DERREENACRINNIG WEST WIND FARM

APPLICATION FOR SUBSTITUTE CONSENT UNDER S177E OF THE PLANNING AND DEVELOPMENT ACT 2000 [AS AMENDED] ABP-REF-302837-18

20kV GRID CONNECTION TO CONNECT THE PREVIOUSLY CONSENTED DERREENACRINNIG WEST WIND FARM, DRIMOLEAGUE, COUNTY CORK TO THE NATIONAL GRID

NON-TECHNICAL SUMMARY

June 2019

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PROJECT	Application for Substitute Consent Under S177e of the Planning and Development Act 2000 [As Amended] Abp-Ref-302837-18 20kv Grid Connection to Connect the Previously Consented Derreenacrinnig West Wind Farm, Drimoleague, County Cork to the National Grid	
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DERREENACRINNIG WEST WIND FARM

NON – TECHNICAL SUMMARY

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PREAMBLE

This document is the Non-Technical Summary of the Environmental Impact Report (EIA) for the construction of a Grid Connection to connect the already consented Derreenacrinnig West Wind Farm to the existing Ballylicky substation in Co. Cork. The Non-Technical Summary sets out, in nontechnical language, a description of the project, predicted impacts and any mitigation measures that can be taken to reduce negative impacts.

Environmental Impact Assessment is a process for anticipating the effects on the environment, which could be caused by a development. Where effects are identified which are unacceptable, these can then be avoided, reduced and mitigated against. The Environmental Impact Assessment (EIA) is a written statement of the affects, if any, which a proposed development, if carried out, would have on the environment.

1.0 INTRODUCTION

An application for Substitute Consent is sought by ESB Networks [ESBN] to regularise planning permission for a partially built Grid Connection to connect the already consented Derreenacrinnig West Wind Farm to the existing Ballylicky substation in Co. Cork.

The consented Wind Farm site is located approximately 12 km west of Dunmanway in the townland of Derreenacrinnig West. Drimoleague is located 7 km south of the site and Dunmanway is located 11km east of the site and is located within the administrative boundaries of West Cork. See **Figure 1.0 - Site Location Map**.

Figure 1 - Site Location

The grid connection consists of a 20kV Electrical Connection (13.916km), of which, 10.738 km is 20kV overhead line (OHL) mounted on single wooden pole sets and 3.178 km is ducted underground power cable in 6 separate locations, to connect the previously consented Derreenacrinnig West Wind Farm to the existing Ballylicky Substation. The extent of the gird connection is show in **Figure 1.1.**

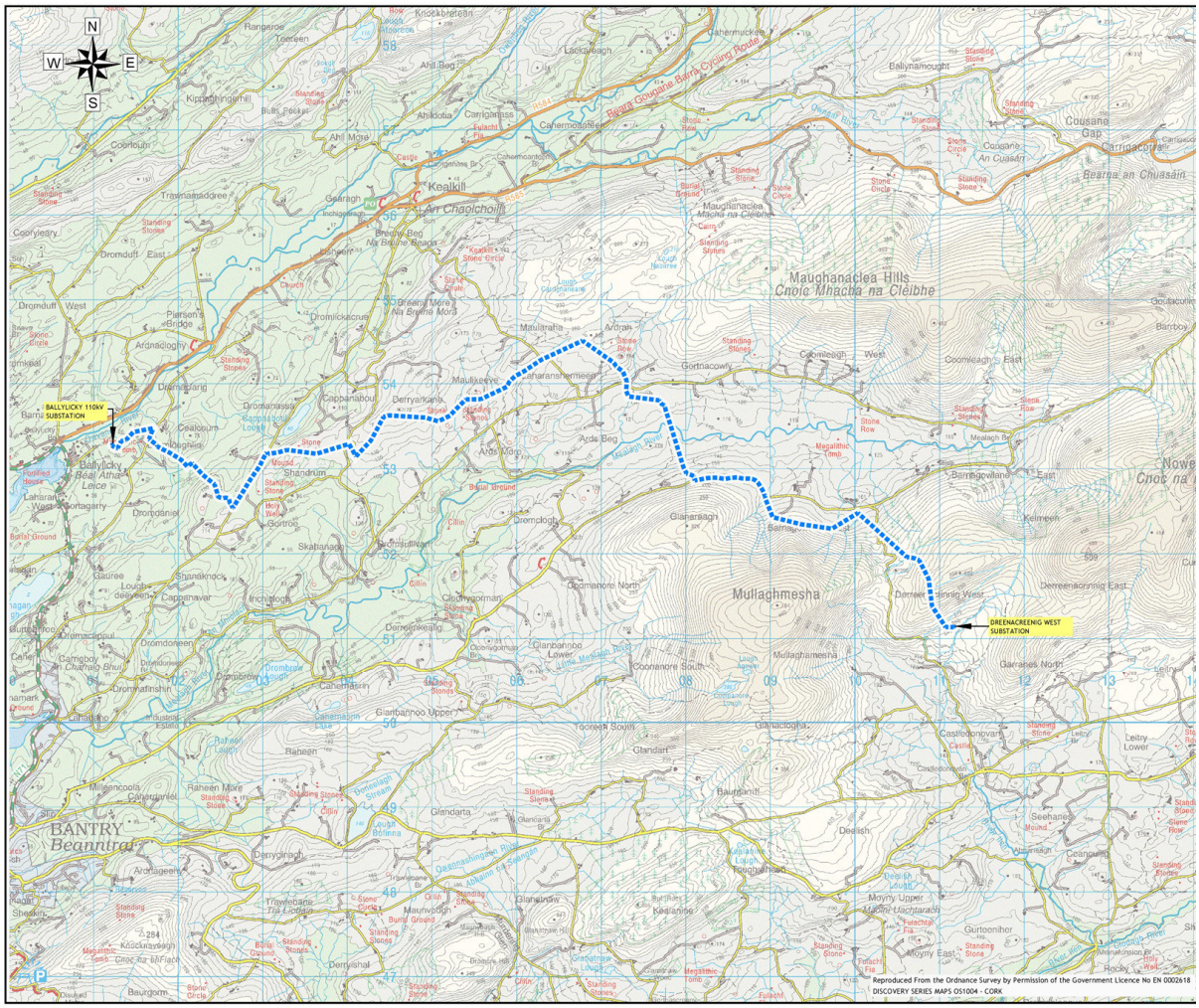

Figure 1.1 Site Location showing Grid Connection from Ballylicky Substation to Derreenacrinnig West Wind Farm

The Grid Connection is located within the townlands of Ardrah, Ards More (East), Ards Beg, Barnagowlane West, Balllicky, Crossoge, Dromlickacrue, Derryarkane, Derreenacrinnig West, Dromclarig, Drumloughlin, Gortroe, Gortnacowly, Gleanreagh, Laharanshermeen, Maulikeeve, Maularaha and Shandrum More in Co. Cork.

