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CASTLEBANNY WIND FARM, CO. KILKENNY
ENVIRONMENTAL IMPACT ASSESSMENT

SCOPING REPORT

CASTLEBANNY WIND FARM

EIA SCOPING REPORT

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TOBIN Consulting Engineers

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1.0 INTRODUCTION

Coillte and ART Generation (hereafter referred to as the Developer) intend to develop Castlebanny Wind Farm, near Mullinavat, County Kilkenny and have commenced the process of Environmental Impact Assessment. It is proposed that the Castlebanny Wind Farm will be built within a site that extends to 1600 hectares (ha) of which 1200ha are commercial forest, owned by Coillte. The remaining 400 ha which is third party property, is comprised of a mix of agricultural grasslands and arable crops with 100 ha planted in commercial forest since 1996. The site location and current site redline boundary are shown in Figure 1.1. below.

It is currently proposed that 21 wind turbines will be located across the proposed wind farm site.

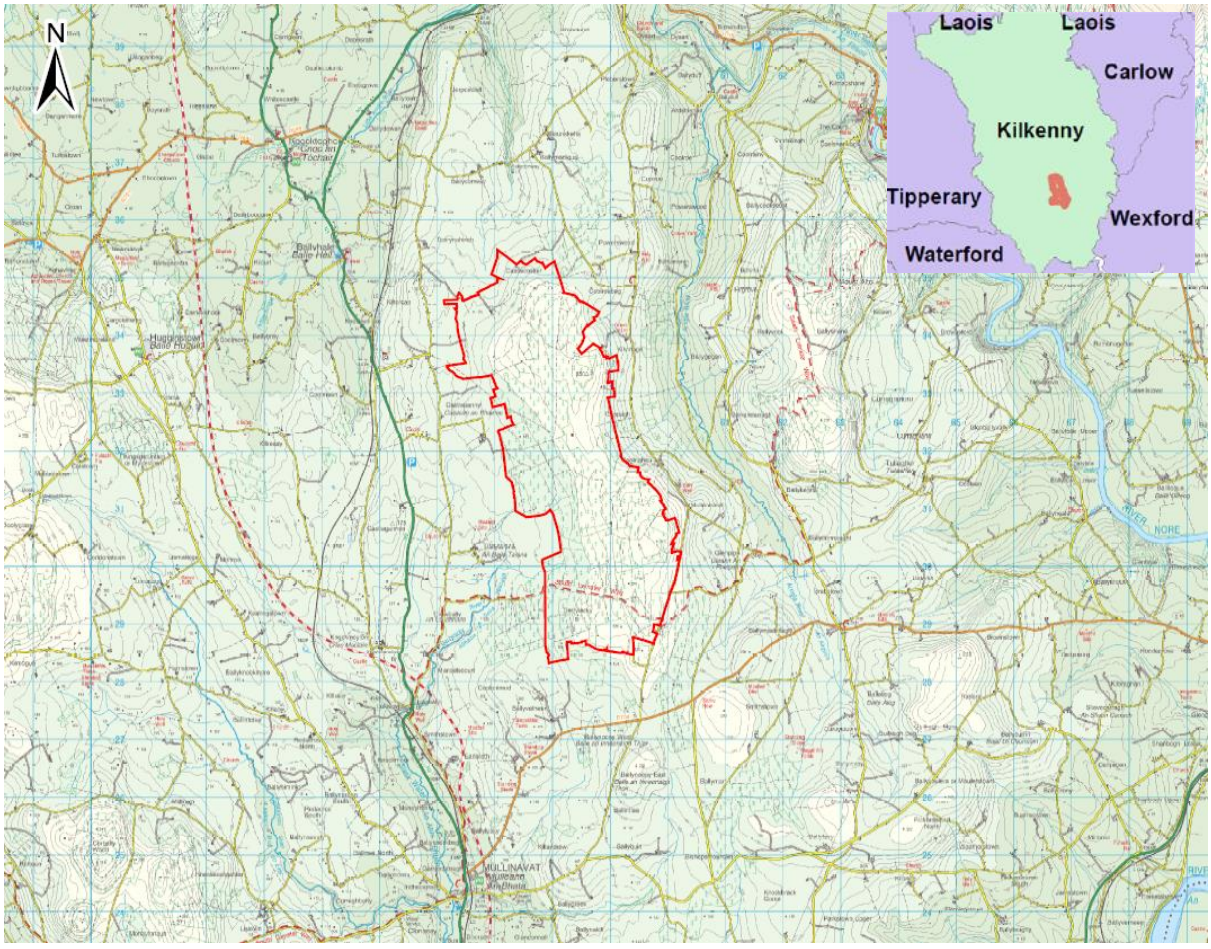


Figure 1.1 – Site Location Map

Note: The site redline boundary shown in Figure 1.1 is indicative only and is subject to change.

1.1 THE NEED FOR ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

The Developer and TOBIN Consulting Engineers (hereafter referred to as TOBIN) consider that the proposed development of the Castlebanny Wind Farm has the potential, prior to design mitigation and other mitigation, to have significant effects on the environment, due to the potential size, scale and location of the proposed development. The proposed development also exceeds the thresholds for completion of an Environmental Impact Assessment (EIA), as detailed in the Planning and Development Regulations 2001 (as amended), Schedule 5, Part 2, Class 3(j). As such, it is not proposed to provide a report on the screening requirement for an EIA but to proceed on the basis of considering the potential effects of the wind farm development through the process of Environmental Impact Assessment. The Developer proposes to accompany the Planning Application for the wind farm with an Environmental Impact Assessment Report.

The European Commission's, "*Guidance on EIA Scoping*" (EU 2001) notes the following in Part A of the guidance,

> "*EIA is a procedure required under the terms of European Union Directives 85/337/EEC and 97/11/EC on assessment of the effects of certain public and private projects on the environment. Article 2 of the Directive requires that*
>
> > "*Member States shall adopt all measures necessary to ensure that, before consent is given, projects likely to have significant effects on the environment by virtue, inter alia, of their nature, size or location are made subject to a requirement for development consent and an assessment with regard to their effects.*"

Article 8 then requires that

> *"The results of consultations and information gathered pursuant to (the EIA procedure) must be taken into consideration in the development consent procedure".*

In terms of legislative context, it is considered that the proposed development of Castlebanny Wind Farm is subject to the requirements set out in the provisions of Part X of the Planning and Development Act 2000 (as amended by the Planning and Development (Amendment) Act 2010 (30/2010), s. 54, (S.I. No. 405 of 2010), the European Union (Environmental Impact Assessment) (Planning and Development) Regulations 2014 (S.I. No. 543 of 2014) Reg. 2, the European Union (Environmental Impact Assessment and Habitats) Regulations 2011 (S.I. No. 473 of 2011) Reg. 6, the European Union (Environmental Impact Assessment) (Planning and Development Act,

2000) Regulations 2012 (S.I. No. 419 of 2012) Reg. 2(c), the European Communities (Environmental Impact Assessment) (Amendment) Regulations 2006 (S.I. No. 659 of 2006) Regs. 2 and 4, and the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018).

1.2 PURPOSE OF EIA SCOPING

The purpose of the scoping for the Environmental Impact Assessment is to provide a framework for the approach to be taken for the individual specialists evaluations, to identify environmental topics for which potential significant environmental impacts may arise, to provide a framework for the consultation process to take place with prescribed Statutory Bodies as part of the environmental assessment work, and as such, a structure for the preparation of the Environmental Impact Statement Report to be prepared and the information required to be included therein.

The European Commission's, "*Guidance on EIA Scoping*" (EU 2001) notes the following in Part B of the guidance, as being the benefits of scoping:

- *"It helps ensure that the environmental information used for decision making provides a comprehensive picture of the important effects of the project, including issues of particular concern to affected groups and individuals;*
- *It helps focus resources on the important issues for decision-making and avoids wasted effort on issues of little relevance;*
- *It helps ensure that the environmental information provides a balanced view and is not burdened with irrelevant information;*
- *It stimulates early consultation between the developer and the competent authority, and with environmental authorities, other interested parties and the public, about the project and its environmental impacts;*
- *It helps effective planning, management and resourcing of the environmental studies;*
- *It should identify alternatives to the proposed project and mitigating measures which ought to be considered by the developer;*
- *It can identify other legislation or regulatory controls which may be relevant to the project and provide opportunities for the necessary assessment work for different control systems to be undertaken in parallel, thereby avoiding duplication of effort and costs for all concerned;*
- *It reduces the risk of delays caused by requests for further information after*

submission of the development consent application and the environmental information; and

- *It reduces the risk of disagreement about impact assessment methods (baseline surveys, predictive methods and evaluation criteria) after submission of the environmental information.*

Due to the size of the proposed Castlebanny site and it's potential to accommodate an estimated number of approximately 21 no. wind turbines, the project has been initially directed into the pre-planning consultation phase with An Bord Pleanála utilising the Strategic Infrastructure Development (SID) process.

1.3 COILLTE

Coillte, one of Ireland's largest semi-state companies with a history in forestry development, has expanded in recent years to include three high potential businesses including Forestry, Land Solutions and MEDITE SMARTPLY.

Within the "Land Solutions" business, Coillte partner, develop and add value where Coillte lands are suited to activity other than forestry, e.g. Renewable Energy projects, and they provide potential partners and clients with expertise in areas such as project management, planning and development, construction, land sales, legal, finance, community engagement procurement and communications.

Renewable Energy: Wind Farms

If Ireland is going to meet its binding national commitments on combatting climate change and de-carbonising the economy, we must develop successful renewable energy projects. Coillte has been at the forefront of this effort and intends to continue to be so through partnership in projects and by continuing to make suitable lands available.

High quality wind farms have been built on Coillte lands and, as Ireland continues to promote new sectors such as solar, storage and biomass, Land Solutions will ensure that Coillte continues to be a key contributor to the re-shaping of Ireland's renewable energy supply landscape.

Coillte has been a supporter of wind energy since the earliest days of the sector in Ireland in the 1990s. Of the approximately 3GW of wind farms now in operation here, nearly one-third are located on Coillte lands. They range from the Galway Wind Park, the biggest wind farm in Ireland, to small scale sites such as Cranemore 0.5MW.

Figure 1.2 – Example Photo of Operational Wind Turbines at Sliabh Bawn Wind Farm in Co. Roscommon (Source: Coillte)

Figure 1.3 – Example Photo of Operational Wind Turbines at Sliabh Bawn Wind Farm in Co. Roscommon (Source: Coillte)

The majority of these wind farms are operated by third party developers but, in recent years, Coillte's strategy has been to lead the development process and also take responsibility for bringing wind farms into construction and operation.

Coillte's experienced development team is committed to working with leading sectoral experts to deliver best-in-class projects. Coillte are also deeply committed to open and transparent consultation with local communities and other stakeholders about both existing and prospective projects.

Social Responsibility

Commitment

Coillte's commitment to communities which they are close to, or which might be interested in their operations, is that they will always include them in the relevant consultation processes. Coillte's forestry plans are always available online and they have developed a bespoke wind farm Community Engagement process for communities close to their wind farms to ensure that they are appropriately involved and can share the benefits of these projects.

Coillte believe that living in the locality of a Coillte Wind Farm should be a positive experience not only from a sustainable energy perspective but also from a local development perspective.

Coillte therefore develop a bespoke wind farm Community Benefit Scheme for communities close to their wind farms that run for the lifetime of the wind farm. The design of the scheme is unique to each project and this design is driven by the community that administer and avail of it.

Consultation

Coillte has a long history of working with communities and our experience around the country has generated an inherent understanding that each community and receiving environment with which we interact is unique.

When developing our projects, we aspire to work with the communities surrounding our projects and wish to be good neighbours and to build a healthy relationship based on trust and respect. Community engagement should be undertaken in an appropriate manner with the communities in the environs of the development, at all stages of the project lifecycle, from Development, Construction through to Operations.

The intention of our engagement process is to:

- ensure that all persons living and working in the environs of our developments are kept informed of ongoing and proposed works throughout the project lifecycle.
- maintain a proactive flow of accurate messaging from Coillte, in order to avoid misinformation circulating.

