

NON-TECHNICAL SUMMARY

INTRODUCTION

Scope

ESB Wind Development Limited, which is a wholly-owned independent subsidiary company of Electricity Supply Board (ESB) is making a planning application to an Bord Pleanála to develop Grousemount Wind Farm project at a location east of Kilgarvan, Co Kerry.

The wind farm will comprise 38 wind turbines, each with a 2.5 – 3.5 megawatts (MW) nominal rating, which will be used to harness the natural energy of the wind to generate electricity.

In summary, the development comprises the amalgamation of two previously permitted wind energy projects, namely Barnastooka Wind Farm (14 wind turbines) and Grousemount Wind Farm (24 wind turbines). Overall, it comprises the same number of turbines as previously approved, all being located at equivalent locations to those approved and with a maximum overall dimensions of 126 metres (m), also effectively the same as approved.

The wind farm differs from the approved developments principally in terms of the electrical rating of the turbines to be installed. It also contains a number of minor modifications that will improve the constructability of the combined project.

The full project comprises Grousemount Wind Farm, Coomataggart 110 kV Substation, which is located within the wind farm site, an underground cable connection from the Substation to ESB Networks' Ballyvouskill Substation near Millstreet, Co. Cork and minor associated works.

Planning permission (Ref. 15/262) for Coomataggart Substation was granted by Kerry County Council in August 2015. Kerry County Council (Ref. EX392) and Cork County Council (Ref. D215.15) have separately declared for the portions of the cable route in their area that it constitutes exempt development, meaning that a requirement for planning permission in accordance with the Planning and Development Acts does not arise.

Comprising a total of more than 25 wind turbines and having an overall electrical rating of more than 50 MW, Grousemount Wind Farm is considered to be a major infrastructure project, requiring that application for planning permission be made directly to An Bord Pleanála rather than to the local planning authority, as would usually be the case.

The Planning and Development Acts require for certain projects that an applicant for consent submits an Environmental Impact Statement (EIS) that examines the likely significant impacts of the project on the environment. The conclusions of the EIS are contained in this Non-Technical Summary.

The EIS has been completed with broad reference to the relevant guidance produced by the Environmental Protection Agency (EPA). Attention has also been paid to the Windfarm Planning Guidelines for planning authorities issued by the Department of the Environment, Heritage and Local Government (DoEHLG).

All elements of the project have been assessed. All phases of the life of the project, i.e. construction, operation and decommissioning, are considered and, as appropriate, the potential cumulative impacts arising from existing and consented wind farm developments

within the broader area have been assessed.

Background

Ireland has one of the best wind resources in the world.

At the end of 2014, approximately 2,200 MW of wind energy capacity had been connected to the national Electricity Network. The Government's target for gross electricity from renewable sources is 40% by 2020. This national target is estimated to be equivalent to about 5,100 MW of installed renewable capacity. This indicates that significant further development of renewables is required, with the majority of this being accounted for by wind energy.

Renewable sources of energy, such as will result from the Grousemount Wind Farm, offer sustainable alternatives to our dependency on fossil fuels, a means of reducing harmful greenhouse emissions and opportunities to reduce our reliance on imported fuels. For these reasons, Irish and European policy supports the increased use of renewable energy.

THE PROJECT

The Developer

The applicant for the proposed extension is ESB Wind Developments Limited, which is a wholly-owned independent subsidiary company of Electricity Supply Board (ESB). ESB has been to the fore in the development of renewable energy in Ireland and has developed all the major hydropower schemes in Ireland.

ESB is Ireland's largest generator of green electricity and the company's commercial wind portfolio has expanded to include a number of developments on its own and in partnership with others. The company's operational wind portfolio stands at more than 400 MW, complementing 217 MW of hydroelectric generation and 272 MW of pumped storage.

In 2014 ESB contributed approximately €2 billion to the Irish economy through purchases from Irish suppliers, taxes, rates, wages and dividends, and it invested €960M in infrastructure projects. A very significant portion of this was associated with upgrading the electricity network in Ireland to accommodate increases in wind energy generation.

By 2030, ESB will be delivering one-third of its electricity from renewable generation.

The Site

The wind farm site is in an isolated rural part of Co. Kerry near its border with Co. Cork. It is at a distance of approximately 7.5 km east from Kilgarvan, Co. Kerry and approximately 14 km west from Ballyvourney, Co. Cork. It comprises the upper reaches of the Roughty River Valley, which has a rugged, wilderness character with land cover being predominantly rock, heath and peat. A small amount of seasonal rough grazing is currently undertaken.

The R569 Regional Road passes within approximately 5 km of the site to the west at Morley's Bridge. Access to the site from here is via the L3021 Third Class Road. Alternatively it may be accessed directly from the N22 National Primary Route via the same third class road from Ballyvourney.

With few exceptions the site is generally not visible from the L3021 (numbered L3400 in Co. Cork) linking Morley's Bridge and Ballyvourney (north-west to north-east of the site). The topography of the area provides an exceptionally high level of screening.

The lands at the wind farm site are in private ownership and ESB Wind Development will lease the lands on which the turbines will be installed. The overall area of the site is

approximately 1,465 hectares (ha), but the completed development will occupy less than 3% of this.

Lands in the same ownership include Ballagh Bog proposed Natural Heritage Area (pNHA), but the development is confined to areas outside of this. Otherwise, the site carries no ecological conservation designation.

The site lies within the Upper Roughty River Valley Landscape Character Area (LCA), as identified in the Kerry County Development Plan 2015-2021.

The settlement pattern in this general area is sparse and dispersed. The nearest settlement of size is Coolea village to the east and beyond it Ballyvourney. To the west the nearest sizeable settlement is Kilgarvan.

