NON-TECHNICAL SUMMARY

Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared by MKO on behalf of Mid Clare Renewable Energy Windfarm Ltd, who intends to apply to Clare County Council for planning permission to construct a renewable energy development and all associated infrastructure in the townland of Cahermurphy and adjacent townlands, in Co. Clare.

The townlands in which the proposed development is located are listed in Table 1.

Table 1 Townlands within which the Proposed Development is Located

Development Works	Townland
Wind turbines and access roads, Substation, Construction Compound, Borrow pits, Met mast, forestry felling and all associated site development works.	Cahermurphy, Knocknahila More South, Carrownagry South and Caheraghacullin.
Grid Connection Route	Cahermurphy, Drummin, Doolough, Carrownagry South, Glenmore and Booltiagh.

This EIAR complies with the EIA Directive 2011/92/EU as amended by Directive 2014/52/EU. The Environmental Impact Assessment (EIA) of the proposed project will be undertaken by Clare County Council, as the competent authority.

Applicant

The applicant for the proposed development is Mid Clare Renewable Energy Windfarm Ltd (MCRE). Coillte and MCRE are proposing to co-develop this project, also known as the Cahermurphy Two wind farm project. Mid Clare Renewable Energy Windfarm Ltd (MCRE) is 100 percent Irish owned and is locally owned by Co. Clare based shareholders.

Coillte have been involved in the development of 4 operating wind farms including Raheenleagh (Wicklow), Sliabh Bawn (Roscommon), Cloosh (Galway) and Castlepook (Cork) which have a combined total capacity of over 300 megawatts (MW). This project is part of a wider Coillte ambition to support the delivery of a further 1 GW of renewable energy and therefore make a significant contribution to the ambitions outlined in the All of Government Climate Action Plan 2019.

Brief Description of the Proposed Development

The proposed development comprises the construction of 10 No. wind turbines and all associated works. The proposed turbines will have a blade tip height of up to 170 metres above the top of the foundation. The full description of the proposed development, is as follows:

i. *Construction of up to 10 No. wind turbines with a maximum overall blade tip height of up to 170 metres and associated hard stand areas;*
ii. *1 no. permanent Meteorological Mast with a maximum height of up to 100 metres;*
iii. *1no. 38kV permanent electrical substation which will be constructed at one of two possible locations on site: either Option A in Carrownagry South townland or Option B in Cahermurphy townland. The electrical substation will have 1 no. control building*

with welfare facilities, all associated electrical plant and equipment, security fencing, all associated underground cabling, waste water holding tank and all ancillary works;

iv. *All associated underground electrical and communications cabling connecting the turbines to the proposed on-site substation;*
v. *All works associated with the connection of the proposed wind farm to the national electricity grid via an underground cable to the existing Booltiagh 110kV substation;*
vi. *Upgrade of existing tracks, roads and provision of new site access roads and hardstand areas;*
vii. *Junction access road works;*
viii. *2 no. borrow pits;*
ix. *1 no. temporary construction compound;*
x. *Site Drainage;*
xi. *Forestry Felling to facilitate construction and operation of the proposed development; and*
xii. *All associated and ancillary site development works.*

This application is seeking a ten-year permission and 30 year operational life from the date of commissioning of the renewable energy development.

The layout of the proposed development has been led by consideration of constraints and facilitators, thereby avoiding the environmentally sensitive parts of the site. The roads layout for the proposed development maximises the use of the existing onsite access roads and tracks where possible, with approximately 6.6 kilometres of existing roadway/ tracks requiring upgrading and approximately 4.9 kilometres of new access road to be constructed.

The planning application for the proposed wind farm includes connection to the national electricity grid. The planning application includes 2 No. substations; however, only one substation will ultimately be constructed and is being applied for as part of this application.

All elements of the overall project, including wind farm, grid connection, forestry felling, as well as the replanting have been assessed as part of this EIAR.

Modern wind turbine generators typically have an output of between 3.0 and 4.8MW. For the purposes of this EIAR it is assumed that the wind turbine model installed as part of the proposed renewable energy development will have a rated output of 4.8MW. Therefore, based on 10 no. wind turbines, the proposed wind turbines will have a combined output of approximately 48MW.

Need for the Proposed Development

It is now clear that Ireland will not meet its 2020 target for renewable energy, with the Sustainable Energy Authority of Ireland (SEAI) reporting in May 2019 that 13 per cent of Ireland's energy will come from renewable sources by 2020, three per cent short of our European target of 16 per cent (SEAI, May 2019). Ireland faces significant challenges to its efforts to meet EU targets for renewable energy by 2030 and its commitment to transition to a low carbon economy by 2050. Further detail can be found in Section 2.2.3 of this EIAR.

In March 2019, the Government announced a renewable electricity target of 70% by 2030. The proposed development is likely to be operational before 2030 and would therefore contribute to this 2030 target. More recently, the EPA reported that Ireland is set to fall far short of all of its carbon emissions reduction targets for 2030, despite climate action measures in the National Development Plan (EPA, June 2019). As such, the proposed Cahermurphy Two wind energy development is critical to helping Ireland address these challenges as well as addressing the country's over-dependence on imported fossil fuels.

The Climate Action Plan 2019 (CAP) was published on the 1st of August 2019 by the Department of Communications, Climate Action and Environment (DoCCAE). The CAP sets out an ambitious course

of action over the coming years to address the impacts which climate change may have on Ireland's environment, society, economic and natural resources. This Plan clearly recognises that Ireland must significantly step up its commitments to tackle climate disruption. The CAP identifies a need for 8.2GW of onshore wind generation. Only 3.7GW is in place as of December 2019, therefore Ireland needs to more than double its installed capacity of wind generation. The CAP presents clear and unequivocal support for the provision of additional renewable energy generation and presents further policy support for increased wind energy. Further information relating to the Climate Action Plan can be found in Chapter 2, Section 2.3.4.

Section 2.2 in Chapter 2 of this EIAR on Background to the Proposed Development, presents a full description of the international, national and regional renewable energy policy context for the proposed project. Section 2.3 addresses climate change, including Ireland's current status with regard to meeting greenhouse gas emission reduction targets.

Economic Benefits

The proposed development will have several significant long-term and short-term benefits for the local economy including job creation, local authority commercial rate payments and a Community Benefit Scheme.

The annual commercial rate payments from the proposed development to Clare County Council, will be redirected to the provision of public services within Co. Clare. These services include items such as road upkeep, fire services, environmental protection, street lighting, footpath maintenance etc. along with other community and cultural support initiatives.

It is estimated that the proposed project will create approximately up to 72 jobs during the construction, operational and maintenance phases of the proposed development. During construction, additional employment will be created in the region through the supply of services and materials to the development. In addition to this, there will also be income generated by local employment from the purchase of local services i.e. travel and lodgings.

Should the proposed development receive planning permission, there are substantial opportunities available for the local area in the form of Community Benefit Funds. Based on the current proposal, a Community Benefit Fund in the region of €5.6 million will be made available over the lifetime of the project. The value of this fund will be directly proportional to the level of installed MWs at the site and will support and facilitate projects and initiatives including youth, sport and community facilities, schools, educational and training initiatives, and wider amenity, heritage, and environmental projects. Further details on the proposed Community Gain proposals are presented in Section 4.5 and Appendix 2-2 of this EIAR.

The proposed Renewable Energy Support Scheme (RESS) sets out that future renewable energy project proposals enable the possibility for local communities to invest in projects in a meaningful way as a means to directly gain from the financial dividends that a project can provide should it be consented, built and operated. In response to this MCRE & Coillte have been working hard with external agencies to develop workable models of Community Investment. As with the benefit fund, we aim to take this work into the community during 2020, to continue to explore this exciting possibility and see how best to embed its design within the community.

Purpose and Structure of this EIAR

The purpose of this EIAR is to document the current state of the environment in the vicinity of the proposed development site and to quantify the likely significant effects of the proposed development on the environment. The EIAR submitted by the applicant provides the relevant environmental information to enable the Environmental Impact Assessment (EIA) to be carried out by the competent authority, in this case Clare County Council.

The EIAR project team comprises a multidisciplinary team of experts with extensive experience in the assessment of wind energy developments and in their relevant area of expertise. Each chapter of this EIAR has been prepared by a competent expert in the subject matter. The chapters of this EIAR are as follows:

1. *Introduction*
2. *Background to the Proposed Development*
3. *Consideration of Reasonable Alternatives*
4. *Description of the Proposed Development*
5. *Population and Human Health*
6. *Shadow Flicker*
7. *Biodiversity*
8. *Ornithology*
9. *Land, Soils and Geology*
10. *Hydrology and Hydrogeology*
11. *Air and Climate*
12. *Noise and Vibration*
13. *Landscape and Visual*
14. *Archaeological and Cultural Heritage*
15. *Material Assets (including Traffic and Transport, Telecommunications and Aviation)*
16. *Interactions of the Foregoing*
17. *Schedule of Mitigation*

A Natura Impact Statement has also been prepared in line with the requirements of the Habitats Directive and has been submitted to the Planning Authority as part of the planning application documentation.

Background to the Proposed Development

This section of the EIAR presents policy information on Energy and Climate Change policy and targets, the strategic, regional, and local planning context for the proposed development, scoping and consultation, and the cumulative impact assessment process. A description of reasonable alternatives studied by the developer, relevant to the project including renewable energy technologies, turbine numbers, layout and design is included at Chapter 3 of this EIAR. This chapter provides an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment.

The policies and targets which have been put in place at the various levels of Government in relation to renewable energy and climate change illustrate the need for the proposed development to assist Ireland in meeting its national targets and European commitments in relation to climate change and decarbonisation. It is of note that latest projections have shown that Ireland is not set to meet its 2020 targets.