The location of the Grid Connection route is shown in Figure 1.1. The site of the proposed development is located between the townlands of Derreenacrinnig West and Ballylicky passing through various townlands as listed above.

The consented Wind Farm comprises 7 electricity generating wind turbines with a hub height of 55 metres and a rotor diameter of 52 metres giving an overall height of 81 m, an electrical compound and substation building, borrow pit, associated site roads and site works. The total site area of the Wind Farm is approximately 123 hectares and ranges in elevation from 210 m to 400 m OD (Malin Head), sloping upwards from south to north.

Existing Grid Connection

The section of Over Ground Connection which has already been constructed [9.537km] which is now the subject of the substitute consent application to An Bord Pleanála.

Table 1.1: Existing Grid Connection

Area 1	Comprises 408 metres of Overhead Lines.
Area 2	Comprises 619 metres of Overhead Lines.
Area 3	Comprises 4.565 km of Overhead Lines.
Area 4	Comprises 829 metres of Overhead Lines.
Area 5	Comprises 3.115 km of Overhead Lines.

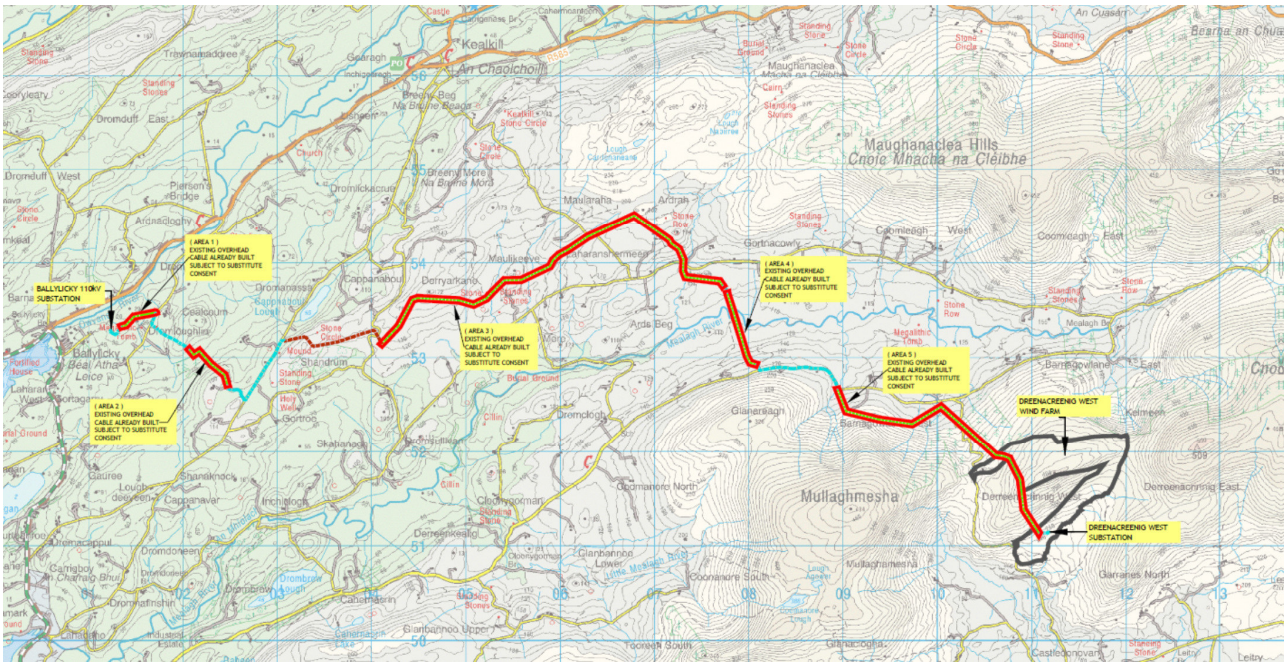

Figure 1.2 Site Location showing the existing overhead grid connection

2.0 ENVIRONMENTAL IMPACT ASSESSMENT

The Environmental Impact Statement is presented in two volumes, of which this is **Volume I**.

- **Volume I - Non-Technical Summary / EIAR Report / EIAR Figures**
- **Volume II - Technical Appendices**

This remedial EIA Report ("EIAR") has been prepared by Jennings O'Donovan & Partners Limited on behalf of the Applicant to accompany an Application for Substitute Consent for the existing grid connection. This EIAR takes into account the overall project as a whole (noting that the Proposed Development application is for modifications to the 2010 Permission), including the Proposed Development (i.e. the development for which planning permission is sought) and all direct and indirect effects, and cumulative impacts and interactions, including all relevant ancillary and subsidiary elements of the overall project.

This EIAR is prepared in accordance with the EIA Directive 2014/52/EU and, to the extent possible and appropriate in the absence of national legislation or adopted guidance.

The EIAR is structured as follows:

- Section 1: Introduction
- Section 2: Project Description
- Section 3: Planning Policy
- Section 4: Population and Human Health
- Section 5: Biodiversity
- Section 6: Land, Soils and Geology
- Section 7: Hydrology and Hydrogeology
- Section 8: Air and Climate
- Section 9: Noise and Vibration
- Section 10: Shadow Flicker and Electromagnetic Interference
- Section 11: Landscape and Visual
- Section 12: Material Assets
- Section 13: Cultural Heritage
- Section 14: Interactions of the Foregoing

Each topic is discussed, with sections detailing the following:

- The Existing Environment,
- Potential Impacts of the proposed development,
- Mitigation Measures,
- Any monitoring measures required.

When considering the characteristics of the proposed development, reference is made to layout, design, size and scale. Projections of the likely levels of impact on any particular environmental

topic can be made. Remedial and/or mitigation measures are recommended, helping to eliminate or reduce negative impacts.

3.0 CLIMATE CHANGE

The global demand for energy is increasing, linked to growing populations and the associated increase in urbanisation and industrial development. The primary source of energy remains non-renewable fossil fuels. Energy is produced by combustion of these fuels. This thermal energy is either used directly as an energy form or is used in the production of secondary energy forms (e.g. transport, electricity).

This energy production process results in the atmospheric emission of various gaseous compounds, such as carbon dioxide (CO_2) and various compounds of sulphur oxides (SOx) and nitric oxides (NO_X). The latter compounds SO_X and NO_X have been identified as contributing to acid rain, which results in damage to forestry, watercourses and associated ecology.

Carbon dioxide (CO_2) is a greenhouse gas. The emissions of greenhouse gases are now recognised as having serious damaging effects on the environment. The effects of the gases result in increased global temperatures with consequent effects on sea levels due to ice-cap melting and altered weather patterns.

