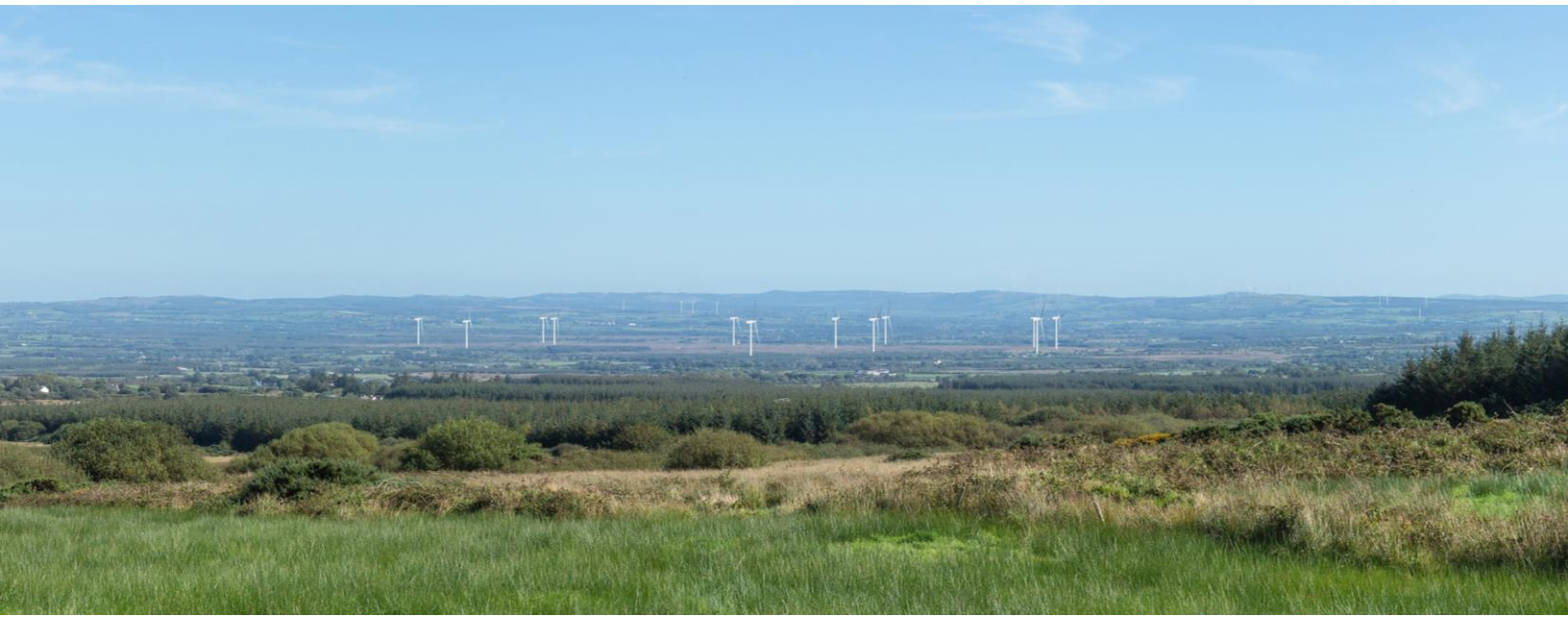
Environmental Impact Assessment Report

Proposed Shronowen Wind Farm
Co. Kerry

Volume 1 NON TECHNICAL SUMMARY

JANUARY 2021



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ISSUE FORM	
Project number	19876
Document number	6014
Document revision	A
Document title	EIAR Non-Technical Summary – Shronowen Wind Farm
Document status	Final
Document prepared by	Sinéad Ryan (MWP 2021-01-13)
Document checked by	Ken Fitzgerald (MWP 2021-01-13)

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1 INTRODUCTION

Shronowen Wind Farm Ltd. is applying to An Bord Pleanála (ABP) for permission to develop a wind farm consisting of twelve (12) wind turbines with associated infrastructure and a grid connection on a 364-hectare site located in the townlands of Tullamore, Coolkeragh, Ballyline West and Dromalivaun, Co. Kerry.

The Site is located approximately 4 kilometres (km) south of Ballylongford and 6km north of Listowel in an area designated by Kerry County Council as 'Open to Consideration' for wind energy developments. The proposed wind farm will have a potential output of 50 to 55 MW (megawatts) of renewable electricity. The application is for a 10-year planning permission with a 30-year operational life.

As the estimated output of the wind turbines exceeds 50MW, and following consultation with ABP, the project is deemed Strategic Infrastructure Development (SID) in accordance with the requirements of Planning and Development (Strategic Infrastructure) Act 2006 for development listed in 7th Schedule of the Planning and Development Act 2000 as amended. The application for the proposed development is therefore being made directly to ABP.

Malachy Walsh and Partners (MWP) have been commissioned by the Applicant to prepare an EIAR for the proposed development.

This Non-Technical Summary represents Volume 1 of the EIAR. The purpose of this Non-Technical Summary is to provide a concise overview, in non-technical terms, of the issues, impacts and mitigation measures highlighted by the Environmental Impact Assessment and presented in the Main EIAR, Volume 2. Further detail is provided in the other three volumes which comprise the EIAR as follows:

- Volume 2: Main Environmental Impact Assessment Report
- Volume 3: Appendices
- Volume 4: Photomontages

1.1 THE APPLICANT

The applicant is Shronowen Wind Farm Ltd., a wholly owned subsidiary of EMP Energy Limited (trading as EMPower). EMPower is an international renewable energy company with locations in Ireland, Tanzania, Ghana and Iceland. The company was established in 2015 with the goal of contributing toward the global transition from traditional, carbon-heavy energy sources to clean, renewable, indigenous power generation with focus in Ireland on the 2030 renewable energy targets. EMPower's primary objective is the development of greenfield wind assets, with a current portfolio of 700MW in development.

The proposed development described above spans several property folios owned by private landowners and will be developed under separate agreements with each landowner. Landowner letters of consent are included with the planning application. The site has some areas of active peat

cutting mainly located on its western extent and the Applicant has engaged with turbary rights owners.

1.2 SITE LOCATION

The Site is located within a rural part of North Kerry approximately 4km south of Ballylongford and 6km north of Listowel on the eastern side of the R552 Listowel-Ballylongford Regional Road (**Figure 1-1)**. It is predominantly comprised of cutaway bog, with smaller areas of intact bog, an area of commercial forestry close the northern boundary and agricultural grassland in the west of the Site. The total area of the Site is approximately 364 hectares. The Site is relatively flat with elevation generally less than 30m metres Above Ordnance Datum (mAOD).

The Site can be accessed from the northeast via the L6021 Local Road which is connected to the R551 Tarbert-Ballylongford road and the N69, and from the west via the L1009, which is connected to the R552.

There are a number of wind farms in the surrounding area; those within 10km include Tullahennel Wind Farm approximately 2.4km to the northwest, Leanamore *c.* 2.5km northeast, Larha c. 5.5km to the northwest, Tobaratooreen *c.* 6.5km to the southeast, Beenanaspuck *c.* 9km southeast and Curraderrig *c.* 8km to the northwest. The permitted Ballylongford Wind Farm which is adjacent to Tullahennel, is approximately 2km to the northwest.