Scheme Design & Output

The proposed development will comprise 38 wind turbines. The proposal includes wind turbine transformers and turbine hardstands at each turbine, construction of new tracks, underground electrical and communication cables linking the turbines with Coomataggart 110 kV Substation, four anemometer masts, nine borrow pits / repositories that will be used as a source of stone fill material during construction and for storage of excess excavated material in their restoration, and all related site works and ancillary development.

The wind turbines will have a maximum overall dimension of 126 m. In line with recognised best practice, all turbines will be located a minimum of 500 m from dwellings outside the site.

The basis of wind turbine operation is as follows:

- A yaw mechanism turns the turbines so that they face the wind
- The blades of the turbine rotate at a rate of once every 3 – 5 seconds.
- The rotation of the blades rotates a generator within a nacelle (housing) located at the turbine hub to produce the electrical power output.
- The electricity generated is fed via underground cables to electrical transformers where it is transformed to a higher voltage for supply to the national Electricity Network.

Sensors are used to monitor wind direction and the tower head is turned to line up with the wind. Power is controlled automatically as wind speed varies and the turbines are stopped at very high wind speeds to protect them from damage.

The wind turbines will be selected from a range of models that have been demonstrated successfully throughout Europe and certified to the highest standard. The contract to supply and construct the wind farm will be open to international competition. Thus, it is not possible to specify exactly the make and model of turbine that will be deployed. However, modern wind turbines from the main turbine manufacturers have evolved to share a common appearance and other major characteristics. Only minor cosmetic features differentiate one from another.

Construction will principally involve the following:

- Provision of turbine access tracks (approximately 28 km of unsurfaced tracks similar to forestry roads) and cranepads, and excavation and construction of reinforced concrete bases (approximately 18 m diameter) with cast-in steel foundation sections for towers.

- The erection by crane of the pre-fabricated turbine towers and the installation of turbines and rotor blades.
- Installation of underground cabling (total approximately 55 km) from each turbine to Coomataggart 110 kV Substation, which is within the wind farm site.

There are two potential routes for delivery of wind turbines to the site. One is from the N22 at Clonkeen via an access track that was used for delivery of wind turbines to other wind farm developments in the area to connect to the L3021 near the site entrance. The other is from the N22 from Ballyvourney via the L3400 / L3021. Both routes require some works to facilitate deliveries. The route from Clonkeen requires some tree felling and approximately 500 m of additional track to complete it, while the Ballyvourney route requires a temporary crossing of the Sullane River there to avoid works to the existing arch bridge.

The electricity generated at Grousemount Wind Farm will be exported to the national Electricity Network via underground cables from Coomataggart Substation, which is located within the wind farm site, to the ESB Networks' Ballyvouskill Substation near Millstreet, Co. Cork.

The cable route from Ballyvouskill Substation to Coomataggart Substation will be installed primarily along the public road network in a trench measuring approximately 1.2 m deep and 0.6 m wide. Approximately 23.5 km will be located in Co. Cork and approximately 7.3 km in Co. Kerry.

Joint bays measuring approximately 2.5 m x 6 m x 2.5 m deep will be required at intervals of approximately 600 – 800 m and will for the most part be located off but adjacent to the public road. The bays will be located underground and will be completely reinstated / backfilled during the works.

It is expected that the project will generate about 350,000,000 kWh (units) of electricity per annum.

Policy Context

Over the past decade energy and environment policies have been adopted and realigned to reflect new concerns at national and international levels, to address the new realities in these areas and provide a focus for future actions.

There is strong support for renewable energy development at European and national levels.

The development of renewable energy, including energy from wind, is a central aim of energy policy at European level. The EU Renewables Directive has targets regarding increasing the share of green electricity and Ireland has specific targets that it is required to meet regarding meeting electricity demand from renewable energy sources.

The Government's commitment to develop renewable sources of energy is a core element of Ireland's Climate Change Strategy. Sustainability is at the heart of Government's energy policy objectives and the Energy White Paper in 2007 outlined the challenge of creating a sustainable energy future for Ireland. The underpinning Strategic Goals include accelerating the growth of renewable energy sources, one of the key targets being that by 2020 renewable sources will provide 40% of Ireland's gross electricity.

The latter renewable penetration target for 2020 is estimated to be equivalent to about 5,100 MW of installed renewable capacity, with about 2,200 MW of wind energy capacity having been connected in Ireland as of December 2014.

The Kerry County Development Plan 2015 – 2021, which is effective since March 2015, is the framework document for guiding and controlling future developments in the county. Through its policies it supports the development of appropriate renewable energy projects, while having due regard to the need to protect the environment and the landscape and ensure the proper planning and sustainable development of the county.

To facilitate the sustainable growth of renewable energies Kerry County Council prepared and adopted a Renewable Energy Strategy (RES) in November 2012. Having assessed various environmental, landscape, technical and economic criteria, three types of wind deployment zones have been identified, namely Strategic Site Search Areas, Open-to-Consideration and Unsuitable. The Grousemount site lies with the area categorised as Open-to-Consideration. The RES notes that there are a significant number of one-off houses in all rural areas throughout the county and as a result there are houses located in all wind deployment zones.

The RES was adopted when the majority of the existing planning permissions for wind farms in the Upper Roughty River Valley area, including the previously permitted Barnastooka and Grousemount Wind Farms, had already been granted. It can be inferred that further capacity in the landscape is considered to exist.

It is evident that there is a presumption in favour of wind farm development at this site.

Alternatives

In the short - medium term at least, current and future demand for electricity generation capacity in Ireland will remain predominantly supplied by fossil fuel plants. However, renewable and alternative sources of power will play an increasingly important role in meeting power needs in the future and in Ireland wind energy currently represents by far the most significant viable option for electricity generation from renewables.