The UN sponsored Intergovernmental Panel on Climate Change (IPCC) has projected increases in sea levels leading to severe flooding and IPCC scientists expect major ecological changes to occur as a result. The IPCC has also estimated that the average global temperature will increase by up to 5.8^{o}C over the next century. The initial effects of these changes are considered by experts to be already manifesting themselves.

4.0 NATIONAL POLICY

In the light of Ireland's commitment to reduce emissions from energy and in the context of increasing national demand for electricity, the Government has introduced a number of measures. These include the efficient use of electricity and the production of electricity from non-fossil renewable sources, in particular wind energy.

The key drivers for renewable energy, and therefore the Derreenacrinnig West Wind Farm project are reducing greenhouse gas emissions, providing energy security, and maximising economic opportunities from investment for Ireland. In addition, this project is considered to represent a significant opportunity for cost reduction in wind energy, an increasingly. The proposed project would have a generation capacity of up to 22.4 MW. Irish legislation is underpinned by a number of international (e.g. EU and United Nations (UN)agreements, which are outlined in this section.

Ireland's first National Climate Change Adaptation Framework (NCCAF), which was published in December 2012, aims to ensure that adaptation actions are taken across key sectors and also at local level to reduce Ireland's vulnerability to climate change. The NCCAF requires the development and implementation of sectoral and local adaptation plans which will form part of the national response to the impacts of climate change. Each relevant Government Department (or State Agency, where appropriate) are required to prepare adaptation plans for their sectors. 12 Sectors were identified in total including Transport, Flood Defence, Agriculture and Energy. The Climate Action and Low Carbon Development Act 2015 puts the development of National Climate Change Adaptation Frameworks and Sectoral Adaptation Plans on a statutory basis.

The "Climate Action Plan 2019" was published by the Government on 17 June 2019. The aim of the plan is to make Ireland a world leader in responding to climate change. The Plan is ambitious, affecting almost every sector of the economy. The key difference however, between this Plan and previous ones is that it creates new governance structures necessary to implement the far-reaching changes. The key focus of the Plan is to identify how the Government plans to reduce Ireland's growing greenhouse gas emissions.

5.0 ALTERNATIVES EXAMINED

The Environmental Protection Agency (EPA), in its guidance documents on EIS preparation, stipulates that alternatives which were assessed prior to beginning the project design be explained in the EIS. The alternatives can include;

- Alternative locations
- Alternative designs
- Alternative processes

5.1 SITE SELECTION

The criteria under which a site is examined are as following;

- **Availability of Wind**

  To operate a wind farm efficiently, an average annual mean windspeed of 8 metres per second is generally considered to be required.

- **Environment**

The wind farm preferably should not be located in an area designated as a Special Protection Area, Natural Heritage Area or Special Area of Conservation or where the visual aspect of the wind farm would be overly obtrusive. Preferably the site should hold little or no particular scenic, archaeological or ecological interest.

- **Accessibility**

  The site needs to have reasonable access to facilitate construction and the subsequent operation, maintenance and monitoring of the site.

- **Dwellings**

  Locations with low housing density and proximity are preferable, so as to minimise any disturbance which may be caused to people as a consequence of construction activities, visual impact, shadow flicker or noise. Ideally no dwelling should be closer than 500 metres.

- **Grid Connection**

  Close proximity to a suitable connection point with the electricity grid is desirable in order to minimise the impact of any overhead lines. The ESB network must be capable of absorbing the power without adverse affects on existing ESB installations or customers.

- **Terrain**

  The site should not be overly difficult to develop and should not exhibit deep cohesive geological strata and should not show signs of instability.

- **Electromagnetic Interference**

  Preferably the development should be sited in an area where there is a low potential for electromagnetic interference with telecommunications, television and radio.

The following alternative site locations were examined:

Option 1 – Glanbannoo Upper

Option 2 – Garranes North

Option 3 – Derreenacrinnig West

Selected Site – Derreenacrinnig West, Drimoleague, Co Cork.

This site was selected for the following reasons;

- Derreenacrinnig West Wind Farm is not located in a Strategic Search Area or a Strategically Unsuitable Area. However, objective INF 7-4 (C) of the Cork Development Plan 2009 states *"It is an objective in the strategic search areas (and in those areas that are identified as **neither** strategic search areas nor strategically unsuitable areas), to consider new, or the expansion of existing, wind energy projects*
- The site is not located within a National or International Environmental Designated areas of conservation concern.
- The site is not designated as a Scenic Landscape by Cork County Development Plan, 2009.
- The site had the lowest elevation resulting in the lowest visual impact on scenic amenities.
- The site has high level of visual screening to the north, west and east by the Maughanaclea Hills, Nowen Hill and Mullaghmesha Hills.
- The site maintains the required distance of 500 metres from houses as recommended by the Windfarm Planning Guidelines, 2006.

5.2 ALTERNATIVE TURBINE TYPES

Turbines considered for the site were required to have:

(a) A wind class rating suitable to the site.
(b) Low noise output.
(c) Three blades, which have a greater aesthetic quality than two bladed or single bladed machines.
(d) Cylindrical type towers, which have a greater aesthetic quality than pylon or lattice type towers.
(e) Reduced height to avoid visually dominating the area and to reduce the wind farms zone of theoretical visibility.
(f) Good financial security by manufacturer (to ensure that operation and maintenance support, spares etc., can be available through the full operational life of the turbine).
(g) Proven track record by manufacturer.

The turbine model will be selected from a range of models that have demonstrated their effectiveness at other locations throughout Europe and are proven to be of the highest international standard. Turbines from well-established manufacturers meeting the above criteria were considered. The following options were short-listed:

(a) 7 No. Nordex N90 turbines (Base to blade to tip height of 125 m).

(b) 7 No. Vestas V52's or Gamesa G52's or a turbine with an equivalent base to blade tip height of 81 m.

(c) 12 No. Enercon E70 turbines (Base to blade to tip height of 99.5 m).

Option (a) was ruled out because it was decided that the Nordex N90's dimensions were too big for the proposed location. Option (c) was ruled out because there would be too many turbines and the view would be too cluttered.

Therefore, it was decided to proceed with option (b) as it is the least visually intrusive option. The proposed turbine dimensions for Derreenacrinnig West are based on a turbine model with an overall height of 81m which offers the following features:

- The minimum number of turbines are utilised.

- The minimum footprint area is required as fewer turbines need to be employed.

The turbines to be used will depend on availability and suitability but the overall height will not exceed 81 metres.

The parameters used in the footprint calculation, visual assessment, shadow flicker assessment and noise impact assessment are based on a turbine of overall height of 81m i.e., Worst Case calculation is recorded for each topic.

5.3 ALTERNATIVE ACCESS ROUTES

There is one haul route to the wind farm site. The routes for civil works construction traffic will be designated the same as that chosen for the turbine delivery traffic.