The proposed development comprises the provision of a wind farm which will generate renewable energy and provide it for use onto the national grid. The need to decarbonise the economy and reduce emissions has always been imperative, however in recent years the urgency involved has become clearer to all stakeholders. The Climate Action Plan published by the Government in 2019 has clearly identified the need for and urgency of change, it states:

> *"The accelerating impact of greenhouse gas emissions on climate disruption must be arrested. The window of opportunity to act is fast closing, but Ireland is way off course.... The shift in climate is bringing profound shifts of desertification, rising sea levels, displaced population, profound challenges to the natural world, and economic and social disruption. We are close to a tipping point where these impacts will sharply worsen. Decarbonisation is now a must if the world is to contain the damage and build resilience in the face of such a profound challenge."*

The primary driver behind the proposed development is the need to provide additional renewable energy to offset the use of fossil fuels within the electricity generating sector. Increasing electricity generation from wind power represents the most economical renewable option to reduce emissions within the power generation sector and is the most mature technology available to achieve national targets that have been established for decarbonisation.

Energy and Climate Change Targets

The overall share of renewables in primary energy in Ireland stood at 11.1% in 2018 which is up from the 2017 figure of 7.3%, and 7.9 in 2016. As per the EU Renewable Energy Directive, the target for Ireland is set at 16% share of renewable energy in gross final consumption (GFC) by 2020. As per the SEAI's Energy in Ireland 2018 Report, the contribution from renewables in 2005 was 2.8%, which as of 2017, has risen to 10.6% of the GFC. The SEAI's 2018 Report continues to note that the share of electricity from renewable energy has increased fourfold between 2005 and 2017 – from 7.2% to 30.1% – an increase of 23 percentage points over 12 years. In absolute terms, there has been a fivefold increase in the volume of renewable electricity generated from 1,873 GWh in 2005 to 8,877 GWh in 2017. Of this, it was noted that Wind energy accounted for 84% of the renewable electricity in 2017.

The June 2018 *'Off Target Report'* published by the Climate Action Network (CAN) Europe, which ranks EU countries ambition and progress in fighting climate change, listed Ireland as the second worst performing EU member state in tackling climate change. It also stated that Ireland is set to miss its 2020 climate and renewable energy targets and is also off course for its unambitious 2030 emissions target. The report states:

> *"Ireland has failed to prepare effective policies to align near-term climate action with EU and Paris Agreement commitments. Without new, immediate and substantive efforts to cut emissions, Ireland faces annual non-compliance costs of around €500 million."*

The Department of Climate Change, Action & Environment (DCCAE) reported in their *'Fourth Progress Report on the National Renewable Energy Action Plan'* (December 2017) that Ireland will achieve 13% of its 16% Renewable Energy Share (RES) target by 2020. SEAI in their report *'Ireland's Energy Targets – Progress, Ambition & Impacts'* (April 2016) estimates that Irelands inability to achieve its 2020 renewable energy targets will result in fines of between €65 million and €130 million per percentage shortfall on its overall binding target after 2020 until it meets its targets.

The Climate Change Advisory Council similarly notes within their *2019 Annual Review* that while the share of renewable electricity generation, particularly wind, is increasing in Ireland, the pace of decarbonisation of the electricity generation sector is not compatible with a low-carbon transition to 2050. As such, Ireland can continue to 'comply' with EU targets by purchasing emission allowances; however, the expenditure of public funds to do so would not result in any domestic benefit, and furthermore, would result in a more difficult and expensive challenge for the county to meet its future 2030 targets and beyond. The Review concludes that continued and additional investment in capacity and technologies in the renewable energy sector is required to reach these said targets.

The latest data available from Eurostat show that as of the 2018 figures, Ireland is still considerably below meeting its 16% target and at the end of 2018 sat at 11.1%.

It is estimated that 1 MW of wind capacity can provide enough electricity to supply approximately 730 homes. EirGrid in their *'Annual Renewable Energy Constraint & Curtailment Report 2017'* (June 2018) stated that the amount of wind energy installed in the island of Ireland at the end of 2017 had reached 3,311 Megawatts (MW). More recently, EirGrid in their *'All Island Generation Capacity Statement 2019 - 2028'* (September 2019), state that, in the absence of the National Energy and Climate Plan 2021 – 2030, it is assumed that renewable targets will be achieved largely through the deployment of additional wind powered generation in Ireland. New wind farms commissioned in Ireland in 2018 brought the total wind capacity to over 3666 MW, contributing to the increase in overall RES-E percentage to 32.5%,

with wind energy accounting for 27.6%. EirGrid estimates that between 3.9 – 4.4 Gigawatts (GW) of wind may be required to meet the 2020 Renewable Energy Supply - Electricity (RES-E) target of 40%. The Capacity Statement also notes that, at a median demand level, Ireland does not have adequate generation capacity to meet demand from 2026 once Moneypoint closes, and should any other plant close prior to this, earlier deficits may arise. This is especially pertinent with regard to the recent announcement that the Electricity Supply Board intends to close the peat fired Shannonbridge and Lough Ree Power Stations at the end of 2020. In this context, the importance of wind energy becomes more apparent as it is estimated that 1 MW of wind capacity can provide enough electricity to supply approximately 650 homes.

It is noted that the key driver for electricity demand in Ireland for the next number of years is the connection of new large energy users, such as data centres. Specifically, there is currently 1000 MVA demand capacity that is contracted to data centres and other large energy users. This statement notes that "*Large industrial connections normally do not dominate a country's energy demand forecast but this is the case for Ireland at the moment".*

It is noted that the full impact of the demand from data centres may be underestimated in the EirGrid Generation Capacity Statement as it is understood that only the data centres with signed connection agreements have been considered in the report. There are other data centre projects which have made connection enquiries with EirGrid estimated at more than 1,000 MVA, that are in the planning process and well advanced however they have not been included in this demand forecast. It should be noted that each MW of additional data centre load will add at least 1 MW of wind to the 40% RES-E 2020 target. Alternatively, 3 MW of wind could be required per MW of data centre electricity demand if the data centre wants to commit to being powered by 100% renewable energy. Many data centres have made such commitments and have well-publicised company policies to use only renewable electricity for their power needs.

In October 2015, the Irish Wind Energy Association (IWEA) commissioned a study titled 'Data-Centre Implications for Energy Use in Ireland' and concluded that an additional 1 GW of electricity demand may be required in Ireland by 2020 due to growth in data centres.

Local Policy

The site of the proposed development is entirely within the administrative area of Clare County Council. As such the extant Clare County Development Plan 2017-2023 (as varied) is relevant.

Clare County Development Plan 2017-2023 (as varied)

In relation to energy, the Clare County Development Plan 2017 – 2023 ('CDP') recognises that an attractive environment for industry and therefore investment depends on the areas ability to deliver *"a competitive and uninterrupted energy supply."* A strategic plan-led approach has been employed in the CDP via the Clare Renewable Energy Strategy ('RES') in relation to renewable energy production. The Development Plan also includes a dedicated Wind Energy Strategy ('WES'). Both are presented in the context of what is a supportive overarching policy framework within the Development Plan.

The Plan is clear regarding the importance of wind energy in the Plan area. It states that the county "*has one of the best wind resources in the world – almost the entire county has either an excellent or very good wind energy resource.*" It also recognises however that wind energy development must be balanced against potential impacts on landscape, ecology and amenities of local communities.

Volume 5 of the Development Plan contains the Clare Wind Energy Strategy ('WES'). The Strategy (CWES) divides County Clare into four areas with regard to their capacity to accommodate wind energy developments on the basis of the County Landscape Character Assessment. The majority of the proposed development site is situated within an area designated as a '**Strategic Area'** for Wind Farm Development. One turbine falls within an area designated as '**Acceptable in Principle'**.

The WES defines these areas as follows:

1. Strategic Areas (WES Eight): "*These key areas are considered to be eminently suitable for wind farm development and are of strategic importance because of;*
    - *Good / excellent wind resources Access to grid*
    - *Distance from properties and*
    - *Outside any Natura 2000 sites Projects within these areas must:*
    - *Demonstrate conformity with existing and approved wind farms to avoid visual clutter. Be designed and developed in line with the Wind Energy Development Guidelines, Guidelines for Planning Authorities (DoEHLG, 2006) in terms of siting, layout and environmental studies.*
    - *Provide a Habitats Directive Assessment under Article 6 of the Habitat Regulations if the site is located in close proximity to a Special Area of Conservation or Special Protection Area.*
    - *Be developed in a comprehensive manner avoiding the piecemeal development of the areas designated as 'strategic'.*

    Target wind energy generation from strategic areas is 400MW"

2. Acceptable in Principle (WES 9) : "*These areas are considered suitable for wind farm development because of:*
    - *Sufficient wind speeds,*
    - *Access to grid network, and*
    - *Established patterns of inquiries.*

    Projects within these areas must:
    - *Demonstrate conformity with existing and approved wind farms to avoid visual clutter. Designed and developed in line with the Planning Guidelines in terms of siting, layout and environmental studies.*
    - *Provide a Habitats Directive Assessment under Article 6 of the Habitat Regulations if situated in proximity to a Special Area of Conservation or Special Protection Area will require. [sic]*

    Target wind energy generation from Acceptable in Principle areas is 150 MW"

As discussed in detail in various chapters of this EIAR the location of the proposed development is considered acceptable under the terms of WES 8 and 9, as noted above.