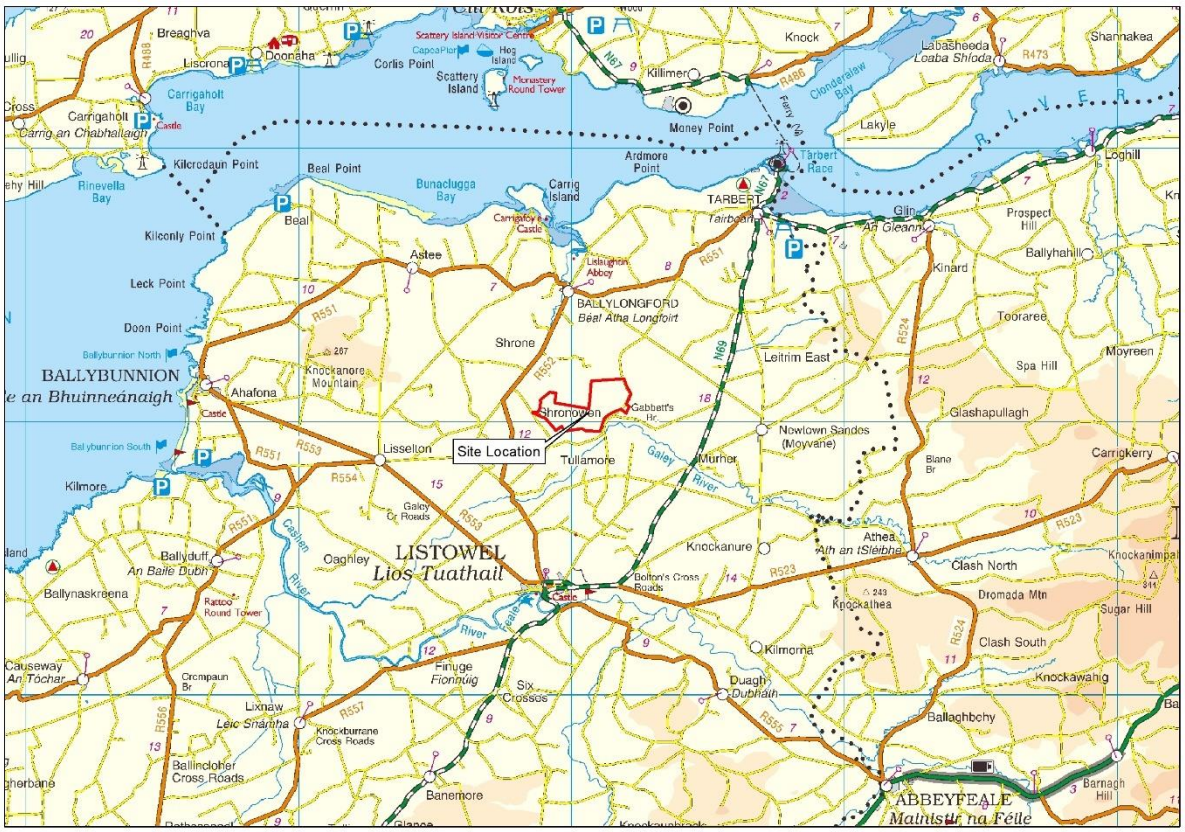

Figure 1-1: Location of the Proposed Development

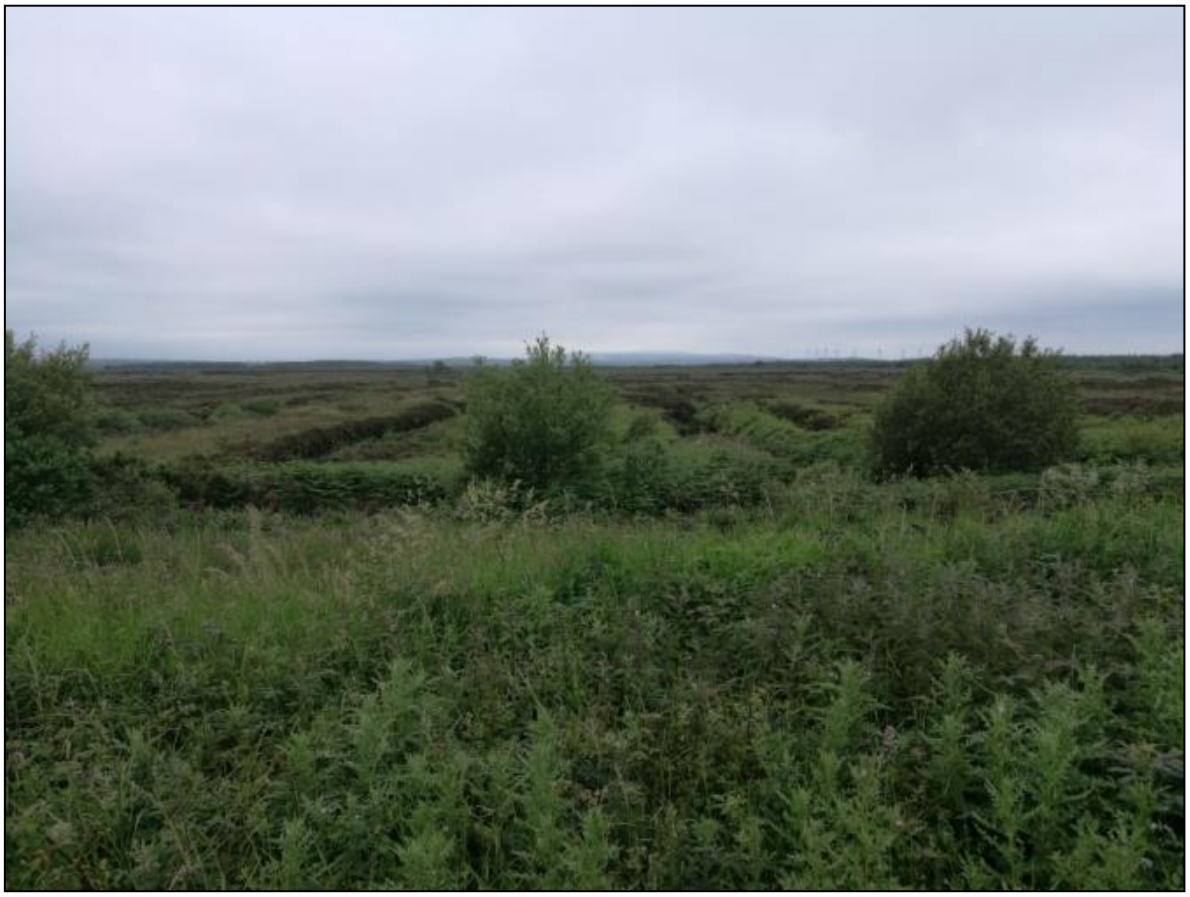

Plate 1-1 View from centre of Site facing north

1.3 EIAR STUDY TEAM

This EIAR has been prepared by Malachy Walsh and Partners (MWP), Engineering and Environmental Consultants, Reen Point, Blennerville, Tralee, Co. Kerry. The assessment has been informed by environmental studies and technical reports by experts in their field and contains input from specialist consultants in landscape and visual impact assessment and archaeology. Refer to **Volume 2 Main EIAR** for further details.

1.4 CONSULTATION

From the outset, the Applicant engaged in consultation with the key stakeholders - the local community and relevant statutory and non-statutory bodies including ABP and Kerry County Council. Consultation was undertaken through meetings, public information physical events and virtual webinars, letters, email and telephone calls. Consultation was initiated during the project design stage with the first public consultation event held in September 2019. Subsequent scheduled events in April and August 2020 were postponed due to government COVID-19 restrictions. Letter mailing, two live online public consultation webinars and a virtual public consultation room have been used to continue the consultation process while adhering to public health advice. A dedicated project website was also set up to share information with the local community and has been actively maintained since September 2019 (https://www.shronowenwindfarm.ie/).

All feedback received during the consultation process was carefully considered by the project design team in designing the layout and siting of wind farm infrastructure and in developing suitable

mitigation measures where required. Following this, the current proposal was finalised and submitted as a planning application to ABP in January 2021.

1.5 POLICY, PLANNING AND LEGISLATIVE CONTEXT

A host of relevant legislation and policy exists at International and European level, which supports the development of renewable energy. Irish renewable energy policy is framed in the context of these European and other International policy initiatives. A key target of the Irish Government's Climate Action Plan 2019 is to provide 8.2GW of onshore wind energy by 2030 (currently around 4.2GW), with an overall target to provide 70% of electricity from renewable sources by 2030. Should permission be granted for this project to proceed, it would contribute 50-55MW to the aforementioned targets.

The preparation of the EIAR follows standard EIA methodology according to the various categories listed in Schedule 2 of the European Communities (Environmental Impact Assessment) (Amendment) Regulations 1999 (S.I. No. 93 of 1999), Schedule 2B of the Planning and Development Regulations 2001-2018, and the requirements of the 2014 EIA Directive. The methodology recommended in the EPA Guidance Document '*Draft Guidelines on the Information to be contained in Environmental Impact Reports' (*EPA, 2017), which is based on the 2014 EIA Directive, has also been followed.