- be transparent in order to contribute towards building respect and trust as a good neighbour in the long term.
- develop an understanding of the communities surrounding our projects and determine if there are community needs and/or requirements that will be addressed by a future Community Benefit Scheme.
- be visible and accessible to the community and stakeholders to find out about project updates and the Community Benefit Scheme.
- ensure communications and public/stakeholder engagement at all stages of the project lifecycle from Development and Construction through to Operations.

1.4 ART GENERATION

ART Generation is a wholly Irish owned renewable energy company based in Ireland. It is a well-established energy development company with responsibility for managing the development, construction and operation of projects throughout Ireland including Foyle Windfarm in Co. Kilkenny. ART Generation most recently developed three wind farms in the counties of Kilkenny and Tipperary.

1.5 EIA TEAM

TOBIN has been engaged by the Developer to coordinate the Environmental Impact Assessment and prepare the EIAR for the proposed development. The relevant specialists included in the Study Team, who are both experienced and competent in their areas of expertise, are noted here:

- TOBIN staff will provide expertise in relation to Project Direction, Project Management, EIAR Production and expertise in relation to the environmental evaluation of the following topics: Planning, Reasonable Alternatives, Land, Soils & Geology, Hydrology & Hydrogeology, Flood Risk Assessment, Traffic, Population and Human Health, Shadow Flicker, Telecommunications & Aviation Assessment and Air Quality & Climate Impact Assessment;
- Ciaran Reilly – Geology & Slope Stability Assessment;
- Ground Investigations Ireland – Geotechnical Site Investigation;
- Blackthorn Ecology – Biodiversity and Ornithology;
- Macro Works – Landscape & Visual Impact Consultants & Production of Photomontages;
- AWN Consultants – Noise & Vibration;
- TLI Group – Substation and Grid Connection Design;

- Western Forestry Co-Op - Forestry; and
- Moore Group – Cultural Heritage.

1.6 SCOPING REPORT STRUCTURE

Individual specialists will undertake their evaluations of the environment and the proposed development, including evaluation under following topics:

- Reasonable Alternatives
- Policy, Planning and Development Context
- Population and Human Health
- Biodiversity
- Land, Soils and Geology
- Hydrology and Hydrogeology
- Air Quality and Climate Assessment
- Material Assets: Shadow Flicker
- Material Assets: Aviation, Telecommunications and EMF
- Noise and Vibration
- Landscape and Visual Impact Assessment
- Forestry
- Cultural Heritage
- Traffic and Transport
- Interaction of the Foregoing
- Schedule of Mitigation Measures.

Initial Constraints

Initial constraints work has begun in relation to mapping of known constraints including planning designations/preferred wind energy development areas as per the current Kilkenny County Development Plan, ground truthing of sensitive receptors, proximity of residential/sensitive receptors, known and mapped archaeological constraints, existing ecological data available for the site location, landscape character areas and telecommunications and aviation constraints.

The South Leinster Way, a significant walking trail totalling 104km in length and running from Kildavin in Co. Carlow to Carrick-on-Suir in Co. Waterford, traverses the southern part of the site. This is expected to be a sensitive receptor and will be considered as part of the environmental assessment.

1.7 PROJECT DESCRIPTION

The proposed development will comprise the installation of c. 21 no. wind turbines at the site including all associated infrastructure.

Castlebanny Wind Farm is located in south-east Kilkenny approximately 2.2 km south-east of Ballyhale, 4.5 km north-east of Mullinavat and 5.8 km south-west of Inistioge. The total land parcel is approximately 1600 ha and the site is predominantly covered in active Coniferous forestry plantation areas. The Arrigle River runs south-north to the east of the site area and the Derrylacky River runs to the west of the site.

1.8 SITE LOCATION

The proposed site which extends to c. 1600 hectares (ha), of which 1200 ha are currently commercial forest owned by Coillte, is in the southern portion of County Kilkenny between the villages of Thomastown to the north, Ballyhale to the northwest, Inistioge to the northeast and Mullinavat to the southwest. The site measures some c.7km from north to south and ranges from c.1.75km wide to c. 3km wide at its widest point. The remaining 400 ha are largely third-party lands and comprise a mix of agricultural grassland, arable crops and forestry. Coillte forestry within the site comprises different stages of coniferous plantation forestry including recent clear-fell, second rotation, immature, semi-mature and mature forestry. Species planted include Sitka Spruce with some Noble Fir and Douglas Fir throughout and a small area of Lodgepole Pine on the western side of the site.

The topography of the site can generally be described as gently sloping, rising from c.130 OD in the east and 120 OD in the west to a high point of 250 OD in the north and 265 OD in the south. The site is bounded by the R704 to the south and local roads to the east, north and west while the South Leinster Way traverses the southern part of the site. The Arrigle River (which form part of the River Barrow And River Nore Special Area of Conservation) runs south-north near the eastern boundary of the site. Several tributaries of the Arrigle and the Derrylacky River encroach on the periphery of the site.

In general terms, the area surrounding the site can be described as rural with dispersed settlement type. There are two commissioned wind farms located south/southeast of the site namely; Ballymartin Windfarm and Rahora Windfarm.

In general, the majority of residential properties identified in the area of the proposed wind farm are located outside the site boundary. The impact of the location of wind turbines in terms of required setback distances has been considered at the design stage and following the completion of a ground-truthing exercise. All properties identified as being potential sensitive receptors are located at a minimum of 750m from the current proposed turbine locations.

1.9 THE PROPOSED DEVELOPMENT

1.9.1 INTERNAL ACCESS ROUTE AND TURBINE LOCATIONS

The exact number, siting and scheme layout for the turbines will be decided as part of the design and EIA process.

In addition, the internal access route layout, access route types and construction methodologies will be designed and the location of the proposed entrance to the wind farm site will be confirmed. The initial layout design will be developed by the design team in the first quarter of 2020 and assessment of potential access points through which turbine components and construction related deliveries may be made will commence at that stage.

1.9.2 WIND TURBINE SPECIFICATIONS

The exact rating and design of the proposed turbine, subject to completion of the statutory processes, will be subject to a competitive tender and will be detailed by the turbine manufacturer on award of the contract. However, the proposed turbines will be the typical three bladed, horizontal axis type.

Details of the maximum hub height, maximum rotor diameter, maximum tip height and the overall proposed capacity will be decided in the design and EIA process. The initial wind turbine specifications are based on a maximum tip height of 185 m and a maximum rotor diameter of 150 m. The potential installed capacities for the wind turbines and the wind farm as a whole will be proposed as part of the design process. Based on turbines available at the scale initially considered, the output from the wind farm would be in the region of 110 MW.

1.9.3 ELECTRICAL/MECHANICAL EQUIPMENT

The main mechanical and electrical components associated with the development include the following:

- Turbine components (tower sections, nacelle, hub, rotor blades);

- 110kV on-site Substation;
- Electrical cable;
- SCADA cable; and
- Main and assist cranes.

It is noted that an existing 80m wind monitoring mast is in place within the boundary of the proposed development, at co-ordinates E258468 N132181.

1.9.4 FORESTRY OPERATIONS MANAGEMENT

The applicant and project team will ensure that the Forestry Operations division of Coillte are involved in the layout design and phasing of the proposed development works. In particular, the forestry consultant contributing to the EIAR will liaise with the Forestry Operations division of Coillte to confirm relevant details including details relating to forestry sections and sub-sections, tree species planted on site, tree planting dates, yield class, thinning and felling regimes and planned felling coupes and schedules.

1.9.5 GRID CONNECTION

Proposed connection point(s) and the method of connection to the grid will be evaluated as part of the design and EIA process. However, for the purposes of this Scoping Report, current grid connection proposals include a new 110kV on-site substation, which will be looped into the existing Great Island/Kilkenny 110kV overhead transmission line which runs north-south approximately 2.3km to the east of the site boundary.

1.9.6 DECOMMISSIONING

The proposed turbine will have a design lifetime of approximately 30 years without replacement of major components.. In certain circumstances, the developer may wish to replace turbines prior to the end of the design lifetime. Such a decision would be made on the merits of economic and technical factors at the time of assessment and undertaken in consultation with the local authorities.

Turbine design renders the decommissioning process as a straightforward process. In the decommissioning phase, cranes disassemble each turbine section and remove from the site. The upper sections of the foundations projecting above ground will be removed, and the remainder of the foundations will be covered by soils typical of the surrounding environment and then re-seeded or left to re-vegetate according to ecological requirements. Underground cables will be

cut back at the turbine termination points and will either be recycled or left buried in situ (de-energised). It is proposed that site routes would remain to allow access through the site either for further alternative development of the site, for ongoing forestry operations and/or for amenity purposes, as considered appropriate at the time.

Site materials will be recycled where practicable or disposed of in accordance with current waste legislation and best practice guidelines. Based on current commodity prices, principally steel and copper, material returns achieved through recycling may exceed current financial costs associated with site decommissioning.

Decommissioning activities are typically similar to construction activities, having similar type risks and sensitive receptors associated with them. The potential impacts of decommissioning activities will be assessed accordingly in the EIAR.

1.9.7 REHABILITATION/CONCURRENT OR FUTURE USE OF THE SITE

Castlebanny Wind Farm consists of a commercial forestry enterprise and the phased use of this site for the purpose of forestry operations will continue during the operation of the wind farm. Any areas of high biodiversity identified during the initial constraints study and the EIA site surveys will remain intact.

2.0 ENVIRONMENTAL IMPACT ASSESSMENT

2.1 PROJECT SUMMARY

At the stage of the submission of the planning application and EIAR, and arising out of the EIA process, the project description as per the application for planning approval will have been finalised.

In the case of a wind farm development, the final project proposal may have gone through a number of iterations during the EIA, including changes to design proposals, numbers of proposed turbines and turbine layouts.

It is proposed that the following EIA guidelines will be followed during the process:

- Guidelines on the Information to be contained in Environmental Impact Statements" (EPA, 2002);
- "Advice Notes on Current Practice in the Preparation of Environmental Impact Statements" (EPA, 2003);
- "Draft Guidelines on the Information to be contained in Environmental Impact Statements" (EPA, September 2015);
- "Draft Advice Notes on Preparing Environmental Impact Statements" (EPA, September 2015); and
- Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, August 2017).

In addition to the Regulations and Guidelines above, the Castlebanny Wind Farm EIAR will be prepared with cognisance to the "Wind Energy Development Guidelines for Planning Authorities (2006)", the proposed draft revisions to these guidelines (December 2013), the Preferred Draft Approach to these guidelines as announced by the Government in June 2017 and the "Draft Revised Wind Energy Development Guidelines (December 2019)".

An Appropriate Assessment (AA) and, potentially, a Natura Impact Statement (NIS) will be prepared for the proposed development. The purpose of the AA/NIS will be to inform An Bord Pleanála in its undertaking of an 'Appropriate Assessment' of the proposal, as required under Article 6(3) of the EU Habitats Directive (92/43/EC). This is an assessment of the potential for significant or adverse effects resulting from the project, both individually and in-combination with other activities, plans and projects, on European Site(s) as designated under the EU Habitats Directive and the conservation objectives for their qualifying species and habitats.

2.2 THE SCOPING PROCESS

This current report will form the basis for the scoping process to be undertaken by the applicant's consultants on behalf of the Developer, with the Planning Authority and the prescribed Statutory Bodies.

The scoping will allow statutory consultees to provide information, data or additional guidance from their governmental departments and will facilitate the iteration of the design and EIA process, to determine what the main potential significant effects might be and what sub-topics the EIAR should focus upon.

The project will be initially directed into the pre-planning consultation phase with An Bord Pleanála utilising the Strategic Infrastructure Development process. It is proposed that this Scoping Report will be used as a framework to facilitate statutory consultees to provide feedback into the EIA process.

2.3 BASELINE ASSESSMENT

Following an introduction to the EIAR, the following information will also be presented:

- Description of the Existing Environment – a detailed description of the existing environment to allow the baseline conditions at the development site to be understood and existing areas of sensitivity to be recorded (as per the EPA EIAR Guidelines).
- Description of the proposed development, including site layout and infrastructural details, construction procedures and the materials required, the operational and maintenance phases in addition to the decommissioning and rehabilitation phases.
- Consideration of Reasonable Alternatives – This provides a detailed assessment of alternatives considered in the selection of site location and site layout.