The turbine blades are the longest piece of equipment to be transported and their delivery requirements have been considered in the selection of the Haul Route. Delivery traffic will travel via the N28 and the N25 National Roads from Ringaskiddy, past Cork City as far as the roundabout in Bishopstown that joins the N25 and the N71. Here the traffic will turn left onto the N71 and

travel through Inishannon as far as Bandon. In Bandon the traffic will turn right onto the R586 over the bridge and turn left, continuing along the R586. The traffic will then travel along R586 Regional road, through the town of Dunmanway, across the north of the square to Castle Street and on to the Local road network. The traffic will follow Castle Street onto the L4609 for approximately 0.5km and turn left onto the Castledonovan Road (L4614-0). The traffic will follow this road for approximately 12km and turn right onto a local road just before it reaches Castledonovan Bridge. The traffic will then follow the local road for approximately 1.6km before it reaches the site entrance.

5.4 ALTERNATIVE INTERNAL LAYOUTS

During the Environmental Assessment process, the site was examined in terms of environmental constraints. Turbine and access roads layouts were designed to avoid deep areas of peat, maintain a 500m distance from dwellings and where possible, maintain a 50 m from all watercourses within the site. The final layout incorporates design recommendations from the Windfarm Planning Guidelines; Recommendations from specialist sub-consultants and other consulted and drainage / road design best practice documentation.

5.5 ALTERNATIVE GRID CONNECTION

The grid connection route was not considered in the 2010 EIS. The planning permission for the Grid Connection and its likely impacts are assessed in this EIAR.

The range of alternatives can include a 'Do Nothing' alternative where appropriate. This examines likely land use changes or other interventions, the likely effects of climate change, and the significance of these changing conditions.

Not proceeding with the current proposal (i.e. the grid connection) would serve to significantly frustrate the completion of a fully permitted and partially constructed wind farm. This will undermine current Government targets under Ireland's Climate Action Plan 2019.

Having regard to all the above, the 'Do Nothing' alternative was not considered to be appropriate.

A rigorous grid connection route assessment was carried out as part of the EIA process. Three high level options were initially explored as part of the Grid Connection Assessment. These options are shown in **Figure 5.1**. Option 1 was considered to be the preferred route option as it posed the least environmental constraints and was a more cost-effective option than Option 2 and 3.

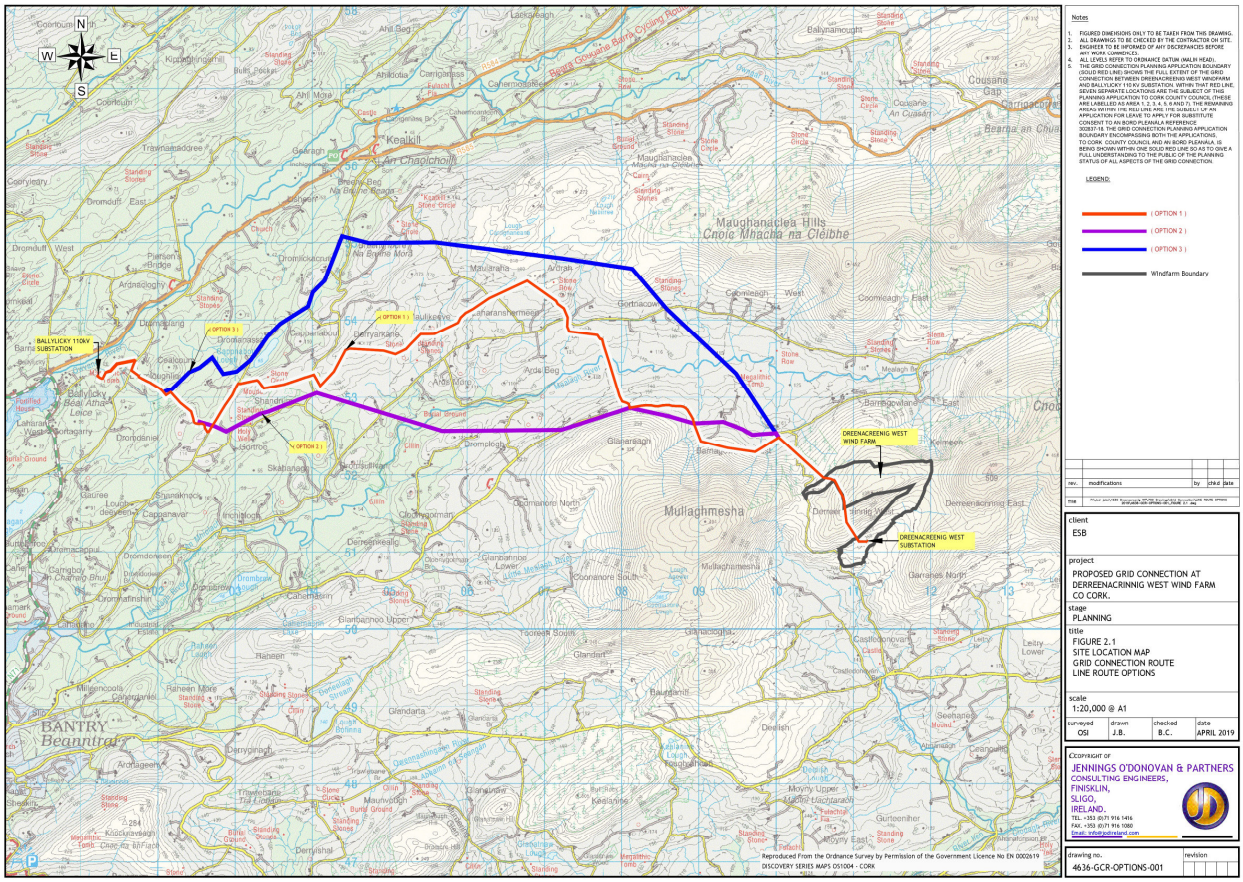

Figure 5.1 Overview of Grid Connection Alternatives

6.0 PROJECT DESCRIPTION

The Applicant is seeing planning permission for the part of the Grid Connection that requires planning permission to connect the project from the consented Derreenacrinnig West Wind Farm to the existing 110kV Ballylicky ESB substation in Co Cork.

The Proposed Development is located in the townlands of Ardrah, Ards More (East), Ards Beg, Barnagowlane West, Balllicky, Crossoge, Dromlickacrue, Derryarkane, Derreenacrinnig West, Dromclarig, Drumloughlin, Gortroe, Gortnacowly, Gleanreagh, Laharanshermeen, Maulikeeve, Maularaha and Shandrum More in Co. Cork ("the Proposed Development Site"). The principle of a wind farm development at the Proposed Development Site has already been approved by An Bord Pleanála with the grant of planning permission on 05th December 2012. Those elements of Grid Connection for which planning permission is sought comprises the following sections of Grid Connection:

The proposed 20kV grid connection will connect the permitted 7-turbine Derreenacrinnig Wind Farm to the existing Ballylicky 110kV substation in County Cork. The circuit will consist of 1.201

km of 20kV overhead line (OHL) mounted on single wooden pole sets and 3.178 km of ducted underground power cable. The proposed electrical connection is to be constructed by ESB Networks to the requirements and specifications of ESB Networks.