The RES aims to, in conjunction with the Development Plan, *"position the County as the national leader in renewable energy generation, supporting energy efficiency and conservation, with an accessible modern telecommunications infrastructure, achieving balanced social and economic development and assisting Ireland's Green Energy target.*"

The RES notes that "*energy needs in County Clare are expected to rise by 2020..."* This is balanced against a recognition that "*the County has considerable capacity to produce energy from renewable and indigenous resources.*" Policy RES 2.1 of the Strategy is that "*it is an objective of Clare County Council to meet the County's energy needs from 100% indigenous renewable energy sources.*"

The proposed development will directly assist in meeting the areas energy needs as noted in the Plan should it be consented.

Wind Energy Development Guidelines

The relevant considerations under the '*Wind Energy Development Guidelines for Planning Authorities*' (Department of the Environment, Heritage and Local Government (DOEHLG), 2006) have also been taken into account during the preparation of this EIAR.

The '*Wind Energy Development Guidelines for Planning Authorities*' (DoEHLG, 2006) are currently the subject of a targeted review. The proposed changes to the assessment of impacts associated with onshore wind energy developments are outlined in the document '*Proposed Revisions to Wind Energy*

Development Guidelines 2006 – Targeted Review' (December 2013), the '*Review of the Wind Energy Development Guidelines 2006 – Preferred Draft Approach'* (June 2017), and the Draft Wind Energy Development Guidelines (December 2019). A consultation process in relation to the 2019 document concluded on the 19th of February 2020.

At time of writing, the Draft Guidelines have not yet been adopted, and the relevant guidelines remain those published in 2006. Notwithstanding this, however, due to the timelines associated with the planning process for renewable energy projects, it is possible that a version of the draft guidelines may be finalised during the consideration period for the current proposed development. The EIAR is cognisant of the Draft Revised Wind Energy Development Guidelines. To this end it is anticipated that the proposed Wind Farm will be capable of adhering to the relevant noise and shadow flicker standards and is in accordance with the setback requirements.

Planning History

The relevant planning history of the proposed development site, the planning applications in the vicinity of the site along with other wind energy applications within the wider area are set out at Section 2.5 of this EIAR.

Scoping and Consultation

A comprehensive scoping and consultation exercise was undertaken during the preparation of this EIAR. A scoping report, providing details of the application site and the proposed development, was prepared by MKO and circulated in June 2019. MKO requested the comments from relevant personnel/bodies in their respective capacities as consultees with regards to the EIAR process. Details of that scoping progress can be found at Section 2.6 of this EIAR.

Pre-application consultations were also held with Clare County Council where the proposed development was introduced and the following items discussed:

- Site Selection
  - Development Plan provisions
  - Site Constraints
- Development Description, Design & Layout
  - Iterative design process
  - Discussion of Layout
- Planning Application Approach
  - EIA Requirements
  - Councils Scoping Response
- Environmental Impact Assessment Report (EIAR)
  - Introduction, Background, Alternatives, Description
  - Population and Human Health, including Shadow Flicker
  - Biodiversity, including Flora & Fauna and Ornithology
  - Land, Soil, Water, Air & Climate
  - Noise
  - Landscape
  - Cultural Heritage, Material Assets (incl. Roads) and Interactions
- Community Engagement
- Cumulative Projects
  - Wind farm applications in vicinity and their status

The Applicant and Coillte's Renewable Energy team have undertaken community engagement, including meeting with many people living within 2km of the proposed wind farm. While public information events would typically feature as part of the overall community engagement process, the impacts of the Covid-19 pandemic and associated restrictions have meant that such engagement requires to be undertaken in a socially distant manner giving utmost regard for public health.

As such, information was distributed in leaflet form to inform of the project proposals, and seek feedback.

The information circulated discussed the need for onshore wind as part of the wider energy mix; the subject site and associated selection process; detail of the proposed development; and community benefits arising.

The 'Next Steps' section of the information leaflet noted that the application was in preparation and that once lodged, the period for public comments would be open.

Postal, telephone and email contacts are provided in the leaflet, as well as a direct link to the dedicated project website, www.cahermurphy2windfarm.ie.

Consideration of Reasonable Alternatives

This chapter of the EIAR includes a description of the reasonable alternatives studied by the developer which are relevant to the project and its specific characteristics and provides an indication of the main reasons for the option chosen, taking into account the environmental effects. The consideration of alternatives includes alternative design, technology, layout, size and scale. A 'Do Nothing Scenario' i.e. an outline of what is likely to happen to the environment should the Project not be implemented, is also included.

Constraints mapping and a Landscape Capacity Assessment (LCA) was carried out at the preliminary stage of the project. The study examined three areas within the Cahermurphy landscape (Area A, B and C) with the view to accommodate a medium to large scale wind farm. Constraints mapping was initially carried out for the three areas. Following the initial constraints study, only two areas were considered for assessment in the LCA. The study looked at a 10 no. turbine layout in Area A and a 4 no. turbine layout in Area B. The findings from the study indicated that the spatial extent of all 14 no. turbines was deemed acceptable within the landscape setting and due to the distance between the proposed development and existing and permitted turbines cumulative effects arising were not considered to be significant. Notwithstanding the findings from the LCA, given the close proximity of the Hen Harrier territory at Doo Lough and the Cragnashingaun Bogs Natural Heritage Area, it was decided not to bring Area B forward for further consideration at this stage.

The design of the proposed development has been an informed and collaborative process from the outset, involving the designers, developers, engineers, environmental, hydrological and geotechnical, archaeological specialists and traffic consultants. The aim of the process being to reduce the potential for environmental effects while designing a project capable of being constructed and viable.

The final proposed turbine layout takes account of all site constraints and the distances to be maintained between turbines and from houses, roads, etc. The layout is based on the results of all site investigations and baseline assessments that have been carried out during the EIAR process. As information regarding the site of the proposed development was compiled and assessed, the proposed layout has been revised and amended to take account of the physical constraints of the site and the requirement for buffer zones and other areas in which no turbines could be located.

It was decided at an early stage during the design of the proposed development that maximum possible use would be made of existing roadways and tracks where available to minimise the potential for impacts by using new roads. An alternative option to making maximum use of the existing road

network within the site would be to construct a new road network, having no regard to existing roads or tracks. This approach was not favourable, as it would create the potential for additional significant environmental effects to occur in relation to land, soils and geology (increased excavation and aggregate requirements), hydrology, and biodiversity (increased habitat loss).

The use of a single temporary construction compound was deemed preferable to the alternative of two smaller compounds for a number of reasons. Principally, there will be less disturbance to site ecology and residential receptors in the vicinity of the site. There will also be a reduced visual impact arising from the development.

One potential location was initially identified for the proposed on-site substation. However in order to provide flexibility to the electrical network provider, two on-site substation locations options have been assessed and included in the planning application. Only one substation will ultimately be constructed.

The proposed grid connection route was one of two grid connection routes considered at the outset of the design process of the proposed development. Landowner consents for a section of the proposed cable grid connection from the onsite substation to the existing Slievecallan substation were not available at the time of report writing and therefore the proposed grid connection to the existing Booltiagh substation was the most favoured option of the two options considered. In conclusion, whilst both options are viable from an environmental perspective, the Slievecallan option has slightly more watercourse crossings when compared to the Booltiagh option which would increase the potential for silt-laden runoff and hydrocarbons to enter receiving watercourses. There is also a slight increase in habitat loss for the Slievecallan option when compared to the Booltiagh option.

The proposed borrow pit location was selected due to the presence of competent or usable rock at an acceptable level below existing surface level. An alternative to using onsite borrow pits was the option of sourcing stone and hardcore materials from a licensed quarry in the vicinity. The movement of such material would result in a significant increase in construction traffic and heavy loads and was therefore considered the least preferable option.

The alternatives considered for the port of entry of wind turbines into Ireland for the proposed development include Dublin Port and the Port of Galway. Dublin Port is the county's principal seaport catering for approximately two-thirds of Ireland's port traffic. The Port of Galway also offers a roll-on roll-off procedure to facilitate import of wind turbines. Both ports and indeed others in the State (including Cork and Shannon-Foynes), offer potential for the importing of turbine components and therefore are equally viable alternatives.

Description of the Proposed Development

The overall layout of the Proposed Development is shown on Figure 4.1. This drawing shows the proposed locations of the wind turbines, electricity substation, borrow pits, construction compound, internal roads layout and the main site entrance. Detailed site layout drawings of the Proposed Development are included in Appendix 4.1 to this EIAR.

The proposed wind turbines will have a tip height of up to 170 metres. Within this size envelope, various configurations of hub height, rotor diameter and ground to blade tip height may be used. The exact make and model of the turbine will be dictated by a competitive tender process, but it will not exceed a tip height of up to 170 metres. Modern wind turbines from the main turbine manufacturers have evolved to share a common appearance and other major characteristics, with only minor cosmetic differences differentiating one from another. The wind turbines that will be installed on the site will be conventional three-blade turbines, that will be geared to ensure the rotors of all turbines rotate in the same direction at all times.

Each wind turbine is secured to a reinforced concrete foundation that is installed below the finished ground level on a granular sub-base after the excavation of soil and peat. The size of the foundation will

be determined by the turbine manufacturer, and the final turbine selection will be the subject of a competitive tender process. Different turbine manufacturers use different shaped turbines foundations, ranging from circular to hexagonal and square, depending on the requirements of the final turbine supplier and a foundation area large enough to accommodate all modern turbine models has been assessed in this EIAR. The turbine foundation transmits any load on the wind turbine into the ground. Hard standing areas consisting of levelled and compacted hardcore are required around each turbine base to facilitate access, turbine assembly and turbine erection. The hard-standing areas are used to accommodate cranes used in the assembly and erection of the turbine, offloading and storage of turbine components, and generally provide a safe, level working area around each turbine position.

To provide access within the site of the proposed development and to connect the wind turbines and associated infrastructure, approximately 4.9 kilometres of new access roads will need to be constructed including the upgrade 6.6km of existing access road.