The environmental and planning considerations for proposed wind farm developments, as set out in the Kerry Renewable Energy Strategy 2012, have been taken into account. The Site is located in an Area 'Open to Consideration' for wind energy development as set out in the current Kerry Co. Development Plan. The project when commissioned would contribute 50-55MW of renewable electricity to the National Grid.

The *2006 Wind Energy Development Guidelines* (WEDG's) (DoEHLG 2006) have been followed where applicable to the design, planning and environmental impact assessment of the proposed wind farm and grid connection. Due regard was also given to the *2019 Draft Revised WEDG's,* however as they have yet to be finalised they are subject to further change.

A report outlining the **Policy and Planning Context** for the proposed project has been prepared and is submitted with the planning application.

1.6 NEED FOR THE DEVELOPMENT

To date, the most significant contribution to renewable energy in Ireland has come from onshore wind energy, which is a proven technology. Continued wind energy development is necessary to meet Ireland's renewable energy targets and displace fossil fuels. The project when commissioned would contribute 50 to 55MW of renewable electricity to the National Grid. A do-nothing scenario would result in the use of non-renewable energy sources applied to meet both current energy demands and future needs.

2 PROJECT DESCRIPTION

The overall project considered in this EIAR comprises project components for which planning permission is being sought and other project components not included as part of the current planning application. These include works along the turbine delivery route, replacement forestry lands and an alternative grid connection option to a permitted solar farm substation. Further details are provided in **EIAR Volume 2 Chapter 2**.

2.1 KEY COMPONENTS

The following is a summary of the key components of the project:

- Twelve (12) wind turbines, with a tip height of up to 150m and all associated foundations and hardstand areas
- Approximately 6,850m of new internal access roads
- Upgrade of approximately 4,430m of existing roads
- One (1) 110kV on-site electrical substation
- Underground electrical cables from the turbines to the substation
- Underground electrical cable connection from the wind farm substation to the existing 110kV Kilpaddoge to Tarbert overhead line
- Two (2) new site entrances; one permanent (off the L6021) and one temporary (off the L1009)
- One (1) permanent meteorological mast
- Six (6) peat deposition areas
- Two (2) temporary construction compounds
- Felling of 3.15ha of forestry and replanting in an adjacent site
- Temporary works along sections of the public road network between Foynes Port and the site to facilitate turbine component delivery
- All associated site development works including site drainage

The surface area of the built infrastructure is approximately 27.5ha within a total site area of 364ha.

It is envisaged that the electricity generated by the wind turbines will be collected on-site by a network of underground cables connected to an on-site wind farm substation in turn connected by approximately 225m of underground cable to the adjacent EirGrid 110kV overhead line from Kilpaddoge to Tarbert. This is the preferred grid route for which planning permission is sought.

An alternative option for grid connection is a 5.5km long underground cable from the wind farm substation along the L6021 local road running westwards and connecting to the permitted 110kV substation at Tullamore Solar Farm (Planning Ref. PL08.302681). This cable route option is located on existing local road network and would connect into the solar farms 110kV substation. Both the preferred and the alternative grid connection options are considered in this EIAR.

2.2 EXAMINATION OF ALTERNATIVES

The proposed development has been designed to minimise potential environmental impacts and to maximise wind potential on site.

The wind farm has been designed following a step by step EIA process which informed and identified the buildable areas suited to turbines, roads and infrastructure based on avoidance of unsuitable areas

and following the good practice of mitigation by design. More details on the project design and evolution can be read in **EIAR Volume 2 Chapter 4**.

Alternatives examined included alternative locations, alternative site layouts, alternative turbine scales, alternative grid connections and alternative construction methods.

Three (3) alternative locations for the proposed wind farm were considered. The exercise concluded that the proposed Site at Shronowen was the most viable for wind energy development from a technical, financial and planning perspective subject to completion of an EIAR, AA, NIS and all associated surveys.

Alternative wind farm layouts were examined in order to find the most optimum design solution for the site with the least level of environmental impact. The final layout was determined based on multi-discipline inputs and consideration of development plan zoning, topography, distance from sensitive receptors, biodiversity, land and soils, archaeology, hydrology, landscape, and engineering aspects and constraints such as road access, access to grid and ground conditions. Of particular concern at the proposed Site was the issue of turbary rights and rights of way which also had to be addressed. The development as proposed is the preferred option as it results in the least effects on resources and receptors while meeting the project objectives of a large-scale renewable wind energy development.

As aforementioned, two grid connection options have been considered – a preferred connection to the existing 110 kV transmission line and an alternative connection to a planned substation. The preferred connection option to the existing transmission line is deemed to be the most technically feasible and is included within the redline boundary of the planning application. The final selected grid route and connection strategy will be confirmed by way of a future grid connection offer process and as determined by EirGrid. Both the preferred and the alternative grid connection options are considered in this EIAR.

Further details on the alternatives examined can be read in **EIAR Volume 2 Chapter 4**.

2.3 CONSTRUCTION WORKS

The construction phase of the proposed development would begin with site preparation works and is complete when the turbines are in place and ready for commissioning, and when all wastes have been removed from the site.

It is proposed to install twelve (12) wind turbines each with a maximum tip height of up to 150 metres. Each wind turbine will have a reinforced concrete base pad foundation, an associated turbine hardstand area and temporary laydown area adjacent.

The preferred underground grid connection will require the installation of two new lattice towers within the existing Tarbert to Tralee 110kV OHL.

The construction of the wind farm will require felling of 3.15 hectares of coniferous forestry. In line with the Forest Service's policy on granting felling licenses, replanting will occur on a hectare by hectare basis on identified replacement planting lands to the northwest of the Site.

Subject to planning approval, it is envisaged that construction of the proposed development will commence in 2022 with an 18-month construction period. The commissioning date is dependent on planning being granted, receipt of a grid connection offer from EirGrid, funding and all permits being in place.

Typically, construction will occur within the hours 7:00am – 7:00pm, Monday to Friday and 7:00am to 2:00pm on Saturdays. Works along public roads would be from 9:00 a.m. to 5:00 p.m. Monday to Friday and 9:00 a.m. to 2:00 p.m. on Saturdays.

A permit for transporting abnormal loads will be sought from An Garda Síochána for the delivery of oversized wind turbine components (i.e. blades, nacelles and towers).

It is envisaged that the construction of the proposed development would generate employment for up to 60 persons during the construction phase to include site contractors, on-site vehicle and plant operators, engineers, materials delivery personnel, environmental personnel, health and safety personnel. Up to 20 permanent jobs will be generated during the operational life of the development.

Primary access to the proposed development site will be provided via a new entrance off the L6021 local public road on the north eastern side of the proposed wind farm development site. This will be the main site entrance during both the construction and operational phases of the development. A second temporary entrance to facilitate construction and access will be formed on the L1009 local public road on the western side of the site. The layout of the site extends in an east west configuration and thus having two entrances will assist during the construction stage of the development. Once the construction phase of the project is complete, the western entrance will then be closed with only controlled access. The eastern entrance off the L6021 will remain as the permanent access for the operational life of the wind farm development.

Two (2) temporary construction compounds will be set up upon commencement of the construction phase. The compounds will be used as a secure storage area for construction materials and will also contain temporary site cabins to provide welfare facilities for site personnel. Facilities will include office space, meeting rooms, canteen area and mobile sanitary facilities.

Six (6) peat deposition areas will be established for the storage of excavated peat. The locations have been strategically located so as to minimise the movement of excavated material from source, and also taking account of flat topography, good containment given local ground conditions, no risk of slippage and avoidance of any natural drains. Once excavation and construction work is complete, the areas will be graded and vegetated with locally occurring vegetation feedstock.

A surface water management system will be constructed on the site so as to attenuate run-off, protect against soil erosion and safeguard downstream water quality. A fundamental aim of the system is to manage discharges at source and maintain flows in the existing drainage network as much as possible.