The extent to which alternative sites have been examined by ESB's companies engaged in wind energy development is evident in the Grousemount site being one of more than 20 sites nationally for which planning applications for wind farm development were made.

A wind farm development at Grousemount has been determined as being viable. Amongst the factors that determined the suitability of this site are wind speed, favourable ground conditions for civil engineering construction, minimum interference with established land uses and the acceptable levels of environmental impacts.

Kerry County Council's previous grant of planning permissions for the separate Barnastooka and Grousemount Wind Farms site has indicated that from a planning perspective the site is suitable for a wind farm development.

The layout was developed taking on board the various constraints in the technical, planning, commercial and environmental aspects of the proposal, the previously approved arrangement and the extent of lands available for development.

The grid connection capacity of approximately 115 MW that is currently available for this development is non-transferable and it cannot be reallocated to another part of the country. Thus, Grousemount Wind Farm cannot be readily substituted by equivalent development elsewhere in Ireland, should it not be possible to deliver it in this locality.

POTENTIAL IMPACTS OF THE DEVELOPMENT

The possible impacts of the development were examined. This was done by assessing the environment in terms of the existing conditions, the impact of the proposed development and the measures taken to mitigate these impacts.

Human Environment

The site is in a remote rural area with relatively low housing density.

The development will lead to employment during the construction stage.

Grousemount Wind Farm will be a large construction project, representing a very significant financial investment. The project will involve a capital investment of about €180M and positive impacts are expected as regards input to the local economy. This will particularly arise during the construction phase when there will be requirements for plant and machinery and for construction materials. In the longer term there will be an ongoing requirement for maintenance support, services and equipment.

A feature of wind farm developments is their low site occupancy. In this instance less than 3% of the available lands will be incorporated in the completed development with the remainder being available for existing or alternative future uses.

The payment of local authority rates to Kerry County Council will provide indirect long-term benefit for the broader community.

Safety is a core value in ESB and its subsidiary companies. Its management and continual improvement are an integral part of company activities. All relevant health and safety legislation will be adhered to during all stages of the project from construction through to decommissioning. Extensive operational experience has shown that the health and safety record of wind turbines is exceptionally high, being better in most instances than other forms of electricity production. The basic technology to be employed in the project is well understood and is in an advanced state of development. It has been used successfully in many equivalent projects both nationally and internationally. There are no implications for health and safety.

Neither Coomataggart 110 kV Substation nor the grid connection from it to ESB Networks' Ballyvouskill Substation near Millstreet, Co. Cork have potential for cumulative impacts regarding the human environment.

Noise & Vibration

Construction works that could give rise to off-site noise will effectively be limited to earth moving, excavating and concreting. Noise levels resulting from construction of the wind farm were calculated for various distances from the site and it was concluded that noise levels will be well below the limits commonly imposed for construction sites. In general potential noise receptors are at a significant distance from the locations of most of the construction activities.

There are no existing significant noise sources at the site. Independent continuous noise monitoring comprising unattended sound level meters at six positions, which were identified as being representative of noise sensitive locations, was undertaken over a 15 day period in February 2015 to establish the typical noise environment in the environs of the development.

Following review of relevant local and international guidance, appropriate noise criteria for the development were identified, with separate limit values applying during daytime and night-time, in accordance with recommendations.

Noise resulting from the operation of the wind turbines was predicted and assessed for a range of wind speeds using computerised modelling in the context of the derived noise limits. The calculations included a factor of safety applied to the turbine noise outputs used. In addition to the turbines at Grousemount, the modelling took account of the

existing wind farms in the area. It also considered permitted but as yet undeveloped projects.

Marginal exceedances of limit values were predicted at a number of locations at certain wind speeds. However, these exceedances were all less than 3 dB, which is commonly recognised as the minimum perceptible increase in noise levels under normal conditions, and at all but one dwelling were less than the factor of safety built into the calculations. Nonetheless, a turbine curtailment strategy was devised, whereby turbine power output and hence noise emissions will be controlled.

The DoEHLG Windfarm Planning Guidelines note that, in general, noise is unlikely to be a significant problem where the distance from the nearest turbine to any noise sensitive property is more than 500 m, as is the case at Grousemount. In reality, discernible breaches of limit values will be unlikely to occur, even without the curtailment strategy. Following implementation of the strategy, any potential impacts on nearby houses from turbine noise will effectively be eliminated. The potential impacts from turbine noise from the Grousemount Wind Farm are considered to be negligible.

Neither Coomataggart 110 kV Substation nor the grid connection from it to ESB Networks' Ballyvouskill Substation near Millstreet, Co. Cork have potential for cumulative impacts regarding noise and vibration.

Shadow Flicker

Wind turbines, as with trees or any other tall structure, can cast long shadows when the sun is shining and is low in the sky. However, wind turbines differ from most other tall structures, such as chimneys. If the sun is behind its rotor, for an observer in an enclosed room in a nearby house the turbine has the potential to create a shadow that apparently flicks on and off as the blades rotate and the shadow passes the window.

This phenomenon, which is known as the shadow flicker effect, is generally only observed in the period after dawn and before sunset, when long shadows are created. It lasts for just a short period and depends for its occurrence on a combination of many circumstances, including there being a suitable window to be affected and the absence of any screening.

Shadow flicker analysis was undertaken using computer software and examined potential occurrence at 44 residences. It was based on the combined operation of the wind turbines at Grousemount and all of those that are already in place or planned in the surrounding area. The results showed a potential for shadow flicker effects at four residences only. The worst case predicted annual hours of occurrence is only slightly in excess of 50% of the recommended limit value.

