Planning and Environmental Consultants

Environmental Impact Assessment Report

Cooloo Wind Farm, Co. Galway

Non-Technical Summary

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1. NON-TECHNICAL SUMMARY

1.1 Introduction

This Environmental Impact Assessment Report (EIAR) has been prepared by MKO on behalf of the applicant, Neoen, who intends to apply to An Coimisiún Pleanála (ACP) for planning permission to construct a renewable energy development comprising 9 no. wind turbines, and associated infrastructure in the townlands of Cooloo and adjacent townlands, near Abbeyknockmoy in Co. Galway.

Due to the nature of the proposed renewable energy development, which will have a potential generating capacity of greater than 50 megawatts (MW) and requires the provision of 110 kV infrastructure which will form part of the national electricity transmission network, two separate planning applications are required.

For the purposes of this EIAR:

- Where the 'Proposed Project' is referred to this encompasses the entirety of the project for the purposes of this EIA in accordance with the EIA Directive. The Proposed Project is described in detail in Chapter 4 of this EIAR.
- Where the 'Proposed Wind Farm' is referred to, this refers to turbines and associated foundations and hard-standing areas, meteorological mast, access roads, temporary construction compound, underground cabling, peat and spoil management, site drainage, biodiversity enhancement, turbine delivery route (TDR) accommodation works and all ancillary works and apparatus. The Proposed Wind Farm is described in detail in Chapter 4 of this EIAR.
- Where the 'Proposed Grid Connection' is referred to the 110kV onsite substation, battery energy storage system and 110kV underground cabling connecting to the existing Cloon 110kV substation, and all ancillary works and apparatus. The Proposed Grid Connection is described in detail in Chapter 4 of this EIAR.
- Where the 'Site' is referred to, this relates to the primary study area for the EIAR, as delineated by the EIAR Site Boundary in green as shown on Figure 1-1 of the EIAR and encompasses an area of approx. 355 hectares.
- Where the 'Proposed Wind Farm site' is referred to, this refers to the portion of the Site surrounding the Proposed Wind Farm but excluding the portion of the Site surrounding the Proposed Grid Connection underground cabling route.

This EIAR, along with a NIS will accompany the planning application for the Proposed Project which will be made to ACP. Both the EIAR and NIS contain the information necessary for ACP to complete the Environmental Impact Assessment (EIA) and Appropriate Assessment as required for this planning application.

The Proposed Grid Connection is an integral part of the Proposed Project and is assessed in this EIAR, however, it will be subject to a separate, future application. The future, application for consent for the Proposed Grid Connection will be made to ACP in accordance with the provisions of 182A of the Planning and Development Act 2000, as amended.

For clarity in this EIAR, all elements of the Proposed Project will be assessed cumulatively and in combination with other projects to aid the competent authority in carrying out an EIA.

Applicant

The applicant for the Proposed Project is Neoen, a French producer of renewable energy, with operations in Dublin, Ireland among its presence across fourteen countries with 8.9GW total capacity of electricity in operation or under construction at the end of 2024. Neoen operates eight wind farms and three solar farms in the Republic of Ireland, with a combined capacity of 112 MW in operation, and a portfolio of 1.7 GW MW in development.

Brief Description of the Proposed Project

The Proposed Project will comprise the construction of 9 no. wind turbines with an overall blade tip height of 180 metres and all associated works, and a 110kV substation and associated works, including underground 110kV cabling to connect to the national grid at Cloon 110kV substation. The full description of the Proposed Project is detailed in Chapter 4 of this EIAR.

The development will consist of the provision of the following:

i. *9 no. wind turbines with the following parameters:*
   - *Total turbine tip height of 180 metres;*
   - *A rotor blade diameter of 150 to 162 metres;*
   - *A hub height of 99 to 105 metres;*

ii. *Permanent turbine foundations, hard-standing and assembly areas;*
iii. *Underground electrical (33kV) and communications cabling;*
iv. *1 no. temporary construction compound (including site offices and welfare facilities);*
v. *A meteorological mast with a height of 100 metres, security fencing and associated foundation and hard-standing area;*
vi. *1 no. new site entrance on the R332 in the townland Lisavally;*
vii. *1 no. new access and egress point off the L6056 Local Road in the townland of Dangan Eighter;*
viii. *1 no. new access and egress point on to an existing access track in the townland of Dangan Eighter;*
ix. *2 no. new access and egress points off the L6301 Local Road in the townland of Cooloo and Lecarrow;*
x. *Upgrade of existing site tracks/roads and provision of new site access roads, clear span crossings, junctions and hard-standing areas;*
xi. *A new temporary access road from N63 national road and to R332 Regional Road in the townland of Slievegorm to facilitate the delivery of turbine components and other abnormal sized loads;*
xii. *Demolition of an existing derelict house and adjacent outbuilding in the townland of Cooloo;*
xiii. *Peat and Spoil Management Areas;*
xiv. *Tree felling and hedgerow removal;*
xv. *Biodiversity Management and Enhancement measures;*
xvi. *Site Drainage;*
xvii. *Operational Stage site signage; and*
xviii. *All ancillary apparatus and site development works above and below ground, including soft and hard landscaping.*

The application is seeking a ten-year planning permission. Current and future wind turbine generator technology will ensure that the wind turbine model, chosen for the Proposed Project, will have an operational lifespan greater than the 35-year operational life that is being sought as part of the planning application.

Modern wind turbine generators currently have a potential generating capacity in the 4 to 8 MW range, with the generating capacity continuing to evolve upwards as technology improvements are achieved by the turbine manufacturers. For the purposes of this application, it is assumed that the wind turbine

model installed as part of the Proposed Project will have a generating capacity of between 6 and 7.2 MW Therefore, on this basis, the proposed 9 no. wind turbines would have a combined generating capacity of between 54 to 64.8 MW. The actual turbine procured as part of a competitive tender process may have a generating potential that is lower or greater than the turbines described in the EIAR. Irrespective of the power output of the actual turbine procured, the conclusions of the EIAR will not be materially affected.

Need for the Proposed Project

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 Chapter 2 of this EIAR.

The Proposed Project is critical to helping Ireland address these challenges as well as addressing the country's over-dependence on imported fossil fuels. If the Proposed Project were not to proceed, this opportunity would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions.

Economic Benefits

The Proposed Project will have several significant long-term and short-term benefits for the local economy including job creation, landowner payments, local authority commercial rate payments and a Community Benefit Scheme. The Proposed Project will be capable of providing electrical energy to approx. 45,990 Irish households every year, as presented in the calculations in Chapter 4 of this EIAR.

Commercial rate payments will be provided to Galway County Council each year which will be redirected to the provision of public services within the County. These services include provisions 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 has the potential to create up to 100 jobs during the construction phase and 3-4 jobs during operational and maintenance phases. During construction, additional indirect employment will be created in the region through the supply of services and materials. There will also be income generated by local employment from the purchase of local services i.e., travel, goods and lodgings.

Should the Proposed Project receive planning permission, there are substantial opportunities available for the local area in the form of Community Benefit Funds. Based on the current proposal, should the Proposed Project enter the Renewable Energy Support Scheme (RESS), the proposed Community Benefit Fund would attract a community contribution in the region of approx. €300,000/year for the first 15 years of operation, to be used by the local community over the lifetime of the Proposed Project. The value of this fund will be directly proportional to the energy produced by the Proposed Wind Farm and will support and facilitate projects and initiatives in the area.

Purpose and Scope of the EIAR

The purpose of this EIAR is to document the current state of the environment on and in the vicinity of the Site and to quantify the likely significant effects of the Proposed Project on the environment. The compilation of this document served to highlight any areas where mitigation measures may be necessary in order to protect the surrounding environment from the possibility of any negative impacts arising from the Proposed Project. This EIAR uses the grouped structure method to describe the existing environment, the potential impacts of the Proposed Project thereon and the proposed mitigation measures. Background information relating to the Proposed Project, scoping and consultation undertaken and a description of the Proposed Project are presented in separate sections.

The chapters of this EIAR are as follows:

1. Introduction
2. Background to the Proposed Project
3. Considerations of Reasonable Alternatives
4. Description of the Proposed Project
5. Population and Human Health
6. Biodiversity
7. Birds
8. Land, Soils and Geology
9. Hydrology and Hydrogeology
10. Air Quality
11. Climate
12. Noise and Vibration
13. Landscape and Visual
14. Cultural Heritage
15. Material Assets (including Traffic and Transport, Telecommunications and Aviation)
16. Major Accidents and Natural Disasters
17. Interactions of the Foregoing
18. Schedule of Mitigation Measures

1.2 Background to the Proposed Development

This section of the EIAR sets out the energy and climate change related policy and targets along with the strategic, regional, and local planning policies relevant to the Proposed Project. It also summarises EIA scoping undertaken, and the cumulative impact assessment process undertaken.

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 urgent need for renewable energy developments such as the Proposed Project to assist Ireland in meeting its national targets and European commitments in relation to climate change and decarbonisation.

The Proposed Wind Farm comprises the provision of 9 no. wind turbines with an overall tip height of 180 meters and an estimated installed generating capacity of between c.54MW and 64.8MW, and associated infrastructure. 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 latest Climate Action Plan (CAP 25) sets out the detail for taking action to deliver the decarbonisation required under the carbon budgets and sectorial emissions ceilings. Central to this is the set of measures set out to increase the proportion of renewable electricity to up to 80% by 2030 and a target of 9GW from onshore wind. CAP 25 places front and centre the facts that without urgent action, global warming is likely to be more than 2˚C above pre-industrial levels, threatening the health and livelihoods of people across the globe. Urgency of action is also a key focus of the CAP 25. All sectors will have to further their efforts if the core and further measures are to be achieved.

A gradual shift towards increasing our use of renewable energy is no longer viable. There is an urgency now to ensure real change happens. Renewable energy development is recognised as a vital component of Ireland's strategy to tackle the challenges of combating climate change and ensuring a secure supply of energy. Ireland is heavily dependent on the importation of fossil fuels to meet its energy need. In 2024, 79.7% of Ireland's energy was imported from abroad, far higher than the European Union (EU) 2023 average of 58.3%[1]. This high dependency on energy imports is highly risky and Ireland is currently extremely vulnerable both in terms of meeting future energy needs and ensuring price stability. As such, expanding indigenous renewable energy supply is critical for energy security and price stability.

[1] *Interim Energy Balance for 2024 (SEAI, May 2025)*

Local Planning Policy

Galway County Development Plan 2022 – 2028

The site of the Proposed Wind Farm is located in the administrative area of Galway County Council. As such the Galway County Development Plan 2022 – 2028 (GCDP) which was adopted by Elected Members of Galway County Council on the 9th of May 2022 and came into effect on the 20th of June 2022 is the relevant County Development Plan, which provides the planning framework within which the planning application is assessed.