2.4 OPERATION

The Applicant is applying for a 30-year operational lifetime for the proposed wind farm. During that time, the turbine manufacturer, the developer/wind farm operator or a service company will carry out regular maintenance of the turbines. In addition, operation and monitoring activities may be carried out remotely with the aid of computers connected via a telephone broadband link. Routine inspection and preventive maintenance visits will be necessary to ensure the smooth and efficient running of the wind farm. At the end of the 30-year anticipated lifespan of the project, the developers will make the decision whether to repower or decommission the turbines and this will be subject to a new planning permission application.

2.5 DECOMMISSIONING AND RESTORATION

If the site is to be decommissioned, cranes of similar size to those used for construction will disassemble each turbine. The towers, blades and all components will then be removed. The turbine transformers will also be removed from site. It is likely that any turbine component will be reused as they have a life well in excess of the wind farm proposal, i.e. greater than 30 years. Wind farm components may also be recycled.

Prior to the decommissioning work, a comprehensive decommissioning plan will be drawn up to ensure the safety of the public and workforce and the use of best available techniques at the time. A comprehensive reinstatement proposal, including the implementation of a program that details the removal of all structures and landscaping, will be submitted to the Competent Authority (likely to be Kerry County Council) for approval.

In the event of decommissioning, the following arrangements will be put in place:

- The turbine components will be dismantled and removed from site for re-use/ recycling using similar methods used for the erection and delivery of the turbine components.
- All lubricants, etc. will be drained down and removed from site in an environmentally safe manner for reprocessing/disposal by a licensed contractor off-site.
- All other equipment will be removed for recycling/disposal in an environmentally safe manner.
- The foundations and roads will likely be left in situ and landscaped.

2.6 TRANSBOUNDARY EFFECTS

The location of the project is entirely in County Kerry in the West of the Republic of Ireland. Transboundary impacts relate to potential impacts on other Member States, i.e. outside of the Republic of Ireland. There is no risk of significant transboundary effects due to the distance of the proposed project from the nearest current boundary with another Member State, i.e. Northern Ireland.

2.7 RISK OF MAJOR ACCIDENTS AND DISASTERS

It is considered that there is no risk for the project to cause major accidents and/or disasters or vulnerability of the project to potential disasters/accidents, including the risk to the project of both natural disasters and man-made disasters.

3 ENVIRONMENTAL IMPACT ASSESSMENT AND MITIGATION

The main objective of the EIA process is to ensure that all direct, indirect and cumulative environmental effects of the project are anticipated. Where effects are identified as unacceptable, these will be avoided or reduced during the design process through the implementation of practical mitigation measures. The main chronological stages of the environmental assessment undertaken include:

- Carrying out baseline studies and collecting data on the existing receiving environment
- Assessing potential for significant environmental effects (impact assessment)
- Recommending or designing mitigation measures to avoid or minimise environmental effects

The EIA has been carried out in accordance with the relevant legislative requirements and guidelines including the *Environmental Impact Assessment of Projects:* Guidance on the preparation of the EIA Report. European Commission (2017) and Draft Guidelines on Information to be contained in environmental impact assessment reports EPA (2017). Specialist guidance as required under each of the environmental topics discussed hereunder has also been used where appropriate.

The detailed assessments are provided in **EIAR Volume 2 Main EIAR, EIAR Volume 3 Appendices to the Main EIAR and Volume 4 Photomontages.**

3.1 POPULATION AND HUMAN HEALTH

The scope of this assessment considers the effects of the construction, operation and decommissioning of the proposed project in terms of how it could affect population and settlement, economic activity, employment, land use, amenities and tourism, and health and safety.

The Site is located in a rural but moderately populated area with settlement patterns typically comprising a mixture of one-off housing and ribbon development along the local and regional road network. There are no residential dwellings within the proposed Site boundary. There are approximately 48 dwellings, some unoccupied, within 1km of the nearest turbine. The nearest residential dwelling to a turbine is approximately 544m. Three dwellings fall within 4 x tip height (600m) of the proposed turbines. Each of these dwellings are owned and occupied by landowners involved in the wind farm project and have each provided setback waiver letters. All other households achieve a setback distance greater than 600m.

The project will have a positive impact on employment at both the local and national level and in both the short and long term. For the construction phase, it is envisaged that resources and labour will be sourced in the region where possible. Aggregates and concrete supply for road construction and foundations will be obtained from local quarries and suppliers, thus contributing in a positive way to the local economy.

There are currently no defined recreational land-uses within or associated with the proposed development lands. However, during the public consultation process, it was reported that the existing bog roads are used as amenity walking routes by some local residents, primarily during the summer months.

Construction activities can cause a nuisance to the local community. The most notable of these include the generation of additional traffic on the local road networks, generation of noise, safety implications and access to the Site.

Construction works are estimated to take 18 months. Any impacts associated with the construction phase will be short-term and will cease on completion of works. A Traffic Management Plan has been prepared and will be implemented and adhered to during the construction works in order to manage and minimise the impact on the Population and Human Health and local residents. Access to Shronowen Bog will remain open to the general public and turbary rightsholders, except for areas where construction or groundworks are actively taking place, when access may be restricted. The planned upgrades to existing bog roads will take place over a period of 3 months, during a time that avoids turf cutting season. Prior to commencement of the works, the Applicant will engage with all stakeholders to minimise disruption and to provide alternative access where possible. The results of the construction noise predictions indicate that noise generated during the construction phase will not exceed the acceptable construction noise limit at any dwelling location, for the duration of the construction phase.

With the appropriate mitigation measures in place, no significant negative impacts on the local Population and Human Health are expected.

There are no predicted major adverse operational impacts associated with the proposed wind farm development which would significantly negatively impact on the local community. Once the wind farm is operational, conventional peat extraction activities on remaining turbary plots will resume and continue to take place at the site independent of the proposed development. In terms of impacts to neighbouring lands and land-uses, it is considered that the proposed development does not pose a significant risk to either existing or future land-uses. All existing land-use practices can co-exist with the development.

The project will produce renewable electricity in an environmentally friendly manner thereby reducing the risk of air pollution and thus risk to human health. It will also bring added benefit to the local community through the provision of a community benefit fund.

3.2 BIODIVERSITY

The biodiversity assessment describes the ecology of the proposed development site and environs in terms of designated sites, habitats, flora, fauna and biological water quality. This assessment further specifies mitigation measures to ensure that significant impacts on these features do not occur.

The proposed development does not occur within any area protected for nature conservation, such as Special Areas of Conservation (SAC) or Natural Heritage Areas (NHA). The Screening for Appropriate Assessment concluded that significant water quality impacts arising during the construction and associated earthworks phase of the project on the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA could not be ruled out. Therefore, further assessment was required and a Natura Impact Statement (NIS) was prepared. With the full and proper implementation of mitigation measures to control water quality within the project site, the NIS concluded that the project would

not result in an adverse effect to the integrity of the Lower River Shannon SAC and River Shannon and River Fergus Estuaries SPA.

The predominant habitat within the Site is cutover bog along with areas of improved agricultural grassland, conifer plantation and scrub. The Site is also characterised by a network of drainage ditches and unpaved tracks/roads. The ecological surveys found that the Site is, both topographically and ecologically, relatively homogeneous, a characteristic that inhibits species diversity not only in terms of flora but also in the variety of fauna routinely present. In terms of fauna, no direct evidence of any of the species that usually would be found in similar locations (hare, rabbit, badger, otter) The Coolkeragh stream and other watercourses within the proposed development site are low gradient artificial channels with bed mostly of peat. These channels were created for the purpose of peat drainage. was recorded within the proposed development site during the surveys. Water quality in these watercourses is considered unsuitable for key fish species such as salmon or freshwater pearl mussel.