It is proposed to develop 2 No. on-site borrow pits as part of the Proposed Development. It is proposed to obtain the majority of all rock and hardcore material that will be required during the construction of the proposed development from the on-site borrow pits.

It is proposed to construct one 38 kV electricity substation within the site, at one of two locations (Option A or B) as shown in Figure 4.1. The footprint of the proposed onsite electricity substation compound measures approximately 2,143 square metre.

One wind farm control building will be located within the substation compound. The wind farm control building will include staff welfare facilities for the staff that will work on the proposed development during the operational phase of the project. Toilet facilities will be installed with a low-flush cistern and low-flow wash basin. It is proposed to manage wastewater from the staff welfare facilities in the control buildings by means of a sealed storage tank, with all wastewater being tankered off site by an appropriately consented waste collector to wastewater treatment plants.

Each turbine will be connected to the on-site electricity substation via an underground 20 or 33 kV (kilovolt) electricity cable. Fibre-optic cables will also connect each wind turbine to the wind farm control building in the onsite substation compound. The electricity and fibre-optic cables running from the turbines to the onsite substation compound will be run in cable ducts laid in trenches approximately 1.3 metres below the ground surface, along the sides of roadways within the windfarm site. A connection between the proposed development and the national electricity grid will be necessary to export electricity from the proposed wind farm. There are 2 No. substations options; however, only one substation will ultimately be constructed. The connection will originate at the proposed onsite substation and will be connected to the national grid via an underground grid connection cable which will connect into the existing Booltiagh 110kV substation. The grid connection cabling route is approximately 12.1 kilometres in length.

One permanent meteorological mast is proposed as part of the wind farm development. The meteorological mast will be equipped with wind monitoring equipment at various heights. The mast will be a slender free-standing structure up to 100 metres in height.

One temporary construction compound is proposed as part of the proposed development. The construction compounds will consist of temporary site offices, staff facilities and car-parking areas for staff and visitors.

It is estimated that approximately 249,714m^3 of peat and spoil will be excavated during the construction of the proposed development. This peat and spoil will be managed by means of placement within the proposed borrow pits or alongside the access roads.

A total of 34.11 hectares of forestry will have to be permanently felled for the proposed development. This includes a total of 27.6 hectares within and around the footprint of the Proposed Development and 6.51 hectares along the grid connection route. The area of forestry that will be permanently felled for

the footprint of the turbines and the other infrastructure and turbine erection will be replaced or replanted on a hectare for hectare basis as a condition of any felling licence that might be issued in respect of the proposed wind farm. This can occur anywhere in the state subject to licence. Four forestry replacement sites have been identified for the purposes of assessment in this EIAR. These sites are located in Cavan, Clare, Galway and Roscommon and have all been granted technical approval for afforestation by the Forest Service.

A 'Hen harrier and Peatland Habitat Enhancement Plan' has also been prepared for the proposed development which identifies an area of 28.2 ha of forestry on which to restore peatland habitats and to provide additional habitat for bird species including hen harrier and other species. In addition, local landowners have been engaged in a programme to farm in a hen harrier friendly manner. An area of c. 30 hectares of farmland has been identified for enhancement measures. This area is located 1.5km from the traditional hen harrier territory to the south of Doo Lough.

It is proposed to access the site of the Proposed Development via an existing access track off the local road to the east of the site. This entrance will be widened to facilitate the delivery of the construction materials and turbine components. The proposed works will result in a permanent upgrade of this current site access from the local road, which will also form the entrance to the Proposed Development during the operational phase.

It is proposed that large wind turbine components will be delivered to the site of the proposed development, from Dublin Port or Galway Port, via the N68 National Secondary Road. From Ennis the turbines will be transported southwest along the N68 National Secondary Road before turning right on to the R484 Regional Road and transported northwest until they reach the village of Kilmihil. The turbines will pass straight through Kilmihil continuing on the R484 until it reaches Creegh. At Creegh, the turbines will turn right at the crossroad onto a local road passing Creegh North, Clooneenagh and Cahermurphy Hill after which it will take a sharp left onto a local road approaching the proposed wind farm development site from the south. The delivery route for general HGV construction traffic will follow a more direct route to the site via the local road network from the village of Kilmihil.

MCRE expects that for each megawatt hour (MWh) of electricity produced by the wind farm, the project will contribute €2 into a community fund for the RESS period i.e. first 15 years of operation and €1 per MWh for the remaining lifetime of the wind farm. If this commitment is improved upon in upcoming Government Policy it will be adjusted accordingly .If this project is constructed as currently designed it is estimated that a total of approximately €5.6 million will be available in the local area for community funding over the lifetime of the project.

The protection of the watercourses within and surrounding the site, and downstream catchments that they feed is of utmost importance in considering the most appropriate drainage proposals for the site of the proposed development. The proposed development's drainage design has therefore been proposed specifically with the intention of having no negative impact on the water quality of the site and its associated rivers and lakes, and consequently no impact on downstream catchments and ecological ecosystems. No routes of any natural drainage features will be altered as part of the proposed development and turbine locations and associated new roadways were originally selected to avoid natural watercourses, and existing roads are to be used wherever possible. There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flows. All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses. Buffer zones around the existing natural drainage features have been used to inform the layout of the Proposed Development.

It is estimated that the construction phase will take approximately 12 to 18 months from starting onsite to the full commissioning of the wind farm. The construction phase can be broken down into three main phases, 1) civil engineering works: 10 months, 2) electrical works: 6 months, and 3) turbine erection and commissioning: 8 months.

During the operational phase, each turbine will be subject to a routine maintenance programme involving a number of checks and changing of consumables, including oil changes. In addition, there will be a requirement for unscheduled maintenance, which could vary between resetting alarms to major component changes requiring a crane. Typically, maintenance traffic will consist of four-wheel drive vehicles or vans. The electricity substation and site tracks will also require periodic maintenance.

The wind turbines proposed as part of the proposed development are expected to have a lifespan of approximately 30 years. Following the end of their useful life, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the proposed development may be decommissioned. The onsite substation will remain in place as it will be under the ownership of the ESB and will form a permanent part of the national electricity grid.

Population and Human Health

One of the principle concerns in the development process is that people, as individuals or communities, should experience no diminution in their quality of life from the direct, indirect or cumulative impacts arising from the construction and operation of a development. The key issues examined in this section of the EIAR relate to population and human health and incorporate population statistics, employment and economic activity, land-use, residential amenity (shadow flicker, noise, visuals and telecommunications), community facilities and services, tourism, property values, accidents/natural disasters, health and safety and other environmental hazards such as water contamination, air pollution, traffic and flooding.

The proposed wind farm site is located approximately 5 kilometres to the north of Kilmihil and 25 kilometres southwest of Ennis, Co. Clare. The majority of amenities and community facilities, including GAA and other sports clubs, youth clubs and recreational areas available in the area are located in the centres of settlement throughout the wider area. Retail and personal services within the vicinity are provided in the larger settlements such as Kilrush and Ennis. There are no key identified tourist attractions pertaining specifically to the site of the proposed development itself.

The Study Area for the Population and Human Health assessment was defined by the 4 No. District Electoral Division (DED)s within and adjacent to the development site. The population of the DEDs within the Study Area decreased by 6.5% between 2011 and 2016, falling from 1,193 to 1,116 persons, respectively, with the rate of population change unevenly distributed between the DEDs. The highest levels of employment within the Study Area were recorded in the Farmer category. The levels of employment within the Employer/Manager, Higher Professional, Lower Professional and Non-manual in the Study Area were lower than those recorded for the State and County Clare, while those recorded within the Unskilled, Own Account, Farmer and Agricultural Worker were higher.

As stated above, up to 72 jobs could be created during the construction, operation and maintenance phases of the proposed development with most construction workers and materials sourced locally, thereby helping to sustain employment in the construction trade. This will have a Short-Term Significant Positive Impact.

There is currently no published credible scientific evidence to positively link wind turbines with adverse health effects. The main publications supporting the view that there is no evidence of any direct link between wind turbines and health are summarised in Chapter 5 of this EIAR. Although there have been no empirical studies carried out in Ireland on the effects of wind farms on property prices, it is a reasonable assumption based on the available international literature that the provision of a wind farm at the proposed location would not impact on the property values in the area. The provision of underground electric cables is common practice throughout the country and installation to the required specification does not give rise to any specific health concerns. The extremely low frequency (ELF) electric and magnetic fields (EMF) associated with the operation of the proposed cables fully comply with the international guidelines for ELF-EMF set by the International Commission on Non-Ionizing

Radiation Protection (ICNIRP), a formal advisory agency to the World Health Organisation, as well as the EU guidelines for human exposure to EMF.

A wind farm is not a recognised source of pollution. Should a major accident or natural disaster occur the potential sources of pollution onsite during both the construction and operational phases are limited. Sources of pollution with the potential to cause significant environmental pollution and associated negative effects on health such as bulk storage of hydrocarbons or chemicals, storage of wastes etc. are limited.

Impacts on human beings during the construction and operational phases of the proposed development are described in Chapter 5 in terms of health and safety, employment and investment, population, land-use, noise, dust, traffic, tourism, residential amenity, renewable energy production and reduction in greenhouse gas emissions and interference with communication systems. Where a negative impact was identified, the appropriate mitigation measures will be put in place to ensure that there will be No Adverse Impacts on human health in the surrounding area.

Following consideration of the residual effects (post-mitigation), the proposed development will not result in any significant effects on population and human health. 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 population and human health are not anticipated at international, national or county or local scale.