Area 1 UGC	201.5m
Area 2 UGC	624.5m
Area 3 UGC	1081m
Area 4 OGC	1201m
Area 5 UGC	112.300m
Area 6 UGC	1046m
Area 7 UGC	113m

The previously consented wind farm development is proposed to comprise seven electricity generating wind turbines with an overall height of 81 metres, an electrical compound, substation building, associated site roads and site works.

The wind turbines proposed are classified as upwind, horizontal axis turbines. The visible components include a cylindrical tower, nacelle generation and blades. The nacelle comprises the hub where the blades meet, and housing for a gearbox, generator and various ancillary items of equipment. The blades will rotate in a clockwise direction.

Underground cabling will be provided around the site for:

- Electricity transmission between the turbines and the Control Building
- Signal transmission between the turbines and the Control Building

The cable routes will be laid in the verge of the site roads and bedded in surplus excavated subsoil material or in imported sand. Danger tape, incorporating a metallic strip, will be laid during backfilling. Where the cables are to cross roads, ducts will be provided. Permanent posts will mark the trenches at regular intervals and at all changes in direction.

7.0 ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

7.1 POPULATION AND HUMAN HEATLH

Jennings O'Donovan & Partners Ltd. ("JOD"), have been commissioned by to assess the potential impacts of the EIA Development on population and human health.

This section of the EIA examines the potential population and human health impacts of the overall development which includes both the wind farm, the proposed grid connection and the cumulative impacts of both the grid connection and wind farm and all on-site infrastructure.

The potential affect of this project on population and human beings was assessed. There is unlikely to be any negative affect with regard to employment, settlement patterns, population, health and safety, land use and tourism. Indeed, some positive impacts can be predicted in terms of employment and settlement patterns due to a more stable energy network in the region. A stable energy network is a key consideration for the location of industry and business.

In addition, there is predicted to be a positive affect on other areas related to human beings such as climate and agriculture as a result of the reduced emissions of greenhouse gases because of this project. As such no mitigation measures are considered necessary.

7.2 BIODIVERSITY

The proposed wind farm development will result in a direct loss of approximately 1.7 ha of wet heath and blanket bog habitat. A small area of coniferous plantation forestry will be impacted where the existing borrow pit is to be extended. This habitat is of low ecological value and will not have a significant impact on local ecology. There will be a loss of heath and exposed bedrock habitat where the turbines are to be located. The small loss of habitat at these locations is not expected to have a significant impact on the functioning of these habitats within the site. Wet heath/bog will be impacted where the access roads are proposed to cross the site. The access road in the south of the site crosses a large area of intact wet heath/bog and has the potential to impact on a much wider area of habitat outside of the development footprint due to potential hydrological impacts cause by peat excavation. The potential indirect impacts associated with the access roads within the site can only be determined based on in-depth hydrological assessments of the peat characteristics, water table and flow directions. All of which will determine the potential for significant impacts to the peat habitats crossed.

Provided the mitigation measures are fully implemented in relation to the protection of all watercourses there will be no significant impacts as a result of the proposed development. Due to the geographical location of the site and the habitats within the site, there is potential for the Kerry slug to occur.

The wind farm and the pole locations for the overhead grid line will result in a cumulative loss of peatland habitats in the form of wet heath in the entire study area. However, the additional loss of this habitat arising from the grid connection route will be negligible, amounting to approximately 66m2 of temporary disturbance and 9.9m2 of permanent loss. This additional disturbance and loss of habitat will

have an imperceptible cumulative effect on the effect the consent wind farm will have on wet heath habitat occurring at the wind farm site.

The grid connection route and the Wind Farm will not have the potential to combine to result in adverse effects to designated conservation areas. No such areas are located in close proximity to or downstream of both elements of the project and due to the distance between the development and these areas and the absence of potential impact pathways there will be no potential for both elements to combine to result in likely significant effects to these areas.

7.3 SOILS AND GEOLOGY

Jennings O'Donovan & Partners Ltd. ("JOD"), have assessed the potential impacts of the proposed EIA Development on the soil and geological environment of the Proposed Development Site

The proposed development site is characterised by elevations between 200maOD and 400maOD at Malin Head and a spatial area of approximately 1km². The proposed development consists of one access road and seven turbines. The underlying geology consists of sandstones, siltstones and some mudstones of the Gun Point Formation with minor parts of the site underlain by the Toe Head and Castlehaven Formations. Bedrock is exposed across the majority of the site with unconsolidated glacial deposits and upland blanket bog peat covering the remainder of the site.

Slope gradients measured in the field, range from 0° to 80° with slopes of 0° to 12° around the proposed development. At the majority of coring sites across the study area humification values are between H3 and H7, with some sites displaying values >7 at the base of the deeper (>2m deep) peat. Shear vane tests across the site indicate a range of 18kPa to 34kPa; which is indicative of very soft to moderately strong peat substrate. There are historic records of two landslides or peatslides within 20km of the site; but locally there is no significant indication of ground stressing or instability.

The results of the geological investigations and assessment indicate that the potentially significant impacts of the proposed development are as follows:

1. Construction activity if undertaken in an inappropriate manner has the potential to destabilise ground conditions in blanket bog and cutover blanket bog environments; and thus, potentially cause a severe negative impact on the soils and geology aspect of the environment

2. The handling, storage and re-use of excavated materials have the potential to cause negative direct impact on slope stability and indirect negative impacts on water quality.

3. Slope stability was assessed and from site evidence and examination of records, the site is at low risk of slope failure. Using precautionary principles however, mitigation measures are recommended for the construction phase of the development to ensure ground stressing does not occur.

4. The mitigation measures recommended in this report to prevent and reduce the impacts identified above are as follows:

   (a) A number of practical measures have been outlined such as ground preparation in advance of excavation works, guidelines in the methodology for drainage and advancing excavation, and monitoring and supervision by an experienced peat geotechnical engineer/engineering geologist to ensure that the excavation part of the construction operations are undertaken in an appropriate way as to not cause ground instability at the site.

   (b) Measures in how to handle the living (acrotelm) and non-living (catotelm) peat have been outlined in order to ensure safe storage of temporary stockpiles and excavation spoils on site away from drainage, stream valleys, high slope gradients and break of slopes. No permanent stockpiles should be stored on site.

   (c) A number of best-practise mitigation measures have been outlined to avoid slope instability at wind farm sites.