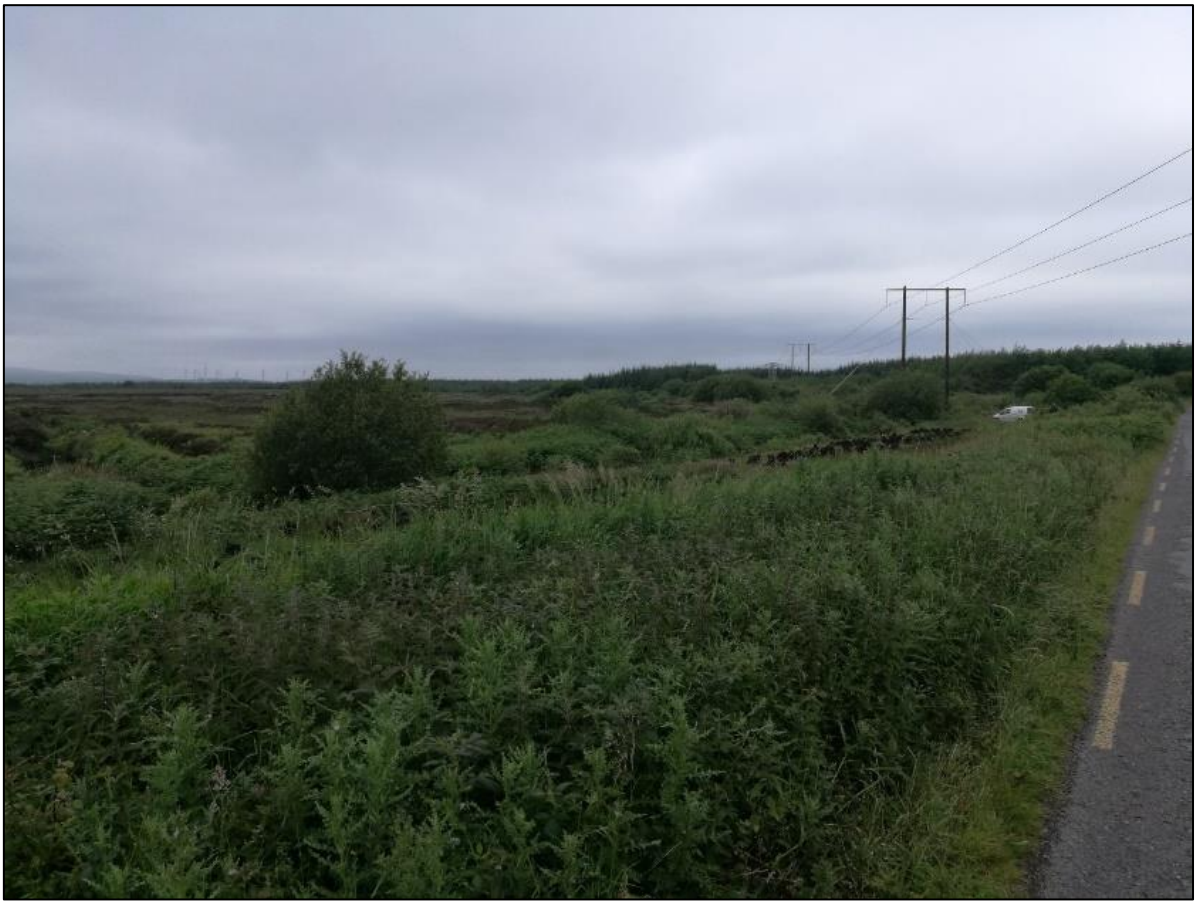

Plate 1-2 View from local road to the E facing NNW showing overhead line, hedgerow, scrub & coniferous forestry in distance

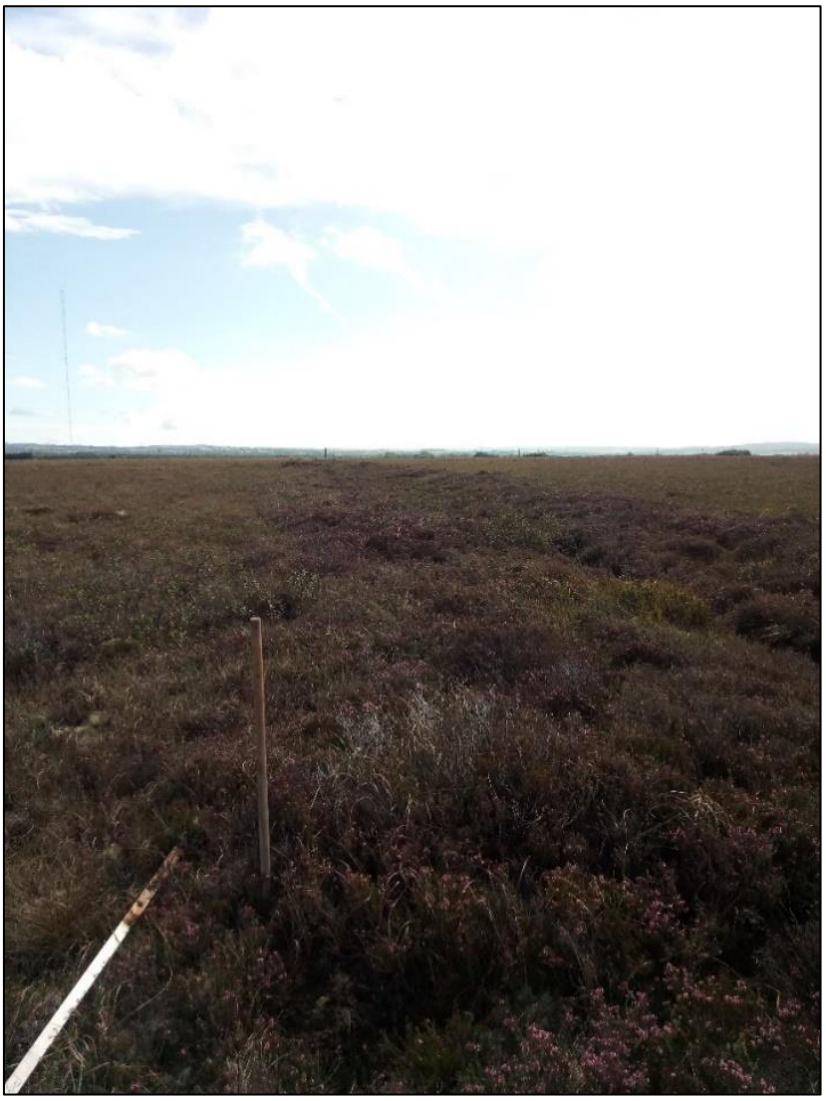

Plate 1-3 View facing north showing vegetated peat surface

The most likely significant effects on biodiversity are habitat loss and alteration effects associated with vegetation clearance, site access roads, excavations for turbine foundations and peat deposition areas, site substation and temporary construction compound, forestry felling, forestry replanting and installation of cable ducting. Other effects associated primarily with the construction stage include temporary disturbance of habitats/fauna during construction, fuel/oil and silt contamination of drains and watercourses that flow into the Galey and Ballyline Rivers and consequent impact on habitats and species in downstream Natura 2000 sites; the potential impairment of water quality from those pollutants and the resultant alteration of aquatic habitats and consequent disturbance and/or displacement of aquatic and semi aquatic species.

Where impacts are assessed to be potentially significant, mitigation measures were incorporated into the project design to remove or reduce impacts. No significant residual effects are likely to remain following the implementation of mitigation measures/best practice.

In terms of mitigation, general best practice construction mitigation measures will be followed, including sequencing and timing of works, installation of a well-designed and robust surface water

management system, working in accordance with a Construction Environmental Management Plan (CEMP). A programme of ecological mitigation measures will be incorporated into the CEMP. A suitably qualified and experienced Project Ecologist will be employed during the construction phase to monitor controls and ensure mitigation measures are in place. Compensation planting of new woodland will be completed at an adjacent site due to the felling of forestry on the proposed Site. Peat deposition areas will have a 50m buffer from any OSI mapped watercourses to further mitigate against any risk of silt reaching watercourses.

No specific mitigation measures for the operation phase are proposed. Silt ponds and silt fences constructed for water quality protection will remain in place for the operational life of the wind farm and will be maintained.

Provided that the proposed wind farm development is constructed and operated in accordance with the design, best practice and mitigation that is described within this application, significant effects on biodiversity are not anticipated.

3.3 ORNITHOLOGY

An assessment of the impacts on ornithology was based on published data, literature and mapping, and field ornithological (bird) surveys completed at the study area over two consecutive years, between October 2018 and September 2020. Consultation was also undertaken with the National Parks and Wildlife Service.