Shadow Flicker

Shadow flicker is an effect that occurs when rotating wind turbine blades cast shadows over a window in a nearby property. Shadow flicker may be experienced by an occupant sitting in an enclosed room when sunlight reaching the window is momentarily interrupted by a shadow of a wind turbine's blade. Shadow flicker effect lasts only for a short period of time and happens only in certain specific combined circumstances. Current guidelines recommend that shadow flicker at neighbouring dwellings within 500 metres of a proposed turbine location should not exceed a total of 30 hours per year or 30 minutes per day. There is a total of 100 No. properties including occupied, unoccupied/derelict, within a distance of 10 rotor diameters (assumed at 1,400 metres) from the proposed turbine locations.

The potential flicker that will occur at houses located within the area surrounding the proposed development was calculated using the WindFarm software package and a regional sun factor of 28.3% was applied. Of the 100 No. properties modelled, it is predicted that 54 No. properties may experience daily shadow flicker in excess of the DoEHLG guideline threshold of 30 minutes per day. This prediction is assuming worst-case conditions (i.e. 100% sunshine on all days where the shadow of the turbines passes over a house, wind blowing in the correct direction, no screening present, etc.) and in the absence of any turbine control measures. When the regional sunshine average (i.e. the mean amount of sunshine hours throughout the year) of 28.3% is applied, only 5 no. properties experience shadow flicker in excess of the 30 minutes per day.

Where shadow flicker exceedances are experienced, suitable mitigation measures as outlined in Chapter 6 will be employed at the potentially affected properties to ensure that the current adopted 2006 DoEHLG guidelines are complied with at any dwelling within the 1km study area. The same mitigation strategies also demonstrate that the proposed Cahermurphy Two Wind Farm can be brought in line with the shadow flicker requirements of the Draft Revised Wind Energy Development Guidelines (2019) should they be adopted while this application is in the planning system.

Biodiversity

The habitats, flora and fauna of the site including species and habitats protected under Habitats Directive (92/43/EEC) were assessed by means of a desk study of literature pertinent to the site and

surrounding area, and field surveys including a survey of habitats and flora and walkover faunal surveys along with general observation work.

The Proposed Development site is located 5 kilometres to the north of Kilmihil and 25 kilometres southwest of Ennis, Co. Clare. It is proposed to connect the development to the national electricity network via a 38kV underground cable which will connect the proposed onsite substation to the existing Booltiagh substation, located approximately 7 kilometres to the southeast of the site. Current land-use on the subject site comprises coniferous forestry, agriculture and turbary.

Dedicated ecological surveys of the proposed development were undertaken on the 8th and 9th May 2019, 19th July 2019, 27th August 2019, 4th September 2019 and 11th October 2019 and 14th of May 2020. Habitats within the site were classified based on vegetation present and management history. During the multi-disciplinary ecological walkover surveys, the potential for the study area to support protected birds, mammals, amphibians and additional fauna was assessed.

A total of thirteen habitats were recorded within the study area including Conifer Plantation (WD4), Wet grassland (GS4), Improved Agricultural grassland (GA1), Wet Heath (HH3) (peatland mosaic), Cutover bog (PB4) (peatland mosaic), Lowland blanket bog (PB3) (peatland mosaic), Scrub (WS1) Spoil and Bare Ground (ED2), Recolonising Bare Ground (ED3), Buildings and Artificial Surfaces (BL3), Mixed broadleaved woodland (WD1), Eroding/Upland Rivers (FW1) and Drainage Ditches (FW4). The proposed development is largely confined to areas of conifer plantation and agricultural grassland.

There are a number of watercourses recorded within the proposed development site that provide connectivity with the Creegh and Annageeragh rivers downstream. Dedicated surveys were carried out to identify any suitable habitat or potential for populations of Freshwater Pearl Mussel (Margaratifera margaratifera) downstream of the proposed development site. Four streams that run from the proposed development site were surveyed for potential to support Freshwater Pearl Mussel; Knocknahila Beg Stream, Lissyneillan Stream, Knocknahila More Stream and Clooneenagh Stream. None of these streams provided suitable habitat for the species and no Freshwater Pearl Mussel were recorded. A suite of best practice measures have been incorporated into the design of the proposed development to ensure there are no indirect impacts on any watercourses.

Dedicated surveys for marsh fritillary larval webs were undertaken on 27th August 2019 and 4th September 2019. No evidence of marsh fritillary was recorded within the proposed development site.

Third Schedule invasive species, Rhododendron (Rhododendron ponticum) was recorded along the proposed cable route. A site specific Invasive Species Management Plan has been prepared in relation to Rhododendron within the site.

The Proposed Development is located approximately 5.8km east of Carrowmore Point to Spanish Point and Islands SAC (001021) and Mid-Clare Coast SPA (004182) and 6.6km east of Carrowmore Dunes SAC (002250). The proposed grid connection route occurs adjacent to Cragnashingaun Bogs NHA in one location but is restricted to forestry track and will not impact on the adjacent peatland habitat. There are a number of watercourses which drain from the Proposed Development site that provide hydrological connectivity with the European sites downstream. Potential impacts in the form of surface water deterioration will be prevented by adherence to the mitigation described in Chapter 4 of the EIAR.

Effects upon European Sites are discussed within the Natura Impact Statement which accompanies this report. The NIS concluded that the subject development, by itself or in combination with other plans and projects, in light of best scientific knowledge in the field, will not adversely affect the integrity of any European sites.

Provided that the proposed development is constructed and operated in accordance with the design, best practice and mitigation that is described within this application, significant individual or cumulative effects on biodiversity are not anticipated at the international, national or county scales.

Ornithology

This chapter assesses the likely significant effects that the proposed development may have on bird species including species protected under the Birds Directive (2009/147/EC). Firstly, a brief description of the proposed development is provided. This is followed by a comprehensive description of the methodologies that were followed in order to obtain the information necessary to complete a thorough assessment of the potential effects of the proposed development on bird species. The survey data is presented in full in the EIAR Appendices, with a summary of the information presented within this chapter. An analysis of the results is then provided, which discusses the ecological significance of the birds recorded within the study area. The potential effects of the proposed development are then described in terms of the construction, operation and decommissioning phases of the development. An accurate prediction of the effects is derived following a thorough understanding of the nature of the proposed development along with a comprehensive knowledge of bird activity within the study area. The identification of Key Ornithological Receptors and the assessment of effects followed a precautionary approach.

The potential for effects on designated sites is fully described in the Natura Impact Statement that accompanies this application. The findings presented in the NIS are that the proposed development, by itself or in combination with other plans and projects, in light of best scientific knowledge in the field, will not adversely affect the integrity of the relevant European sites and no reasonable scientific doubt remains as to the absence of such effects.

Based on the detailed assessment, it is considered that the potential effects of the proposed development upon birds will not be significant. Effects associated with habitat loss, disturbance displacement, collision risk and cumulative effects have been assessed to be no greater than Long-term slight negative effect (EPA, 2017) and low effect significance (Percival, 2003), for all species with the exception of hen harrier.

A Habitat Enhancement Plan has been proposed for hen harrier and is fully described within the Chapter and accompanying Appendix 8-8. With the successful implementation of the enhancement plan, the predicted impacts on hen harrier will reduce from Moderate to Long Term Slight Effect (EPA, 2017). The implementation of the plan will also have positive effects on other KOR species.

The implementation of the prescribed enhancement and mitigation measures will render any potential effects on avian receptors to low significance. In conclusion, no significant effects as a result of the proposed development are foreseen on key ornithological receptors of the study area at any stage of construction, operation or decommissioning, either in isolation or cumulatively with other surrounding windfarms.

Land, Soils and Geology

This chapter assesses the likely significant effects that the proposed development may have on land, soils and geology and sets out the mitigation measures proposed to avoid, reduce or offset any potential significant effects that are identified.

The geology of the Proposed Development site predominately comprises poorly draining soil or blanket peat overlying mineral subsoil which in turn is underlain by sandstone and siltstone bedrock.

Peat depths at the wind farm site ranged from 0 to 2.7m with an average of 0.7m. Over 95 percent of peat depth probes recorded peat depths of less than 3.0m. The peat depths recorded at the turbine locations varied from 0.25 to 2.6m with an average depth of 0.7m.

With respect to the existing and proposed access roads, peat thicknesses are typically less than 1.5m with localised depths of 2.5m.

The average peat depth across the grid connection cable route is 1m with 42% being less than 0.5m and 65% being less than 1m.

Construction of the wind farm site and grid connection infrastructure will require the removal of peat, soil and rock to competent foundation. Excavation of bedrock from 2 no. on-site borrow pits will provide material for access road, turbine bases and general hard-standing construction. Removal of soil, peat and bedrock represents a direct impact on the geology of the proposed development site which is considered to be an acceptable part of economic progression and development.

During the construction phase sources of contaminants (such as oil based substances or other hazardous chemicals) will not be stored at the site except where this is done within safely bunded areas that safely contain all spillages and prevent the migration of contaminants into soil, peat and bedrock. Refueling will be done with a double skinned bowser with spill kits on the ready in case of accidental spillages. The use of hydrocarbons in plant and vehicles is a standard risk associated with all construction sites. Proven and effective measures to mitigate the risk of spills and leaks have been proposed and will break the pathway between the potential source and the receptor.. Drainage and erosion prevention measures will be put in place at all works locations.

The peat stability assessment undertaken at the site shows that the wind farm site and grid connection cable route have a low risk of slope failure or mass movements. Peat removed during the excavation works will be deposited in the on-site borrow pits and also used for reinstatement and landscaping works around the site. This will reduce the requirement for stock piling and potential slope failure and erosion. The handling and management of peat will be undertaken in accordance with the Peat & Spoil Management Plan which is included in Appendix 4-2 of the EIAR.

If the mitigation measures presented in the EIAR are put in place no significant residual impacts on the land, soils and geological environmental are anticipated.