   (d) All excavated earth materials must either be re-used in an environmentally appropriate and safe manner e.g. landscaping and bog restoration OR removed from the development site at the end of the construction phase. All introduced equipment and materials that have not been used up during the construction phase will be removed from the site.

   (e) It is recommended that an independent and experienced peat geotechnical engineer/engineering geologist be contracted for the detailed design stage of the project and geotechnical services should be retained throughout the construction phase, including monitoring and supervision of construction activities on a regular frequency.

Following implementation of the mitigation measures outlined for the geological and geotechnical aspects of the site, the resultant predicted impact of the development at the Derreenacrinnig West site is that there will be a change in ground conditions with the replacement of a small area of natural materials with concrete, and road construction sands and gravels. To ensure that the mitigation and control structures operate to stated purpose and comply with licence requirements, monitoring of ground conditions at an agreed frequency during the operation phase is recommended.

Cumulative effects from the EIA Development and other developments in the area will only occur during the construction and decommissioning phases of the Development as wind farms do not have an effect on soils and geology during operation.

7.4 WATER

An Application for Substitute Consent is sought for an Overhead Line to connect the previously consented Derreenacrinnig West Wind Farm to the National Grid at the existing 110kV Ballylicky ESB substation.

Study Area

The study area comprises the consented wind farm site and the grid connection route which extends from the Ballylicky Substation to consented Derreenacrinnig West Substation. The Grid Connection route comprises some 13.178 km and traverses' agricultural fields and an element of public road.

Minerex Environmental Limited (MEL) was contracted by Jennings O'Donovan & Partners on the 16th June 2010 on behalf of George O'Mahoney to undertake an impact assessment on the water aspects of the environment by the proposed wind farm at Derreenacrinnig West, County Cork. This study involved field investigations and desk assessment of all relevant data available on the site. The methodologies used are in accordance with best practise procedures and are outlined in detail in the technical report prepared and issued by MEL.

The proposed development site is characterised by elevations between 200 m OD and 400 m OD at Malin Head and a spatial area of approximately 122 hectares. The proposed development consists of one access road and seven turbines. The Derreenacrinnig West Wind Farm site is drained by two small streams which drain via the Melagh River to the north of the site, and the Ilen River to the south of the site. The bedrock underlying the site is classified as a 'Locally important aquifer, generally productive only in local zones (LI)'. The national well database compiled by the Geological Survey of Ireland (GSI) shows no wells located within 2km of the boundary of the site.

The result of the hydrological and hydrogeological assessment indicates the following impacts of the proposed development:

Construction Phase

There is anticipated to be increased surface water runoff arising from the developed sections of the site, which has the potential to be a significant negative impact if this runoff is not controlled or mitigated.

The release of suspended solids during the construction phase has the potential to be a short to medium-term, temporary but significant negative impact on the receiving surface water environment.

There is a risk of pollution from introduced hydrocarbons for plant equipment and sanitation facilities during the construction stage. These potentially significant to severe negative impacts can be mitigated by appropriate practical measures.

Groundwater seepage / inflow during excavation works is identified as a low magnitude, short-term negative impact that can be easily controlled by appropriate interceptor drainage.

There is potential for pollution of the underlying aquifer, albeit at a lower risk than for the surface water due to poor aquifer properties.

Operational Phase

There is potential during the lifetime of the project that the mitigation measures put in place to control surface water runoff and discharge can be damaged, blocked or under-perform to required specification.

Associated with drainage runoff, there is also a continued risk of suspended solids entering the surface water network pending on the maintenance of the constructed drainage design over the lifetime of the project.

The mitigation measures recommended in this report to prevent and reduce the potentially significant negative impacts identified are as follows:

Constraints Zoning

A process of "mitigation by avoidance" was undertaken by the EIA team where possible during the design of the turbine and associated infrastructure layout in order to avoid direct impact on drainage crossings and apply 50m buffer zones around site drainage.

Construction Phase Mitigation

A constructed drainage design is to be installed that includes (a) regular buffered outfall fans along the proposed road which disperses runoff across the site in a diffuse manner that mimics baseline hydrology, and (b) a two tier stilling pond system to control runoff discharge and attenuate suspended solids prior to exist discharge from the site.

Drainage and associated pollution control measures shall be implemented on site before the main body of construction activity commences. Where possible drainage controls should be installed during seasonally dry ground conditions.

A series of recommendations / remedial measures have been outlined to resolve the problem of peat erosion at the site and where possible, remediate the condition of the blanket bog vegetation cover, the purpose of which is to reduce surface water runoff and suspended solids loading from source.

In addition to the constructed drainage design, riparian buffer zones of 50m have been applied to protect existing drainage from suspended solids release.

A site-specific discharge and water chemistry monitoring programme is required during the construction stage to ensure that waters discharged from the site are below regulatory limits, particularly under high rainfall / storm events.

An environmental management plan is required for the construction stage, which will include regular checking and maintenance of pollution control measures tied in with water quality monitoring. Trigger-response action plans will be drafted up for repair or backup if any breaches in pollution control design (physical evidence) or water quality discharge limits (indirect evidence) occur.

It is strongly recommended that hydrocarbons are not stored or transferred on the development site. All refuelling for plant equipment during the construction phase of the project should be undertaken off-site at a controlled (bunded) transfer station. Risk of leakage on site from plant equipment requires regular checks and audits as part of the construction phase environmental monitoring plan (EMP).

A temporary, self contained port-a-loo with an integrated waste holding tank will be used on site for sanitation facilities. No water supply or sanitation structures will be introduced that will source, interact or potentially discharge to the site's hydrology.

Any groundwater seepage / ingress that may be encountered in the weathered bedrock / mineral subsoil should be intercepted by an interceptor drain and diverted to the constructed drainage system for pollution control attenuation prior to discharge. In the case of turbine bases, these can be pumped to interceptor drainage.

Operational Phase Mitigation

An environmental monitoring and audit programme is required for the operation phase of the project. This will include clear schedules and response measures for checking, auditing and maintenance of surface water flow / discharge and pollution control structures at the site to ensure their continued effective performance to regulatory standards for the lifetime of the project.

Following implementation of the mitigation measures outlined for the surface water and groundwater aspects of the site, the resultant predicted impact of the development is that there will be some local changes to how water flows at the site. There is also likely to be some short-term deterioration of the quality of runoff waters within the site. To ensure that the mitigation and control structures operate to stated purpose and comply with licence requirements, monitoring of water discharge and water quality during the construction phase and regular monitoring at an agreed frequency during the operation phase is recommended. It is anticipated that the hydrological impacts of the development will be negative, slight and temporary overall, with increased runoff being a negative, slight and permanent impact.

7.5 AIR AND CLIMATE

Jennings O'Donovan & Partners undertook a desk study of the potential impacts on air and climate from the proposed development. The desk study revealed that air quality in "Cork is Very Good". There is not expected to be any negative affect on air quality from this development in the long term although dust may be a factor during the short-term i.e. the construction stage.