2.4 ASSESSMENT METHODOLOGY

In the case of each of the environmental topics, it is proposed that the following elements will be evaluated, and that the format of the EIAR will follow the standard methodology and be presented in accordance with the above-mentioned legislation and guidelines. Individual chapter topics are discussed further below in this section. The development is assessed and described within each environmental topic in terms of:

- **Introduction -** includes a background to the assessment and describes the study methodology employed in carrying out the assessment.

- **Existing Environment –** Describes and assesses the existing environment in the context of the relevant environmental categories. This section also takes account of any other proposed and existing developments in the vicinity.
- **Potential Effects** - Provides the description of the potential specific direct, indirect and cumulative effects, associated with the development. This is done with reference to the existing environment and characteristics of the proposed development, while also referring to the magnitude, duration, consequences and significance of the effect associated with the construction and operation and decommissioning of the development. This section also considers cumulative effects with other proposed or permitted developments.
- **Mitigation Measures** - A description of any remedial, or mitigation measures that are either practicable or reasonable having regard to the potential effects. It will also outline, where relevant, monitoring proposals to be carried out should consent be granted in order to demonstrate that the project in practice conforms to the predictions made.
- **Residual Impacts -** Provides the description and assessment of the predicted residual impact associated with the development on the surrounding environment.
- **Conclusion –** Provides a summary of the salient points of the assessment chapter.

2.5 ASSESSMENT OF EFFECTS

As stated in the "Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, August 2017), an assessment of the likely significant effects of a proposed development is a statutory requirement of the EIAR process. The criteria for the presentation of the characteristics of potential significant effects will be described with reference to the magnitude, spatial extent, nature, complexity, probability, duration, frequency, reversibility, cumulative effect and transboundary nature (if applicable) of the effect.

The classification and description of effects in the Castlebanny Wind Farm EIAR will follow the terms provided in Table 3.3 of the Draft EPA Guidelines (2017) referenced above (and duplicated in Table 2.1 below for information purposes).

According to the Guidelines, the relevant terms listed in the table below can be used to consistently describe specific effects, but all categories of terms do not need to be used for every effect.

The use of standardised terms for the classification of effects will ensure that the EIAR employs a systematic approach, which can be replicated across all disciplines covered in the EIAR. The consistent application of terminology throughout the EIAR will facilitate the assessment of the proposed development on the receiving environment.

Table 2.1: Descriptions of Effects (as per Table 3.3 of the August 2017 Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports).

Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Describing the Significance of Effects ''Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see *Determining Significance* below.).	**Imperceptible** An effect capable of measurement but without significant consequences.
	Not significant An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects

	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics
Describing the Extent and Context of Effects Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.	**Extent** Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)
Describing the Probability of Effects Descriptions of effects should establish how likely it is that the predicted effects will occur – so that the CA can take a view of the balance of risk over advantage when making a decision.	**Likely Effects** The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing the Duration and Frequency of Effects 'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	**Momentary Effects** Effects lasting from seconds to minutes
	Brief Effects Effects lasting less than a day
	Temporary Effects

	Effects lasting less than a year
	Short-term Effects Effects lasting one to seven years
	Medium-term Effects Effects lasting seven to fifteen years
	Long-term Effects Effects lasting fifteen to sixty years
	Permanent Effects Effects lasting over sixty years
	Reversible Effects Effects that can be undone, for example through remediation or restoration
	Frequency of Effects Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)

2.6 POTENTIAL MITIGATION

The strategies for identification of appropriate Mitigation Measures, as detailed in the EPA EIAR Draft Guidelines (2017), will be followed in the preparation of the Castlebanny Wind Farm EIAR.

There are four established strategies for effects mitigation - avoidance, prevention, reduction and remedy/offsetting. As noted above, following the iteration of the design and EIA process, and following implementation of any design mitigation, the description of any remedial, or mitigation measures that have been incorporated into the design will be included to offset or minimise identified potential adverse impacts.

In accordance with the guidelines, these measures can mitigate impacts:

- *By Avoidance*
  When no impact is caused (often through consideration of alternatives).
- *By Prevention*
  When a potential impact is prevented by a measure to avoid the possibility of the impact occurring.
- *By Reduction*
  When an impact is lessened.
- *By Remedy/Offsetting*
  When an adverse impact is resolved by a remedial action or balanced by a positive impact.

2.7 NON-TECHNICAL SUMMARY AND CONSTRUCTION ENVRIONMENTAL MANAGEMENT PLAN

The non-technical summary (NTS) provides an overview and summary of the main EIAR using non-technical language. It is a standalone document which presents a clear and concise summary of the existing environment, characteristics of the proposed development, a clear outline of the potential significant impacts/effects which could result from the proposed development and mitigation measures adopted into the design of the development to minimise impacts on the surrounding environment.

A standalone Construction Environmental Management Plan (CEMP) will also be prepared which will set out the details of proposed construction compounds, construction methodologies, environmental mitigation measures and proposed reinstatement measures. The CEMP will

incorporate the relevant construction phase mitigation measures which will have been integrated into the project, EIAR and AA.

3.0 REASONABLE ALTERNATIVES

As set out in the EIA Directive, the EIAR is required to provide a description of the reasonable alternatives studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

3.1 ALTERNATIVE SITES

In respect of consideration of alternative sites, the EIAR will set out the reasonable alternative sites available to the Developer which will include consideration of suitable land banks held in ownership by Coillte. Details on the assessments carried out to identify the proposed site location as appropriate for this project will be provided.

3.2 ALTERNATIVE DESIGN

In the context of alternative design (incorporating scale and size), this section of the EIAR will set out the processes and assessments that were followed to arrive at the proposed turbine layout, turbine envelope and infrastructure layout. This section will be informed by comprehensive site surveys and ground investigations.

3.3 ALTERNATIVE TECHNOLOGY/ ALTERNATIVE PROCESSES

The proposed wind farm development at Castlebanny will support European and National policy in decarbonising electricity generation and contribute to Ireland's target to generate 70% of the country's electricity from renewable sources by 2030. There are a number of different renewable energy technologies available on the market, however not all will be viable at the proposed development location. This section will consider the various renewable energy alternatives (such as solar) and will assess the alternative wind turbine technologies available.

4.0 POLICY, PLANNING AND DEVELOPMENT CONTEXT

The planning assessment will evaluate the planning history and the planning and development context of the proposed wind farm development.

The evaluation will include a review of relevant European, national and local planning policy documentation, planning legislation, strategies and plans and set the local context of the project. Also reviewed will be the Regional Spatial and Economic Strategy for the Region, County Development Plans, Wind Energy Strategies, the Preferred Emerging Wind Energy Guidelines and other appropriate renewable/wind energy development policies as they emerge.

The planning assessment will include a review of the relevant planning and wind energy development policies included in the Kilkenny County Development Plan and any emerging Development Plan. A full review of all renewable energy applications (wind and solar) local to the site will be carried out to identify potential technical and environmental cumulative impacts and to present a summary of the local renewable energy infrastructure.

Of note in relation to the project are the following governmental policies, guidelines and reports:

- The 2006 Wind Energy Development Guidelines;
- The Emerging Preferred Draft Approach to Wind Energy Guidelines, superseded by the Draft Revised Wind Energy Development Guidelines published in December 2019;
- The publication by the government of an Energy White Paper entitled, "Ireland's Transition to a Low Carbon Energy Future 2015-2030";
- The Climate Action Plan 2019;
- The Strategy for Renewable Energy 2012-2020;
- The "National Renewable Energy Action Plan-Ireland" (2010);
- National Mitigation Plan 2017;
- The National Planning Framework: Project 2040;
- The preparation of a 'Renewable Electricity Policy and Development Framework';
- Draft National Energy and Climate Plan 2021-2030; and
- The development of new Renewable Electricity support scheme.

As noted in Section 1 above, energy infrastructure already exists in the local area e.g. Ballymartin Wind Farm to the south and Rahora Wind Farm to the south east of the site. The Great Island to Kilkenny 110kV line is located a short distance from the site.

The site is currently identified in the Kilkenny County Development Plan – Wind Energy Strategy as 'Open for Consideration' for the development of wind energy.

5.0 POPULATION AND HUMAN HEALTH

5.1 INTRODUCTION

A review of the current census data will be completed. The existing local population will be described and the projected change in the population, if any, of the study area will be assessed. This section will address, in particular, the effects of the development on nuisance and residential amenities in the surrounding area. Any impacts on recreational activities as a result of the development will be discussed in this chapter. In addition, the positive economic impacts will be examined, as employment will be created during the construction an operational phase of this project. The project will also generate a community benefit fund and create investment opportunities for the local community. This section will also consider public access, adjacent landowners / dwellings and local services such as existing electricity lines / masts on site. The Human Health assessment will be prepared in accordance with the relevant guidelines produced by the Environmental Protection Agency (EPA), as detailed in 5.4 below. Aspects examined in this section of the chapter will primarily relate to impacts from the proposed development on socio-economic activities, tourism and on local community health.

5.2 STUDY AREA

The study area for the "Population and Human Health" assessment will include County level data in relation to Electoral Divisions. In addition, the mapping in relation to residential receptors will include an area within 1km of the proposed wind farm site boundary.

5.3 SENSITIVE RECEPTORS

All properties in close proximity to the site boundary will be mapped as potential sensitive receptors. Properties will include residential dwellings, commercial properties, derelict buildings, agricultural buildings and pre-planning infrastructure (including houses submitted for planning permission). All properties will then be reviewed by ground-truthing and further desktop assessment (in the case of planning applications) to identify potential sensitive receptors in the vicinity of the development. In addition, as part of the initial turbine layout design process, a minimum 750m buffer will be extended from the location of any proposed turbines to sensitive receptors. This will inform the turbine layout and for the current proposed turbine tip height of 185m, exceeds the proposed minimum set-back requirement of four times tip height

5.4 DESKTOP AND FIELD SURVEYS

The following information sources and references are of relevance in relation to the desktop study for the Population and Human Health assessment;

- EPA Guidelines - Information to be contained in Environmental Impact Assessment Reports, Draft August 2017 (EPA, 2017);
- Revised Guidelines on the Information to be contained in Environmental Impact Statements, Draft September 2015 (EPA, 2015);
- IWEA Best Practice Guidelines for the Irish Wind Energy Industry 2012;
- IWEA Best Practise Principles in Community Engagement and Community Commitment 2013;
- OSI mapping and Aerial Photography to identify land use and possible amenity sites;
- Kilkenny County Development Plan 2014-2020;
- Central Statistics Office (CSO) information;
- Fáilte Ireland Information in relation to tourism amenity in conjunction with websites of relevant tourism sites and amenities for the area;
- Health Impact Assessment Resource and Tool Compilation (US EPA, 2016);
- Guidelines for Community Noise (WHO,1999);
- Health in Environmental Impact Assessment - A Primer for a Proportionate Approach (IEMA, 2017);
- Health Impact Assessment (Institute of Public Health Ireland, 2009);
- Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011);
- Air Quality Guidelines (WHO, 2005);
- British Standard (BS) 5228-1:2009+A1:2014 – Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 1: Noise;
- Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (EPA, 2016); and
- WHO Environmental Noise Guidelines for the European Region 2018.

Houses in proximity to the boundary of the proposed Castlebanny Wind Farm were investigated using aerial imagery (Bing 2013 Imagery) to verify the An Post Geo-directory data. Following on from this verification process, during July 2019, TOBIN commenced ground-truthing of houses in the vicinity of the proposed Castlebanny Wind Farm.

The Population and Human Health impact assessment evaluates the receiving environment/land use and includes analysis of local population patterns. The assessment also includes a review of appropriate demographic documentation and incorporates Census Reports and Electoral Division Information, Land use, Population, Employment and Planning Permissions. In addition, the evaluation will provide details of Coillte Community Benefit proposals and any consultation with regard to the same.

There are separate health profiles available for all local authority areas. The most recent profile published for Kilkenny relates to 2015 (Lenus, 2015)[1] which will be used to establish a community health profile for the proposed wind farm. The assessment of human health for the proposed development, in terms of health protection, will follow the approach set out in the EPA 2017 Guidelines, Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018) and in the Commission's SEA Implementation Guidance.