The land and soils impact assessment undertaken in this EIAR outlines that significant effects are unlikely due to the direct, localized nature of the construction works. Therefore, no cumulative effects will occur with other local developments. The proposed nearby hen harrier enhancement lands, which form part of the overall project development, will have no significant effect on land, soils and geology.

The proposed forestry replanting lands are located in counties Roscommon, Clare, Galway and Cavan and underlain by different geological bedrock formations, and therefore are not likely to contribute to potential cumulative impacts with the Proposed Development site in terms of impacts on land, soils and geology.

Hydrology and Hydrogeology

Hydro-Environmental Services (HES) was engaged by MKO to undertake an assessment of the potential direct, indirect and cumulative effects of the proposed Cahermurphy Two Wind Farm development on water aspects (hydrology and hydrogeology) of the receiving environment.

On a local scale the northern section of the wind farm site (3 no. of 10 turbines) is located within the Annageeragh River catchment while the southern section of the site (7 no. of 10 turbines) is located within the Creegh River catchment. The Annageeragh River originates from Doo Lough which is located approximately 2.6km to the northeast of the wind farm site. There is no wind farm site drainage into Doo Lough.

The majority of grid connection cable route is located in the Annageeragh River catchment (~180m of the grid near the Booltiagh WF Substation extends into the Doonbeg River catchment. Within the

Annageeragh River catchment, approximately 6.5km of the grid route drains into Doo Lough. The proposed hen harrier enhancement lands, which form part of the overall project, are also located in the Annageeragh River catchment.

The bedrock underlying the proposed development site is classified as locally important in terms well water yields. The bedrock has little or no open cracks which means groundwater movement within the aquifer is localised. Groundwater at the site can be classed as sensitive in terms of potential impacts from the proposed development. However, the majority of the bedrock is covered in peat which acts as a protective cover to groundwater quality. The low potential for pollutant travel within the bedrock groundwater makes surface water bodies such as streams more vulnerable to pollution than groundwater at this site. There will be no impact on private wells as a result of the development.

Ecologically protected sites downstream of the site include the Mid-Clare Coast SPA (Site Code 004182), Carrowmore Point to Spanish Point and Islands cSAC (Site Code 001021) and White Strand/Carrowmore Marsh (Site Code 001007). From a surface water quality perspective there will be no impact on these marine designated sites.

Due to the nature of wind farm developments, being near surface construction activities, impacts on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments. The primary risk to groundwater at the site would be from hydrocarbon spillage and leakages at the borrow pits. These are common potential impacts to all construction sites (such as road works and industrial sites). These potential contamination sources are to be carefully managed at the site during the construction and operational phases of the development and measures are proposed within the EIAR to deal with these potential minor impacts.

Two methods will be employed to control drainage water within the site during construction, thereby protecting downstream surface water quality and aquatic habitats. The first method involves 'keeping clean water clean' by avoiding disturbance to natural drainage features, minimising any works in or around artificial drainage features, and diverting clean surface water flow around excavations and construction areas. The second method involves collecting any drainage waters from works areas within the site that might carry silt, to allow settlement and cleaning prior to its release. During the construction phase all runoff will be treated to a high quality prior to being released. A self-imposed 50m stream buffer was used during the layout of the proposed wind farm development site, thereby avoiding sensitive hydrological features.

Other preventative measures also include fuel and concrete management and a waste management plan which is incorporated into the overall Construction and Environmental Management Plan included in Appendix 4-4 of this EIAR.

There will be no risk of increased flooding down-gradient of the site as a result of the proposed development due to these drainage measures. Impacts on water quality during the construction phase of the wind farm will be imperceptible to none. A surface water monitoring programme will be put in place during the construction phase.

During the operational phase drainage control measures will ensure that surface runoff from the developed areas of the site will continue to be of good quality and will therefore not impact on the quality of down-stream rivers and streams. The present drainage regime of the site will not be altered in any way. Impacts on water quality during the operational phase of the wind farm will be negligible to none.

In terms of potential cumulative hydrological impacts with other wind farm developments, the biggest risk is during the construction phase of the development as this is the phase when earthworks and excavations will be undertaken at the sites. However, within the Creegh River and the Annageeragh River catchments the vast majority of the other windfarm developments are either operational or currently being constructed, therefore construction phase impacts with the proposed Cahermurphy

Phase Two Wind Farm cannot occur if the development is permitted. No operational phase cumulative hydrological impacts are anticipated.

The forestry replanting lands are located in counties Roscommon, Clare, Galway and Cavan and in a different water catchment and therefore will not contribute to potential cumulative impacts with the proposed wind farm development site or grid connection.

Air and Climate

This chapter identifies, describes and assesses the potential significant direct and indirect effects on air quality and climate arising from the construction, operation and decommissioning of the proposed development.

The Environmental Protection Agency (EPA) has designated four Air Quality Zones for Ireland:

- Zone A: Dublin City and environs
- Zone B: Cork City and environs
- Zone C: 16 urban areas with population greater than 15,000
- Zone D: Remainder of the country.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the Clean Air for Europe (CAFE) Directive (as amended) and the Fourth Daughter Directive. The site of the proposed development lies within Zone D, which represents rural areas located away from large population centres.

Due to the non-industrial nature of the proposed development and the general character of the surrounding environment, air quality sampling was deemed to be unnecessary for this EIAR.

The production of energy from wind turbines has no direct emissions as is expected from fossil fuel-based power stations. Harnessing more energy by means of wind farms will reduce dependency on fossil fuels, thereby resulting in a reduction in harmful emissions that can be damaging to human health and the environment. Some minor short term or temporary indirect emissions associated with the construction of the wind farm include vehicular and dust emissions.

A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-4 of the EIAR) and includes dust suppression measures. In addition, turbines and construction materials will be transported to the site on specified haul routes only. The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as necessary.

Climate Change and Carbon Balance Calculations

Climate change is one of the most challenging global issues facing us today and is primarily the result of increased levels of greenhouse gases in the atmosphere. These greenhouse gases come primarily from the combustion of fossil fuels in energy use. Changing climate patterns are linked to increased frequency of extreme weather conditions such as storms, floods and droughts. In addition, warmer weather trends can place pressure on animals and plants that cannot adapt to a rapidly changing environment. Moving away from our reliance on coal, oil and other fossil fuel-driven power plants is essential to reduce emissions of greenhouse gases and combat climate change.

In June 2019, the EPA published an update on Ireland's Greenhouse Gas Emission Projections to 2040. The report includes an assessment of Ireland's progress towards achieving its emission reduction targets out to 2020 and 2030 set under the EU Effort Sharing Decision (Decision No 406/2009/EU) and Effort Sharing Regulation (Regulation (EU) 2018/842).

Projected greenhouse gas emissions up to 2040 are obtained using two scenarios; '*With Existing Measures'* and *'With Additional Measures'*. The '*With Existing Measures'* scenario assumes that no additional policies and measures, beyond those already in place by the end of 2017 are implemented. The *'With Additional Measures'* scenario assumes the implementation of the *'With Existing Measures'* scenario and further implementation of the governments renewable and energy efficiency policies including those set out in the National Renewable Energy Action Plan (NREA), the National Energy Efficiency Action Plan (NEEAP) and the National Development Plan 2018-2027.

The EPA Emission Projections Update notes that Ireland's non-Emissions Trading Scheme (ETS) emissions are projected to be 5% and 6% below 2005 levels in 2020 under the *'With Measures'* and *'With Additional Measures'* scenarios, respectively. The target for Ireland is a 20% reduction. Over the period 2013 – 2020, Ireland is projected to cumulatively exceed its compliance obligations by 10 Mt CO_2 (metric tonnes of Carbon Dioxide) equivalent under the *'With Measures'* scenario and 9 Mt CO_2 equivalent under the *'With Additional Measures'* scenario.

The report concludes:

- *"Projections indicate that Ireland will exceed the carbon budget over the period 2021-2030 by 52-67Mt CO_2 equivalent with the gap potentially narrowing to 7-22 Mt CO_2 equivalent if both the ETS and LULUCF flexibilities described in the Regulation are fully utilised."*
- *"To determine compliance under the Effort Sharing Decision, any overachievement of the binding emission limit in a particular year (between 2013 and 2020) can be banked and used towards compliance in a future year. However, even using this mechanism Ireland will still be in non-compliance according to the latest projections."*
- *"Ireland still faces significant challenged in meeting EU 2030 targets in the non-ETS sector and national 2050 reduction targets in the electricity generation, built environment and transport sectors. Progress in achieving targets is dependent on the level of implementation of current and future plans."*

The carbon balance of proposed wind farm developments in peatland habitats has attracted significant attention in recent years. When development such as wind farms are proposed for peatland areas, there will be direct impacts and loss of peat in the area of the development footprint. There may also be indirect impacts where it is necessary to install drainage in certain areas to facilitate construction. The works can either directly or indirectly allow the peat to dry out, which permits the full decomposition of the stored organic material with the associated release of the stored carbon as CO_2. It is essential therefore that any wind farm development in a peatland area saves more CO_2 than is released.

A methodology for calculation carbon losses was published in June 2008 by scientists at the University of Aberdeen and the Macauley Institute with support from the Rural and Environment Research and Analysis Directorate of the Scottish Government, Science Policy and Co-ordination Division. This methodology was refined and updated in 2011 based on feedback from users of the initial methodology and further research in the area. The web-based version of the carbon calculator, which supersedes the excel based versions of the tool, was released in 2016. The tool provides a transparent and easy to follow method for estimating the impacts of wind farms on the carbon dynamics of peatlands and was used to assess the effects of the proposed wind farm in terms of potential carbon losses and savings taking into account peat removal, drainage and operation of wind farm. The model calculates the total carbon emissions associated with the proposed wind farm development including manufacturing of the turbine technology, transport, construction of the development and carbon losses due to peatland disturbance and forestry felling. The model also calculates the carbon savings associated with the proposed wind farm development.