Air quality issues associated with wind farms generally relate to dust and vehicle exhaust emissions during construction and decommissioning. A wind farm has little potential for impact on air quality when operational, the main potential effect is generally dust emissions from access tracks being the main factor. The potential for impacts therefore comes during the construction and decommissioning phases and the significance of the impact is influenced by its proximity to any sensitive receivers.

In terms of climate, the main potential effects are positive, in terms of reduced CO2 emissions during the operational phase.

The potential impacts arising from the Grid Connection works arise from the construction phase of the project. There is potential for the generation of dust from excavations and from construction of

access tracks and hardstands and the trench for the cable ducting for the grid connection. The construction phase is likely to lead to small localised increases in these emission levels which is likely to lead to a temporary imperceptible effect.

The proposed development of the wind farm and grid connection has the potential to cause negative effects in combination with other plans and projects during the construction phase should they be constructed at the same time. Increased amounts of dust could become friable and increased traffic could lead to increased emissions in the local area. However, given the short-term nature of the proposals any effects would be minor in nature.

7.6 NOISE

Mr Brendan O'Rielly of Noise and Vibration Consultants Limited undertook a Noise Impact Assessment of the proposed development on the surrounding dwellings. The impact of the proposed wind farm on the local environment has been assessed in line with the recommendations documented in the Department of the Environment, Heritage and Local Government recently published '*Wind Energy Development Guidelines'- Guidelines for Planning Authorities June, 2006*. Noise levels have been predicted at the nearest residences and, at all of these, the predicted noise levels are well below the derived limits as specified in the 2006 document. The effect of the wind farm at local residences should be at maximum no more than a marginal impact.

Planning permission was originally granted for development for a seven-turbine wind farm at Derreenacrinnig West, Drimoleague, Co. Cork. The 2010 EIS submitted as part of that application assessed the existing background noise levels at some of the dwelling locations closest to the proposed turbines. The potential impact on residential amenity at these Noise Sensitive Locations (NSLs) were assessed by comparing predicted noise levels from the wind turbines at the NSLs with existing background noise levels and extrapolated noise limits as recommended by the Wind Energy Development Guidelines 2006[1] The background noise levels being the noise level equalled or exceeded for 90% of the monitoring interval.

The low frequency noise and vibration from the proposed wind farm operation is predicted to have a negligible impact on residents and on local properties.

The Grid Connection Route

The proposed development works have been assessed using a desktop assessment on the possible noise issues which could arise as a result of the proposed underground cable grid connection works.

[1]. The Department of Environment, Heritage and local Government has recently published 'Wind Energy Development Guidelines'- Guidelines for Planning Authorities June, 2006

The proposed grid connection works have the potential to generate noise impacts in the surrounding area during the construction phase. There will be no noise impacts generally during the operational phase due to the nature of the proposed development. There could however be noise impacts if any maintenance is required on the cable and this impact would be of a similar nature to that of construction. Therefore, this assessment will primarily focus on the construction phase.

The low frequency noise and vibration from the proposed wind farm operation is predicted to have a negligible impact on residents and on local properties.

With implementation of the mitigation measures outlined above (and additional mitigation as needed) it is unlikely that the proposed Grid Connection will have any significant effects in terms of noise and vibration.

7.7 SHADOW FLICKER

Jennings O'Donovan & Partners undertook a calculation on the "worst-case" shadow flicker impact from the proposed development. Shadow flicker occurs under a special set of conditions when the sun passes behind the hub of a wind turbine and casts a flickering shadow over neighbouring properties.

As the shadow flicker is predicted to occur only during specific times of the year and specific times of the day. If this is deemed to be a nuisance then the turbine(s) responsible for shadow flicker can be turned off during this (short) time thereby completely removing the shadow flicker impacts. This is likely to involve pre-programming the turbine with dates and times when shadow flicker is likely to occur. All major turbine manufacturers use a computerised system to monitor the shadow flicker. A photo sensor cell would be used to monitor sunlight.

The assessment found that the proposed Derreenacrinnig West Wind Farm development will cause no major long-term negative impacts relating to Shadow Flicker on nearby residents.

7.8 LANDSCAPE AND VISUAL ASSESSMENT

Jennings O'Donovan & Partners undertook a visual assessment of the impacts of the proposed development on the landscape. Wind farms have effects on the landscape by virtue of the height and prominence of the turbines and their location in exposed and elevated locations. A full visual assessment, which consisted of the production of Wire Frames, Photomontages and Zone of Theoretical Visibility (ZTV) figures was prepared for the proposed Derreenacrinnig West Wind Farm and all consented and operational wind farms in the vicinity.

The selected thirteen viewpoints represent a variety of locations, directions, elevations and distances for observing the site. It can be seen that the ZTV and the wireframes are generally in agreement. However, the photomontages, which show the wind farm in a "real" context, show that views can be both blocked and distracted by features in the foreground of a view, such as vegetation, angle masts, telephone and ESB poles and other landscape features. The local topography, as shown in the ZTV, is such that prolonged views are impossible when driving on public roads.

The proposed Derreenacrinnig West Wind Farm is deemed to be of a high significance from no viewshed, medium to high significance from two view sheds, medium significance from seven view sheds, low to medium significance from two view sheds and of low significance from two viewsheds.

These results show that the surrounding landscape has a varying landscape sensitivity.

The ZTV in Figure 3 was produced for a 15 km area surrounding the proposed Derreenacrinnig West Wind Farm. The ZTV displays a three colour index;

- The green colour indicates where 1-2 turbines are visible.
- The blue colour indicates where 3-4 turbines are visible.
- The pink colour indicates where 5-7 turbines are visible.
- Where no colour is present within the 15 km radius zone no turbines are visible.

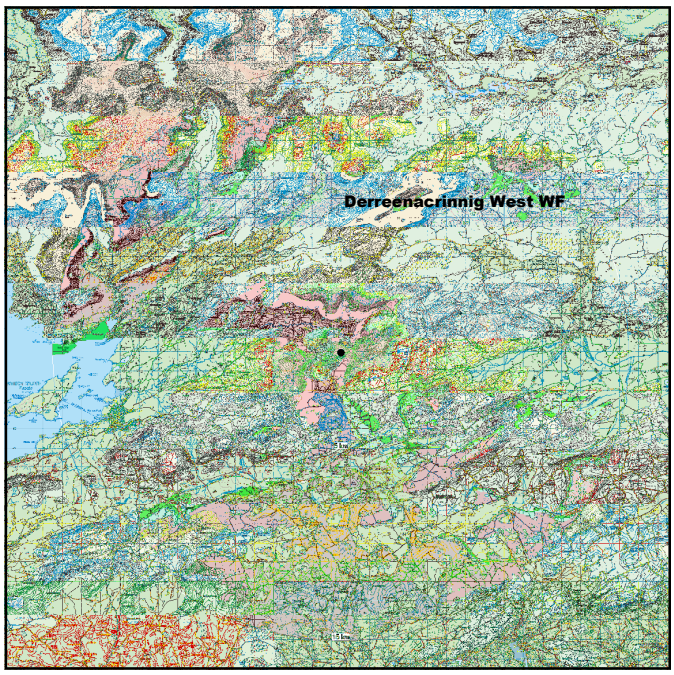

Figure 7.1

Due to the undulating topography of the area surrounding the proposed Derreenacrinnig West Wind Farm it is expected that all seven turbines will only be visible from 19.51% of the area assessed. Derreenacrinnig West Wind Farm will not be visible from 73.84% of the assessment area.