Furthermore, the probability of the actual simultaneous occurrence of all the multiple circumstances needed for shadow flicker is very low and it is considered highly unlikely that shadow flicker could cause a nuisance. However, in the event of validated records indicating a significant shadow flicker impact, the developer will consider suitable mitigation, which would include pre-programming turbines to prevent their operation on the dates and times when shadow flicker could cause a nuisance.

Neither Coomataggart 110 kV Substation nor the grid connection from it to ESB Networks' Ballyvouskill Substation near Millstreet, Co. Cork have potential for cumulative impacts regarding shadow flicker.

Terrestrial Ecology

The wind farm site is dominated by wet heath vegetation, which has developed on sloping

terrain with a relatively shallow peat cover and which is generally in good condition, reflecting relatively low levels of livestock grazing in recent times. This is a common habitat in the upland regions of Co. Cork and Co. Kerry. Other important habitats such as dry heath and scrub woodland also occur, but have a relatively restricted distribution. Areas of blanket bog occur on deeper peat at higher altitudes and especially on plateau areas to a limited extent. Although these areas support a typical flora, the habitat has generally been affected in past times by drainage, peat-cutting and possibly overgrazing, which have impacted on their hydrology. Much better and more representative areas of blanket bog occur in a regional context, especially in sites designated for nature conservation.

The vast majority of the route of the underground cable and its associated joint bays is along or adjacent to public roads. The main exception to this occurs in six instances along the route where watercourse crossings will be by means of horizontal directional drilling (HDD) requiring localised access off the public road.

The principal ecological impact of the wind farm will be loss and disturbance of habitats, some of which are of conservation value. However, the extent of the permanent loss of habitat is a low proportion of the total development land (less than 3%). The loss of this habitat is considered an impact of moderate significance. Mitigation measures are proposed that will keep disturbance of habitats to a minimum.

With the underground cable being within the public road, the loss of habitat arising from trenching works and construction of joint bays will be limited to the marginal strips along the road carriageway. Limited disturbance will also result from the work zone around the joint bays. The overall effect is rated as an imperceptible impact.

The open and exposed character of the wind farm site results in few mammal species being present. The fauna recorded during the surveys or expected on site is fairly typical of the habitats present and the geographical location, with a limited number of species adapted to the open and exposed environment. The loss of relatively small amounts of habitat will have no measurable impacts on the terrestrial mammal, amphibian and reptile populations that inhabit the site and all should continue to retain a presence in the vicinity after the turbines are constructed. As the construction works for the underground cable will be confined almost entirely to roads and tracks, with local off-road incursions for stream crossings, habitats suitable for supporting mammal species will be largely unaffected.

Although it is still very widespread in Ireland and is present on most river systems, otter is a species of high conservation value. It is the most important mammal species present on the wind farm site and is expected to be resident on all the main rivers and streams along the cable route having fish populations. A pre-construction survey for otters will be carried out, focussing on search for holts and regular otter activity, and mitigation, which will include measures to be taken at river and stream crossings to maintain water quality, will be recommended as considered necessary and in compliance with the Wildlife Acts.

Red Grouse, a species confined to peatland habitats and of conservation importance, is the most significant bird species associated with the Grousemount site, where it is resident, although sparsely distributed. Red grouse could be disturbed during construction works, although this would be of temporary duration and at any one time limited to only part of the site. While not considered to be at risk from collision with wind turbines, they could also show some displacement behaviour when the turbines are operational. However, it is likely that they would habituate to the presence of turbines, as observed elsewhere.

While White-Tailed Eagle has been recorded on site and in the wider area, the site does not offer potential nesting sites for eagles or stands of trees suitable as night roost sites. At most, as with any other location in the wider area, feeding birds could be attracted to the site should carrion or carcasses be present, or they may pass through the site in transit to large lakes or other locations in the region. It is considered that the wind farm will not introduce a significant risk to white-tailed eagles. While the cable route passes through and alongside the Mullaghanish to Musheramore Mountains Special Protection Area (SPA), it is not expected that the works would have adverse impacts on the local hen harrier population. This reflects the scale and nature of the works.

While habitats and fauna species of conservation interest are present within the wind farm site, it is considered that the overall ecological impact of the development will be of low significance in the medium to long term, due to the sensitive project design and the mitigation measures that will be implemented to minimise identified adverse impacts. In particular, the proposed development will not affect adversely the qualifying interests of any site designated for nature conservation in the vicinity of the wind farm.

The potential for impacts on European Natura 2000 sites in the vicinity of the project was evaluated by considering three principal sites (St. Gobnet's Wood SAC, Mullaghanish Mountain SAC, Mullaghanish to Musheramore Mountains SPA) and it concluded that the project would not have significant adverse impacts on these sites.

Aquatic Ecology – Wind Farm

There are no Natura 2000 sites within 15 km of any part of the site that have a hydrological connection to the wind farm. The nearest site is the Kenmare River SAC and it will not be adversely impacted by the development.

Watercourses at the site, all of which are part of the Roughty River system, which drains to the Atlantic at Kenmare c. 20 km downstream of the wind farm site, that are marked on 1:50,000 OS Discovery Series mapping were assessed.

Twenty three sampling sites were established for biological water quality assessment and timed electrofishing was carried out at nine sites, where chemical assessments were also carried out.

A habitat assessment, which addressed salmonid habitat quality, lamprey habitat quality and freshwater pearl mussel habitat quality, was undertaken for the Roughty River's Main Channel, the Red Trench South River, Roughty Eastern Tributaries, Roughty Western Tributaries, Roughty Southern Tributaries and Roughty Northern Tributaries. In addition, barriers to upstream movement of salmonid fish were identified and the Biological Water Quality, Fishery Value and Ecological Value of each catchment area were assessed.