5.5 CUMULATIVE EFFECTS

The potential cumulative impact of the proposed development with other relevant projects in the area on the local community and human health will also be addressed. This may include other wind farm developments, other renewable energy projects or any proposed project which could have the potential to have a cumulative impact.

[1] Health Service Executive (HSE) Public Health Profile Working Group, (2015), "Health Profile 2015 Kilkenny": Health Service Executive (HSE). Available: https://www.lenus.ie/bitstream/handle/10147/584041/Kilkenny.pdf;jsessionid=896A65608A28AFB237D53B3CF7F464D1?sequence=1 (accessed 31/07/2019)

6.0 BIODIVERSITY

6.1 INTRODUCTION

Potential impacts on the biodiversity from the wind farm project will be addressed in line with the requirements of the Environmental Impact Assessment Directive 2011/92/EU as amended by Directive 2014/52/EU and the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296/2018), which implements EU Directive 2014/52/EU in planning law. Due regard will be had to published guidelines and best practice including:

- EPA (2017) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal
- DEHLG (2006) Wind Energy Development Guidelines and Draft Revised Wind Energy Development Guidelines (December 2019)
- IWEA (2012) Best Practice Guidelines for the Irish Wind Energy Industry
- Accepted specific best guidance for assessing wind farm impacts on birds, bats and other sensitive ecological receptors

To date, a significant amount of desk study and field survey has been undertaken from October 2016 to gather information on the biodiversity of the study area and surrounds. This information has been used to inform the draft design of the wind farm layout.

6.2 STUDY AREA

The study area is an area of conifer plantation and surrounding agricultural land at Castlebanny and surrounding townlands, near Ballyhale, Co. Kilkenny. Where required, the study area has been expanded to take into account sensitive receptors that may be within the zone of influence of the project. The zone of influence depends on the particular sensitivities of receptors and the ecological pathways along which impacts may be transmitted.

6.3 SENSITIVE RECEPTORS

Several sensitive ecological receptors have been identified by ecological surveys carried out to date. These include designated areas, habitats, birds and bats.

There is one Natura 2000 site within the zone of influence of the project: the River Barrow and River Nore SAC (site code 2162). The Arrigle River, which is part of the SAC is situated approximately 1.5 km downstream of the site boundary and is likely to be crossed by the grid connection route. Potential effects on this SAC and others that may be within the zone of influence, including Hugginstown Fen (site code 404), which is 3.9 km west of the site, and the River Nore SPA (site code 4233), 4.6 km north of the site, will be addressed in a Natura Impact Statement that will accompany the planning application and EIAR.

There are no NHAs or pNHAs in or adjacent to the wind farm site. There are a number of pNHAs in the vicinity, most of which are included within the River Barrow and River Nore SAC. The two standalone pNHAs in the area are wetland sites: Kilkeasy Bog (site code 839), approximately 3 km west and south of the proposed wind farm, and Lough Cullin (site code 406), approximately 9 km south.

Field surveys have identified a number of largely fragmented areas of habitat that are of High Local or County value for biodiversity. The most significant of these are patches of blanket bog and wet and dry heath in mosaic with failed conifer plantation. There are also examples of species-rich wet grassland and poor fen that are considered to be sensitive receptors.

Field and desk studies to date have not identified any rare, threatened or legally protected plant species within the zone of influence of the site.

Vantage point surveys and breeding surveys for raptors have produced only occasional records of Hen Harrier (Amber Listed) and no evidence of communal winter roosts or breeding. Peregrine (Green Listed) was also recorded occasionally, and the nearest occupied breeding site was 5 km from the study area. Sparrowhawk and Kestrel (Amber Listed) were regularly recorded. Lesser Black-backed Gull (Amber Listed) was the only waterbird regularly recorded. A single Greylag Goose (Amber Listed) was observed during vantage point surveys. The study area was found to support a small number of breeding Snipe (Amber Listed) and a strong population of breeding Woodcock (Red Listed).

Six species of bats have been recorded within or near the study area. No bat roosts have been recorded in trees in the forestry plantations, but several important bat roosts were recorded in buildings in the agricultural lands in or near the study area.

Desktop surveys have found records of badger, otter and red squirrel in the vicinity of the study area. Desktop surveys have also found records of a number of threatened invertebrates in the

vicinity of the study area. Of these, there is the potential for five species, Gooden's nomad bee, large red-tailed bumblebee, dark green fritillary, dingy skipper, and small heath butterfly, to occur within suitable semi-natural habitat patches within the site, but not the dominant conifer forests or improved grasslands.

The locations of sensitive receptors on site, such as habitats and bat roosts, have been mapped in an Ecological Constraints and Opportunities Plan (ECOP). The ECOP has been updated as new information arises from desk and field studies. The ECOP has been used to design the wind farm layout and implement mitigation by avoidance.

6.4 DESKTOP AND FIELD SURVEY

6.4.1 DESKTOP SURVEY

Desktop surveys have been carried out, and the results for potentially sensitive receptors have been outlined above. The primary data sources for the desktop surveys were:

- National Biodiversity Data Centre records
- NPWS rare and protected species records
- National Hen Harrier survey data
- Irish Wetland Bird Survey site coverage information
- Bat Conservation Ireland database records
- Irish Cave Database
- Coillte sub-compartment (tree species and planting date) data
- Coillte Biodiversity Areas
- NPWS designated area boundary data
- NPWS site-specific conservation objectives shapefiles
- National Survey of Native Woodland sites
- National Fen Database sites
- EPA water quality data
- Aerial photography

6.4.2 FIELD SURVEYS

To date, the following field surveys have been carried out:

- Habitat survey and mapping: 5 days between May 2017-Aug 2018
- Bird vantage point surveys: six full survey seasons between winter 2016/17 and summer 2019

- Bird transect general surveys: 7 transects surveyed twice per season in Jan-Feb 2017 and Apr-Jun 2017 and 1 transect surveyed monthly from winter 2017/18 to summer 2019
- Hen Harrier roost surveys: 49 days over three winter seasons between Dec 2016-Mar 2017 and Nov 2018-Mar 2019
- Hen Harrier breeding surveys: repeat visits to 7 selected areas of suitable habitat between late Mar and end Jul in 2017 and 2018
- Breeding wader surveys: monthly surveys of 6 selected areas of suitable habitat in Apr-Jun 2017 and 2018
- Woodcock surveys: 3 transects surveyed three times per summer in May-Jun 2017, 2018 and 2019
- Peregrine breeding surveys: repeat visits to 6 selected areas of suitable habitat in Apr-Jun 2017 and 8 selected areas in Apr-Jun 2018
- Bat winter roost survey: 1 day in Jan 2017
- Bat activity spring surveys: 3 days in May 2017
- Bat activity summer surveys: 4 days in Jul 2017 and 2 days in Jun 2018
- Bat activity autumn surveys: 2 days in Oct 2017
- Bat roost emergence counts: 3 days Jun 2018
- Static bat detector surveys at 12 locations at or near proposed turbines in Summer and Autumn 2019

Additional field work that has been programmed includes:

- Habitat survey of grid connection route in Spring 2020
- Detailed vegetation surveys at proposed turbines and other specific key infrastructure locations in Spring 2020
- Detailed protected fauna surveys at proposed turbines and other specific key infrastructure locations in Spring 2020
- Barn Owl roost surveys in March 2020
- Static bat detector surveys at 12 locations at or near proposed turbines in Spring 2020
- Aquatic and fisheries surveys of watercourses in Spring 2020

During detailed vegetation surveys, habitat mapping will be updated as needed in line with the CIEEM (2019) Advice Note on the Lifespan of Ecological Reports and Surveys.

Barn Owl was scoped out at the beginning of the project but has now been scoped in in light of recent expansions of Barn Owl range coinciding with the spread of greater white-toothed shrew.

Due to changes in the proposed wind farm layout between Autumn 2019 and Spring 2020, the locations of 6 static bat detectors will be moved to provide more representative data of the bat fauna at particular turbine locations. The results of this survey will be reviewed in conjunction with the static detector, bat activity and roost surveys already undertaken to determine if further static bat detector surveys at the new locations will be required. Static bat detector surveys were initiated with regard to the recent Scottish Natural Heritage (2019) guidance on Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation after extensive bat survey work had already been completed.

Aquatic and fisheries surveys will be carried out at watercourses within and downstream of the proposed wind farm. Additional survey effort will be undertaken at sites where the grid connection route is proposed to cross the Little Arrigle River and a tributary stream. The Little Arrigle is part of the River Barrow and River Nore SAC. The surveys will include a fisheries appraisal, a white-clawed crayfish survey, physiochemical and biological water quality sampling, and an aquatic macrophyte survey.

A marsh fritillary survey was scoped out due to the absence of previous records from the area and the lack of suitable breeding habitat within the study area.

The need for additional survey work to address any information gaps has been and will be reviewed on an ongoing basis.

6.5 CUMULATIVE EFFECTS

Cumulative impacts with other developments, including but not limited to other wind farms, will be assessed for all sensitive receptors. Interactions with other environmental disciplines, especially hydrology and climate, will also be assessed as set out in Section 17.

6.6 APPROPRIATE ASSESSMENT

A Natura Impact Statement (NIS) will be prepared and submitted to assess potential effects on the integrity of Natura 2000 sites within the zone of influence of the project. The NIS will be prepared with due regard to the European Commission's (2010) guidelines on *Wind Energy*

Developments and Natura 2000. In line with best practice, the NIS will be a separate document to the EIAR.

7.0 LAND, SOILS AND GEOLOGY

7.1 INTRODUCTION

The principal objectives of the Land, Soils and Geology Chapter of the EIAR will be to identify and mitigate potential issues of the proposed development to ensure that the impact on the environment is minimised.

7.2 STUDY AREA

The EIAR study area of the Lands, Soils and Geology chapter will primarily focus on the project red line boundary which will include the proposed grid connection route. In addition, the assessment will consider the lands adjacent to the site boundary as well as proposed forestry replacement lands off-site.

7.3 SENSITIVE RECEPTORS

There are currently no known geological sensitive receptors at the outset of the scoping process and prior to site investigation. This will be reviewed as further data is collected.

7.4 DESKTOP AND FIELD SURVEY

Consultation will be undertaken, and feedback requested from a number of statutory bodies;

- The Geological Survey of Ireland (GSI). Well data will be sourced and information on proposed Natural Heritage Areas (pNHAs), County Geological Sites (CGS) and any recorded Landslide Events (from the historical landslide database) in the region of the study area will be requested;
- Inland Fisheries Ireland (IFI);
- The Environmental Protection Agency (EPA);
- The Local Authority Environment Officer; and
- Scoping of geotechnical aspects of the EIA for peat sites will be agreed in conjunction with the multidisciplinary team, including but not limited to Geotechnical Engineer, Hydrogeologist, Hydrologist, Ecologist and the requirements of any and all of the design team as necessary e.g. Engineering designers deciding on access route types and construction methodologies.

The evaluation will include:

- Desk study of soils, subsoils, bedrock, geological maps and aerial photography;

- Geomorphology assessment and mapping will be undertaken of geomorphological features;
- Site Investigation works have been specified in conjunction with the requirements of the designers and are currently underway. The site investigation will provide detail on soils, geology, geotechnical risk and potential requirements for water management and drainage. Investigations include, but are not limited to:
    - Trial pitting;
    - Peat Probes;
    - Boreholes (drilling methods and depths to be determined as part of specification);
    - Geophysical surveys;
    - In-situ Standard Penetration Test (SPT) testing and sampling; and
    - Ground Water Monitoring Installation.
- Development of Geotechnical Risk register to identify and mitigate potential issues that may arise during the construction stage (including karst risk and geomorphology features);
- Design of appropriate erosion and sediment control measures; development of erosion and sediment control procedures for implementation on site;
- Design and installation of monitoring wells, piezometers and surface hydrometric structures where required;
- Conduct preliminary geotechnical site investigations to inform the following:
    - Identify the depth of soil and bedrock across the site;
    - Access routes construction methodology;
    - Cable route construction methodology;
    - Foundation construction methodology;
    - Borrow Pits / quarry potential;
    - Earthworks and Material Balance calculations;
    - Groundwater management, as required;
    - Drainage Design;
    - Overburden (Soils) Storage and management;
    - Temporary works design; and
    - Site Reinstatement, to be aligned with the existing site rehabilitation plan (including erosion control).
- Geohazard Mapping & Risk Assessment; and

- Interpretation and reporting of all geological & geotechnical data with reference to data within the Geotechnical & Soil Stability Report.