In total, it is estimated that **1,941,113** tonnes of carbon dioxide will be displaced over the proposed thirty-year lifetime of the wind farm.

Construction of the proposed development will have a Short-Term, Imperceptible Negative Effect as a result of greenhouse gas emissions from construction plant and vehicles. Operation of the proposed development will have a Long-Term Moderate Positive Impact on climate as a result of reduced greenhouse gas emissions.

Noise and Vibration

AWN Consulting Limited has been commissioned to conduct an assessment into the likely environmental noise and vibration impacts of the proposed Cahermurphy Two Windfarm development.

The methodology adopted for assessing the noise impact of the wind energy development is based on the guidance in the document '*Wind Energy Development Guidelines for Planning Authorities'* published by the Department of Environment, Community and Local Government, which are based on the UK document ETSU-R-97 The Assessment and Rating of Noise from Wind Farms which describes a detailed method for deriving maximum values of wind turbine noise, when measured at an external location in the vicinity of a house. Maximum values, or limits, are primarily based on the background noise levels and how it varies with wind speed, in the absence of wind farm.

The background noise environment has been established through noise monitoring surveys undertaken at several noise sensitive locations (NSLs) surrounding the proposed development. Typical background noise levels for day and night periods at various wind speeds have been measured in accordance with best practice guidance contained in the Institute of Acoustics document *'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise'* (IoA GPG). Prevailing noise levels are primarily attributable to wind noise in foliage, local road traffic noise and other agricultural and anthropogenic sources in the area.

When considering a development of this nature, the potential noise and vibration effects on the surroundings must be considered for two stages: the short-term construction phase and the long-term operational phase.

The assessment of construction noise and vibration and has been conducted in accordance best practice guidance contained in BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise and BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration. Subject to good working practice as recommended in the EIAR Chapter, noise associated with the construction phase is not expected to exceed the recommended limit values. The associated noise and vibration are not expected to cause any significant effects.

Based on detailed information on the site layout, turbine noise emission levels and turbine height, worst-case turbine noise levels have been predicted at NSLs for a range of operational wind speeds. The predicted noise levels associated with the proposed development will be within best practice noise limits recommended in Irish guidance, therefore it is not considered that a significant effect is associated with the development.

No significant vibration effects are associated with the operation of the site.

In summary, the noise and vibration impact of the proposed development is not significant in the context of current national guidance.

Landscape and Visual

The site is on the western edge of an elevated plateaux of land over 100 metres in elevation and extending up to 261 metres (Ben Dash) and 391 metres (Slievecallan) in places that forms an area of upland in central West-Clare. The site is nine kilometres inland from the Atlantic coast, ten kilometres

south of the town of Miltown Malbay, 16 kilometres northeast of Kilrush and 12 kilometres east of the village of Doonbeg.

The majority of the proposed development site, and nine of the ten proposed wind turbines are situated within an area designated as a 'Strategic Area' for Wind Farm Development in the Clare Wind Energy Strategy. One turbine falls within an area designated as 'Acceptable in Principle'. The proposed site is largely located in the Sliabh Callan Uplands LCA (landscape character area), which is recognised as having an overall Medium to Low sensitivity to wind farm developments, in which "large" sized wind farms are deemed to be appropriate. Although a portion of the proposed site and two proposed turbines are located in the Malbay Coastal Farmland LCA, which is considered to have a higher overall sensitivity to wind farm developments, those two turbine locations are also classified as being 'Strategic Areas' for wind farm development in the Clare Wind Energy Strategy.

There are five scenic routes within the 20 km LVIA study area, with four (SR1, SR19, SR20, SR33) being coastal routes and the fifth inland (6.7 kilometres north of the site) but with an intended view towards the coast rather than towards the site.

Using the landscape types in the Wind Energy Planning Guidelines (DoEHLG, 2006), 'Transitional Marginal Landscapes' best describes the site and the LCA in which the site is located.

There are 12 operational, 2 permitted and one proposed wind farms that form part of the baseline landscape in the wider area and are considered in this LVIA. Wind energy developments are now an integral part of the west Clare landscape, having been guided and directed by a plan-led approach over the last decade. The proposed development is intended to further deliver on the targets that have been set by the Clare Wind Energy Strategy for the specific policy area and landscape character areas in which the proposed development site is located.

In the Do-Nothing scenario, the proposed development would not take place. The opportunity to harvest the wind resource at the site would be lost. Existing land uses would continue, which are forestry operations, including felling and replanting, agriculture and turbary. The existing wind farm developments in the general vicinity would continue to operate for their full permitted lives, including the adjacent four-turbine Cahermurphy wind farm, three of which are already operating. Other planning applications for wind farm developments are likely to continue to be brought forward for consideration in the wider area in years to come to meet the State's objective to decarbonise the economy and combat climate change, and until the stated acceptable capacities of the Clare Wind Energy Strategy's 'Strategic', 'Acceptable In Principle' and 'Open to Consideration' areas are delivered in full.

An assessment of the effects on landscape character was undertaken for the six Landscape Character Areas within the LVIA study area that were identified as having theoretical visibility of the proposed development. The significance of the landscape character effect was assessed as being Slight in three (LCA 17, LCA 19 and LCA21) with one Moderate (LCA 20), one Minor (LCA 18) and one Not Significant (LCA 3).

After identifying the cumulative baseline and cumulative status for each LCA, as assessment was made as to whether the additional proposed turbines would change the status of the individual LCAs. Although, it was found that the proposed development's turbines would add to the cumulative landscape status, they would not change the character of the individual LCAs in terms of wind energy and therefore the cumulative landscape effects are considered Slight. Wind turbines are already a common component of the west Clare landscape, as identified and intended by the Clare Wind Energy Strategy. The scale of the cumulative effect is also considered to be well within what was envisaged and considered to be acceptable under Clare Wind Energy Strategy which would have been subject to a full Strategic Environmental Assessment (SEA). The proposed development does not transform or redefine the baseline landscape character from any but a small handful of selected viewpoints.

The significance of the residual visual effect was not considered to be "Profound", "Very Significant" or "Significant" at any of the 13 viewpoint locations selected. All other viewpoints were assessed as resulting in Moderate (5), Slight (4), Not Significant (3) or Imperceptible (1) residual visual effects.

Of the 26 settlements identified in the study area, 16 were screened out in the 'Visual Receptor Preliminary Assessment', as no visibility of the proposed development could be established from the ZTV analysis. The classification of visual effect from the three closest settlements to the site (Kilmihil, Mullagh, Creegh) is Not Significant, and the visual effect from the other remaining settlements of Miltown Malbay, Spanish Point, Cranny, Doonbeg, Cappagh, Kilrush, and Moyasta is no greater than Not Significant and likely Imperceptible in a number of individual cases.

The addition of the proposed turbines will only result in turbines being visible from a very small additional area in the LVIA study area, compared to where the existing (operational), permitted or other proposed turbines will already be visible from. Therefore, the additional cumulative visibility of the proposed turbines is deemed to be Not Significant, that being an effect which causes noticeable changes in the character of the environment but without significant consequences. Overall, the cumulative visual impact can be described as a Long Term, Slight Cumulative Impact, given the amount of wind farm development that has already occurred and the limited numbers of additional turbines that will come into view as a result of the proposed development. The proposed development does not increase the spatial extent of the area from which any wind turbine will be visible. When viewed cumulatively with the other existing, permitted or proposed wind farms, the proposed development does not transform or redefine the baseline landscape character and is in keeping with current and emerging trends as clearly provided for in and envisaged by the planning policy for wind energy developments in west Clare.

Archaeology and Cultural Heritage

The archaeology and cultural heritage assessment of the proposed Cahermurphy Two Windfarm was prepared by Dominic Delany & Associates (DDA). The assessment is based on both a desktop review of the available archaeological and cultural heritage data and a comprehensive programme of field walking of the study area. A description of potential impacts is presented and mitigation measures are recommended where appropriate. The potential visual impact of the proposed development on recorded monuments is also assessed.

The archaeological heritage of the area was assessed in terms of national monuments / recorded monuments within two kilometres of the EIAR / primary study area. There is a recorded monument CL048-005 (Ringfort - cashel) located within the EIAR / primary study area. This monument is subject to a preservation order made under the National Monuments Act 1930-2014 (PO No. 4/1957) and consequently is designated as a National Monument. It comprises an almost circular cashel defined by a well-built drystone wall of small flags with a distinct batter. It is sited on the top of an east-west ridge named 'Cahermurphy Hill' and commands good views especially to the south of the county. The impact on the setting and visual amenity of the monument was assessed. Despite its prominent siting, the monument does not have a high visual amenity. The nearest turbines are over 800m to the north and northwest of the monument, where views are limited due to the rising topography of the land. Turbines will be visible within the views to the north and northwest and the impact on the setting of the monument is considered to be moderate. There is one recorded monument CL048-005001 (Hut site) located within the EIAR / primary study area. This monument comprises a hut site defined by a low drystone wall. It abuts the north interior of CL048-005 (Ringfort – cashel). The impact on the setting of this monument is slight.

A potential impact on an unknown archaeological resource lies in the uncovering of sub-surface archaeological features during the construction of the Proposed Development. Archaeological monitoring of all ground works will be undertaken during the construction stage in order to avoid any potential direct or indirect impacts on sub-surface archaeological material which may exist on the site.

The archaeological monitoring will be undertaken with the benefit of a licence from the Department of Culture Heritage and the Gaeltacht (DCHG).