The proposed development does not occur within any area protected for birds, such as Special Protection Areas (SPAs), Irish Wetland Bird Survey sites or Ramsar sites. The closest SPA is the River Shannon and Fergus Estuaries SPA, which is 2.7km to the north.

The proposed development site is in an area considered by BirdWatch Ireland as one where protected bird sensitivity to wind energy is 'Low'. Ten bird species were identified as 'Important Ecological Features' (IEF's) and were subject to detailed impact assessment, namely Hen Harrier, Kestrel, Peregrine, Sparrowhawk, Whooper Swan, Mallard, Cormorant, Snipe, Little Egret, Passerines (e.g. Pipit, Wagtail).

The proposed development has the potential to result in habitat loss, disturbance and displacement of birds. Habitat loss within the development area will be mostly on peatland habitats and to a lesser extent on conifer plantation and agricultural grassland reducing feeding and nesting opportunities for foraging birds of prey, hen harrier, kestrel and sparrowhawk. Disturbance can be caused by the presence of machinery and personnel on-site. There is also potential for indirect downstream effects on the River Shannon and Fergus Estuaries SPA via site and near site watercourses. Collisions with moving turbine rotors is a further potential impact of the operational phase.

Mitigation measures have been proposed in the EIAR in order to reduce the impact on birds from the proposed development. Mitigation by design was undertaken to reduce the potential for significant effects on bird species. Measures adopted included: avoiding and/or minimising infrastructure placement on cutover peat habitats; minimising direct habitat loss by upgrading existing access tracks

where possible; avoiding a potential barrier effect on birds by placing turbines at distances of 460m to 740m apart; and, placing grid connection cables underground to avoid effects on roadside hedgerows and disturbance to nesting birds. Direct habitat loss will be limited to wind farm infrastructure and peat deposition areas while most of the habitat within the site will remain intact.

Mitigation measures proposed for the construction phase include removal of vegetation outside of breeding seasons, implementation of a Construction Environmental Management Plan (CEMP) and appointment of a Project Ornithologist. Heavy construction work will take place outside of the breeding season, where feasibel. Pre-construction and construction bird surveys will be completed and specific measures for the protection of birds will be outlined in the CEMP.

With the avoidance measures (design phase), and full implementation of mitigation measures throughout the construction phase, operational phase, and decommissioning phase of the project, significant residual effects on IEF's are not expected.

During the operational phase, bird surveys will continue at the locations used pre- and during construction and maintenance vehicle movements will be limited to access roads and around wind farm infrastructure.

The wind farm was assessed on its own and cumulatively with other wind farms in the area. No potentially significant habitat loss, disturbance, displacement or barrier effects on any of the Key Ornithological Receptors were identified with regard to the development proposal.

3.4 WATER

The southern boundary of the Site is situated in close proximity to a tributary of the Galey River which drains to the River Feale/ Cashen River and ultimately to the River Shannon. The Ballyline River drains the northern part of the Site and also discharges to the River Shannon downstream of Ballylongford. The Site itself contains a network of artificial land drains to facilitate peat harvesting. These drains flow to the Galey River to the south and to a series of tributaries of the Ballyline River to the north.

According to EPA data, the biological rating of the Galey and Ballyline Rivers varies from Moderate to Good status (Q3-4).

The subsoil has low permeability and the groundwater vulnerability is low to moderate, resulting in a low risk of groundwater contamination.

During construction and operation/maintenance phases of the proposed development, a number of activities will take place on site, some of which will have the potential to affect the hydrology and water quality at the site. The main potential impacts are an increase in the rate and composition of surface water run-off arising from physical disturbance of ground, mismanagement of excavations, excavated material and peat storage areas, and operation of machinery, all of which could lead to increased suspended solids (silt) run-off, risk of localised flooding; changes to surface water flows, concrete and fuel contamination.

Impacts will be avoided or mitigated through the adoption of best practice drainage design and good site management practices. Best practices for wind farm construction that establish erosion and sediment control measures have been incorporated into the project design. The design aims to maintain a continuity of existing flows and to manage the discharges at source where possible. A 50m buffer was applied to streams and lakes at the design phase and used as a constraint for turbine placement. No turbines are within 50m of a stream or lake. Preventative measures detailed in the Construction Environmental Management Plan (CEMP) will minimise adverse impacts on water quality, for example the installation of silt traps and interceptor drains, dedicated fuel and waste storage areas, fuel and waste management plans, employment of an Environmental Manager.

Mitigation measures will be monitored throughout the construction and operational phases. It is considered that the proposed project design including the control and mitigation measures that will be put in place will ensure that no significant impact occurs to adversely affect surface water quality, surface water flows or groundwater resources.

3.5 LAND AND SOILS

The lands and soils environment for this site has been assessed for impacts from roads and drainage; excavation works; material storage; soil erosion; tree felling; and waste generation activities during construction, operational and decommissioning phases. The impact due to the replacement lands has also been assessed. Cumulative impacts have also been considered. Data analysed to determine the impacts came from desk studies and site visits.

Most of the Site is covered in cutaway peat bog, with some intact areas. The Site is heavily modified having been subjected to peat extraction over many years. There is an area of coniferous forestry near the northern boundary and agricultural pasture to the west. The Site is relatively flat, with elevations generally below 30m AOD. This greatly reduces the risk of peat slides. A peat stability assessment indicated that the depth of peat ranges from 0.3m to 7.4m in parts. The assessment found that that all of the turbines have been placed in areas of low residual risk of peat instability.

Potential impacts on the land and soils environment include: Permanent change from existing land uses for the duration of the wind farm operating life; Removal of topsoil, subsoil and possibly small quantities of bedrock to facilitate construction; Potential contamination of groundwater in the underlying aquifer from construction-related activities such as uncontrolled and untreated fuel leaks and spills, concrete wash-out; Felling of forestry; Vehicular movement on-site during construction.

Potential operational stage impacts are associated with the maintenance of the wind farm and will be similar to the construction stage impacts. Impacts during decommissioning of the wind farm may arise due to the removal of the relevant wind farm infrastructure and reinstatement of the site and will be similar to the construction stage impacts.

In order to mitigate the impacts of the proposed development, a number of mitigation measures have been proposed. These are proposed in the areas of: Design; Land Use; Slope Failure; Excavations; Storage and Disposal of Excavated Materials; Waste Generation; General Site Management; Drainage; Surface Water; and Replacement Forestry Lands. An example is that infrastructure will be designed to avoid areas of deep peat. Another example is all excavated material (i.e. peat, subsoil) will be re-used

on-site as much as possible. Excess peat will be stored in the dedicated on-site peat storage areas in such a manner that will not cause a risk of peat movement or sedimentation from runoff. Another example is a commitment to adhering to best practice methodologies and operating to a Construction Environment Management Plan. Tree felling will be undertaken in accordance with the felling licence conditions and best practice. However, the impact is not considered significant as the soil has previously been disturbed by afforestation and conifer growth. Furthermore, the area of forestry to be felled is relatively small (approx. 3.15ha) and will be compensated by replanting on a nearby site.

Given the low risk and highly modified nature of the Site, and in light of the construction methodologies and mitigation measures proposed, it is considered that there will be no significant impact to the land and soils environment from the construction and operation of this project.

3.6 AIR QUALITY

The proposed Site is in a rural area characterised by one-off houses, ribbon development along te road network, farmsteads and agricultural land. The Site itself is used for peat harvesting, with agricultural and forestry activities in the southwest and north, respectively. The nearest large settlement is 4km to the north at Ballylongford. The EPAs Air Quality Index for Health (AQIH) for the Rural West AQIH Region in which where the proposed Site is located is currently ranked as Good.

The main potential impact of the proposed development on air quality in the receiving environment during the construction stage of the wind farm comprises fugitive dust and vehicle emissions associated with the following activities:

- Earthworks associated with the construction of the wind turbine foundations and hardstandings and associated grid connection infrastructure;
- Transportation and unloading of crushed stone around the site;
- Vehicular movement on potentially hard dusty surfaces such as freshly excavated and constructed access tracks and crane hardstanding areas;
- Vehicular movement on material potentially carried off site and deposited on public roads.