Climate change mitigation and adaptation objectives have been incorporated into the policies of the GCDP. This is to ensure that climate change has been consistently integrated into policy themes addressed by the GCDP. Chapter 14 of the GCDP outlines the County's Climate Change, Energy and Renewable Resource Policies, with '*a commitment to address climate change in a proactive manner, through the careful consideration of growth and development,*' The policy document aligns itself with wider policy, integrating climate action into every chapter and strategy of the GCDP. In relation to renewable energy and climate action, strategic aims for County Galway include '*reducing dependencies on imported fossil fuels and to provide alternative energy sources by harnessing the County's potential for renewable energy sources, while strengthening the grid transmission networks,*'.

Regarding renewable energy, the GCDP maintains the underlying theme of '*a reduction in carbon footprint by integrating climate action into the planning system in support of national targets, supporting indigenous renewable sources in order to reduce dependence on fossil fuels and to improve the security of supply,*'.

Local Authority Renewable Energy Strategy

The initial site selection process for the Proposed Wind Farm began in 2019. At this time, the relevant local wind energy policy document was the County Galway Wind Energy Strategy 2015 – 2021 (WES) and therefore the Proposed Wind Farm site was selected with consideration to these policies. The entire Proposed Wind Farm site was classified as "Open to Consideration" for wind energy development under the WES.

When the Galway County Development Plan 2022 – 2028 was adopted, parts of the Proposed Wind Farm site were classified as "Generally to be Discouraged". This classification was prescribed under the County Galway's Local Authority Renewable Energy Strategy (LARES) which is included as Appendix 1 of the GCDP. The majority of the site remained classified as "Open to Consideration". 6 no. turbines are located in areas classified as "Open to Consideration", 2 no turbines are located in areas classified as "Generally to be Discouraged".

This classification for "Open to Consideration" is defined as follows in the LARES:

> *'Areas where Wind Energy development is likely to be favourably considered - subject to the results of more detailed assessment of polices and potential effects.'*

This classification for "Generally to be Discouraged" areas is defined as follows in the LARES:

> *'Areas where Wind Energy development is unlikely to be favourably considered on account of potential to adversely effect protected landscape, water, ecological resources and residential amenity.'*

The associated LARES Policy Objective associated with the 'Generally to be Discouraged' wind energy zoning classification is as follows:

'Wind energy development proposals in areas that are identified as 'Generally to be Discouraged' for wind energy development will be considered in accordance with the LARES and the proper planning and sustainable development of the area.'

Whilst the modification of the wind energy classification was acknowledged, the decision was made to advance with the Proposed Wind Farm through the planning process. This decision was based on detailed site surveys and a comprehensive constraints analysis concluding in the site retaining its suitability for wind energy development.

It should be noted that the wind energy classification in the LARES does not restrict wind turbines within the "Generally to be Discouraged" but rather, they are assessed on the principles of proper planning and sustainable development, in accordance with the LARES. Section 7.2 of the Planning Report, included as part of this EIAR and Planning Application demonstrates the Proposed Wind Farm's compliance with the relevant policies of the CDP and the LARES.

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) hereafter referred to as 'the Guidelines', have been taken into account during the preparation of this EIAR.

The aim of these guidelines is to assist with the proper planning of wind energy projects in appropriate locations around Ireland. The Guidelines highlight general considerations in the assessment of all planning applications for wind energy. They set out advice to planning authorities on planning for wind energy through the development plan process and in determining applications for planning permission. They contain guidelines to ensure consistency of approach throughout the country in the identification of suitable locations for wind energy development. Each wind project has its own characteristics and defining features, and it is therefore impossible to write specifications for universal use. Furthermore, the Guidelines should be applied practically and do not replace existing national energy, environmental and planning policy. While the Guidelines remain the relevant guidelines in place at the time of lodgement, and decision makers (An Coimisiún Pleanála and Local Authorities) are required to have regard to them, they are not bound to apply their provisions and they can (and do), where there is sufficient justification, consider updated standards/requirements/specifications in assessing impacts and the proper planning and sustainable development of the area.

The Proposed Wind Farm adheres to the Guidelines in its design and preparation. In this regard this EIAR considers all relevant potential environmental impacts that could arise (Chapter 5 of the Guidelines), and the design of the Proposed Wind Farm has followed the design principles established in Chapter 6 of the Guidelines.

The Department of Housing, Planning and Local Government published the Draft Revised Wind Energy Development Guidelines (Draft Guidelines) in December 2019, and they remain in draft at the time of writing. The Draft Guidelines note that potential impacts of wind energy development proposals on the landscape, including the natural and built environment, must be considered along with the legitimate concerns of local communities. The design of the Proposed Wind Farm has been designed in accordance with the Guidelines and has also been developed with the provisions of the Draft Guidelines in mind (for example in relation to 4 times turbine tip height set back distance from sensitive receptors).

Planning History

The planning history of the Proposed Wind Farm site is outlined in Section 2.5 of this EIAR. A planning search was carried out through the national planning application database and An Coimisiún Pleanála's online planning portal in September 2025 for relevant planning applications lodged within the planning application boundary of the Proposed Wind Farm. There have been 3 no. applications

made within the Proposed Wind Farm planning application site boundary. These applications comprise of small scale permissions relating to one off rural dwellings and agriculture and one for an 80 metre high meteorological mast.

Scoping and Consultation

Section 2.7 presents detail of the EIA Scoping undertaken with regards the Proposed Project. A scoping report, providing details of the Proposed Project, was prepared by MKO, and circulated in April 2023. MKO requested the comments of the relevant personnel/bodies in their respective capacities as consultees with regards to the EIAR process. As part of the constraints mapping process, which is detailed in Chapter 3 of this EIAR, telecommunications operators were contacted in February 2024 in order to determine the presence of telecommunications links either transversing the site or in close proximity to the Proposed Wind Farm site. Chapter 2 includes a list of scoping consultees and responses received, with full copies of all scoping responses received set out in Appendix 2-1 of the EIAR.

Community engagement has been undertaken by the Applicant, details of which can be found in Appendix 2-2 of this EIAR. In summary, the report was prepared to record the consultation carried out with the local community in respect of the Proposed Project. The applicant has carried out consultation in relation to the Proposed Project with local residents surrounding the proposed Wind Farm site and interested parties in the wider community. The objective of the consultations was to ensure that the views and concerns of all were considered as part of the Proposed Project design and EIA process.

The Proposed Project has the potential to have significant benefits for the local economy, by means of job creation, landowner payments and commercial rate payments. An important part of any renewable energy development, which Neoen has been at the forefront of developing, is its Community Benefit Package as discussed in detail in Appendix 2-2.

Section 2.8 of this EIAR includes details of the pre-planning meetings undertaken prior to the planning application being lodged, including engagement with An Coimisiún Pleanála under the provisions of Section 37B of the Planning and Development Act 2000, as amended and with Galway County Council.

Cumulative Impact Assessment

The EIA Directive and associated guidance documents state that as well as considering any direct, indirect, secondary, transboundary, short-, medium-, and long-term, permanent and temporary, positive and negative effects of a proposed development or project (all of which are considered in the various chapters of this EIAR), the description of likely significant effects should include an assessment of cumulative impacts that may arise. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to a proposed development or project. The factors to be considered in relation to cumulative effects include population and human health (including Shadow Flicker), biodiversity, ornithology, land, soil and geology, water, air, climate, noise and vibration, material assets, landscape, cultural heritage and major accidents and natural disasters as well as the interactions between these factors.

To gather a comprehensive view of cumulative impacts on these environmental considerations and to inform the EIA process being undertaken by the consenting authority, each relevant chapter within this EIAR includes a cumulative impact assessment where appropriate.

The potential for cumulative impacts arising from other plans and/or projects has therefore been fully considered within this EIAR. The cumulative impact assessment of projects has three principle aims:

- To establish the range and nature of existing and approved plans and/or projects within the cumulative impact study area of the Proposed Project.

- To summarise the relevant plans and/or projects which have a potential to create cumulative impacts.
- To identify the plans and/or projects that hold the potential for cumulative interaction within the context of the Proposed Project and discard plans and/or projects that will neither directly or indirectly contribute to cumulative impacts.

Assessment material for this cumulative impact assessment was compiled on the relevant plans and/or projects within the various cumulative impact study areas of each discipline for the Proposed Project. The material was gathered through a search of relevant online Planning Registers, reviews of relevant EIAR (or historical EIS) documents, Planning Registers and EIA Portal, planning application details and planning drawings, and served to identify past and future plans and/or projects, their activities and their environmental impacts.

Geographical boundaries within which there may be potential for cumulative impacts to arise, relative to each individual EIAR topic (i.e. each chapter) is set out within the Chapter. To gather a comprehensive view of cumulative impacts within the cumulative study areas for each discipline and to inform the EIA process being undertaken by the competent authority, each relevant chapter within the EIAR addresses the potential for cumulative effects where appropriate and within the context of their identified cumulative study area. A long list of all plans and/or projects considered by each of the different disciplines in their cumulative impact assessment are included in Appendix 2-3 of the EIAR.

1.3 Consideration of Reasonable Alternatives

This chapter of the EIAR introduces the reasonable alternatives studied by the applicant which are relevant to the Proposed Project and its specific characteristics and an indication of the main reasons for the option chosen, taking into account the environmental effects. The consideration of alternatives typically refers to alternative design, technology, location, size and scale. A 'Do-Nothing Alternative' i.e., an outline of what is likely to happen to the environment should the Proposed Project not be implemented, has also be considered.

Do Nothing Alternative

An alternative land-use option to the development of a renewable energy project at the Site would be to leave it as it is, with no changes made to the current land-use practices. Predominantly agricultural fields with areas in the north occupied by active raised blanket bog would continue. In doing so, the environmental effects in terms of emissions are likely to be neutral.

By implementing this 'Do-Nothing' alternative, however, the opportunity to capture the available renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions. The opportunity to generate local employment, local authority development contributions, rates and investment in the local area would also be lost. Furthermore, the opportunity to create and further enhance the biodiversity of the surrounding area as part of the Proposed Project would also be lost.

Alternative Site Locations

The process of identifying a suitable wind farm site is influenced by a number of factors, while wind speeds, the area of suitable or available land, proximity to a grid connection point and planning policy are all very important, a wind farm project must be commercially viable/competitive, as otherwise it will never attract the necessary project finance required to build it.

The Site has been identified as having potential for a wind energy development as a result of a nationwide search of suitable lands. The site selection process has been constraints and facilitators led.

Facilitators are factors that give an advantage to a Proposed Project, while constraints are restrictions that inform the location and design of a project by highlighting sensitivities.

Site selection for the development of a wind farm must be suitable for consideration under a number of criteria, such as:

- **Local Policy:** Site location relative to Galway County Development Plan Wind Energy Capacity's classification of areas considered that have capacity for wind farm development from a planning policy perspective;
- **Environmental Sensitivities**: Located outside areas designated for protection of ecological species and habitats;
- **Grid Connection**: Access to the national electricity grid possible within a viable distance;
- **Sensitive Receptors**: Capable of complying with required setbacks from sensitive receptors;
- **Site Scale:** Sufficient area of unconstrained land that could potentially accommodate a wind farm development and turbine spacing requirements.

From the review of the criteria set out above, the Site is considered a suitable location for the provision of a renewable energy development of the scale proposed. The Proposed Wind Farm site turbines are located within an area designated as 'Open to Consideration', with a small proportion of the Proposed Wind farm site classed in 'Generally to be Discouraged'. It was considered that the Proposed Wind Farm is in accordance with the aims and objectives of the LARES and represents an opportunity to increase the supply of renewable electricity to the national grid on a suitable site.