Most tributaries were classified as being of high local importance with some being of a lower moderate importance and the main channel of the Roughty River being classified as of regional importance. Most tributaries were classified as being of high local importance with some being of a lower moderate importance and the main channel of the Roughty River being classified as of regional importance. Whereas the previously known furthest upstream record for Freshwater Pearl Mussel was at Morley's Bridge, survey results extended the known range of the population in the Roughty upstream to a closer to the proposed development

Potential impacts during construction were evaluated in terms of pollution of streams with suspended solids and potential significant long-term aquatic effects (permanent loss of habitat due to track construction and obstruction to upstream movement of aquatic fauna

due to culverting).

Detailed mitigation measures are outlined to prevent suspended solids pollution during construction of turbines, trenches and tracks. Other mitigation will involve the contractor drawing up a Construction Environmental Management Plan (CEMP), which will include all of the avoidance and detailed mitigation measures as outlined, and detail how the effectiveness of these mitigation measures will be monitored. There will be ongoing consultation with National Parks & Wildlife Service (NPWS) and Inland Fisheries Ireland (IFI) throughout all phases of the works and a mechanism for reporting of pollution incidents will be agreed in advance. The Contractor will be required to consult with the NPWS and IFI in relation to the final detail of the CEMP and will include their requirements in this regard.

Before earthworks commence on site, erosion control and sediment control measures will be in place and functioning. They will be inspected and approved by the Ecological Clerk of Works (EcOW), who will be part of the site management team and will be supported by an independent Project Ecologist providing advice as necessary on all matters relating to ecology.

Span structure or fauna passable culvert and span structures that do not interfere with the bed or immediate bank of the river/stream are recommended for watercourse crossings.

Following implementation of mitigation measures, where they do arise, residual impacts will be minor.

Aquatic Ecology – Cable

The route of the underground cable traverses two main river catchments, namely the Roughty River to the west containing about 25% of the route, although the main channel is not crossed, and the Sullane to the east containing the remaining 75%.

A series of detailed field investigations was undertaken in late-2014 at all the main river and stream crossings along the cable route to assess water quality and fisheries habitats.

At each of the 147 crossings encountered, an assessment was made about the likelihood that fish were utilising the habitat present. Of these, the majority (92) are thought likely to have no fish life, a smaller number (31), all being small or very small streams, are thought very unlikely to have fish present, and a further smaller number (16) of small to moderately sized streams are thought to have a higher probability of fish being present. Finally, there are eight larger streams and river sections that will definitely have fish present and contain moderate to good fisheries habitat downstream of each crossing point. Only in the case of one crossing is it possible that salmon might be present.

Where there is insufficient overburden above the bridge or culvert to allow the cable be laid over the structure without a need for in-stream works, the method of watercourse crossing will be either open-cut or trenchless (horizontal directional drilling (HDD) where the cable is installed below the bed of the watercourse without in-stream works). Open-cut will only be undertaken in the period May - September at streams likely to contain fish, i.e. outside of the salmonid spawning and early fry development period. The choice of open-cut method, either damming with pump-over or damming with flume, will depend mainly on the flow in the channel being crossed. HDD will be employed at six river crossings, all of which are significant watercourses and all of which contain fish.

Fish bearing watercourses crossed by the open-cut method will exhibit localised temporary reductions in habitat quality due to residual sedimentation below the crossing points. However, these impacts will be minor and temporary in nature in the context of

each of the river systems affected.

Two Annex II aquatic species are present within the Roughty and Sullane catchments, namely the Freshwater Pearl Mussel, which require a very high standard of water quality to maintain sustainable populations, and the Atlantic salmon, whose fertilised eggs laid in redds require adequate clean water flowing through the redds to allow them to hatch and develop. Based on the assessment undertaken, it was concluded that there will be no significant adverse impacts caused to the Annex II aquatic species freshwater pearl mussels or salmon downstream of any of the crossings.

Landscape

The site is situated in the uplands enclosing the Upper Roughty River Valley, an area that comprises a deep and steep-sided valley, enclosed by a roughly U-shaped range of mountains. It is a remote mountainous landscape of large scale, where existing turbines are already co-dominant features of the landscape (along with the topography), and where there is a relative lack of settlement and recreation activity.

The mountains around the upper valley are predominantly covered in moorland that is free of divisions such as hedgerows, with patches of coniferous forest in places. On the sheltered valley floor there is a strip of farmland, with generally small, irregularly shaped grassland fields divided by mature sparsely vegetated hedgerows. In Co. Cork to the east and south of the Upper Roughty River Valley the topography is complex, with smaller hills and valleys forming an undulating landscape descending gradually in elevation towards the east and south. This area is also characterised by a high degree of visual enclosure.

Grousemount Wind Farm will result in a more complete occupation of the Upper Roughty River Valley landscape by wind energy development. However, because of the Valley's topography, which generates an unusually high degree of visual enclosure for the site, and of the location of the turbines below the ridgeline of the mountains enclosing the valley, less than 25% of the area within 30 km of the site would afford views of the turbines.

A total of 24 locations considered to be typical of the development's receiving environment were selected for detailed assessment of the potential effects on views and visual amenity by way of photomontage and wireframe analysis.

The assessment found that in all areas outside of the Upper Roughty River Valley, including important recreation and tourist routes for walking, cycling and driving, passing through the receiving environment, visual exposure to the wind farm would be very limited. The large scale of the development would not be apparent in any of the views assessed. The few turbines that would be visible would generally be seen as part of the existing array of turbines occupying the mountains around the valley. The prominence of wind energy development in views would not be significantly increased.

For the vast majority of the receiving environment and potential visual receptors, it was concluded that the effects of the development on visual amenity would be of low significance and neutral. The composition, character and quality of views would not be significantly affected. However, it was found that in two small areas of the receiving environment, adverse effects on visual amenity would be experienced.