There will be no potential significant impacts on air quality during the operational phase of the development as there are no emissions to atmosphere.

It is recommended that best practice is adhered to during the construction phase in order to minimise the potential for fugitive dust emissions in particular. This will be achieved by the implementation of a dust minimisation plan as part of the project-specific CEMP.

Once operational, there will be no negative residual impacts regarding air quality. The proposed wind farm will displace of 1,858,770 tonnes of CO_2 over its lifetime that would otherwise have been produced by fossil fuel generated electricity and consequently contribute to national, EU and international targets for reducing greenhouse gas emissions. This is a long-term beneficial effect.

3.7 NOISE

There are three potential sources of noise from the proposed development:

- Operational turbine noise consisting of wind passing the blades (the whoosh sound) and mechanical noise from the gearbox.
- Substation noise from the operation of transformers and heating/cooling systems.
- Construction-generated noise.

Noise assessments were undertaken for the operational, construction and decommission phases of the proposed development. The cumulative impact with other operational and permitted wind farms and a solar farm in the area was also considered.

The nearest noise sensitive receptors were identified for inclusion in the noise assessment. Monitoring was completed during amenity and night-time hours at six (6) locations in April and May 2019 to determine existing noise levels. The locations were carefully selected in accordance with relevant guidance and best practice. Appropriate noise limits for the operation of the proposed development at any potentially impacted locations were then derived based on the 2006 DoEHLG Wind Energy Guidelines, which are the current applicable guidelines. A computer model was used to map the predicted noise levels, which were then compared to the derived noise limits.

The assessment found that the predicted noise levels do not exceed the derived noise limit criteria (amenity 45dB(A), night-time 43dB(A)).

The operational noise of the substation was also assessed against relevant noise thresholds and can comply with the EPA noise limit of 35dB(A) for areas of low background noise.

Construction noise will occur during excavation and earth moving, laying of roads and hard standings, transportation of materials and erection of the wind turbines. The construction phase will be phased and temporary. The decommissioning phase works will be similar in magnitude to the construction phase.

The results of the construction noise predictions indicate that noise generated during the construction phase will not exceed the acceptable construction noise limit at any dwelling location, for the duration of the construction phase.

Best practice will be adopted during the construction phase in order to minimise the noise generated by construction activities and nuisance to neighbours. Once the construction works are completed there will be no further residual impact.

De-commissioning is likely to result in less noise than during construction, and therefore be associated with minor effects at most which is not significant.

No cumulative construction activities would occur in sufficient proximity to generate potentially significant cumulative construction effects. Cumulative operational noise levels including all neighbouring schemes are considered acceptable in line with relevant noise limits and are therefore not significant.

3.8 SHADOW FLICKER

Shadow flicker is defined as the alternating light intensity produced by a wind turbine as the rotating blade casts shadows on the ground and stationary objects, such as the window of a residence. No flicker will occur when the turbine is not rotating or when the sun is obscured by clouds or fog. A larger turbine rotor diameter will cast a larger shadow, meaning a larger area will be prone to incidences of shadow flicker. At distances of greater than approximately 500 metres between a turbine and a receptor, shadow flicker generally occurs only at sunrise or sunset when the cast shadows are extremely long. It is generally considered the occurrence of shadow flicker is very low "at distances greater than 10 rotor diameters from a turbine" or at a distance greater than 1km.

Shadow flicker could occur at up to 25 properties under theoretical worst case scenario conditions. When the results are modified to take account of average sunshine hours (28% of daylight hours), shadow flicker will exceed threshold values of 30 hours per year or 30 minutes per day at 4 of the 25 properties. This would be long-term significant impact for these locations without mitigation.

The installation of programmable shadow flicker modules on turbines will allow the control of turbines in order to eliminate shadow flicker. The correct operation of the installed shadow flicker control modules will ensure that there will be no impact from shadow flicker. The operation and performance of the shadow flicker control measures will be monitored on an ongoing basis.

3.9 LANDSCAPE AND VISUAL IMPACT

The Landscape and Visual Impact Assessment describes the landscape context of the proposed development and assesses the likely landscape and visual impacts of the proposed development on the receiving environment.

A detailed assessment has been carried out within the study area to assess the landscape and visual sensitivity, the magnitude of change and the significance of change arising from the proposed development. These impacts have been described in terms of landscape effects, visual effects and cumulative effects.

The assessment found that the landscape value of the actual site and the immediate environs (within 5km), an area of flat peatland within primarily agricultural land, with a number of existing wind turbines, is considered to be Low-Medium in value. The area is not subject to any specific landscape designations and is zoned Rural General. The wider landscape (between 5-20km) contains several elements which appear valued. These include several scenic routes and designated landscapes. Given the size of the turbine structures and their proposed position within relatively open flat terrain, a visual impact is unavoidable. The extent of intrusion will vary in degree and significance according to viewing distance, the numbers and parts of turbines visible, the number of viewers affected and the perception of the person viewing them.

Twenty (20) viewpoints were chosen to determine the nature of visibility of the proposed development from a variety of elevations, landscape contexts and directions in the immediate vicinity of the site and from the wider landscape. The turbines will be visible from some views very close to the Site and will be also be visible from certain elevated long distance viewpoints. The assessment of

the 20 viewpoint locations shows that the visual effects range from those with: No visual effect (1 No. viewpoint); Not significant or Not Significant to Slight (8); Slight (3); Slight to Moderate (2); Moderate (4) and Significant (2). Of these four (4) viewpoints had an Adverse quality to the impact; these locations were along local roads where open views of the site are evident. The visual effects are more pronounced in these locations due to the proximity to the turbines and the flat topography with little or no intervening vegetation. However all other views, with the exception of Viewpoint 9, resulted in Not Significant, Slight or Slight-Moderate effects. Viewpoint 9, an elevated scenic view on the eastern side of Knockanore Mountain, was considered to have a Moderate and Neutral visual effect.

Cumulative landscape and visual effects were also assessed. Viewpoints close to the site are likely to experience the most pronounced visual effects as there are several wind farms in relatively close proximity. Combined – 'in combination' effects and 'in succession' effects are likely to arise, but sequential views will also be experienced. Cumulative visual effects resulting from the addition of the proposed turbines are not considered to be Significant in views representing sensitive receptors the wider landscape.

3.10 CULTURAL HERITAGE

This cultural heritage chapter contains an assessment of the likely impacts of the proposed development on the archaeological and wider cultural heritage.

There are no recorded archaeological monuments or artefacts within the boundary limits of the proposed Site. No previously unrecorded archaeological sites or features were noted or recorded in the course of the field walking or in the course of the desk-based research within the boundary limits of the proposed project.

Examination of the wider study area encompassing the proposed development Site demonstrates that the wider study area has been occupied from at least the Neolithic period. However, it was not densely settled, being represented by nine recorded sites within approximately a 3km radius from the centre of the Site.

There will be no physical impact from the proposed development on the known recorded archaeology within the boundary limits of the Site as there are no recorded monuments there.

There is a possibility that there will be a low impact on the unknown potential subsurface archaeology within the boundary of the Site during the construction phase. The potential that sub-surface archaeological features and artefacts may be present is based on the general anoxic / anaerobic environment of peatland to preserve organic materials.

In order to reduce the impact, it is recommended that licensed archaeological monitoring should be undertaken in advance of construction at targeted areas of all primary ground impacts associated with the proposed development including: - (a) turbine pad foundations; (b) substation; (c) compounds (d) proposed new internal excavated trackways (e) met mast.

3.11 MATERIAL ASSETS

Material assets are defined as resources of intrinsic value which may be of either natural or human origin. Material assets that were addressed which were not outlined in other chapters include roads and traffic, electricity, telecommunications, aviation, on-site resources and waste management.

Traffic and Transportation Infrastructure

The traffic and transportation assessment was undertaken to quantify and assesses the impact of construction, operational and decommissioning traffic generated by the proposed development on the existing local road network. Mitigation measures are recommended, as appropriate.