The nearest Natura 2000 site to the Proposed Wind Farm site is the Lough Corrib SAC, which is located approximately 0.5km to the north of the Proposed Wind Farm site at its closest point (i.e., T07). Natural Heritage Area (NHA) or proposed Natural Heritage Area (pNHA) to the Proposed Wind Farm site is the Summerville Lough NHA which is located approximately 3.1km east of the Proposed Wind Farm site at its closest point (i.e., T08). The nearest Natura 2000 site to the Proposed Grid Connection is the Lough Corrib SAC, which the Proposed Grid Connection crosses within the existing public road corridor approx. 1.8km south of the Cloon 110kV for approx. 95m. The nearest Natural Heritage Area (NHA) or proposed Natural Heritage Area (pNHA) to the Proposed Grid Connection is the Belclare Turlough pNHA which is located approximately 5.3km west of the Proposed Grid Connection at its closest point.

Within the Site, Article 17 Annex 1 Active Raised Bog habitat has been identified through assessment of available resources and through comprehensive multi-season site surveys. The Proposed Wind Farm has been designed to avoid as much of the most sensitive areas as possible.

The Proposed Project intends to connect to the national grid via underground electrical cabling within the local and regional road network along the Proposed Grid Connection to the existing Cloon 110kV substation, in the townland of Cloonascragh, Co. Galway.

The Applicant sough to identify an area with a relatively low population density, the Site has emerged suitable to accommodate the Proposed Project. The population density of the Population Study Area in 2022 is 27.9 persons per square kilometre.

The site comprises a mix of pastoral agriculture, peatlands, low-density residential, and small-scale commercial forestry. The Proposed Wind Farm site will be easily accessible via new temporary construction site eneterence of the R332 regional road to the south of the Proposed Wind farm site and for the operational phase via L6301 local road in the centre of the Proposed Wind Farm site.

Alternative Renewable Energy technologies

The Proposed Project will be located on a site where small-scale pastoral agriculture and peat cutting practices will continue to be carried out around the footprint of the Proposed Project.

Both onshore and offshore wind energy development will be required to ensure Ireland reaches the target set in the Climate Action Plan 2025 (CAP25) to source 80% of our electricity from renewable energy by 2030.

Offshore Wind

Although the screening exercise was based on identifying lands for onshore wind development; another alternative source of renewable electricity generation would be offshore wind energy.

Neoen Ltd is interested in offshore wind development however, due to regulatory delays, continues to focus primarily on onshore wind to help meet the 2030 renewable energy targets set out in CAP25. Offshore opportunities will still be explored alongside progressing suitable onshore projects like the Proposed Project.

The Applicant is committed to playing a key role in helping the State achieve its CAP25 objectives while building upon its proven record of generating clean renewable energy to the national grid. As such, the option of an offshore project is not considered to be a reasonable alternative at this time.

Solar Energy

To achieve the same maximum estimated electricity output from solar energy as is expected from Proposed Wind Farm Development a larger development footprint would be required. Solar PVs have a smaller capacity factor than wind farms. The capacity factor of solar PV panels in the solar middle of Ireland is approximately 14.6%, compared to the wind capacity factor of the Site of 35%. The potential installed capacity of the Proposed Project will have a combined generating capacity of between 54 to 64.8 MW, and therefore has the potential to produce between 165,564 MWh and 193,158 MWh of electricity per year. A solar PV array with the same potential installed capacity would produce between 69,063.8 MWh and 82,876.6 MWh of electricity per year.

In order to supply the same number of households with electricity per year as the Proposed Project, a solar PV array would require a potential installed capacity of between 129.5 MW and 151 MW, thus requiring a development footprint approximately 6-7 times the Proposed Wind Farm site (At 0.7ha per MW for Solar PV, to achieve the same electricity output as the Wind Farm, between 90.7 ha and 105.7 ha would be required.

In addition, a solar development of this scale, would have a higher potential environmental effect on Traffic and Transport (construction phase), Air Quality (construction phase) and Biodiversity and Ornithology (habitat loss), Hydrology and Hydrogeology (ecological damage), a greater potential for direct impacts on unknown subsurface archaeology (construction phase) and glint and glare at the Site (operational phase). Taking into account the factors outlined above, and considering the farming practices in the area, it has been determined that wind energy is the most suitable renewable energy technology for the Site with the lesser potential for significant, adverse environmental effects.

Alternative Turbine Layout and Development Design

The design of the Proposed Wind Farm has been an informed and collaborative process from the outset, involving the designers, developers, engineers, environmental, ecological, hydrological and geotechnical, archaeological specialists and traffic consultants. The design process has also taken account of the recommendations and comments of the relevant statutory and non-statutory organisations, near neighbours / the local community and local authorities. Throughout the preparation

of this EIAR, the layout of the Proposed Wind Farm has been revised and refined to take account of the findings of all site investigations and baseline assessments, which have brought the design from its first initial layout iteration to the Proposed Wind Farm layout.

Constraints and Facilitators Mapping

The design and layout of the Proposed Project follows the recommendations and guidelines set out in the '*Wind Energy Development Guidelines'* (Department of the Environment, Heritage and Local Government, 2006) (the 2006 Guidelines) and the '*Best Practice Guidelines for the Irish Wind Energy Industry'* (Irish Wind Energy Association, 2012).

An initial 9 no. turbine layout was proposed following a preliminary desk-based constraints assessment. A more detailed constraints mapping exercise was then carried out to inform the final proposed turbine layout.

The constraints mapping process involved applying buffer zones around various environmental and technical constraints to clearly define areas where no development will occur. These buffers were established based on relevant standards and best practice guidelines. Key constraints included sensitive receptors, such as residential dwellings, which were assigned a 720 metre buffer in line with the draft 2019 Guidelines recommending a separation distance of four times the maximum turbine tip height. Designated Natura 2000 sites were given a 100 metre buffer, while a 50 metre buffer was applied to watercourses, waterbodies, and recorded archaeological sites or protected structures. Infrastructure was carefully sited to avoid the loss of habitats of Local Importance (higher value) or greater. Additionally, telecommunication links were protected with operator-specific buffers to avoid interference.

The development of the Proposed Wind Farm at the Site was facilitated by several key advantages, including the availability of land, a strong wind resource, existing access points, and well-developed road infrastructure, along with a limited extent of constraints. Where constraints such as sensitive habitats, unmapped watercourses, or unsuitable ground were identified, alternative locations were proposed. The layout was also shaped by wind data, noise, and shadow flicker assessments to ensure optimal and compliant siting.

Turbine Layout

The design of the Proposed Wind Farm evolved through multiple iterations, starting with an initial layout of nine turbines based on preliminary constraints mapping and viability analysis.

Early desk-based assessments led to adjustments, such as relocating Turbine 1 to avoid a telecommunications link. In Iteration 2, turbines were renumbered, and preliminary infrastructure siting and site investigations including habitat, ecological, hydrological, and geotechnical surveys prompted further relocations of several turbines to avoid deep peat, maintain setbacks, and optimise wind capture. Iteration 3 maintained the nine turbines, incorporating additional detailed investigations and a telecoms impact assessment, which led to a minor relocation of Turbine 7.

The final layout is considered optimal, balancing technical efficiency with minimal environmental impact. It integrates all site and design constraints, site investigation results, and includes biodiversity enhancement measures such as native replanting and habitat restoration. Peat and spoil management areas were also refined based on multidisciplinary surveys to avoid ecological and hydrological constraints.

The final proposed turbine layout is based on a combination of the results of all site investigations and surveys that have been carried out during the EIAR process and the EIA scoping process with statutory and non-statutory consultees.

Alternative Design of Ancillary Infrastructure

The ancillary structures required for the Proposed Project include roads, temporary construction compound, meteorological (met) mast, peat and spoil repository areas, onsite 110kV substation, battery energy storage system (BESS) compound, and associated underground cabling.

- **Road Layout:** Access tracks are essential within the Proposed Wind Farm to facilitate the safe transport of materials and equipment were designed with appropriate gradients and widths. From the outset, the design aimed to maximise use of existing tracks to minimise environmental impacts. To avoid significant disruption to local traffic, particularly along the L6301 local road, only crossing points were included there, with new internal roads used instead of upgrading public roads. The final internal road layout was developed based on site constraints, ensuring efficient access while avoiding sensitive ecological areas. While initial plans considered using the R332 regional road for all access, it was later limited to abnormal load deliveries only, with the L6301 local road designated as the main operational access route;
- **Temporary Construction Compound:** A single temporary construction compound will be used for storing materials, turbine components, and providing staff facilities and parking, minimising the overall development footprint compared to having two compounds. Initially planned for the southern part of the site near the L6301 local road, the compound was later relocated closer to the proposed temporary construction entrance. This strategic move reduces reliance on the public road network, limits construction traffic impacts, and helps minimise vehicle emissions and dust during the construction phase;
- **Alternative Internal Site Cabling Route:** The internal 33kV underground cabling will follow the internal road network to connect all nine turbines to the onsite 110kV substation. Although this results in a longer cabling route, it was chosen as the most suitable due to the low ecological value of the habitat, avoiding greater disturbance and increased peat and spoil generation that would occur with a direct, 'as the crow flies' route;
- **Alternative Meteorological Mast Location:** The meteorological mast is situated in the southern part of the Proposed Wind Farm site along an existing access track planned for upgrade. This location was chosen for its low ecological value, suitable setback from turbines, and position in the southwest of the site to best capture prevailing wind conditions;
- **Onsite 110kV Substation and Battery Storage Compound:** The proposed onsite 110kV substation and BESS compound is located in the south of the Proposed Wind Farm site and forms part of the Proposed Grid Connection. 3 no. potential locations were identified were considered at the early stage of the design of the Proposed Project. This location was deemed to be suitable due to the habitats it is located on, proximity to the local road network in which to facilitate the connection of the Proposed Wind Farm site to the national grid, and the existing ground conditions;
- **Transport of Material from Nearby Quarrie**s: it was determined that onsite borrow pits would not be feasible as they would create a larger local impact than the traffic generation associated with deliveries of materials from off-site sources to the Site. In order to facilitate the construction of the Proposed Project, materials will need to be imported from nearby quarries.

Alternative Grid Connection Underground Electrical Cabling Route Options

Two underground grid connection options were considered to link the Proposed Grid Connection onsite substation with existing substations. Option A connects to the Cloon 110kV substation approximately 11.1km west, with a total route length of 20.9km, mainly within public road corridors and including 2.6km of new or upgraded access tracks. Option B connects to the Cashla 220kV substation about 22.2km southwest, with a longer total route of 35.5km and similar access track requirements. While Option B is approximately 14.6km longer and poses greater potential for short-

term disturbance to residents and long-term habitat loss, Option A crosses more watercourses (5 compared to 4). However, Option B presents greater risks to material assets due to crossings of a railway, motorway, and high-pressure gas line, which Option A avoids. Based on these environmental considerations, Option A was identified as the preferred grid connection route.