7.5 CUMULATIVE EFFECTS

Based on the site investigation findings and the likely impacts and risks that may be anticipated, and the potential cumulative effects that may arise, guidance will be provided towards the mitigation of these impacts and minimisation of the associated risks during construction, operation and decommissioning of the proposed wind farm.

8.0 HYDROLOGY AND HYDROGEOLOGY

8.1 INTRODUCTION

The principal objectives of the Hydrology and Hydrogeology Chapter of the EIAR will be to identify and mitigate potential issues of the proposed development to ensure that the impact on surface water and groundwater is minimised.

8.2 STUDY AREA

The EIAR study area of the Hydrology and Hydrogeology assessment will extend outside the red line boundary and include watercourses which will receive surface water from the proposed development site. These include tributaries of the River Blackwater (Kilmacow) to the west and the River Arrigle to the east. The River Arrigle is part of the River Barrow and River Nore SAC (Site code 002162).

8.3 SENSITIVE RECEPTORS

There are currently no known hydrology-specific sensitive receptors at the outset of the scoping process and prior to site investigation. This will be reviewed as further data is collected and throughout the assessment.

8.4 DESKTOP AND FIELD SURVEYS

A desk study shall be undertaken to acquire all published hydrological data for the proposed development site and surrounding area, including flood data and surface water quality data.

Consultations will be carried out with a number of statutory bodies including:

- The Geological Survey of Ireland (GSI). Well data will be sourced and information on Natural Heritage Areas (NHAs), County Geological Sites (CGS) and any recorded Landslide Events (from the historical landslide database) in the region of the study area will be requested;
- The Local Authority Environment Officer;
- Inland Fisheries Ireland (IFI); and the
- Environmental Protection Agency (EPA).

8.5 HYDROLOGICAL ASSESSMENT

As part of the EIAR, TOBIN will establish baseline/existing hydrological conditions, identify potential impacts and proposed appropriate mitigation measures. TOBIN will also:

- Identify the existing surface water drainage characteristics of the site (including any natural or man-made drainage). A surface water feature survey/catchment assessment of the study area will be carried out to record all streams, rivers and lakes within the site boundary and surrounding area; and
- Establish baseline water quality across the site. Any historical water quality for this area will be reviewed and existing EPA water quality data will also be examined as part of the study including any available data relating to the river catchments in this area. Where required, surface water samples will be collected in order to provide a baseline set of water quality results for the area. Biological assessments of the rivers will also be carried out, if required.

TOBIN will also assess the potential for siltation as a result of the proposed development, particularly during the construction phase and propose mitigation measures for associated pollution control. Any existing siltation management practices will be reviewed as part of this assessment.

Groundwater Assessment:

TOBIN will also carry out the following studies as part of the EIA:

- Aquifer assessment; and
- Impact assessment on water schemes/water supplies.

Water Quality Assessment:

TOBIN will complete the following as part of the EIAR:

- Conduct water sampling (surface water and groundwater where possible) in accordance with industry standards; and
- Establish baseline/existing conditions, identify potential impacts and propose appropriate mitigation measures.

Flood Risk Assessment (FRA):

The OPW's National Flood Risk Assessment (PFRA) mapping and Flood Maps were reviewed. There are no recorded flood events for the proposed development site, and it is approximately

3km from potential flood areas as indicated on the Flood Maps. Although the risk of fluvial flooding (rivers and streams) is low, the risk of pluvial flooding from new hard-stand areas and infrastructure will be considered

The Flood Risk Assessment for this project will include the following works:

- Review of available information, planning guidelines and historical flooding records;
- Topographical survey of site, including survey of smaller water courses;
- Assessment of hydrometric data (water levels and flows) for adjacent water bodies; and
- Assessment to take cognisance of climate change and the 1 in 100 year to 1 in 1000-year flood events.

The Flood Risk Assessment will be completed for the overall site and detailed within the EIAR. This assessment shall include undertaking the following tasks:

1. A visual Inspection of site and watercourses by hydrologist;
2. Site Topographical Survey;
3. Site survey of watercourses for hydraulic modelling;
4. A review of existing information and planning guidelines;
5. An assessment of historical flooding;
6. Estimation of the 100 and 1000 MRFS (Mid-Range Future Scenario) design flood events at the proposed Castlebanny Wind Farm site, as recommended by *'The Planning System and Flood Risk Management Guidelines'* (OPW, 2009). The hydrological assessment of the site may include:
    i. Statistical estimation of design flood flow from available hydrometric data;
    ii. Analysis of watercourses using the OPW's Flood Studies Update Portal; and
    iii. Estimation of design flood flow from catchment descriptors and rainfall.
7. Hydraulic Modelling, using HEC-RAS or similar, of watercourses for the 100- and 1000-year design flood events. Where possible, the model shall be calibrated against historical and gauged flow data if available from the OPW and EPA hydrometric station network in the vicinity of the site;
8. Modelling and assessment of one flood risk solution proposed by the design team; and Floodplain Mapping for the 100 and 1000-year MRFS design flood events for the watercourses.

8.6 CUMULATIVE EFFECTS

Based on the evaluation findings and the likely impacts and risks that may be anticipated, and the potential cumulative effects that may arise, guidance will be provided towards the mitigation of these impacts and minimisation of the associated risks during construction of the proposed wind farm.

9.0 AIR QUALITY AND CLIMATE

9.1 INTRODUCTION

The purpose of the Air Quality and Climate assessment will be to assess the potential impacts of the proposed wind farm on the Climate and Air environments. The development of renewable energy is identified as having the potential to be a clean form of energy production and as such to have a potential net beneficial effect on the Air Quality and Climate environments.

The climate impact assessment will consider the targets and objectives of the Climate Action Plan 2019 and how the project will contribute to achieving these targets. The assessment will also consider the direct and indirect effects of the project on climate change in the context of the current and proposed land use and consideration of national objectives on forestry development.

9.2 STUDY AREA

The proposed development is located approximately 1.8km south-east from Ballyhale, 3.9km south-east of Knocktopher, 7.1km south of Thomastown, 4.1km north-east of Mullinavat, 5.7km south-west of Inistioge, 4km west of Tullogher and 10.8km north-west of New Ross. The surrounding landscape is primarily a mixture of forestry and agricultural land.

9.3 SENSITIVE RECEPTORS

Measurement results from the air monitoring stations at Seville Lodge on the Callan Road, Co. Kilkenny and The Mall, Waterford City will be reviewed and evaluated in order to assess the current environment in relation to sensitive (residential) receptors.

9.4 DESKTOP AND FIELD SURVEY

The climate assessment within the EIS will consist of a general overview of the climate for the South-East Region. Specific meteorological data for the site will be obtained from the nearest meteorological and synoptic stations (data from Met Éireann). This information will provide historical and existing baseline information for the regional climate in this area.

The positive effects that wind farm developments have on climate will also be discussed in this chapter, as well as a CO_2 balance calculation for the proposed construction, operation and

decommissioning of the development as well as the production and transport of turbine components to the site.

This air quality assessment will include the findings of a desk-based air quality assessment using available data from the Environmental Protection Agency in consideration of the Air Quality Standards Regulations, 2002 (SI No. 271 of 2002) and the EU Air Framework Directive.

9.5 CUMULATIVE EFFECTS

The air quality and climate assessment will also consider the potential cumulative impacts of other developments in the area including the cumulative contribution to decarbonisation strategies and national greenhouse gas reduction targets.

10.0 MATERIAL ASSETS: SHADOW FLICKER

10.1 INTRODUCTION

The purpose of the Shadow Flicker assessment will be to assess the potential impacts of the proposed wind farm to sensitive receptors in the surrounding environment.

10.2 STUDY AREA

The study area (approximately 1600ha) is located approximately 1.8km south-east from Ballyhale, 3.9km south-east of Knocktopher, 7.1km south of Thomastown, 4.1km north-east of Mullinavat, 5.7km south-west of Inistioge, 4km west of Tullogher and 10.8km north-west of New Ross. The study area will incorporate all sensitive receptors which have the potential to be impacted by shadow flicker from the proposed development.

The shadow flicker assessment will be carried out using windPRO modelling software and in accordance with the guidelines set out in the 2006 Wind Energy Guidelines as well as the Draft Revised Wind Energy Guidelines (December 2019). Consideration will also be given to relevant UK guidance including *"Update of UK Shadow Flicker Evidence Base"* carried out by Parsons Brinckerhoff in 2011.

10.3 SENSITIVE RECEPTORS

The envelope within which sensitive receptors will be evaluated will be determined by the size, scale and layout of the final wind farm. The current Wind Energy Guidelines (2006) outline that at distances greater than ten rotor diameters from a turbine, the potential for shadow flicker is very low, therefore the assessment will initially consider all sensitive receptors within 1.5 km of the proposed turbines. This will be revised as necessary to identify all potential receptors.

10.4 DESKTOP AND FIELD SURVEY

The extent and impact of Shadow Cast Analysis and Shadow Flicker depends on the relative positions and orientation of nearby houses and wind turbines, the presence of windows facing on to the proposed wind farm, the absence/presence of vegetation or other obstructions between the houses and the wind farm etc. This will be assessed as part of the EIA.

WindPRO Computer Modelling software will be employed, for this element of the assessment, through the use of the shadow module. This facilitates calculation and documentation of

flickering effects in terms of hours per year during which a specific receptor or an area would be exposed to flickering from nearby turbine rotors.

For each receptor identified, maximum minutes of potential shadow flicker per day are calculated. The software can calculate the worst-case results (sun always shining in daytime, turbines always rotating and wind direction "worst case") or the "real expected values", based on assumptions on solar statistics and operating hours divided by wind direction. Typically, calculations are made in a worst-case scenario assuming that each sensitive receptor location has windows on all sides (i.e. glasshouse effect) but can also allow for user defined windows on properties.

Results will be presented in the form of calendars, cumulated hours with flicker or, for the area calculation, as maps of flicker hour isolines

10.5 CUMULATIVE EFFECTS

Cumulative impacts of shadow flicker from existing operational or consented wind farms will also be included in the assessment. The configuration of existing or consented wind farms can be added to the model and is particularly relevant to consider properties which may experience low levels of shadow flicker from one or more wind farms on their own but may be significantly impacted by adjacent wind farms.

11.0 MATERIAL ASSETS: AVIATION, TELECOMMUNICATIONS & ELECTROMAGNETIC INTERFERENCE

11.1 INTRODUCTION

This chapter will detail the telecommunications baseline environment of the proposed development site and identify the possibility of interference occurring to telecommunications and radio transmissions as a result of the wind turbine installations as well as potential impacts for commercial/private aviation authorities and associated communications.

11.2 STUDY AREA

The study area (approximately 1600ha) is located approximately 1.8km south-east from Ballyhale, 3.9km south-east of Knocktopher, 7.1km south of Thomastown, 4.1km north-east of Mullinavat, 5.7km south-west of Inistioge, 4km west of Tullogher and 10.8km north-west of New Ross. The Telecommunications and Aviation Consultants will identify operators of telecommunications and aviation assets and determine, through consultation with them, whether there is potential interaction or interference with the assets within the study area as a result of the potential development.

11.3 SENSITIVE RECEPTORS

As part of the study of potential impact to telecommunications and aviation operators by the Castlebanny Wind Farm, identified stakeholders will be approached with project details and asked to revert with any potential impacts on their communications and flight management infrastructure. An initial list of telecommunications consultees has been prepared and will be added to as necessary throughout the project.

11.4 DESKTOP AND FIELD SURVEY

The Television and Radio Impact Assessment will include:

- Identification of sources of local TV and radio reception;
- Identification of local telecommunications transmitters;
- Site surveying of telecommunications infrastructure including a microwave link survey;
- Determining if the turbines are in the path between the receptors and transmitter;
- Liaison with RTÉ as required to assess impacts and address any queries or issues should they arise;
- Carrying out a baseline interference assessment; and

- Providing recommendations for pre and post construction monitoring.

