communication of the scale and extent of the proposed project.

Clear and concise mapping of the existing areas of landscape and visual sensitivity together with photomontages of the proposed wind turbines will be essential in demonstrating the nature and extent of the development.

Zone of Theoretical Visibility Mapping (ZTVs) will be prepared based on the Department of the Environment, Heritage and Local Government's 'Wind Farm Planning Guidelines'. The ZTVs will illustrate the study area extending to defined area around the site and highlight the areas where the proposed turbines will theoretically be visible from, as well as the cumulative visual impact arising from other wind farms in the area. These ZTVs do not take into consideration vegetation cover, changing weather conditions or the mitigating effect of distance and therefore illustrate the worst-case scenario of visibility.

Estimation of the visual impact of the proposed scheme on the landscape will be based on the visual presence of the turbines, their aesthetic impact the landscape context and the significance of the impact.



The assessment will examine potential landscape and visual impact of the turbines on designated landscape, properties, roads, recreation and tourism areas, including:

- Direct effects on landscape features, views, routes and areas described in the County Development Plan and Landscape Character Assessment. The review of the landscape setting will account for a study area from the site boundary. Assessments of and objectives for landscape character are looked at in the development plan for these counties to ensure a consistent and integrated appraisal of the area within the study area.
- Potential changes to landscape and townscape character referring to County landscape character assessments noting subtle effects that contribute to the experience of more intangible landscape characteristics. Landscape types, significance/value, sensitivity and capacity for change will be examined.
- Effects on designated landscapes, views, conservation sites and other special areas of interest.
- Effects during construction and decommissioning.

Viewshed reference points (VRP) from the surrounding landscape will be identified from the desktop studies outlined above and will be verified on site. Photomontages from these viewshed reference points will be prepared for the proposed wind turbines, together with a wireframe and photomontage views of the other planned/permitted wind turbines in the landscape, to assist in demonstrating the levels of visual impact.



## 5. CUMULATIVE IMPACTS, INDIRECT IMPACTS AND INTERACTION OF EFFECTS

### 5.1 Aspects to be Addressed

The cumulative impact of the proposed development with other projects which are either existing, permitted or pending planning permission, or for which there is information in the public domain, at a sufficient level of detail to allow assessment, will be addressed. Indirect effects and effects in different environmental media will be addressed. The cumulative effects from the construction of the wind turbines, cabling and haul route alterations will also be assessed.

### 5.2 Cumulative Assessment Methodology

The assessment methodology will be based on the EPA guidance and the EU guidelines, 'Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions', published by the Office for Official Publications of the European Communities in May 1999. As part of scoping the studies required to assess the impacts of the proposed development in the different environmental media, the potential for significant cumulative and indirect impacts and interactions will be examined and any such potential impacts will be identified. Where the potential for significant cumulative and indirect impacts and interactions is identified, such impacts and interaction of impacts will be included in the scope and addressed in the baseline and impact assessment studies for each of the relevant environmental media and aspects of the project. The cumulative and indirect impacts and interaction of impacts will be presented in the chapters of the EIAR which address the most relevant environmental media. The matrix and expert opinion approaches, as outlined in the EU Guidelines, will be used in the identification of the potential for significant cumulative and indirect impacts and interactions. A matrix of potential interactions will be prepared.

#### 5.2.1 Potential Impacts

If other projects of a similar scale and type are under construction at the same time as proposed development, there would be a cumulative increased demand for construction materials and skills, and there would be potential for increased construction traffic, dust and noise. The proposed development has the potential to reduce Ireland's reliance on fossil fuel power generation and assist in it meeting its EU targets for renewable energy generation. Once operational, the cumulative effects with other wind farms and solar farms in area will be a positive one due to the replacement of fossil fuel energy production with clean, green energy.







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