Environmental considerations for the two grid connection options highlight Option A as having generally lower potential impacts compared to Option B. Option A passes fewer residential dwellings, reducing the likelihood of dust, noise, and vibration nuisances, and has a smaller development footprint, resulting in less habitat loss, peat excavation, and disturbance to potential subsurface archaeology. While Option A crosses more EPA-mapped watercourses, Option B's longer route increases potential for habitat loss, higher excavation volumes, greater emissions, and more significant interactions with sensitive infrastructure such as railways, motorways, and gas lines. Overall, Option A presents fewer environmental risks and impacts, making it the more favourable route.

The Proposed Grid Connection (Option A) includes connection to the national grid via underground electrical cabling, located primarily within the public road corridor to the Cloon 110kV substation. Underground electrical cables will transmit the power from each wind turbine to the proposed onsite substation. The power from the proposed onsite 110kV substation will be transmitted to the existing Cloon 110kV substation, via an underground electrical cabling route, measuring approximately 20.9km in length.

The chosen underground electrical cabling route will follow existing public roads and new/existing track across private land, and thereby have a reduced permanent visual impact due to the placement of the cabling route underground, with no above ground infrastructure visible in the operational phase.

The Proposed Grid Connection will be subject to a separate planning application but has been assessed within this EIAR.

Alternative Transport Route and Site Access

Wind turbine components (blades, nacelles, and towers) are not manufactured in Ireland and therefore must be imported from overseas and transported overland to the Site. With regard to the selection of a transport route to the Site, alternatives were considered in relation to turbine components, general construction-related traffic, and site access locations.

The alternatives considered for the port of entry of wind turbines into Ireland for the Proposed Project include Port of Galway, Shannon Foynes Port and Dublin Port. Shannon Foynes Port is the principal deepwater facility on the Shannon Estuary and caters for dry bulk, break bulk, liquid, and project cargoes. The primary chosen port of entry is Galway Port due to its proximity from the port to the M17 motorway, in which the exit to the national and regional roads towards the Proposed Project is accessible.

The preferred turbine delivery route (Option 2) was selected based on its reduced environmental and traffic impacts compared to Option 1. Turbine components will be transported from Galway Port via the M6, M17, and N63, using the consented N63 Liss to Abbey Realignment Scheme before connecting to the R332 and entering the site. Option 2 avoids multiple pinch points and third-party land requirements present in Option 1, requiring fewer accommodation works and resulting in lower emissions, noise, dust, and traffic disruption. All deliveries will follow a detailed Traffic Management Plan, be escorted by Gardaí, and managed by specialist teams. The site entrance will be temporarily widened for turbine deliveries and scaled down for operational use. Overall, Option 2 was determined to have the least amount of environmental effects when compared to other proposed routes.

Alternative Mitigation Measures

Mitigation by avoidance has been a key aspect of the Proposed Project's evolution through the selection and design process. Avoidance of the most ecologically sensitive areas of the Site limits the potential for environmental effects. As noted above, the site layout aims to avoid any environmentally sensitive areas. Where loss of habitat occurs in the Site, this has been mitigated with the proposal of habitat enhancement and improved habitat connectivity with hedgerow replanting on the Proposed Project.

The best practice design and mitigation measures set out in this EIAR will contribute to reducing any risks and have been designed to break the pathway between the Site and any identified environmental receptors. The alternative is to either not propose these measures or propose measures which are not best practice and effective and neither of these options is sustainable.

1.4 Description of the Proposed Project

This section of the EIAR describes the Proposed Project and all its component parts. The current application for planning permission is being made to An Coimisiún Pleanála (ACP) in accordance with Section 37E of the Planning and Development Act 2000, (as amended) for the Proposed Project. This chapter also describes elements of the overall project which are not subject to this planning application but are assessed in this EIAR. Construction methodologies for the main infrastructural components of the Proposed Project are also included in this chapter of the EIAR.

The layout of the Proposed Project (Proposed Wind Farm and Proposed Grid Connection) has been designed to minimise the potential environmental effects while at the same time maximising the energy yield of the wind resource passing over the Site. Detailed drawings of the Proposed Wind Farm can be found in Appendix 4-1. Drawings of the Proposed Grid Connection (assessed within this EIAR) can be found in Appendix 4-4.

The proposed turbine layout has been verified using industry standard wind farm design software ensuring that it maximises the energy yield from the Proposed Project, while maintaining sufficient distances between the proposed turbines so as to ensure turbulence and wake effects do not compromise turbine performance. The Grid Reference coordinates of the proposed turbine locations are listed in Table 1 below.

Table 1 Proposed Wind Turbine Locations and Top of Foundation level

Turbine	ITM X	ITM Y	Top of Foundation Levels (metre OD)
1	555297	747613	73m
2	555608	748030	76m
3	555563	748640	75.5m
4	556167	748591	83.5m
5	556198	749183	66.5m
6	555648	749699	73.5m
7	555568	750508	70m
8	556986	749348	76m
9	556813	749855	66.5m

The proposed wind turbines to be installed on the Proposed Wind Farm site will have the following dimension range:

- Turbine Tip Height – 180 metres
- Hub Height – Maximum height 105 metres, Minimum height 99 metres
- Rotor Diameter: - Maximum diameter 162 metre, Minimum diameter 150 metres

The Proposed Wind Farm would have a combined generating capacity of between 54 to 64.8 MW. For the purposes of this EIAR, a rated generating capacity of 7 MW has been chosen to calculate the

potential capacity of the proposed 9-turbine renewable energy development, which would result in an estimated installed capacity of 63 MW.

The Proposed Wind Farm site makes use of the existing road network insofar as possible. It is proposed to upgrade approx. 1.25km of existing site roads and tracks, and to construct approx. 9.3km of new access roads. The excavation of peat and spoil and founding of access roads on competent stratum (below the peat) for new access roads will be carried out at various locations on the Proposed Wind Farm site. Floating tracks are also proposed to minimise the impact on the peat, particularly peat hydrology.

As part of the Proposed Project, there will be demolition works undertaken on an existing derelict structure located approx. 180m southwest of T05 in order to facilitate the construction of new access roads within the Proposed Wind Farm site.

Each turbine will be connected to the onsite electricity substation (part of the Proposed Grid Connection) via underground 33kV (kilovolt) electricity cabling. Fibre-optic cables will also connect each wind turbine and the met mast to the onsite substation. The electricity and fibre-optic cabling connecting to the onsite substation compound will be run in cable ducts approx. 1.2 metres beneath ground level, along the sides of roadways or under the roadways.

One meteorological (met) mast is proposed as part of the Proposed Wind Farm. The met mast will be a free-standing slender lattice structure 100 metres in height and equipped with wind monitoring equipment at various heights. The proposed met mast will be located at ITM X 555128, ITM Y 747944.

A temporary construction compound measuring approx. 10,240m² in area will be located in the southern section of the Proposed Wind Farm site. The construction compound will facilitate the temporary storage of some general construction materials, however, turbine components will be brought directly to the proposed turbine locations following their delivery to the Proposed Wind Farm site.

Tree felling will be required within and around Proposed Wind Farm infrastructure footprint to allow for the construction of the turbine bases, access roads underground cabling, and the other ancillary infrastructure. In addition to the commercial forestry felling, segments of hedgerows will require removal to facilitate the construction of wind farms roads and ancillary infrastructure, and to achieve the required bat foraging buffers from the proposed turbines.

A Biodiversity Management and Enhancement Plan has been prepared for the Proposed Project and is included as Appendix 6-4 of this EIAR. This plan has been developed to offset the loss of habitats identified within the Proposed Wind Farm site and further enhance the biodiversity of the Proposed Wind Farm and its environs. Offsetting measures will include replanting of hedgerow habitat within the Proposed Wind Farm site and broadleaved woodland will be planted to replace the existing conifer woodland within the felled conifer woodland areas, as well as plant additional broadleaved woodland between T3 and T5. Additional measures include allowing uncut raised and regenerating cutover bog to regenerate into what is expected will become bog woodland habitat, converting grassland areas into long-flowering meadows, enhancing marsh fritillary breeding habitat, riparian areas and fen habitat within the Proposed Wind Farm site, and allowing constructed embankments/berms to be recolonised by natural vegetation. Please see Appendix 6-4 for details.

It is intended to construct a 110kV electricity substation within the Site. Access to the proposed onsite 110kV substation will be via the operational site access points along an existing local track. Upon decommissioning of the Proposed Wind Farm, the 110kV substation will remain *in situ* and form part of the national grid infrastructure. Two substation control buildings will be located within the substation compound. A battery-based energy storage system (BESS) will be located adjacent to the 110kV substation compound.

It is intended to connect the onsite 110kV substation to the existing 110kV Cloon substation in the townland of Cloonascragh, Co. Galway via 110kV underground electrical cabling. The underground electrical cabling route is approx. 20.9km in length and located primarily within the public road corridor, with approx. 2.6km located within the Proposed Wind Farm site.

The construction of the Proposed Wind Farm will require the excavation of peat and spoil. It is proposed to manage any excess overburden generated through construction activities locally within the Site, in identified 4 no. peat deposition areas and 5 no. spoil management areas. Peat excavation has been considered available for placement, reinstatement and re-use across the Proposed Wind Farm site and spoil volumes have alos been considered as available for re-use in the construction of safety berms across the Proposed Wind Farm site. This provides enough capacity for the total volume of peat and spoil requiring management for the Proposed Wind Farm.

As part of the Proposed Project, a new site entrance will be constructed from the R332 regional road in the southwest of the Proposed Wind Farm site. This entrance will be used during the construction phase of the Proposed Project. On completion of the construction phase, this entrance will be reduced in size and gated for security and will only be used for the delivery of abnormal loads (i.e., turbine component replacement) if required. Construction traffic will access the Proposed Wind Farm site via 2 no. proposed access junctions on either side of L6506 local road for crossing. No construction traffic will access the Proposed Wind Farm site or exit onto the L6506 via these access and egress points.

The Proposed Wind Farm site will be accessible during the operational phase at 3 no. locations, which includes the upgrade of 1 no. existing access track running north from the L62312 local road and the construction of 2 no. new operational entrances at 2 no. locations along the L6301 local road within the centre of the Proposed Wind Farm site.

It is proposed that the large wind turbine components will be delivered from the Galway Port. After exiting the M17 at Junction 19 the turbine delivery vehicles will travel northeast for 12.7km along the N63 national road before turning north and traveling in a northwestern direction for along the R332 regional road. The turbines will continue straight on the R332 for approx. 2.1km before turning right into the Proposed Wind Farm site entrance. The proposed route will utilise the approx. 2.1km of new national secondary road along the N63 as proposed in the consented N63 Liss to Abbey Realignment Scheme (Pl Ref: ABP 312877-22).