The Radar, Telecommunications and Aviation Impact Assessment will include:

- Identification of local telecommunications and aviation microwave links;
- Desktop assessment of all identified aviation infrastructure and aviation routes which could potentially be impacted by the proposed development;
- Liaison with all relevant Radar, Telecommunications and Aviation operators to assess impacts and address any queries or issues should they arise;
- Determining if the turbines are in the path between the receptors and transmitter;
- Examining the interference scenario;
- Identification of predicted impacts;
- Mitigation Studies;
- Measurement of existing electromagnetic environment and statement regarding future compliance to relevant regulations; and
- Providing recommendations for pre and post construction monitoring.

11.5 CUMULATIVE EFFECTS

The potential for cumulative impacts is low because the interference that is generated from a wind turbine is directly related to the presence of that turbine in the path of television or communication link signal and less likely to be generated from multiple cumulative reflections. However, consideration will be given to other wind farm developments and relevant infrastructure as part of this assessment.

12.0 NOISE AND VIBRATION

12.1 INTRODUCTION

The Noise and Vibration Chapter of the EIAR will assess the potential impacts of the proposed development on sensitive receptors in the surrounding environment during the construction, operational and decommissioning phases. The principal objectives of the Noise and Vibration assessment will be to specify appropriate limit values and mitigation measures to ensure that the impact on the noise sensitive receptors is minimised to an acceptable level.

12.2 STUDY AREA

The study area for the operational phase will cover at least the area predicted to exceed 30 dB L_{A90} when all existing and proposed turbines are at their maximum output noise level and will include all identified Noise Sensitive Locations (NSL's) that are within this area.

For the construction phase, all properties within 500m of the proposed construction activities or the nearest NSL if greater than 500m will be considered in the assessment.

Potential NSL's will include residential dwellings, commercial properties, derelict buildings, and pre-planning infrastructure (including relevant properties with planning permission). All properties will then be reviewed by ground-truthing and further desktop assessment (in the case of planning applications) to identify potential sensitive receptors in the vicinity of the development.

12.3 RECEIVING ENVIRONMENT

Initial iterations of the noise model will be developed and expected noise levels predicted at the nearest noise sensitive locations. This initial exercise will be used to inform the selection of appropriate baseline noise monitoring locations in the vicinity of the site.

12.3.1 BACKGROUND NOISE SURVEY

A background noise monitoring survey will be completed at several NSL's in the vicinity of the proposed development site. All measurements will be conducted in accordance with the IoA document "*A Good Practice Guide to the Application of ETSU-R-97 for The Assessment and Rating of Wind Turbine Noise*" (GPG) and the associated supplementary guidance notes.

12.4 ASSESSMENT OF IMPACTS

The baseline work will characterise the noise climate existing in the area and facilitate the quantification of potential noise impact which may arise from the proposed development. The potential noise and vibration impacts will be considered for the following phases:

- Construction Phase;
- Operational Phase; and
- Decommissioning Phase.

12.4.1 CONSTRUCTION PHASE

Construction noise levels associated with various elements of the proposed development will be predicted at the facades of the closest noise-sensitive locations in the vicinity of the development by developing detailed construction calculations. All predictions will be conducted in accordance with the guidance contained in ISO 9613:1996: Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation. Source noise levels will be obtained from BS 5228 2009 +A1 2014 Code of practice for noise and vibration control on construction and open sites.

Vibration during construction will also be considered regarding the potential impact of residential amenity and structural damage to buildings.

12.4.2 OPERATIONAL PHASE

We will predict noise levels at all the identified noise sensitive locations. All predictions will be free field and done in accordance with appropriate guidance using a proprietary noise modelling package. The use of a computer-based noise model lends itself to ongoing evaluation of proposal and provides output that is detailed and extensive. Noise contour maps will be generated for the site noise models illustrating noise levels in the vicinity of the proposed turbines.

We will use the results obtained from the prediction calculations to assess the likely noise impact of the operation of the proposed turbines. This will include appropriate downwind assessments at various noise sensitive locations. Where necessary and possible, we will consider noise control measures. Discussion of other issues will be undertaken where appropriate (e.g. tonality, low frequency noise/Infrasound, amplitude modulation etc.).

The potential noise impact associated with road traffic movements and other ancillary parts of the development including the substation and any other permanent source of noise will be assessed and included as part of the noise chapter.

12.5 CUMULATIVE EFFECTS

A cumulative assessment considering existing and permitted windfarms will be undertaken.

13.0 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

13.1 INTRODUCTION

The purpose of this Scoping Report is to describe the scope of work and methods to be applied in the identification and assessment of landscape and visual impacts associated with the proposed Castlebanny Wind Farm.

13.2 STUDY AREA

The current 2006 Wind Energy Development Guidelines specify different radii for examining the Zone of Theoretical Visibility of proposed wind farm projects ('ZTV'). The extent of this study area is influenced by turbine height as follows:

- 15 km radius for blade tips up to 100 m;
- 20 km radius for blade tips greater than 100 m; and
- 25 km in order to incorporate features of national or international renown.

In the case of this project, the blade tips will be over 100 high and, thus, the minimum ZTV radius required is 20 km from the outermost turbines of the proposed development. It is not considered that there are any features of 'national or international renown' within 25km of the site and thus, the study area will remain at a consistent 20km radius from the proposed turbines.

Consideration will also be given to the guidelines set out in the Draft Revised Wind Energy Guidelines (December 2019) with regard to defining the study area.

13.3 SENSITIVE RECEPTORS

Sensitive landscape and visual receptors will be identified during baseline studies and fieldwork and will consist of both designated (highly sensitive landscape zoning / scenic views in the CDP) and non-designated receptors. Visual receptors will be selected from the following categories;

- Designated scenic routes / views (CDP)
- Local Community views (roads and residences within approximately 5km)
- Centres of Population
- Major Transport Routes
- Amenity, Heritage and Tourism locations

13.4 SURVEY METHODS

13.4.1 DESKTOP AND FIELD SURVEY

The desktop study will comprise of the following:

- Prepare and review of Zone of Theoretical Visibility (ZTV) maps, which indicates areas from which the development is potentially visible in relation to terrain within the Study Area;
- Review of relevant County Development Plans, particularly with regard to sensitive landscape and scenic view/route designations;
- Selection of potential Viewshed Reference Points (VRPs) from key visual receptors to be investigated during fieldwork for actual visibility and sensitivity; and
- Preparation of an initial VRP selection report and associated map for consultation purposes (Planning Authorities).

Fieldwork will consist of:

- Select a refined set of VRP's for assessment.
- Record a description of the landscape elements and characteristics within the Study Area generally and also within view from each VRP.
- Capture high quality base photography from which to prepare photomontages of the proposal.

13.5 IMPACT ASSESSMENT

The assessment of landscape effects involves establishing the landscape baseline. This includes consideration of the geographic location and landscape context of the proposed wind farm site as well as the essential landscape character and salient features of the wider Study Area and is discussed with respect to; landform and drainage and; vegetation and land use. The visual baseline is more population based, but still overlaps with elements of the landscape baseline. The visual baseline is discussed in relation to; centres of population and houses; transport routes and; public amenities and facilities. Once the baseline environment is established an assessment of the potential significant effects associated with the proposed development will be carried out. In accordance with the Guidelines for Landscape and Visual Impact Assessment (2013), the method for estimating the significance of landscape impacts and visual impacts is very similar. This is summarised in the diagram below.

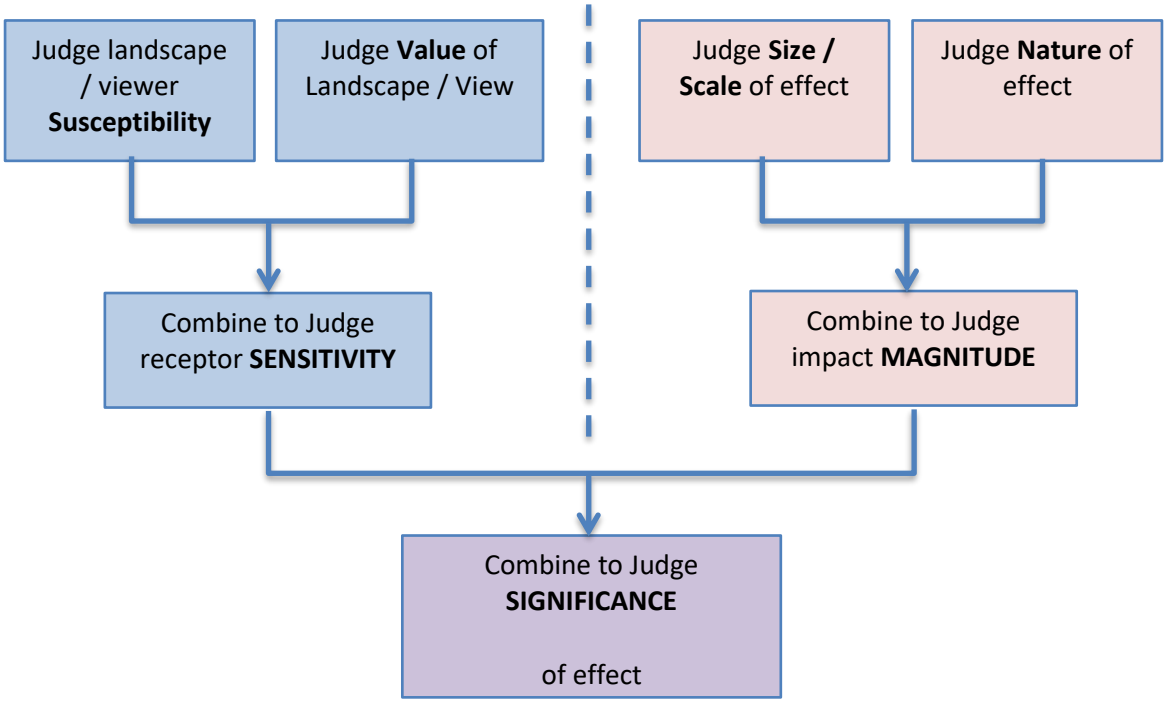


Figure 13.1 - Method for assessing Landscape Impact significance and Visual Impact significance (based on GLVIA – 2013)

13.5.1 LVIA ASSESSMENT TOOLS / TECHNIQUES

The following assessment tools and techniques will be considered for this project and applied as appropriate and beneficial to the assessment.

Photomontages:

Photomontages are photo-realistic depictions of the proposed development superimposed on baseline photography at selected receptor/viewpoint locations. The photomontages will be fully compliant with the most recent SNH guidelines (2014).

In the case of Castlebanny Wind Farm, it is anticipated that approximately 30 no. viewpoints will be required overall. It is imperative that base photography is captured in the clearest of viewing conditions, especially where existing turbines are contained within the view.

Route Screening Analysis (RSA):

The project team landscape specialist has developed a 360° vehicle mounted photo-capture unit to gather imagery every second (approximately 15m intervals). The images are then synchronised with a 3D model of the proposed development for rapid analysis of screening

levels. When used in vegetated lowland landscapes, RSA has shown actual visibility to be much less than indicated by traditional Zone of Theoretical Visibility (ZTV) maps.

Theoretical Visual Intensity (TVI) Mapping:

Because traditional ZTV maps are of limited value in illustrating likely comparative visual prominence over distance, a more advanced form of visibility mapping will also be utilised, which takes into account both the scale in relation to distance of the proposed development and the degree to which it is visible within the 'bare-ground' terrain context. TVI mapping will highlight, at the baseline stage, those areas that have the most potential to be significantly affected by views of the proposed development as well as areas where visual impacts are not likely to be significant.

360° On-line Photomontage Viewer:

This is principally a design team collaboration tool but can be used for consultation purposes also. All viewpoint photography will be captured in 360° and early stage design iterations will be presented on an on-line photomontage viewer, which is calibrated to a 24-inch screen allowing the viewer to pan around the image as if turning their head. This resource allows the project team to efficiently compare design options and discuss potential impacts / design solutions.

13.6 CUMULATIVE EFFECTS

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'. The landscape specialist will use their own on-line viewer (see detailed description above) to compare 360° photography against corresponding 360° cumulative Wireframe images to aid the cumulative impact assessment.