A number of cultural heritage features were identified within the EIAR / primary study area. These include a ruinous vernacular structure, townland boundaries, field walls and a gate post formed of a single Liscannor flagstone. The townland boundary between Cahermurphy and Caheraghacullin is a substantial wall of drystone construction and there is another well-preserved field wall adjacent to a track in open ground in Carrownagry South. These walls do not have a high architectural or cultural heritage value but are good representative examples of the enclosure of marginal lands deemed suitable for grazing or cultivation. Proposed new access roads will breach the townland boundaries and field walls at a number of locations and the proposed upgrade to the access road between T2 and T3 will necessitate the displacement of the gate post. Mitigation includes minimisation of damage to field walls, recording by means of written descriptions and photographs of all sections of walling to be impacted by the development, salvage and reuse of the gate post and monitoring of groundworks.

The layout of the Proposed Development was designed sympathetically to the known cultural heritage features which exist on the site. Every effort was made to ensure that the development proposal would have the minimum impact possible by placing turbines, access roads and grid connection in areas which have no above ground archaeological, architectural or cultural heritage features. The project archaeologist was consulted extensively by the project design team during the design of the project, and various iterations of the proposed project layout, to ensure every effort was being made to minimise potential archaeological and cultural heritage impacts.

It is concluded that the proposed wind energy development will not have a significant effect on Archaeology and Cultural Heritage.

Material Assets

Traffic and Transport

An assessment of the traffic effects of the proposed Cahermurphy Two Wind Farm Development, consisting of 10 turbines, located in the townland of Cahermurphy, County Clare, was undertaken. The assessment presents the likely impacts of the proposed development during both the construction and operational stages of the development and considers the impact that the traffic generated by the proposed development would have on the local highway network. An assessment of the route geometry with respect to accommodating the abnormally sized vehicles required to deliver the turbine plant to the site was also undertaken.

The delivery route to the site for the abnormally sized loads required to transport the turbine components to the site (blades, towers and nacelles) comprises of the N68 to Ballyduneen, followed the R484 to Creegh. The route then heads east on the local road network through the village of Clooneenagh to the east of Cahermurphy Hill, before turning left to head northbound on towards the site access. It is noted that this is the same route that was used for the delivery of the abnormally sized loads for the Cahermurphy Phase 1 Wind Farm development, which is located just to the east of the subject site.

General construction traffic will travel to the site via the more direct route via the local road network to the site, which was also used for this purpose for the Cahermurphy Phase 1 Wind Farm Development.

The types of vehicles that will be required to negotiate the local network will be up to 74.6 metres long with a blade length of 68.5 metres. An assessment of the geometric requirements of the delivery vehicles was undertaken on the delivery route. Locations where it was established that the existing road geometry will not accommodate all of the vehicles associated with the proposed development are highlighted, with the extent of remedial works indicated. In addition to the assessment presented, it is

recommended that a dry run is undertaken by the transport company to check vertical and horizontal clearance on the transport route prior to construction.

In terms of daily traffic flows it is estimated that the impact of the development traffic on the delivery routes will be as follows:

- During the 10 days when the concrete foundations are poured the effect on the surrounding road network will be negative, resulting in an increase in traffic levels ranging from 6.1% on the N68 to an increase of 21.1% on the R484 leading to the site. As Castlepark Road currently provides for low traffic volumes, on these 10 days of the construction phase, flows are forecast to increase by almost 3 fold (186.8%). The effect will be temporary, lasting for 10 days, and will be slight to moderate.

- During the remaining 245 days for the site preparation and ground works when deliveries to the site will take place, the effect on the surrounding road network will be negative, resulting in an increase in traffic levels ranging from 1.3% on the N68, to an increase of 4.6% on the R484 approaching the site. On the Castlepark Road it is forecast that traffic flows will increase by 40.4%. The effect will be temporary, lasting for 245 days, and will be slight.

- During the 10 days of the turbine construction stage when general materials are delivered to the site, the delivery of construction materials will result in a negative impact on the surrounding road network, increasing traffic levels, ranging from 0.9% on the N68, to an increase of 26.1 on the local Castlepark Road leading to the site. The effect during this period will be temporary and will be slight.

- During the 30 days when the various component parts of the wind turbine plant are delivered to the site using extended articulated HGVs, the effect of the additional traffic on these days will be moderate due to the size of vehicles involved, resulting in increased traffic volumes of between 1.5% on the N68 to 17.2% on Creegh Road and 19.6% on Castlepark Road leading to the site, but will be temporary. The effect may be reduced to slight if the delivery of the large plant is done at night, as is proposed.

- It was determined that all links in the study area and the key junction on the delivery route between the N68 / R484 will operate within operational capacity for all days within the construction period.

Once the facility is operational the traffic impact created by maintenance staff will be negligible.

Telecommunications and Aviation

Wind turbines, like all large structures, have the potential to interfere with broadcast signals, by acting as a physical barrier or causing a degree of scattering to microwave links. The most significant effect at a domestic level relates to a possible flicker effect caused by the moving rotor, affecting, for example, radio signals. The most significant potential effect occurs where the wind farm is directly in line with the transmitter radio path.

RTÉ Transmission Network (operating as 2rn), stated that that there is a risk of disruption to television reception for viewers to the west of the site that receive their signal from Maghera and for viewers to the northeast of the site that receive their signal from Knockanore. To mitigate against interference on viewers' television sets and/or broadcast radio receivers, RTÉ have recommended that a protocol agreement be put in place for the wind farm development. The Protocol Document ensures that the appropriate mitigation is carried out in the event of any unanticipated broadcast interference arising to RTÉ television or radio reception as a result of the proposed wind farm.

Of the scoping responses received from telephone, broadband and other telecommunications operators only Airspeed had telecommunication links in the area. On review by Airspeed it was concluded that the proposed wind farm location is below the link and therefore there was sufficient clearance available between the proposed development and the Airspeed link.

In June 2019, a scoping response was received from the Department of Defence (DoD) which set out lighting requirements for turbines, as follows:

1. *Single turbines or turbines delineating corners of a wind farm should be illuminated by high intensity obstacle strobe lights.*
2. *Obstruction lighting elsewhere in a wind farm will be of a pattern that will allow the hazard be identified and avoided by aircraft in flight.*
3. *Obstruction lights used should be incandescent or of a type visible to Night Vision Equipment. Obstruction lighting fitted to obstacles must emit light at the near Infra-Red (IR) range of the electromagnetic spectrum specifically at or near 850 nanometres (NM) of wavelength. Light intensity to be of similar value to that emitted in the visible spectrum of light. Obstruction lights used should be incandescent or of a type visible to Night Vision Equipment.*

In June 2019, a scoping response was received from the Irish Aviation Authority (IAA). The requirements of the IAA include the following:

1. *Agree an aeronautical obstacle warning light scheme for the wind farm development.*
2. *Provide as-constructed coordinates in WGS84 format together with ground and tip height elevations at each wind turbine location.*
3. *Notify the Authority of intention to commence crane operations with a minimum of 30 days prior notification of their erection.*

In June 2019, a scoping response was received from Shannon Airport which included the following general comments:

4. *The siting of wind turbines at this location may have implications for the operations of the communication, navigation and surveillance systems used by Air Traffic Control for the separation and safety of aircraft. The geographical siting of these turbines may also have implications for the flight paths of aircraft.*
5. *Regard must be had to the Irish Aviation Authority (IAA) Obstacles to Aircraft in Flight Order, 2002 (S.I. No. 14 of 2002), as amended, which specifies the criteria used to determine whether or not any object anywhere in the state is deemed to be an obstacle affecting aircraft operations. Also, in order to assure the safety and efficiency of aircraft operations in the vicinity of airports, the International Civil Aviation Organisation (ICAO) has defined a volume of air space above which new objects are not permitted to interfere.*
6. *It would also be best practice that all wind energy developers should seek the views of the Irish Aviation Authority (IAA) at the pre-planning stage of consultation, with details of locations and proposed heights of turbines, to ensure that proposed developments do not cause difficulties with air navigation safety.*
7. *In the event that any potential adverse effects relating to this wind turbine development were identified as part of the consultation process, Shannon Airport Authority DAC would fully support any submission from the IAA.*
8. *Final, should planning permission be granted for this development in the future, we would ask that the planning authority stipulate the mandatory deployment of obstacle avoidance lighting on each individual wind turbine in the interests of flight safety.*

The nearest operational airport to the Proposed Development site is Shannon Airport, located approximately 32 kilometres southeast of the site, and therefore outside the range at which such issues would be expected.

All of the above requests will be complied with should the proposed development receive a grant of planning permission.

In summary, there will be no significant impact on telecommunications and aviation as a result of the proposed development.

Interactions of the Foregoing

Chapters 5 to 15 of this EIAR identify the potential significant environmental effects that may occur in terms of Population and Human Health, Biodiversity, Ornithology, Land, Soils and Geology , Hydrology and Hydrogeology, Air and Climate, Noise and Vibration, Landscape and Visual, Cultural Heritage and Material Assets, as a result of the proposed development. All of the potential significant effects of the proposed development and the measures proposed to mitigate them have been outlined in the main EIAR. However, for any development with the potential for significant environmental effects there is also the potential for interaction between these potential significant effects. The result of interactive effects may exacerbate the magnitude of the effects or ameliorate them or have a neutral effect.

A matrix is presented in Chapter 16 of the EIAR to identify interactions between the various aspects of the environment already discussed in the EIAR. The matrix highlights the occurrence of potential positive or negative impacts during both the construction and operational phases of the proposed development. Where any potential interactive impacts have been identified, appropriate mitigation is included in the relevant sections (Chapters 5–15) of the EIAR.