The preliminary swept path analysis indicates that a temporary track is required in a field west of the N63/R332 junction, in the townland of Slievegorm, in order to facilitate the movement of wind turbine vehicles through this junction. Upon the completion of the construction phase, the temporary road will be covered with a layer of topsoil and reseeded and will only be used again in the unlikely event that an oversized delivery was required for wind turbine maintenance purposes

In order to facilitate the construction of the Proposed Project, all crushed stone, hardcore materials and ready-mix concrete that will be required during the construction phase will be sourced from local, appropriately authorised quarries. For the purposes of assessment within the EIAR, quarries within a 20km range of the Proposed Wind Farm site that could potentially provide stone and concrete have been assessed. It is also envisaged that general construction traffic (including materials and staff) will travel to the Site via the public road network to the proposed site entrance.

It is estimated that the construction phase of the Proposed Project will take approx. 18-24 months from commencement of civil works to the commissioning of the wind turbines. The construction phase can be broken down into three main overlapping phases 1) civil engineering works - 10 months, 2) electrical works including grid connection works - 9-12 months, and 3) turbine erection and commissioning - 8 months.

As part of the Proposed Wind Farm planning application, permission is being sought for a 35-year operation period commencing from the date of full operational commissioning of the proposed turbines. During the operational period, on a day-to-day basis the wind turbines will operate

automatically, responding by means of meteorological equipment and control systems to changes in wind speed and direction.

The Proposed Project has the potential to have significant benefits for the local economy, by means of job creation, landowner payments and commercial rate payments. An important part of a renewable energy development, which Neoen (the Applicant) has been at the forefront of developing, is its Community Benefit Package. Based on the current Renewable Energy Support Scheme (RESS) guidelines it is expected that for each megawatt hour (MWh) of electricity produced by the wind farm, the Proposed Project will contribute €2 into a community fund for the first 15 years of operation of the Proposed Wind Farm. If this commitment is changed in upcoming Government Policy, the fund would be adjusted accordingly. Should the Proposed Project be developed under RESS, it would attract a community contribution in the region of approx. €300,000/year for 15 years for the local community, totalling €4.5 million. Should the Proposed Project not be developed under RESS, the Applicant commits to paying the above.

Following the end of their useful life, the equipment may be replaced with a new technology, subject to planning permission being obtained, or the Proposed Wind Farm will be decommissioned fully. The Proposed Grid Connection infrastructure will remain in place as it will be under the ownership and control of the ESBN.

1.5 Population and Human Health

One of the principal concerns during the development process is that human beings, as individuals or communities, should experience no significant diminution of their quality of life from the direct, indirect or cumulative effects arising from the construction, operation and decommissioning of a development. Ultimately, all the effects of a development impinge on human beings, directly and indirectly, positively and negatively. The key issues examined in this chapter of the EIAR include population, human health, employment and economic activity, land use, residential amenity (including visual amenity, shadow flicker and noise), community facilities and services, tourism, property values, traffic and health and safety

The Proposed Wind Farm is located within a rural, agricultural setting in east Galway, approximately 12km southeast of Tuam. The village of Brierfield is located approximately 1.3km south of the nearest proposed turbine, and the village of Moylough is located approximately 5.3km east of the nearest proposed turbine. The N63 National Road runs south of the Proposed Wind Farm site in a general northeast-southwest orientation entering the settlement of Abbeyknockmoy and then heading northeast towards Moylough, passing within 1.27km of the nearest proposed turbine.

Land use within the Site is predominately agricultural with some adjacent areas in the north of the Proposed Wind Farm occupied by active raised blanket bog. Land-use in the wider landscape comprises a mix of pastoral agriculture, peat bogs and low density residential. The Proposed Wind Farm site is accessed via local roads from the R332 Regional Road which travels in a southeast-northwest direction between Tuam and the N63 National Road, Co. Galway and L6301 Local Road which transverses the Proposed Wind Farm site. The Proposed Wind Farm site itself is served by a number of existing agricultural roads and tracks.

The design, construction and operation of the Proposed Grid Connection will provide employment for technical consultants, contractors and maintenance staff. As discussed, it is proposed to construct the wind farm and grid connection concurrently which would require approximately 100 employees in total, with an estimated 20 jobs focusing on the construction phase of the Proposed Grid Connection. Construction of the Grid Connection infrastructure is estimated to last approximately 9 months of the overall 18-24 month construction timeframe.

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. Similarly, there is insufficient evidence from the scientific literature discussed in Chapter 5 to credibly determine that there is the potential for a significant effect on property values in Ireland, or abroad, as a result of the Proposed Wind Farm and Proposed Grid Connection.

Shadow flicker is an effect that occurs when rotating wind turbine blades cast shadows over a window in a nearby property. Shadow flicker is an indoor phenomenon, which 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 lasts only for a short period of time and occurs only during certain specific combined circumstances. The Guidelines (DoEHLG, 2006) 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. Although the 2006 DoEHLG Guidelines threshold applies to properties for the purposes of this assessment, the thresholds of 30 hours per year or 30 minutes per day have been applied to all properties located within ten rotor diameters of the proposed turbines (as per IWEA guidelines, 2012).

The WindPRO computer software was used to model the predicted daily and annual shadow flicker levels in significant detail, identifying the predicted daily start and end times, maximum daily duration and the individual turbines predicted to give rise to shadow flicker. The maximum shadow flicker model assumes that daylight hours consist of 100% sunshine. This is a conservative assumption which represents a worst-case scenario. Following the detail provided above on sunshine hours, a sunshine factor of 26.46% was applied. The predicted shadow flicker levels have been modelled for all 218 Sensitive Receptors located within 1.62km (10 x 162m rotor diameter) of the proposed turbine locations. The predicted shadow flicker model results indicate:

- 47 Sensitive Receptors are theoretically predicted to experience zero shadow flicker;
- 171 Sensitive Receptors are theoretically predicted to experience some shadow flicker;
  Of the 218 Sensitive Receptors, 76 Sensitive Receptors are theoretically predicted to experience shadow flicker that exceeds the Guidelines (DoEHLG, 2006) . Please see Table 5-11 below for details.
- Appendix 5-4 of this EIAR contains the shadow flicker results for the 218 houses, i.e. including the Sensitive Receptors experiencing zero or less than the Guidelines (DoEHLG, 2006) threshold for daily and annual shadow flicker.

Where daily shadow flicker exceedances have been predicted at buildings by the modelling software, a Site visit will be undertaken firstly to determine the level of occurrence, existing screening and window orientation. The shadow flicker prediction data will be used to select dates on which a shadow flicker event could be observed at one or multiple affected properties and the following process will be followed. Please refer to Chapter 18 Schedule of Mitigation and Monitoring Measures for a full list of measures.

Impacts on human beings during the construction, operational and decommissioning phases of the Proposed Project are described in Chapter 5 in terms of population levels, employment and investment, land-use patterns and activities, property values, tourism, residential amenity, health and safety, dust, water quality, noise and vibration, traffic and transport, major accidents and natural disasters, and shadow flicker. Where a negative impact is identified, appropriate mitigation measures will be put in place to ensure that there will be no significant health effects on sensitive receptors in the surrounding area. Overall, the construction, operation and decommissioning of the Proposed Project will not have any significant adverse effects on population and human health, following the implementation of the appropriate mitigation measures.

1.6 Biodiversity

This chapter assesses the likely significant effects (both alone and cumulatively with other projects) that the Proposed Project may have on Biodiversity, and sets out the mitigation measures proposed to avoid, reduce or offset any potential significant effects that are identified.

To inform the assessment, a comprehensive desk study and suite of field surveys have been carried out. Multidisciplinary walkover surveys were undertaken between May 2021 and September 2025. Detailed botanical assessments were carried out between July 2023 and September 2025. Dedicated species/habitat specific surveys including for bats, marsh fritillary, protected mammals and detailed habitat assessment surveys were carried out, during which any incidental records of other species were also recorded. In addition, fisheries surveys and aquatic macroinvertebrate surveys have been undertaken as part of the detailed baseline assessment, the detailed results of which are provided in technical appendices to this EIAR.

The multi-disciplinary walkover surveys comprehensively covered the lands within the EIAR Site Boundary and based on the survey findings, further detailed targeted surveys were carried out for features and locations of ecological significance. These surveys were carried out in accordance with NRA Guidelines on Ecological Surveying Techniques for Protected Flora and Fauna on National Road Schemes (NRA, 2009).

During the multidisciplinary surveys, a search for Invasive Alien Species (IAS) listed under the Third Schedule of the European Communities Regulations 2011 (S.I. 477 of 2015) was conducted.

The habitats on the Site were the subject of a detailed survey and assessment and habitat mapping. This habitat mapping and assessment was undertaken following the 'A Guide to Habitats in Ireland' (Fossitt, 2000). Cutover raised bog and grassland communities have been categorised to plant communities following the Irish Vegetation Classification (IVC). Cutover bog habitats have also been assigned cutover bog classifications using Irish Wildlife Manual (IWM)128 *The habitats of cutover raised bog* (Smith & Crowley, 2020) and raised bog habitats have been assigned ecotopes based on the IWM 81 *Raised Bog Monitoring and Assessment Survey 2013* (Fernandez et al., 2014).

Habitats found alongside the Proposed Grid Connection Underground Cabling Route (which is restricted to the existing road) include Improved agricultural grassland (GA1), Buildings and artificial surfaces (BL3), Cutover bog (PB4), Treelines (WL2), Hedgerows (WL1), Wet grassland (GS4), Parkland and scattered trees (WD5), Conifer plantation (WD4), (Mixed) Broadleaved woodland and Dry meadows and grassy verges (GS2). There are eight watercourse crossings over watercourses (FW2) and drains (FW4), which pass beneath the existing road along which the underground cable connection route will be located.

The Proposed Wind Farm site consists of 18 different habitat types, including the following: Wet grassland (GS4)
Improved agricultural grassland (GA1), Dry meadows and grassy verges (GS2), Arable crops (BC1), Buildings and artificial surfaces (BL3), Stone walls and other stonework (BL1), Recolonizing bare ground (ED3), Conifer plantation (WD4), Broadleaved woodland (WD1), Scrub (WS1), Wet grassland/scrub (GS4/WS1), Cutover bog (PB4), Raised bog (PB1), Rich fen (PF1), Treelines (WL2), Hedgerows (WL1), Lowland/depositing rivers (FW2) and Drainage ditches (FW4). The proposed

Substation and BESS Compound are also proposed to be located within an Improved Agricultural Grassland (GA1) habitat.

The construction of the Proposed Grid Connection underground cabling will not result in the permanent loss of any habitat. The works will be restricted to the existing road categorised as Buildings and Artificial Surfaces (BL3). This is not significant at any geographic scale. The construction of the Proposed Wind Farm will result in the direct loss of 8.77ha of Improved Agricultural Grassland (GA1), 1.85ha of Dry Meadows and Grassy Verges (GS2), 3.05ha of Wet Grassland (GS4) and 0.81ha of Arable Crops (BC1). These habitats are assessed as being of local importance (lower value), the loss of which is not considered significant at any scale.

There will be a loss of 2.12ha of Cutover Bog (PB4) habitat associated with new roads and proposed infrastructure within the Proposed Wind Farm site. This loss constitutes approximately 5% of the total cutover bog habitat area located within the site. Additionally, 0.18ha of raised bog (PB1) will be lost as a result of the proposed new floating access road between T7 and T9. By taking a precautionary approach, this habitat has been assessed as corresponding to the Annex 1 habitat *7120 Degraded raised bogs still capable of natural regeneration*. The loss of 0.18ha of raised bog habitat corresponds to a loss of 0.54% of the total raised bog habitat area within the Proposed Project. This is considered a significant effect at a county scale.