14.0 FORESTRY

14.1 INTRODUCTION

The objectives of the Forestry Chapter of the EIAR will be to describe the existing forest environment and the impact of the wind farm in relation to the ongoing operation of the forestry. Further environmental impacts associated with forestry felling and replanting e.g. ecology, water quality, etc. will be addressed in the relevant technical sections of the EIAR. This Chapter will also describe the impacts associated with replacement planting required on suitable lands which will be identified by the Developer. These replacement lands may not be proximate to the Project.

14.2 IMPACT ASSESSMENT

The forestry impact assessment will include:

- Modelling of the temporary and permanent felling required for the wind farm as well as other silvicultural felling ongoing in the area to assess impacts in terms of felling coupe size, runoff and nutrient mobilisation and present mitigation measures against all impacts; and
- Assessment of all mitigation measures including replanting and any replacement lands required for the project.

Permanent felling requirements, while ensuring constructability, will be the minimal possible and will be determined based on turbine manufacturers requirements and any environmental or other mitigation measures proposed.

14.3 METHODOLOGY

The typical methodology for completing this assessment is as follows:

1) Establish Baseline/existing conditions of area to be felled (including adjacent felled areas):
    - Area of impacted forest (temporary and permanent felling area)
    - Ages of forest
    - Species planted
    - Standing Volume (Carbon)
    - Soil Conditions
    - Aquatic areas
    - Archaeological features

- Biodiversity and habitat features
- Landscape Assessment
- Proximity to Natura site

2) Potential Forest Impacts: The potential impacts that will be identified and monitored are:
   - Soil disturbance and compaction
   - Carbon loss
   - Water quality (sediment & nutrient)
   - Archaeological sites
   - Biodiversity impact
   - Landscape impact
3) Site Mitigation Measures: Comprehensive planning and operations will protect environmental resources outlined in the forestry felling and harvest plans.

14.4 MITIGATION MEASURES

Buffer and Exclusion Zones

Identify the appropriate buffer width and exclusion zones for aquatic, biodiversity, landscape and archaeological features in the felling area.

Ancillary structures

Provide details and location for ancillary structures, such as:

- temporary bridges where machine routes cross aquatic zones;
- sediment traps/silt fences in drains where considerable sediment flow is expected;
- brash mats to reinforce short sections of soft ground subject to high traffic usage;
- log steps on steep routes to prevent the flow of sediment-laden surface water.

Site restoration

Outline site restoration procedures to be undertaken, including replace damaged culverts, clearing and repairing drains, sediment traps, correctly disposal of hazardous materials, and removing log bridges and other temporary structures as necessary.

Wildlife habitats and biodiversity

Ensure that biodiversity zones and important wildlife habitats retained for biodiversity are protected during harvesting. Assess harvest operations with due regard to the breeding and nesting seasons of important species, and associated features such as badger setts and

heronries. Important species to consider include birds of prey, badger, bats, red deer, hare, hedgehog, otter, pine marten and red squirrel.

Method of harvesting and the harvesting machinery

Assess impact on soil, road network, habitats, water courses etc. and identify machinery to suit harvest system, soils, terrain, environment and forest road network.

Replanting Lands

Identification of replacement land area in line with the Forest Service Policy on the Granting of Felling Licences for Wind Farm Development. An environmental assessment of the planting of replacement land will be assessed as part of the EIAR.

15.0 CULTURAL HERITAGE

15.1 INTRODUCTION

The principle aim of the Cultural Heritage Assessment is to anticipate and avoid impacts on the cultural heritage resource. Detailed constraints mapping in GIS will form the basis of this work, followed by further analysis of sites that will potentially be impacted upon, and field surveys to ground truth the results of the desk-based assessment and ascertain the significance of any potential impacts.

15.2 STUDY AREA

Moore Group (MG) will map the Study Area in GIS and identify the cultural heritage resource within the broader area. The various data sources (including but not limited to OSI mapping and historic mapping, aerial photography, archaeological sites, architectural sites and other cultural heritage sites) will be presented as GIS datasets which will be combined with desktop data.

15.3 SENSITIVE RECEPTORS

The archaeological and architectural sites noted above will be reviewed in GIS to ascertain whether there is a potential for direct or indirect impacts or for impacts on the setting of cultural heritage sites. Where sites are in visually prominent locations and may be susceptible to impacts on their setting from visually prominent development in the wider area these will also be mapped. Sensitive receptors within and in the vicinity of the study area of the proposed Castlebanny Wind Farm will be identified as part of the scoping, constraints and EIAR process. Initial work indicates that there are two known archaeological monuments within the study area (KK032-029--- and KK036-040---, an enclosure and structure respectively). There are three known monuments within 200m of the project boundary.

15.4 DESKTOP AND FIELD SURVEYS

All cultural heritage work will be cognisant of best current practice. MG will undertake preliminary windscreen surveys to ensure that any potentially significant cultural heritage constraints are noted as early as possible. Along with analysis of the density of cultural heritage sites within and in the vicinity of the proposed development, this will form the basis of the initial scoping report. MG will produce written studies identifying cultural heritage constraints (including sites where there is potential for impact on setting). This initial scoping document will comprise a high-level report outlining the relevant legislation and what the designated and

undesignated cultural heritage sites that could be impacted on by the proposed development are. It will include a review of County Development Plans, Heritage Plans, Landscape Conservation Areas, other heritage studies such as industrial heritage surveys and relevant Policies and Objectives. A report will be produced that provides written description of data including how and when it was obtained and outlining the various degrees of legislative protection and importance.

Cultural heritage sites located in the immediate vicinity of the proposed development which could be subject to direct physical impacts during the construction phase will be highlighted for review of design to avoid impacts where possible. We will also undertake a review of the data to highlight sites with particular sensitivity to impacts on setting that are located within the surrounding landscape. MG will assist the lead consultant in the layout optimisation process as necessary, providing specialist feedback in relation to cultural heritage issues. A review of cartographic sources and aerial photography will be carried out at this stage, and any anomalies observed will be mapped and recorded. Any issues arising will be flagged at this stage for further investigation.

A second phase of field inspection will be carried out to investigate any identified anomalies and ground truth the desktop analysis. This will, where possible, involve viewing sites from nearby roads or field visits. A survey of the proposed cable and haul routes will also be carried out. The survey team allocated to this task will note, record and locate vernacular features which could be impacted upon by the proposed works. This will include Protected Structures, bridges, street furniture etc. and other cultural heritage features as well as other cultural heritage features in the vicinity of these proposed routes.

Upon completion of a final design of access routes, haul roads, substations, connections and location of turbines etc., MG will undertake the preparation of the Cultural Heritage Chapter of the EIAR. This work will be completed to the highest standards of professional best practice and cognisant of EPA guidelines, relevant County Development Plans, Best Practice Guidelines and legislative protection afforded to the archaeological, architectural and cultural heritage resource. MG will ensure that the scope and extent of the cultural heritage chapter are appropriate to form the basis of the EIAR to be submitted with the application. Following completion of the preliminary baseline study and preliminary assessment of impacts, and, subsequent to freezing of site layout, a final programme of fieldwork will be undertaken to ground truth the results of the desk based work and ascertain the likely potential significance of

the impacts that the proposed development may have on the cultural heritage resource. Sites that may experience impacts from the proposed development will be visited and the potential impacts qualified and quantified in line with EPA guidelines.

MG will work closely with the landscape consultant in highlighting the most important archaeological and architectural sites and coordinate with them in the production of photomontages from the most sensitive archaeological and architectural receptors.

A detailed assessment will be carried out on any potential impacts that the proposed development may have on the cultural heritage resource, based on analysis of the data sources listed above and elsewhere herein. Any potential impacts identified will be discussed with the project team and amendments made to the proposed design where possible to eliminate or minimise the potential impact.

15.5 CUMULATIVE EFFECTS

Based on the findings and the likely impacts and risks that may be anticipated, and the potential cumulative effects that may arise, guidance will be provided towards the mitigation of these impacts and minimisation of the associated risks during construction.

16.0 TRAFFIC AND TRANSPORT

16.1 INTRODUCTION

The purpose of the traffic impact assessment will be to assess the potential impacts of the proposed wind farm on the surrounding roads and potential sensitive receptors. The potential requirement for construction stage traffic management will be assessed as part of the EIAR process.

16.2 STUDY AREA

Castlebanny Wind Farm is located in south-east Kilkenny approximately 1.8km south-east from Ballyhale, 3.9km south-east of Knocktopher, 7.1km south of Thomastown, 4.1km north-east of Mullinavat, 5.7km south-west of Inistioge, 4km west of Tullogher and 10.8km north-west of New Ross. The selected Coillte land parcel is approximately 1600 ha and the site is predominantly covered in active Coniferous forestry plantation areas. The Arrigle River runs south-north to the east of the site area and the Derrylacky River runs to the west of the site.

The national motorway, the M9, is approximately 5km from the study area. A network of regional roads including the R699, R448 and R407 are in the vicinity of the site with local access to the existing site access and internal haul roads.

16.3 SENSITIVE RECEPTORS

As detailed in Section 5, sensitive receptors in the vicinity of the proposed Wind Farm will be identified as part of the scoping and EIAR process.

16.4 DESKTOP AND FIELD SURVEY

The primary traffic related impact caused by a wind farm generally occurs during the construction stage of the project. As such, the traffic assessment within the EIAR will focus on the impacts that will be associated with the construction of the Wind Farm. From the site investigation works, the quality of the materials that will be arising from excavations will be considered and peat/overburden will be side cast or deposited elsewhere on the site for beneficial reuse.

The extent of rock, sand and gravel on-site will be identified and it is expected that if present that this will be exploited in order to minimise traffic movements to and from the site. The

wind farm will also be designed such that all surplus excavated materials will be used on-site for landscaping purposes thereby minimising the volume of materials leaving the site, reducing the cost of disposal and minimising the construction traffic.

Using aerial photography and mapping, haul routes will be identified for the construction process. These haul routes will be originally assessed by undertaking a site visit and driving the proposed haul routes. A qualitative assessment of the proposed haul routes will be carried out identifying pinch points, tight bends, steep elevations, poor pavement conditions, road structures, watercourse crossings etc. and the haul routes will be revised where necessary. Swept path analysis will be undertaken at identified constraints by the traffic specialists to inform the assessment. Early engagement with third party landowners will be undertaken where details of external road improvements are proposed and these will be included in the EIA as appropriate.

The traffic team will also look at traffic access to the site from the public road network, including sightlines and advise on any limitations. They will consider if the existing site access is appropriate for construction and work vehicles to enter and exit the site in a safe manner. Due to the location and existing land use, steep gradients are envisaged on existing access roads. Longitudinal profiles and sections shall be undertaken in accordance with the TII Publication Rural Road Link Design (DN-GEO-03031 June 2017) to develop suitable road levels.

Using information on the project construction methodology, an estimate of the number of vehicles (both light and heavy good vehicles) that would be generated by the construction phase, will be produced. These estimates can be used to assess the impact on the road network in numerical terms and will also feed into other EIAR chapters such as noise and air quality. The Road / Traffic Section of Kilkenny County Councils will be consulted, and the relevant information will be taken into consideration in accordance with the Traffic and Transportation Assessment Guidelines, May 2014 (PE-PAV-02045).

The Traffic Chapter of the EIAR will be completed, taking into consideration the information generated during the processes described above, identifying impacts and proposing mitigation measures where appropriate.

Typically, wind farms are located in rural areas and this poses challenges for the delivery of abnormal load turbine components to site. The proposed Wind Farm is no different in this respect and so one of the key roads and traffic issues will be identifying a suitable haul route for

the successful and safe delivery of turbine components to site. The close proximity of the M9 national road, with links to ports in Kilkenny (Port of Waterford), Dublin and Cork, is a benefit to the site location.

A separate report, a Traffic Management Plan, will be appended to the EIAR. This report is a 'living document' that incorporates the commitments outlined in the EIAR at planning stage and shall be developed further by the Designers at Detailed Design Stage and Contractor at Construction Stage. The Traffic Management Plan will consider measures to ensure that any increase in activity along the public road network during construction, operation and decommission does not result in an increase in safety hazards.

The requirement for the preparation of a Stage 1 Road Safety Audit (RSA) will be considered and discussed with the traffic department in Kilkenny County Council. Where required, this will be completed by a suitably qualified traffic expert and included in the EIAR.