Mitigation measures proposed for the consented wind farm, to minimise this impact include: Choice of Blade Arrangement; overall turbine height, Tower Design; Turbine Colour; Sunlight Reflection Minimisation; Rotation Direction.

The Grid Connection

The nature and scale of the grid connection works proposed is such that it can be accommodated in a landscape where there are existing overhead electricity lines, housing and forestry. This landscape is a working landscape capable of accommodating change.

7.9 ELECTROMAGNETIC INTERFERENCE

Early consultations by Jennings O'Donovan & Partners were made with existing radio, TV and mobile phone operators to determine if the development of Derreenacrinnig West Wind Farm would have any impact on their utilities.

Mobile phone operators Vodafone, O_2 and Meteor as well as RTE and Eircom were canvassed for their opinions on the potential impact of wind turbines on the transmission of their signals in the area.

During the operation phase the proposed Derreenacrinnig West Wind Farm is not expected to cause any electromagnetic interference on the existing environment. It is concluded that the proposed development will cause no major long-term negative impacts relating to Electromagnetic Emissions. Should any issues arise following construction, suitable mitigation measures will be implemented as appropriate.

7.10 MATERIAL ASSETS

No significant negative affects are predicted in terms of agriculture, natural resources, forestry infrastructure or air traffic. In general, these elements of the environment will be unaffected or will experience minor negative or positive affects.

7.11 ARCHAEOLOGY AND BUILT HERITAGE

John Cronin Associates have been commissioned by ESB Networks to assess the potential impacts of the proposed EIA Development on the archaeological, architectural and cultural heritage environment of the study area.

While there are 44 recorded archaeological sites (mainly comprising hut sites, standing stones and enclosures) within 1.5km of the boundaries of the wind farm holding, there are no recorded archaeological sites within the land-holding or development boundary. The nearest recorded monument to the wind farm is that of a hut site which is located within Derreenacrinnig West townland, c.70m to the west of the land-holding boundary.

As there are no recorded archaeological monuments within the boundaries of the wind farm site, and as no archaeological remains were revealed during the monitoring of the first phase of construction works, development works to date at the Derreenacrinnig Wind Farm site have had no impact on the archaeological resource of the area. Furthermore, it can be considered that there is low potential for the uncovering of archaeological remains during future phases of work at the development site.

With the exception of the above potential archaeological impacts, there will be no adverse impacts on any specific site of cultural heritage significance. Therefore, recommendations in relation to specific cultural heritage sites are deemed unnecessary.

The assessment of the combined wind farm development and grid route connection has identified a number of slight visual impacts on archaeological monuments while no direct impacts have been identified.

Derreenacrinnig West Wind Farm Site

The works completed to date at the Derreenacrinnig West Wind Farm development site have resulted in no impact on the archaeological resource of the area.

The Constructed Overhead Line

It is noted that the "as constructed" sections of the OHL were not monitored by an archaeologist. Generally, however, the footprints and associated ground disturbances of the poles and stay supports are quite small (usually less that 1m2 each). Given that the site walkover/desktop assessment considered that such locations, outside the zone of notification (ZON) of recorded monuments, were of low archaeological potential, it is unlikely that any artefacts, features or deposits of an archaeological nature were disturbed during construction works.

Proposed Overhead Line

There will be no direct, negative impacts on any recorded archaeological monument or ZON of any monument in its vicinity, due to the construction of the remaining section of the OHC. However, the lack of any shielding elements, such as hedgerows or trees, between the proposed OHC route and the site of the stone circle – multiple-stone and boulder-burial in Cappanaboul townland, means there will be a very slight visual impact on the setting of both monuments due to the construction of the OHC in this area.

Proposed Underground Line

There is no predicted direct, negative impact on the known archaeological resource due to the construction of the underground cable portion of the grid connection route. While the route does pass through the ZON of two recorded monuments in Shandrum Beg townland and radial stone cairn the nature of the topography in the area, combined with the construction of the road that will carry the cable, substantially reduces the archaeological potential of this section of the route.

7.12 INTERACTIONS OF THE FOREGOING

Because no significant negative impacts have been predicted in the above studies no negative impact caused by the interaction of any or all of these topics are likely to occur. The proposed Grid Connection works are unlikely to have significant environmental effects for those topics outlined above. Additionally, it is unlikely to significant cumulative or in-combination effects when assessed together with other plans and projects in the vicinity, especially the already consented Derreenacreenig West Wind Farm project. Furthermore, it is considered that, given the assessed effects, the conclusions reached in the Derreenacrinnig West Wind Farm EIS [November 2010] would not change as a result of the proposed Grid Connection works detailed in this EIA Report.

8.0 ENVIRONMENTAL BENEFITS

The proposed project aims to generate approximately 18,243MWh of electricity per year operating at 35% efficiency. This would be enough to supply up to 3,868 households. This is the equivalent energy production from 38,184 barrels of oil each year. By displacing fossil fuel generation, Dereenacrinnig West Wind Farm would avoid the following annual discharges to the atmosphere:

- 16,065 tonnes of Carbon Dioxide (CO_2)
- 292 tonnes of Sulphur Dioxide (SO_2)
- 33 tonnes of Nitrous Oxide (NO_x)
- 1,041 tonnes of ash

The global warming potential of 1 tonne of NO_x is equivalent to 310 tonnes of CO_2. As such this proposed wind farm will achieve the removal of approximately 26,295 tonnes of CO_2 equivalent.

9.0 CONCLUSION

This project will supply electricity to the south west region in a sustainable and environmentally friendly manner. In general, the development will have no major negative effect on the human, built or natural environment.

No significant negative impacts on the environment are predicted.

A positive impact is predicted for air quality and climate as well as employment.

It is therefore considered that there are no environmental issues that should stop this project from proceeding.

The development accords with both National and Local Plan Policy. In particular, the project if completed will help meet the objectives of the Climate Action Plan 2019, where there is a pressing need to meet renewable energy targets.