A total of 3.74ha of linear features including hedgerows (WL1), treelines (WL2) and stone walls (BL1) will be lost as a result of the Proposed Project. Approximately 0.17ha of broadleaved woodland (WD1) will be lost to accommodate access road widenings and a turning bay, and approximately 0.7ha of conifer woodland (WD4) will be lost to accommodate new access roads and turbine bat buffers. An additional 10.55ha of conifer woodland is to be felled as part of the biodiversity enhancement measures and will be replaced with native broadleaves (as described below).

A Biodiversity Management and Enhancement Plan (BMEP) is in place as part of the Proposed Project. This Plan sets out measures to plant 4.7km of hedgerows within the Proposed Wind Farm site, which will result in a net gain of 960m additional linear features. Additionally, 11.5ha of native broadleaf woodland will be planted to replace the loss of conifer woodland and broadleaved woodland within the Proposed Project.

The BMEP also sets out enhancement measures, which includes enhancing 4.45ha of improved grassland by managing the grasslands as long-flowering meadows. Marsh fritillary habitat has been identified throughout the Site. As part of proposed enhancement measures, existing marsh fritillary breeding habitat will be safeguarded and maintained within the Proposed Wind Farm site. It is proposed to enhance approximately 3.2ha of existing grassland areas that have existing devil's bit scabious (*Succisa pratensis),* the larval foodplant of the species, within the Proposed Wind Farm site. The Annex 1 habitat *7230 Alkaline Fen* found within the Proposed Wind Farm site will be entirely retained which will provide opportunities to protect and further enhance the condition of this habitat.

A number of uncut raised bog (PB1) and regenerating cutover bog (PB4) habitat areas have started to recolonize with scrub. It is proposed to allow these areas to regenerate into what is expected will become bog woodland habitat. Approximately 18ha is available within the site to provide this habitat enhancement.

It is also proposed to provide 1.23km of permanent fencing and riparian hedgerow planting along sections of rivers/drains to prevent livestock poaching. This will aim to avoid excess nutrients entering into the waterbodies and prevent damage to the stability of the riverbank edge. Enhancement opportunities are also proposed within the peat and spoil repository areas by encouraging natural regeneration.

There are two main rivers which flow through the Proposed Wind Farm site; the Grange River in the north and the Abbert River in the south. The southern portion of the Proposed Wind Farm site is drained by the Lecarrow Stream and the Forty Acres Stream, both of which are headwater streams of the Abbert River. The Dangan Eighter Stream and a number of unnamed streams drain into the Grange River to the north of the Proposed Wind Farm site. No residual significant effects on surface and groundwater quality or the hydrological/ hydrogeological regime were identified during construction, operation or decommissioning phases. A full hydrological assessment in relation to the Proposed Project has been carried out in Chapter 7 of the EIAR.

Evidence of otter activity was found in the form of spraint along the Dangan Eighter Stream, however, no otter holts or other resting places were recorded during any of the ecological surveys. There is no potential for direct loss or fragmentation of significant otter habitat including loss of breeding or resting places. There are no in-stream works proposed during any phase of the Proposed Project. Given that no otter holts or resting places were recorded within the Site, no direct mortality, significant disturbance or any barrier to the movement of otter is anticipated.

Bat species composition and abundance was found during detailed bat surveys undertaken at the Proposed Wind Farm site to be typical of the geographic location and the largely open nature of the Proposed Wind Farm site. Bats as an Ecological Receptor have been assigned Local Importance (Higher value) on the basis that the habitats within the study area are utilized by a regularly occurring bat population of Local Importance. Following the implementation of mitigation, no potential for residual significant effects with regard to loss of commuting and foraging habitat, loss or damage to roosts, displacement or other construction phase impacts have been identified; the proposed net gain in linear landscape features within the site will result in a long-term positive impact on bats at the local level. In relation to potential collision risk and injury with operational turbines, a bespoke adaptive monitoring and mitigation strategy has been devised for the Proposed Project in line with NatureScot (2021) Guidance, which will ensure that there is no potential for significant residual effects on local bat populations during the operational phase of the Proposed Project.

There was no evidence of Badger *(Meles meles)* within the Proposed Wind Farm site. However, the Proposed Wind Farm does provide suitable supporting habitat for this species, particularly within conifer plantation habitat and linear features within the Proposed Wind Farm site. However, this is considered on a precautionary basis given that there was no evidence of badger found directly within the EIAR site boundaries during any of the surveys carried out. Other incidental mammal records include Irish hare *(Lepus timidus)* recorded in various locations throughout agricultural grassland areas, cutover bog habitats and along existing roads. Pine marten *(Martes martes)* were recorded outside of the EIAR site boundary, south of T6. Although there were no records of Red Squirrel (*Sciurus vulgaris*), there is potentially suitable habitat within broadleaved and conifer wooded areas of the site. Fox *(Vulpes vulpes)* was recorded on several occasions throughout the Proposed Wind Farm site commuting. The Irish Stoat *(Mustela erminea hibernica)* were observed on occasion outside of the EIAR Site Boundary.

Marsh Fritillary suitable habitat was recorded within the Proposed Wind Farm Site. Dedicated Marsh Fritillary surveys undertaken recorded larval webs northwest of the Proposed Wind Farm site, as well as within a stand-alone field within the Proposed Wind Farm site to the southeast, A singular Marsh Fritillary larval web was also recorded approximately 17m north of the proposed new access road located north of T5. There will be no loss of suitable marsh fritillary habitat associated with the Proposed Project, and enhancement measures detailed above will ensure that existing suitable habitat and additional suitable habitat will remain within the Proposed Wind Farm site for the lifetime of the Project.

No signs of any additional protected terrestrial fauna were recorded within the Site during the survey work undertaken.

The proposed new floating road between T7-T9 is partially located within an area mapped as the Article 17 raised bog habitat. Detailed botanical relevé data was collected within these habitat areas to assess the condition of the habitat determine any affinity to Annex 1 habitats. The proposed new 580m floating road between T7 and T9 crosses through approximately 285m of uncut raised bog habitat. The data was assessed using Ecotope criteria within the IWM 81. It is likely that this habitat is a degraded raised bog habitat with small, fragmented areas of active raised bog. By taking a precautionary approach, it was determined that the location of the proposed floating road between T7 and T9 is located within a habitat that corresponds to the Annex 1 habitat *7120 Degraded raised bogs still capable of natural regeneration*.

In relation to nationally designated sites, the following Nationally Designated Sites have been identified as being within the Likely Zone of Impact and have been assessed in the EIAR:

- Turlough Monaghan pNHA [001322]
- Turloughcor pNHA [001788]
- Lough Corrib pNHA [000297]

Lough Corrib pNHA is also designated as European designated sites including the following:

- *Lough Corrib SAC*
- *Lough Corrib SPA*

These European Sites (SACs and SPAs) have been fully assessed under those designations within the Appropriate Assessment Screening and Natura Impact Statement (NIS) that accompanies this EIAR. This report has been prepared to provide the competent authorities with the information necessary to complete an Appropriate Assessment screening and an Appropriate Assessment for the Proposed Project in compliance with Article 6(3) of the Habitats Directive. The NIS concludes that the Proposed Project, individually or in-combination with other plans or projects, will not adversely affect the integrity of any European Site.

Following consideration of the residual effects it is concluded that the Proposed Project will result in a residual significant effect on the KER Raised Bog (PB1) *Degraded Raised Bogs Still Capable of Natural Regeneration (7120)* in the form of the direct loss of approximately 0.18ha of this habitat as a result of the proposed new floating access road between T7 and T9, which amounts to approximately 0.54% of the total raised bog habitat area within the Proposed Project. This floating road structure, although designed to minimize impacts on the hydrology of the underlying habitats and avoiding the need for any excavations, will result in likely significant effects on thy underlying hydrology of this habitat in an area of approximately 50-100m of the proposed new floating road. This identified significant residual effects will be on a receptor of County Importance.

No further significant residual effects on features of International, National, County Importance or Local importance (higher value) were identified.

The proposal will result in a net gain of 960m of hedgerows, 1.23km of permanent fencing and riparian hedgerow planting, as well as planting 11.5ha of broadleaved woodland to offset the loss of 0.17ha of broadleaf woodland and 11.25ha of conifer woodland. Enhancement proposals will enhance the existing Annex 1 habitat *7230 Alkaline Fen* habitat, marsh fritillary habitat, bog woodland/scrub

enhancement, encouraging long-flowering meadows in existing agricultural grassland and creating new marsh fritillary habitat within existing wet grassland areas.

1.7 Birds

This chapter assesses the likely significant effects of the Proposed Project on avian receptors. Particular attention has been paid to bird species with national and international protection under the Irish Wildlife Acts 1976-2022 and the European Union (EU) Birds Directive (2009/147/EC). Where potentially significant effects on avian receptors are identified, mitigation is described, and the residual effects are assessed. As detailed in Section 1.1.1 in Chapter 1, for the purposes of this EIAR, the various project components are described and assessed using the following terminology: 'Proposed Project, 'Proposed Wind Farm', 'Proposed Grid Connection', 'Site' and 'Proposed Wind Farm site'.

The potential for effects on designated sites is fully described in the Natura Impact Statement (NIS) that accompanies this application. The NIS concluded that where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within this report and its appendices. The measures ensure that the construction, operation and decommissioning of the Proposed Project will not adversely affect the integrity of any European sites.

Based on the detailed assessment, it is considered that the potential effects of the Proposed Project 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).

If the Proposed Project were not to proceed, it is unlikely that any changes would be made to the current land use practices. The majority of the lands within the Site would continue to be managed as they are now either as forestry or improved agricultural grassland and associated turbary activities. The other habitats identified within the Proposed Wind Farm site and Proposed Grid Connection, including stone walls, treelines, hedgerows, watercourses etc. would likely remain in a similar condition.

The turbine layout is engineered to maintain a minimum buffer zone exceeding 800 meters from Horseleap Lough, a critical avian habitat, thereby mitigating habitat loss, minimizing construction and operational disturbances, and reducing avian collision risk during flight paths. Similarly, turbines are sited over 700 meters away from the hen harrier roost at Cloonboo More bog, preserving key roosting habitat, reducing disturbance and displacement, and lowering collision risk for hen harriers and sympatric merlin populations. Hardstanding areas are optimized to the minimal spatial footprint required by the turbine specifications, limiting ground disturbance. The proposed grid connection predominantly follows existing built infrastructure corridors, with underground cable installation beneath public roads to prevent impacts on roadside hedgerows and minimize disruption to nesting bird populations.

Following consideration of the residual effects (post-mitigation), it is concluded that the Proposed Wind Farm will not result in any significant effects on any of the identified KORs. No significant effects on receptors of International, National or County Importance were identified. Provided that the Proposed Wind Farm is constructed, operated and decommissioned in accordance with the design, best practice mitigation measures and Bird Mitigation Plan that are described within this application, significant individual or cumulative effects on the identified KORs are not anticipated.