Other than from the most elevated locations, no wind turbines are currently visible in the landscape in the scenic area around Ballingeary and Lough Allua, Co. Cork. In certain locations / views within this area the introduction of turbines to a landscape relatively free of human influence would compromise the visual amenity, even though only a small number of turbines might be visible and the area is very sparsely populated, limiting the

number of affected visual receptors.

Visual amenity would also be adversely affected in the Upper Roughty River Valley. In views from the Coolknoohil area the wind farm would be prominent - the array of turbines becoming co-dominant features along with the mountains in views from a number of houses. The character and quality of views would be significantly altered.

There being one-off houses in all wind deployment zones identified in the RES, impacts on residential amenity as a result of wind energy development cannot be entirely avoided. Therefore, the objective should be, through careful siting, to restrict the impacts to the smallest area and most limited number of visual receptors possible, and to apply best practice in the design of wind development.

The assessment found that the landform of the site lends itself to good wind farm design as prescribed in the DoEHLG Windfarm Planning Guidelines. The photomontages of views from houses at Coolknoohil show that the siting, spatial extent and arrangement of the turbines would respond appreciably to the landform. The height of the turbines is appropriate to the height of the mountains and the turbines would accentuate the topographic profile. Thus, the design mitigates the adverse visual effects of the wind farm to some extent.

Neither Coomataggart 110 kV Substation nor the grid connection from it to ESB Networks' Ballyvouskill Substation near Millstreet, Co. Cork have potential for cumulative impacts regarding landscape.

Atmospheric Emissions & Air Quality

Air pollution is a local, regional and global problem, and the impacts of air pollutants are wide and varied, affecting both the environment and human health.

Having no environmental emissions to atmosphere, Grousemount Wind Farm will have no direct impact on air quality in the area.

Electricity generated by Grousemount Wind Farm will not lead to additional emissions of sulphur dioxide (SO₂) or nitrogen oxides (NO_x), long-range atmospheric transport of which can contribute to regional problems of acidification and eutrophication of soils and waters and to air pollution over a wide area. The Government has international obligations regarding reduction of carbon dioxide (CO₂) emissions, which is the primary greenhouse gas associated with global warming and whose emissions will also be avoided by this development. In its overview of Ireland's greenhouse gas emission projections the EPA has reported that there continues to a significant risk that Ireland will not meet its 2020 EU targets even under the most ambitious emission reduction scenario.

The development of renewable energy and, particularly in Ireland, wind energy with zero emissions is seen as an essential element in achieving reductions in emissions, while allowing continuing economic expansion.

Whereas emissions from road traffic are now considered the primary threat to air quality in Ireland, the primary air quality issue related to construction is dust. However, all residences are at a significant distance and it is considered that they will be affected by dust from the site construction works, if any is created.

A loss of forestry of approximately 1 ha will result from completion of the wind turbine delivery route from the N22 at Clonkeen with an associated loss of carbon sequestration. However, the equivalent environmental benefit in avoided annual air emissions that Grousemount Wind Farm will confer greatly exceeds the extent of lost carbon sequestration, which is inconsequential.

Neither Coomataggart 110 kV Substation nor the grid connection from it to ESB Networks' Ballyvouskill Substation near Millstreet, Co. Cork have potential for cumulative impacts regarding air and climate.

Geology & Soils

Geological mapping indicates the underlying bedrock at the turbine locations comprises purple siltstone and fine sandstone from the Bird Hill Formation. A small section of the northern end of the site comprises cross bedded sandstone and siltstone of the Slaney Sandstone Formation. The ground conditions across the wind farm site generally consist of peat overlying glacial till over sandstone and siltstone bedrock.

There are no records of historical peat slips within the site and walkover reconnaissance surveys have indicated no topographical features indicative of peat instability. It has been confirmed that there are no proposed geological heritage sites within the boundary of the development.

A geotechnical site investigation comprising a total of 256 trial pits along the access tracks, at turbine locations and at other infrastructure locations, together with rotary boreholes at the locations of the turbines, the borrow pits and the permitted Coomataggart Substation, commenced in Spring 2015. Results have indicated peat depths of less than 1 m at just over 80% of the turbine locations and along almost 80% of the proposed access tracks. Peat depths are in the range 0.4-2.5 m at Coomataggart Substation and at all but two borrow pits are less than 1 m.

Spoil will be created from excavated access tracks, which will have an excavated width of 7 m, the wind turbine foundations, which will be approximately 18 m diameter, and associated hardstandings, and Coomataggart Substation. Other minor sources of spoil will be the foundation for the anemometer masts and cable trenches for power and control cabling. As a worst case scenario, a total volume of excavation of approximately 450,000 m³ has been calculated.

The primary considerations in the management of earthworks at the site will be ensuring the geotechnical safety of the site and protecting the aquatic environment by preventing sediment laden surface water runoff to watercourses. Detailed design stage and construction stage mitigation measures have been specified for the project. A spoil management strategy has been developed to securely store the vast majority of surplus excavated material within excavated borrow pits and bunded peat repositories on the site so that the risk of a peat slide from uncontrolled peat storage is negligible. In addition some excavated material will be sidecast at suitable locations.

A Peat Stability Risk Assessment (PSRA) was carried out using information on the ground conditions, topography, hydrology, ecology, land use and other factors. The impact of a potential peat slide was also considered. The likelihood and impact of a peat failure at different areas of the site were combined to derive the risk ratings. The peat risk has been minimised by optimising the design of the wind farm and will be mitigated by choosing a safe and controlled construction methodology; having a rigorous documentation and quality control system during construction and by controlling construction activities carefully.

The primary risk mitigation measures that reduce the likelihood of a peat slip include constructing the tracks and hardstandings by excavate / replace down onto the underlying glacial till or weathered rock below the peat, and the implementation of specific spoil handling procedures to control on-site storage of excavated peat and mineral soil.