16.5 CUMULATIVE EFFECTS

Based on the site investigation findings and the likely impacts and risks that may be anticipated, and the potential cumulative effects that may arise, guidance will be provided towards the mitigation of these impacts and minimisation of the associated risks during construction, operation and decommissioning.

17.0 INTERACTION OF THE FOREGOING

A section of the EIAR entitled "Interaction of the Foregoing" will summarise the primary interrelationships of aspects of the various environmental topics with the potential for significant effects as a result of the proposed development.

18.0 SCHEDULE OF MITIGATION MEASURES

A summary chapter collating all of the mitigation measures relevant to the proposed development will be included in a standalone section of the EIAR i.e. a Schedule of Mitigation Measures.

19.0 CONSULTATION

19.1 SCOPING CONSULTATION

Following the preliminary design of the Castlebanny Wind Farm layout and turbine locations, it is proposed that the project team will commence consultation initially with the bodies listed below, in order to allow sufficient time for receipt of meaningful feedback.

A request to enter into pre-application consultation with An Bord Pleanála was submitted to the Board in December 2019 and a date for an initial consultation meeting is awaited.

Consultee List
Prescribed Bodies
Department of Communications, Climate Action and Environment
Department of Culture, Heritage and the Gaeltacht (Development Applications Unit)
Department of Housing, Planning and Local Government
Department of Agriculture, Food and Marine
Transport Infrastructure Ireland
An Taisce - The National Trust for Ireland
Fáilte Ireland
The Heritage Council

Southern Regional Assembly
Inland Fisheries Ireland
Waterways Ireland
Irish Aviation Authority
Kilkenny Airport
Waterford Airport
Coras Iompair Eireann (CIE)
Department of Transport, Tourism & Sport
HSE South
Commission for Regulation of Utilities
Irish Water
Department of Defence
Other Consultees
Waterford County Council - Planning, Environment, Roads
Tipperary County Council - Planning, Environment, Roads
Wexford County Council - Planning, Environment, Roads
Geological Survey of Ireland
BirdWatch Ireland
Teagasc
Irish Raptor Study Group
The Arts Council
Environmental Protection Agency
Health & Safety Authority
Sustainable Energy Authority of Ireland
Irish Wildlife Trust
Bat Conservation Ireland

3 Counties Energy Agency
Office of Public Works
Forest Service
Mountaineering Ireland
Irish Trails/Sport Ireland
Met Eireann

Additional consultees will be added to this list throughout the preparation of the EIAR and through discussions with the planning authority and local authority.

19.2 PUBLIC CONSULTATION

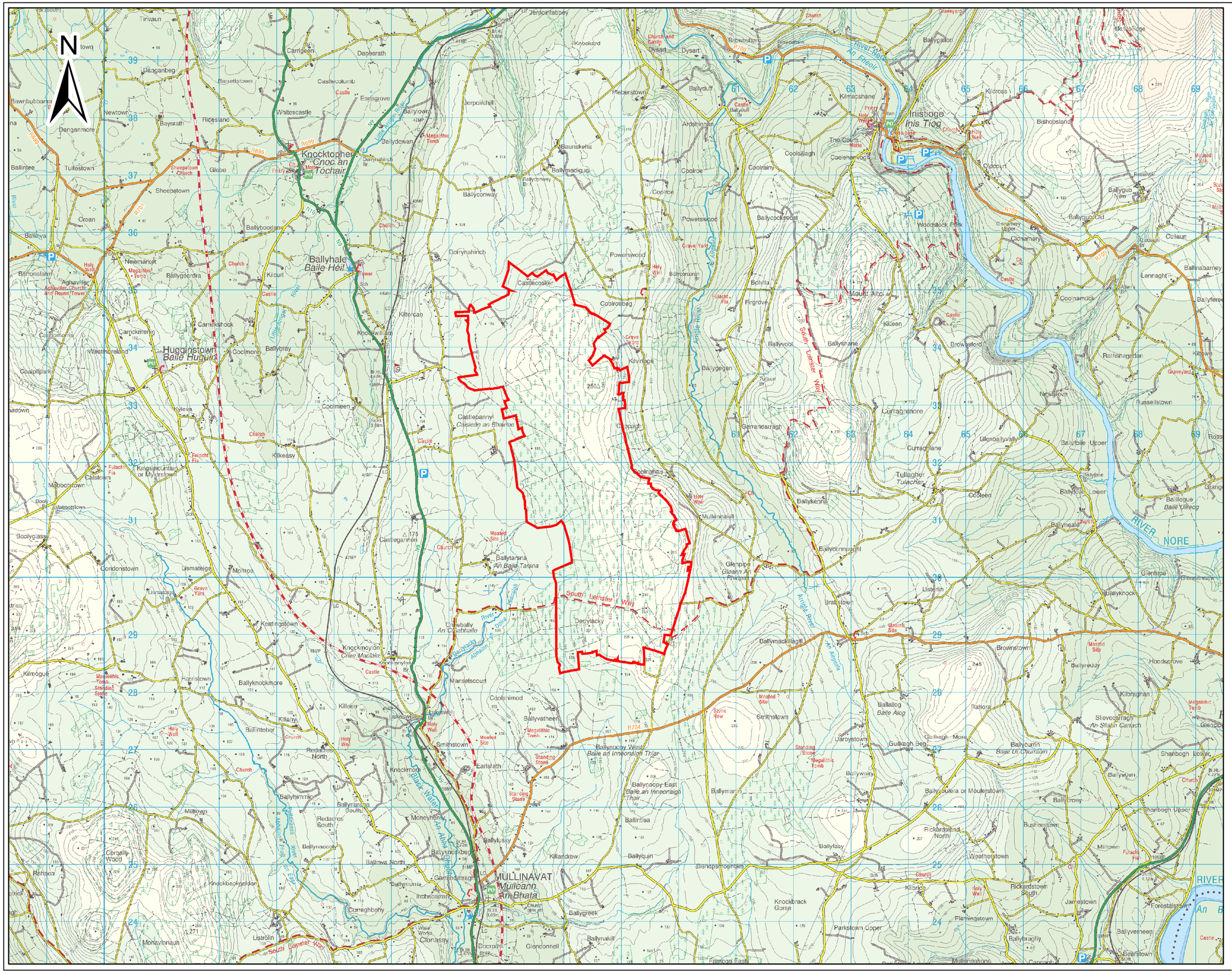
The Community Engagement Strategy for the Project is based around engaging with the local community in an open, honest and transparent manner with the aim to not only provide clear and understandable information but also to gain feedback to understand the views of the local community. This feedback and information will be used to inform the design process, thereby allowing the local community an opportunity to have an influence on the project design.

A Community Liaison Officer (CLO) has been appointed as the point of the contact for the Project and has begun engaging with the local community. The purpose of the CLO is to introduce the project to the local community, engage and establish a line of dialogue with the local community and facilitate one-to-one consultation meetings, or group meetings as appropriate. The CLO will also disseminate information on the project to the local community as it becomes available and as the project progresses.

Contact details for the CLO and Project Manager will be provided, for local residents to get in touch with any queries or comments regarding the design and assessment of the proposed project as it progresses.

TOBIN will be providing assistance to the Coillte Engagement Team where needed, particularly in areas where technical specialist knowledge is required.

Appendix A – Figures



Legend

Site Boundary

Issue	Date	Description	By	Chkd.
A	Dec. '19	Final	F.H.	R.H.

0 0.5 1 2

Kilometres

Client: COILLTE

Project: Castlebanny Wind Farm

Title: Regional Site Location Map

Scale @ A3: 1:60,000

Prepared by:	Checked:	Date:
F. Healy	R. Hunt	Dec 2019

Project Director: Siobhán Tinnelly

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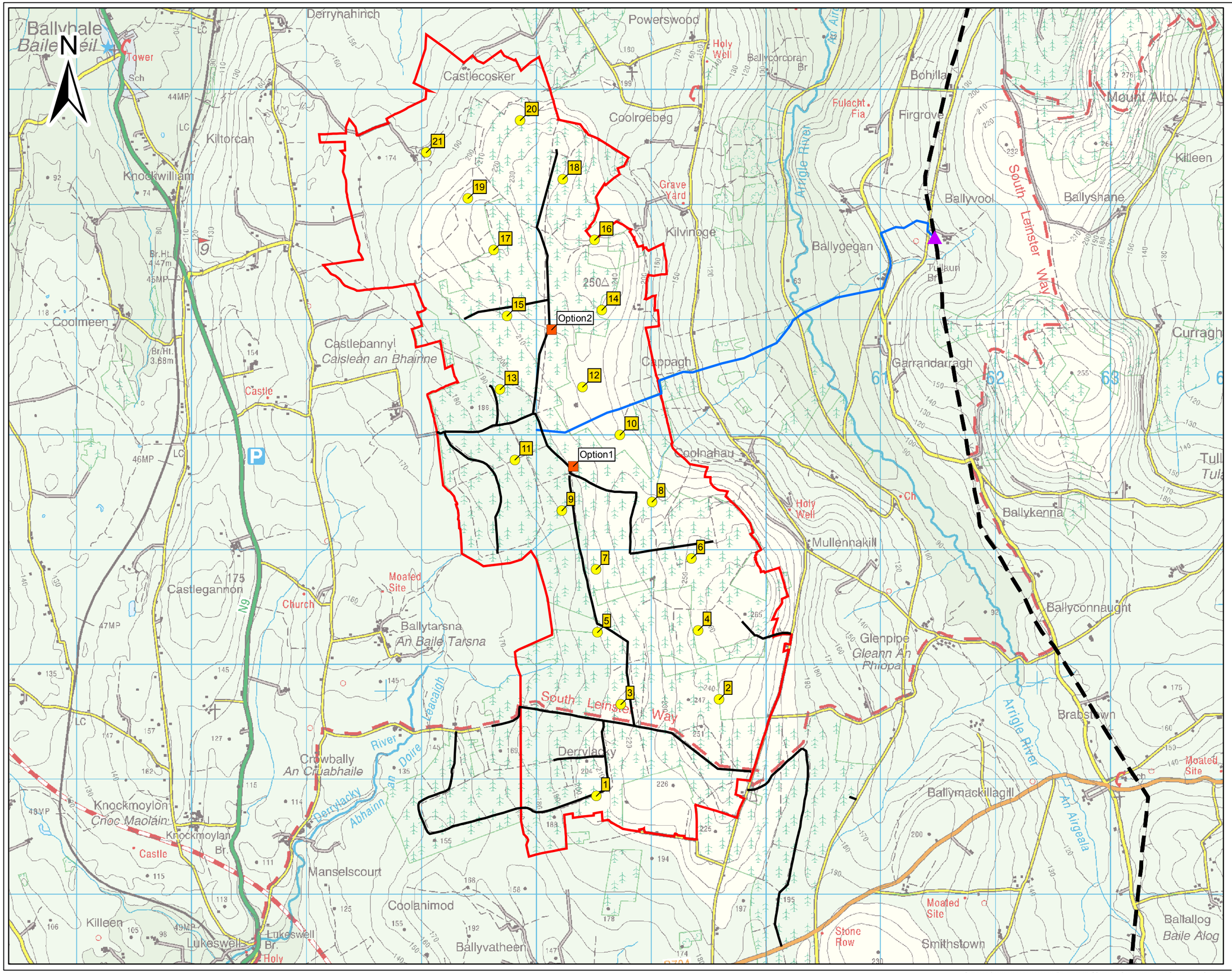
Drawing No.: Figure 1

Draft: A



Legend

- Site Boundary
- Turbine Locations
- Overhead Line Connection
- Proposed Substation Locations
- Exisiting Forest Roads
- Provisional Cable Route
- Existing Overhead Route

Issue	Date	Description	By	Chkd.
A	14/01/2020	Final	F.H.	R.H.

0 0.5 1
Kilometres

Client: COILLTE

Project: Castlebanny Wind Farm

Title: Indicative Turbine Layout and Grid Connection Corridor

Scale @ A3: 1:30,000

Prepared by:	Checked:	Date:
F. Healy	R. Hunt	January 2020

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Drawing No.: Figure 2

Draft: A

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