1.8 Land, Soils and Geology

The geology of the Site comprises cutover raised bog (peat) and limestone tills over limestone bedrock. Trial pit and drilling investigations were undertaken to investigate the subsoil and bedrock conditions below the peat. Peat depths were determined by probing.

The peat thickness encountered by intrusive investigations across the Site varies from 0m (in areas where peat is absent) to a maximum of 7.1m, with an average of 1.3m, and a median of 0.4m recorded.

The ground conditions are generally variable across the Site, and comprise Peat, Lacustrine Marl (CLAY/SILT), Cohesive Glacial Till (CLAY/SILT) and Granular Glacial Till (SAND/GRAVEL) layers overlying limestone bedrock. Overburden depths at the Site typical range from approximately 1 to 5m.

Investigation drilling at the Site typically encountered strong dark grey LIMESTONE with MUDSTONE. No karst conduits, significant fractures or clay infilled fractures were encountered during the site investigation drilling due to the competent nature of the bedrock.

Construction of the Proposed Project infrastructure will require the removal of peat, soil and rock to competent foundation. Local quarries will provide material for access road, turbine bases and general hard-standing construction. The turbine base construction will be gravity foundation unless future investigations say otherwise. Removal of soil, peat and bedrock represents a permanent direct impact on the geology of the Site which is considered to be a fundamental and acceptable part of the construction of the Proposed Project.

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 bunded areas that safely contain all spillages and prevent the migration of contaminants into soil, peat and bedrock. Refuelling will be done with a double skinned bowser with spill kits on the ready in case of accidental spillages. The risk is considered to be low following the implementation of the prescribed mitigation measures.

The Peat Stability Risk Assessment undertaken showed that all Proposed Project infrastructure elements are located in areas of negligible risk. Notwithstanding the above, the management of peat stability and appropriate construction practices will be inherent in the construction phase of the Proposed Project to ensure peat failures do not occur on site.

The findings of the Geotechnical Karst Risk assessment, indicate that the majority of the Proposed Wind Farm site can be classed as having a low to medium karst hazard. In these locations, it is considered that significant karst development is unlikely and unstable ground and significant cavities are not anticipated. In areas of higher hazard mitigation measures can be employed to reduce the overall karst risk to low – moderate.

A Peat and Spoil Management Plan has been prepared for the Proposed Project which details management of peat and spoil during construction works and long-term storage thereafter. The majority of peat and spoil removed during the excavation works will be deposited in proposed on-site spoil and peat repositories. A smaller quantity will be taken off-site to a licenced waste facility.

The potential residual impacts associated with soil or ground contamination and subsequent health effects are imperceptible.

No significant impacts on land, soil and geological environmental are anticipated during the construction, operation or decommissioning phases of the Proposed Project.

The land, soils and geology impact assessment undertaken in this chapter outlines that significant effects will not occur due to the localised nature of the construction works and therefore there is no potential for cumulative effects.

1.9 Water

This chapter assesses the likely significant effects that the Proposed Project may have on hydrology and hydrogeology and sets out the mitigation measures proposed to avoid, reduce or offset any potential significant effects that are identified.

Regionally, the Site is located in the Lough Corrib surface water catchment and within the River Clare sub-catchment. On a more local scale the Site drains to the Grange River and Abbert River.

Due to the nature of Proposed Wind Farm and Proposed Grid Connection developments, being near surface construction activities, effects on groundwater are generally negligible and surface water is generally the main sensitive receptor assessed during impact assessments. The primary risk to groundwater would be from oil spillage and leakages at turbine foundations or during construction plant refuelling. 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 proposed site during the construction and operational phases of the Proposed Wind Farm and measures are proposed within the EIAR to deal with these potential minor local impacts.

The Site is underlain by a Regionally Important Aquifer, however due to the basin peat geological setting there is relatively low recharge to groundwater. This is because the majority of the Site is covered by low permeability peat as well as CLAY/SILT glacial deposits, which acts as a protective cover to the underlying limestone aquifer. Surface water runoff rates are relatively high.

Any contaminants which may be accidentally released on-site are more likely to travel to nearby streams within surface runoff. The deep and relatively low permeability of the glacial deposits means contaminants are unlikely to reach the bedrock and will instead disperse with the glacial deposits and would remain localised to the source or would be removed as runoff during wet periods.

During each phase of the Proposed Development (construction, operation, and decommissioning) a number of activities will take place at the proposed Site, some of which will have the potential to significantly affect the hydrological regime or water quality at the proposed Site or downstream of the proposed Site. These significant potential effects generally arise from sediment input from runoff and other pollutants such as hydrocarbons and cement-based compounds.

Surface water drainage measures, pollution control and other preventative measures have been incorporated into the project design to minimise significant impacts on water quality and downstream designated sites. A self-imposed 50m stream buffer was used during the design of the Proposed Project, thereby avoiding sensitive hydrological features. The surface water drainage plan will be the principal means of significantly reducing sediment runoff arising from construction activities and to control runoff rates. The key surface water control measure is that there will be no direct discharge of Site runoff into local watercourses or into the existing bog drainage network. This will be achieved by avoidance methods (i.e. stream buffers) and design methods (i.e. surface water drainage plan). Preventative measures also include fuel and concrete management and a waste management plan which will be incorporated into the Construction and Environmental Management Plan.

No significant impacts to surface water (quality and flows) and groundwater (quality and quantity, and any local groundwater wells) will occur as a result of the Proposed Project provided the proposed mitigation measures are implemented. This EIAR presents proven and effective mitigation measures to mitigate the release of sediment which will reduce the concentration of suspended solids to acceptable levels. The storage and handling of hydrocarbons/chemicals will be carried out using best practice methods which will ensure the protection of surface and groundwater quality. The Proposed Project drainage system will be designed to slow surface water runoff from the proposed site by providing greater attenuation. This will ensure that the Proposed Project does not alter downstream surface water flows and will not contribute to downstream flooding.

A Flood Risk Assessment was carried out for the Proposed Project. There is no proposed development in fluvial, pluvial or groundwater flood zones. The Proposed Project will not increase flood risk in the area of the Site.

The EIAR acknowledges that the Mid Galway PWS and Barnaderg GWSs sources are very important local water supply that serves a wide population in the area, and that it is classified as an extremely sensitive water supply source. Considering the source importance and potential sensitivity to impacts from the Proposed Project detailed hydrogeological investigations/monitoring to assess the impact of the Proposed Project.

A hydrological assessment of potential impacts on local designated sites was undertaken. Lough Corrib SAC is located downstream of the Site and is considered very sensitive to affect. Following implementation of the appropriate mitigation measures as outlined in the EIAR no significant impacts on this designated site will occur as a result of the Proposed Project.

A Water Framework Directive (WFD) Compliance Assessment has been completed for all waterbodies (surface water and groundwater bodies) with the potential to be impacted by the Proposed Project. With the implementation of the mitigation measures detailed in this EIAR there will be no change in the WFD status of the underlying groundwater body or downstream surface waterbodies as a result of the Proposed Project. The Proposed Project has been found to be fully compliant with the WFD and will not prevent any waterbody from achieving its WFD objectives.

An assessment of potential cumulative effects associated with the Proposed Project and other developments on the hydrological and hydrogeological environment has been completed. With the implementation of the mitigation measures detailed in this EIAR, the cumulative assessment found that there will be no significant effects on the hydrological and hydrogeological environments.

1.10 Air Quality

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

The air quality zone for the Proposed Project was selected, followed by a review of EPA collated baseline air quality data, namely Sulphur Dioxide (SO_2), Particulate Matter (PM_{10}), Nitrogen Dioxide (NO_2), Carbon Monoxide (CO) and Ozone (O_3) for the selected air quality zone to determine the representative levels of such emissions for the Proposed Project.

The EPA has designed 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 as described in the CAFE Directive. The Site lies within Zone D, which represents rural areas located away from large population centres.

The air quality in the vicinity of the Site is typical of that of rural areas in the southwest of Ireland, i.e., Zone D. Prevailing south-westerly winds carry clean, unpolluted air from the Atlantic Ocean onto the Irish mainland. The EPA publishes Air Monitoring Station Reports for monitoring locations in all four Air Quality Zones. The Air Quality in Ireland 2023 report provides SO_2, PM_{10}, NO_2 and O_3 concentrations for areas in Zone D.

The production of energy from wind turbines generates no direct emissions, unlike fossil fuel-based power stations. Harnessing more energy through renewable sources will reduce dependency on fossil fuels, thereby reducing harmful emissions that are damaging to human health and the environment. Some minor short term or temporary indirect emissions associated with the construction and decommissioning of the Proposed Project include vehicular and dust emissions.

The potential for health effects are considered negligible as the potential for exhaust emissions will be limited and controlled through site layout design and mitigation measures.

A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-2). The CEMP includes dust suppression measures.

During the construction phase, the Proposed Project is expected to cause temporary to short-term, slight negative effects on air quality due to exhaust and dust emissions from both the wind farm and grid connection activities. In the operational phase, exhaust emissions are predicted to have a long-term, imperceptible negative impact; however, the Project will generate significant long-term positive air quality benefits by offsetting emissions of CO2, NOx, and SO2 through renewable energy production. During decommissioning, construction-phase mitigation measures will be applied to minimize impacts, resulting in residual effects consistent across all turbine options.

1.11 Climate

This chapter identifies, describes, and assesses the potential direct and indirect effects on climate arising from the construction, operation and decommissioning of the Proposed Project and has been completed in accordance with the EIA guidance and legislation set out in Chapter 1: Introduction.

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.

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 May 2024, the Environment Protection Agency (EPA) released '*Ireland's Greenhouse Gas Emissions Projections 2023-2050*'. The EPA has produced two scenarios in preparing these greenhouse gas emissions projections: a "With Existing Measures" (WEM) scenario and a "With Additional Measures" (WAM) scenario. These scenarios forecast Irelands greenhouse gas emissions in different ways. The WEM scenario forecasts Ireland emissions including all national policies and measures implemented by the end of 2021, the latest inventory year. The WAM scenario has a higher level of ambition and includes government policies and measures to reduce emissions, such as those in Ireland's Climate Action Plan 2025 (CAP 2025), that are not yet implemented. As implementation of policies and measures occurs, they will be migrated into the WEM Scenario.

The latest EPA projections show that currently implemented policies and measures (WEM) will result in Ireland achieving a total GHG reduction of 9% on 2005 levels by 2030, significantly short of Irelands 2030 target under the EU Effort Sharing Regulation (ESR), i.e., 42% reduction of emissions compared to 2005 levels by 2030, and also lower than the 10% reduction projected in the 2023 report.[2] If policies and measures in the higher ambition (WAM) scenario are implemented, EPA projections show that Ireland can achieve a reduction of 25% by 2030, still short of the 42% reduction target and also lower than the 30% reduction projected in last year's estimates. The EPA projections show that agriculture and transport emissions form the majority of ESR emissions; combined they represent 78% and 80% of emissions in 2022 (latest inventory data) and 2030, respectively. Decarbonisation of power generation is a key measure, not only in the energy sector, but for other energy intensive sectors, such as transport and agriculture, whose activities result in high levels of greenhouse gas emissions.