The results of the PSRA show that, taking mitigation measures into account, Grousemount Wind Farm can be constructed safely from a geotechnical perspective and that the proposed development will not result in significant long-term adverse environmental impacts.

The grid connection to ESB Networks' Ballyvouskill Substation near Millstreet, Co. Cork has no potential for cumulative impacts regarding geology and soils.

Hydrology, Hydrogeology & Water Quality

The site is located within the South West River Basin District (SWRBD) with surface water from the site forming the upper reaches of the Roughty River, which flows through Kilgarvan to enter the sea at Kenmare Bay, approximately 20 km downriver of the site

An increase in run-off following rainfall will occur, but the extent of the lands at the site that will be impacted by the development is small relative to the total land area, representing less than 3% of the site. The increase in surface water runoff over the baseline condition is calculated as approximately 0.23%, which is not considered significant.

There is a low potential for groundwater dispersion and movement within the underlying aquifer, thereby making surface waters more vulnerable than groundwater at this site. Impacts on local groundwater levels are anticipated to be negligible. There is no potential to impact on groundwater quality or quantity supplying any wells that may be a source of domestic water supply to private dwellings in the vicinity

Consideration of surface water hydrology of the development and other aspects of the receiving environment indicates that there is potential for local impacts during the construction phase at isolated locations within the site, notably the potential for elevated suspended solids in natural drainage discharges. Mitigation drainage designs are required so that no residual significant impacts will occur.

Runoff control and drainage management are key elements in terms of mitigation against impacts. The rationale underlying drainage water management is to keep clean water clean by avoiding disturbance to natural drainage features and diverting clean surface water flows and to collect any drainage waters from works areas within the site that might carry silt or sediment and nutrients and route them towards stilling ponds prior to controlled diffuse release over vegetated surfaces. There will be no direct discharges to surface waters. During the construction phase, all runoff from works areas, i.e. dirty water, will be attenuated and treated to a high quality prior to being released.

No wind farm development infrastructure is located either up-gradient or down-gradient of Sillahertane Bog or Ballagh Bog and there will be no impact on the surface water hydrology of these sites.

Detailed mitigation measures are specified to control potential pollution and these include deployment of mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit, and specifically designed for use on construction sites

FWPM are known to be particularly sensitive to the presence of fine sediments. Earthworks such as those proposed have the potential to impact on FWPM sites from runoff, if the appropriate stringent mitigation measures are not put in place. While settlement ponds will form an important element of the drainage proposals for the site, they will not be stand alone measures but will be part of a treatment train of systems that will be applied in series to ensure protection of downstream watercourses.

The measures that have been prescribed and the approach taken follow best practice and

have been successfully employed on similar schemes in similar sites.

An inspection and maintenance plan for the on-site drainage system will be prepared in advance of commencement of any works. Surface water quality monitoring, which will be completed in consultation with IFI, will be undertaken during the construction phase.

No significant cumulative hydrological impacts are anticipated from the construction of Grousemount Wind Farm, including Coomataggart 110 kV Substation, the permitted grid connection from it to ESB Networks' Ballyvouskill Substation near Millstreet, Co. Cork and other wind energy developments in the region.

Roads & Traffic

The site is accessed from the L3021 (Co. Kerry designation) / L3400 (Co. Cork designation) Third Class Road, which is part of a network of country roads that serves a rural community that is reliant mainly on agriculture. Short-term effects on traffic will arise during the construction period, but there will be no effects thereafter.

On the basis of a worst case scenario of some stone fill material being imported to the site, the total number of materials deliveries involving heavy commercial vehicles (HCVs) is estimated as being approximately 6,025, or a total of 12,050 traffic movements on and off the site when allowance is made for the return of empty vehicles. This includes traffic associated with the construction of Coomataggart 110 kV Substation. Over an 18-month construction period the additional average daily traffic movements is about 30 HCVs. There will also be private car movements at the beginning and end of the day as the workforce arrives at and departs from the site.

For wind farm developments the most significant source of construction traffic is usually trucks carrying stone fill and the above worst case calculated daily traffic includes an allowance for some import of this material. However, in this instance it is anticipated that most stone will be sourced from up to nine borrow pits within the site and there will be less traffic on the public road than would otherwise be the case.

Rather than occurring uniformly throughout the construction period, traffic movements will peak on the 38 non-consecutive days on which concrete for turbine foundations will be delivered. Each foundation will involve up to 55 deliveries or 110 vehicle movements. For most of the construction period the additional traffic will be lower than this.

Short-period traffic counts were carried out in June 2015 on the L3021 / L3400 at the bridge adjacent to the N22 at Ballyvourney, Co Cork to ascertain the traffic patterns in the area. There are no particularly notable sources of traffic in the area, and cars and light vans accounted for virtually all the traffic occurring, with only one heavy goods vehicle (HGV) being recorded in four hours of measurement. The road is currently operating well below capacity, with users experiencing no significant delays. Whereas the increase in HCV traffic will be discernible due to the low level of existing use, correspondingly the number of motorists using the route that will be temporarily affected by increased traffic will be low.

Local roads will be affected by construction traffic and to that end independent surveys undertaken at the start and end of the construction phase will form the basis for assessing the extent of any repairs that may subsequently be necessary. In the interim it will be the Developer's intent to maintain the roads in a suitable condition for wind farm related and other traffic. Any road improvements that are undertaken will ultimately benefit the local population.