There are two proposed entrances to the proposed development site. Both will be utilised for the delivery of construction materials and by staff. Primary access to the proposed development site will be provided via a new entrance off the L6021 local road on the north eastern side of the proposed development site. This will be the main site entrance during both the construction and operational phases of the development. A second temporary entrance to facilitate construction and access will be formed on the L1009 local road on the western side of the site. The layout of the site stretches in an east-west configuration and thus having two entrances will assist during the construction stage of the development. Once the construction phase of the project is complete the western entrance will then be closed with controlled access. The eastern entrance off the L6021 will remain as the permanent access for the operational life of the wind farm development.

Potential impacts on the surrounding road network will arise principally during the construction phase. The construction phase traffic impact will occur over a period of 18 months with peak activities occurring during the initial 6-8 months. Peak daily construction traffic is predicted to be 158 HGVs with the predicted highest peak hourly HGV traffic volumes to be approximately 13 per hour. Peak construction traffic would principally occur during delivery of construction materials/ turbine base pours and therefore arise on twelve occasions.

Traffic surveys carried out for the proposed development indicate that while the increased traffic volume on the local road network during the construction phase would be substantial, this increase will be well within the carrying capacity of the local road network.

The wind turbine loads will be delivered in consultation with Kerry County Council, and An Garda Síochana, during off-peak traffic periods. A total of 120 delivery vehicles will be required for the 12 turbines. This could result in temporary delays for other location traffic during the off-peak traffic delivery periods.

A Traffic Management Plan for the construction phase has been completed. The Plan outlines mitigation measures and delivery routes in order to lessen the impact on residents and the road infrastructure.

The overall conclusion is that the proposed development would not have a significant adverse traffic impact on the surrounding road network, provided the Traffic Management Plan is adhered to.

Electricity

Existing electricity infrastructure in the vicinity of the proposed development site includes a 110kV Kilpaddoge to Tarbert overhead line.

The proposed development does not pose a negative risk to the local electricity infrastructure. There is currently sufficient capacity and infrastructure in place to accommodate the additional renewable energy to be generated. The proposed development will result in an enhancement of the local electricity infrastructure and assist in meeting increases in electricity demand nationally by exporting electricity to the National Grid. Therefore, the effects on grid capacity and electrical infrastructure are considered to be long term and positive

Aviation

There is one aviation centre within 20km of the proposed development; Abbeyfeale Airfield to the southeast; and four within 50km also including Shannon Airport to the northwest, Ardfert Airfield to the southwest and Kerry Airport to the south. Abbeyfeale Airfield is not a commercial airfield. The proposed development is located within an area characterised by operational wind farms. It is not within any flight paths, therefore the effects on aviation are considered not significant. There will be no impact on aviation radar or aviation telecommunications from the wind farm development. Consultation with the Irish Aviation Authority (IAA) was undertaken and they indicated that they will evaluate the development following submission of the planning application and EIAR.

Television and Telecommunications

TV reception in the area is principally received from the Cnoc an Oir transmitter circa 10km west of the development. Correspondence from Broadcasting Authority of Ireland (BAI) has indicated that they are not aware of any issues from existing wind farms with existing Frequency Modulation (FM) networks. Furthermore, the proposed development is not located close to any existing or planned FM transmission sites. It is unlikely therefore, given that the proposed wind farm is not located close to any existing or planned FM transmission sites, that receptors in the vicinity of the wind farm could experience interference with television reception. Mobile and broadband network operators with masts and communication links in the area include Meteor, Vodafone, Three, Imagine, Eir and Virgin Media. Any impacts on TV and Telecommunication reception in areas can be suitably addressed under agreement between the Applicant and any affected Telecommunication provider.

Water and Wastewater Infrastructure

No public water or wastewater utility infrastructure is required at the wind farm site.

Water needs for construction activities will be low and limited to truck washing, wheel wash, dust suppression and sanitary facilities. Sanitary wastewater will be collected in portable toilets during construction. Disposal of sanitary wastes will be managed through a contract with a licensed waste contractor.

Waste Management

During the course of the project, waste will be produced such as construction wastes and wastes from welfare facilities. The types of wastes to be generated will be similar to established construction waste streams and will not require unusual or new treatment options. Waste volumes will not be significant

as to require new permitted treatment, storage and disposal facilities as there is sufficient capacity at existing licensed disposal or recycling facilities in proximity to the proposed development

On decommissioning about 85% of turbine components can be recycled or reused. The effects of waste management are considered to be moderate negative.

There will be no significant, negative, residual impacts to material assets. However, the operation of the turbines will make a positive contribution to the supply of renewable energy. In terms of material assets, the proposal presents an opportunity for a positive effect in the use of renewable energy as it will correlate to a reduction in the use of fossil fuels.

3.12 INTERACTION OF THE FOREGOING

There is potential for interactions between one aspect of the environment and another. Where relevant, interactions are already addressed within each of the individual chapters of the EIAR. The purpose of this chapter is to draw attention to significant interaction and interdependencies between one topic and another.

A matrix has been generated to summarise the relevant interactions and interdependencies between specific environmental aspects and a significance rating has been given (see **Figure 3-5**).

There are a small number of major interactions and a greater number of minor interactions indicated. The major interactions are as follows:

- The interactions between Biodiversity and Civil engineering and Roads/Traffic are expected to be greatest during the construction phase. These impacts have been assessed in the Biodiversity and Traffic and Transportation Chapters.
- The interactions between Land and Soils, Water, Civil Engineering and Roads/Traffic are about the onsite civil engineering works and their potential to impact on the water and land. The mitigation measures are detailed in Chapter 2 of this EIAR, the Construction Environmental Management Plan (CEMP) and the Construction Traffic Management Plan (CTMP) as part of the civil works to ensure adequate protection of water courses during the construction phase.

	Population and Human Health	Civil Engineering and Roads	Biodiversity	Ornithology	Water	Land and Soils	Air and Climate	Noise and Vibration	Landscape and Visual	Shadow Flicker	Cultural Heritage	Material Assets
Population and Human Health		C			C	C	C/O	C/O	C	O		O
Civil Engineering and Roads	C		C	C	C	C	C	C			C	C
Biodiversity		C		C	C	C		C/O				
Ornithology		C	C			C		C/O				
Water	C	C	C			C						
Land and Soils		C	C	C	C						C	
Air and Climate	C/O	C										C
Noise and Vibration	C/O	C	C/O	C/O								
Landscape and Visual	O	C									O	
Shadow Flicker	O											
Archaeology and Cultural Heritage		C				C			O			
Material Assets	O	C					O					

	Major Interaction
	Minor Interaction
	No Interaction

C	Construction Phase Impact
O	Operation Phase Impact

Figure 3-5: Matrix of Environmental Aspect Interactions

During the construction phase, the proposed wind farm development may impact on the local environment; however mitigation measures, good site management and best construction practices will mitigate and reduce identified impacts.

The overall wind farm design philosophy of avoiding deep peat and integrating the existing roads and drainage where possible and the exclusion of and buffers to sensitive areas and watercourses all underpin the sustainable design philosophy applied to this wind farm.

Overall, the wind farm will be beneficial at a local, national and wider level. The avoidance of fossil fuels and the associated avoidance of emissions of air pollutants and greenhouse gases will have a positive impact. During the operation phase, the development will assist in meeting both domestic and European energy targets and is in line with sustainable development principles in its use of indigenous renewable energy.

4 CUMULATIVE IMPACTS

It is considered that other projects, plans and ongoing activities have the potential to interact synergistically to create cumulative or in combination impacts with the proposed project. A cumulative impact arises from incremental changes caused by other past, present or foreseeable future actions together with the proposed development. A review of relevant existing and permitted projects, plans and activities was conducted. Where relevant, each of the environmental chapters in the EIAR has considered these projects, plans and activities in their assessment of potentially significant environmental effects of the proposed project. For example, the relevant investigations for the Landscape and Visual Assessment and for environmental aspects such as Noise included the consideration of other wind farm developments.

5 CONCLUSION

Overall, the proposed development is considered to be an appropriately and sensitively-designed 12 turbine wind farm and grid connection. No significant impacts are anticipated from the development of the proposed wind farm and the mitigation measures recommended in this EIAR are proven and standard methodologies.