Delivery of wind turbine components will use special transporter vehicles and, although

they are relatively light, it is the turbine blade deliveries that typically defines both vertical and horizontal alignment requirements. With each turbine expected to involve about 12 loads, the total number of loads involved in turbine deliveries will be 456. Depending on whether the deliveries originate from the N22 at Clonkeen or at Ballyvourney, certain road improvements will be required to facilitate the long-load vehicles. At Ballyvourney this may involve a temporary crossing of the Sullane River. Appropriate traffic management measures will be agreed in advance with the relevant authorities for delivery of turbine components.

Traffic arising during operation will be limited to occasional visits by light vehicles used during routine inspection and preventive maintenance. This will be indistinguishable from other traffic and there will be no significant impact in the long term.

The roads in which the underground cable will be installed are the L11187 and the L3021 / L3400 from Coomataggart 110 kV Substation within the wind farm to site to Ballyvourney. From here it follows to N22 for approximately 40 m before turning to follow a series of minor roads to ESB Networks' Ballyvouskill Substation near Millstreet, Co. Cork.

A slight increase in traffic will arise due to construction vehicles, all of which will be regular road going vehicles. It can be estimated that approximately 20 HGV movements will occur daily at each cable work location. The necessary traffic control measures to be employed over the cable will include single lane and full road closures. In the latter case, an all-stop system may be required for local residents where no suitable diversion route available.

Material Assets

Tourism & Amenity: The site location is not a significant tourism area in its own right and the wind farm is not anticipated to have any negative impacts on tourism. There is no potential to impact on the flagship tourism attractions in Co. Kerry. Independent research has shown that the presence of wind farms makes little difference to holidaymakers' enjoyment of their holiday and wind farms were not seen as having a detrimental effect on tourist visits.

While the wind farm will be visible over a short length of the Kerry Way in the area north of Kenmare, at a distance of 15 km the wind turbines will not be prominent features and they will not negatively affect the character or quality of the view.

Energy Supply: The electricity generated by the proposal will make a significant contribution to national availability of electricity supplies, being equivalent to the annual consumption of approximately 70,000 homes during the lifetime of the project. The project will contribute to ensuring that adequate electricity supplies are available to support economic activity and growth in a manner fully compatible with Government energy and environmental policies.

Amongst the benefits of electricity generation from wind are considered to be its contribution to environmental sustainability and displacement of imported fossil fuels.

Air Navigation: There are no implications for air navigation and there will be no impact on the safety of air traffic.

Electromagnetic Interference: While no impacts are predicted, in the event that the wind farm development leads to interference with television reception, all necessary measures will be undertaken by the developers to fully eliminate any negative impact. This will be in accordance with a protocol agreement that has been established specifically to cover such situations and that will be entered into with RTÉ by the developer.

A total of 46 companies were contacted in a desktop assessment of possible interference impacts on telecommunications and radar infrastructure in the vicinity of the wind farm. No company expressed any serious concerns about the development, this being largely attributed to the area being rather unpopulated, remote and not having a significant existing telecommunications infrastructure.

Neither Coomataggart 110 kV Substation nor the grid connection from it to ESB Networks' Ballyvouskill Substation near Millstreet, Co. Cork have potential for cumulative impacts regarding material assets.

Cultural Heritage

A detailed field survey of the development areas was undertaken in July 2015 and this complimented previous surface reconnaissance surveys undertaken in 2003, 2008, 2010 and 2014. In addition, a wade and metal detecting survey of proposed watercourse crossings, during which nothing of archaeological potential was noted, was undertaken in 2015. The lands in the Barnastooka area were previously subjected to a surface reconnaissance survey and archaeological testing in 2010, while additional inspections throughout the site were undertaken in 2015 during geotechnical investigation works. A 100m wide corridor centred on the cable route was assessed for the presence of archaeological monuments.

There are seven sites/complexes of archaeological interest/potential and listed in the Sites and Monuments Record (SMR) of the Archaeological Survey of Ireland (ASI) located in the wind farm area, although not all of these are in the development area. A further 36 sites of archaeological potential have been identified during the various fieldwork. None of the four sites of archaeological interest/potential within the overall underground cable study area is located immediately adjacent the road network and all are located at sufficient distances that they do not have the potential to be impacted by the works

All but one of the Recorded Monuments are located outside the boundaries of the wind farm site and at distances which do not allow for any impacts to occur. All of the remaining monuments are generally located a minimum of 100 m from the various elements of the development. However, five sites are located at closer distances and consequently, without appropriate mitigation measures, have the potential to be disturbed by construction works/construction traffic. Potential impacts will be mitigated by establishing a marked 20 m buffer from the outermost identifiable edge of the monument.

There are no protected structures within the meaning of the Planning and Development Act, 2000 situated within the study area at the wind farm. However, there are a number of habitable, abandoned or ruinous structures, which by their general nature and construction dates are considered to be of local interest from the perspective of architectural heritage. There are two protected structures situated within the study area for the underground cable and ten further structures of architectural heritage interest were noted as result of research and field survey undertaken.

It is not considered that any of the sites/structures at the wind farm site or along the route of the underground cable will be directly impacted upon by the proposed development, and consequently it is considered that no predicted direct impacts will occur.

Interaction of Impacts

Interaction of impacts does occur to some extent, but the level of such interaction does not significantly magnify the primary impacts as described.

CONCLUSION

The equipment used will be of the most advanced technological design available. The most significant environmental impacts from the project have been examined and the best available control technologies have been applied in an integrated approach.

The site is located in an isolated location with a high level of visual screening.

The project will have no significant impact on Natura 2000 sites.

The main risks identified relate to protection of water quality, for which mitigation measures are proposed.

With the application of various mitigation measures, there are no impacts that are considered unacceptable within the context of the planning policy framework for assessing wind energy projects.

It is therefore concluded that the proposed wind farm is supported by Government policy regarding the promotion of renewable energy and is consistent with planning guidance for the development of wind energy.