A methodology 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. The document, '*Calculating Carbon Savings from Wind Farms on Scottish Peat Lands*', was developed to calculate the impact of wind farm developments on the soil carbon stocks held in peat. 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. Please note, the web-based version of the carbon calculator is currently not available, the Macauley Institute has supplied a worksheet of the calculator (Version 2.14.0) which has been used to complete the following carbon loss assessment. The tool provides a transparent and easy to follow method for estimating the impacts of wind farms on the carbon dynamics of peatlands.

[2] *Irelands Greenhouse Gas Emission Projections 2022-2024 (June 2023)* <https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/EPA-GHG-Projections-2022-2040_Finalv2.pdf>

Previously guidance produced by Scottish Natural Heritage in 2003 had been widely employed to determine carbon payback in the absence of any more detailed methods.

Given the absence of peat, the Proposed Project will not give rise to any impact on peat habitat. The Macauley Institute methodology states that the total volume of peat impacted by the construction of a wind farm is strongly correlated to the extent of the peatland affected by drainage at a site. Therefore, in calculating the carbon loss/saving of the Proposed Project, all potential carbon losses associated with constructing a wind farm on peatland environments were discounted. The carbon losses as a result of the manufacture, transportation and erection of the proposed turbines were included in the calculation.

The full life cycle and embodied carbon of the proposed turbines have been taken account of in the Macauley Institute model. The emissions associated with the embodied carbon, along with the construction phase transport movements of the remaining site infrastructure associated with the Proposed Development are considered using the Transport Infrastructure Ireland (TII) Carbon Tool (TII 2022)[3]. The TII Carbon Tool is customised for road and light rail projects in Ireland, using emission factors from recognised sources during the construction, maintenance, and operation of TII projects in Ireland.

The Proposed Project is estimated to generate 145,705 tonnes of CO2 equivalent emissions over its 35-year lifespan. Key contributors include turbines (38%), backup generation (28%), soil disturbance (12%), embodied carbon in construction materials (17.6%), with smaller contributions from tree felling, reduced carbon fixation, and construction transport. Soil-related emissions are conservatively estimated assuming all disturbed land is acid bog, though actual emissions are expected to be lower due to a mixed habitat composition. Forestry impacts will be partially offset by replanting and habitat enhancements such as native woodland and hedgerow planting. Embodied carbon and transport emissions are calculated using standardized material and logistics assumptions. Decommissioning plans involve dismantling turbines and removing cables, with foundations left in situ to minimize disturbance, further reducing potential CO2 losses. Overall, habitat restoration and management measures are anticipated to lower the net carbon emissions relative to initial estimates.

The Proposed Project is expected to displace 39,462 tonnes of CO2 annually by generating clean electricity, replacing carbon-intensive sources like natural gas. Over its 35-year lifespan, this amounts to approximately 1,381,176 tonnes of CO2 emissions avoided. However, the project will generate 145,705 tonnes of CO2 emissions due to soil disturbance, construction, and operation—about 11% of the total CO2 savings. The emissions from soil and ground changes (72,211 tonnes) will be offset by the wind farm's clean energy production within roughly 3.6 years of operation. Habitat enhancement and afforestation activities, including replanting coniferous forestry and native woodland, hedgerow planting, and wet grassland restoration, are planned to improve carbon storage potential, though these benefits have not been quantified in the current assessment. The carbon sequestration potential of these restoration efforts will be better understood in the future through tools like the Teagasc Forest Carbon Tool.

Following construction of the Proposed Development, there will be a Permanent Imperceptible Negative Effect on Climate as a result of greenhouse gas emissions from construction plant and vehicles, embodied carbon associated with the turbines and construction materials. Operation of the Proposed Project will have a Direct Long-Term Moderate Positive Effect on climate as a result of reduced greenhouse gas emissions.

[3] *Transport Infrastructure Ireland Carbon Tool for Road and Light Rail Projects: User Guidance Document* https://www.tiipublications.ie/library/GE-ENV-01106-01.pdf

1.12 Noise and Vibration

A noise and vibration assessment was undertaken to determine the likely significant effects from the construction, operational and decommissioning phases of the Proposed Wind Farm, at nearby noise sensitive receptors (residential properties).

A comprehensive background noise survey was undertaken at seven noise monitoring locations. The data was analysed in conjunction with onsite measured wind speed data.

Predicted construction noise levels at the nearest noise sensitive receptors during all phases of construction are below the threshold values within BS 5228 and predicted levels would be short term. Construction vibration would also likely be at low levels and would be short term. Therefore, the effect from construction noise and vibration is deemed to be not significant. Activities related to decommissioning would use similar plant to that used for construction activities and would occur at the same locations, as such noise level output during the decommissioning phase is expected to be no higher than the construction phase.

The operational noise assessment was undertaken in three stages, which involved setting the Total 2006 Guidelines Noise Limits (which are limits for noise from all wind farms in the area) at the nearest noise sensitive receptors (NSRs), predicting the likely effects (undertaking cumulative noise predictions) and finally setting Site-Specific Noise Limits for the operation of the Proposed Wind Farm on its own. The Total 2006 Guidelines Noise Limits have been derived in relation to background noise levels and other applicable criteria in accordance with the 2006 Guidelines.

Predicted cumulative operational noise levels indicate that for noise sensitive receptors neighbouring the Proposed Wind Farm, cumulative wind turbine noise (which considers noise predictions from all nearby operational and permitted wind farms and the Proposed Wind Farm) would meet the Total 2006 Guidelines Noise Limits at all Noise Assessment Locations.

The Total 2006 Guidelines Noise Limit is applicable to all operational and permitted wind farms in the area. Therefore, Site-Specific Noise Limits have also been derived to control the specific noise from the Proposed Wind Farm. In accordance with the guidance in IOA GPG, the Site-Specific Noise Limits have been derived with due regard to cumulative noise by accounting for the proportion of the Total 2006 Guidelines Noise Limit which is potentially being used by other nearby developments. The Site-Specific Noise Limits have been derived in accordance with the IOA GPG.

Predictions of Proposed Wind Farm turbine noise have been made in accordance with good practice using four candidate wind turbines, a max tip height of 180 m, a 150-162 m rotor diameter range and a hub height range of 99-105 m. Predicted operational noise levels from the Proposed Wind Farm indicate that for noise sensitive receptors neighbouring the Proposed Wind Farm, wind turbine noise from the Proposed Wind Farm would meet the Site-Specific Noise Limits at all Noise Assessment Locations (NAL) and are therefore deemed to be not significant.

The use of Site-Specific Noise Limits would ensure that the Proposed Wind Farm could operate concurrently with other operational wind farm developments in the area and would also ensure that the Proposed Wind Farm's individual contribution could be measured and enforced if required.

The four candidate wind turbine models were chosen in order to allow a representative assessment of the noise impacts. Should the Proposed Wind Farm receive planning permission, the final choice of wind turbine would be subject to a competitive tendering process. The final choice of wind turbine will be required to meet the noise limits determined and contained within any condition imposed.

Predicted noise levels from the BESS indicate there would be no significant effects at all BNALs.

1.13 Landscape and Visual

The Proposed Project of Cooloo Wind Farm located in Cooloo, Co. Galway is an appropriately designed development, sited in a rural, modified working landscape of significantly low population density deemed capable of accommodating wind energy development. This LVIA assessed the likely significant effects of the Proposed Project on key sensitive landscape and visual receptors, as well as visual effects on local residential receptors in close proximity to the proposed turbines, including cumulative effects with other wind energy developments within 20km of the proposed turbines. In terms of the wind farm design, the siting of the proposed turbines exceeds the 500m set-back distance from residences set out in the 2006 Guidelines and adheres to the 4-times-tip-height set-back distance for residential visual amenity prescribed by the draft 2019 Guidelines. The LVIA was informed by desk study, field surveys, on-site visibility appraisals, GIS analysis including Zone of Theoretical Visibility (ZTV) and Route Screening Analysis (i.e. on-the-ground visibility appraisal within 3-5km), and the production of verified photomontages.

The LVIA is accompanied by one volume booklet and four appendices as follows:

- *EIAR Volume 2: Photomontage Booklet*, presenting photomontage visualisations of the proposed turbines from 13 no. representative viewpoints VP01-VP15, including modelling of other existing, permitted and proposed wind energy developments,
- *Appendix 13-1: LVIA Methodology*, outlining the guidance and detailed methodology used for the assessments conducted in the LVIA,
- *Appendix 13-2: LCA Assessment Tables*, assessing landscape and cumulative effects of 4 no. designated Landscape Character Areas (LCAs) scoped in for assessment,
- *Appendix 13-3: Photomontage Visual Impact Assessment Tables*, assessing visual and cumulative visual effects at viewpoints VP01-VP15 presented in the *Photomontage Booklet*,
- *Appendix 13-4: LVIA Baseline Map*, an A0-size map showing all baseline landscape features, viewpoints, and visual receptors.

Considering the 20km LVIA Study Area, no residual Significant effects will occur on designated landscape and visual receptors or scenic sensitivities of county, regional or national. No designated landscape receptors, landscape sensitivities or scenic views as set out in local planning policy exist within the 20km LVIA Study Area. 9 No. proposed turbines and all Proposed Wind Farm infrastructure are sited within landscape of Co. Galway designated as "Low" sensitivity in the Galway County Development Plan (GCDP) 2022-2028 defined as *"Unlikely to be adversely affected by change"*. The proposed Grid Connection underground electrical cabling route is sited within the same.

Proposed turbines T1-T5 and T9 are located within areas zoned as *Open to Consideration* to wind energy development in the GCDP Local Authority Renewable Energy Strategy (LARES). Proposed turbines T6, T7 and T8 are sited within areas zoned as *Generally to be Discouraged*, thus the potential impact of the proposed turbines on these areas was a key consideration of the LVIA. It was determined that landscape sensitivity is not considered to be the key factor influencing the zoning of lands where proposed turbines T6, T7 and T8 are located. The landscape type and character of the *Generally to be Discouraged* lands where T6, T7 and T8 are located were determined to be generally the same type and character as that of the surrounding lands zoned as *Open to Consideration*, that is, modified working landscape types of low sensitivity which can effectively accommodate wind energy development, comprising agricultural fields, cutover peatlands, and commercial forestry.

The proposed turbines at 180m tip height, deemed the essential aspect of the Proposed Project from an LVIA perspective, are sited in primarily flat terrain of agricultural fields, forestry and cutover and raised boglands with localised undulations and mature boundary vegetation that provide visual screening from most receptors beyond 3km of the proposed turbines. A range of turbine model scenarios was assessed in the LVIA, with hub height ranging from 99-105m and rotor diameter ranging from 150-162m. For the avoidance of doubt, the turbine model scenario with the greatest potential to result in landscape and

visual effects (Scenario 3 Maximum) was assessed in all visualisations, and additional representative visualisations of the Scenario 1 Minimum and Scenario 2 Median turbine scenarios were also produced for assessment. Irrespective of which turbine scenario is used, the determination of residual visual effects in the visual impact assessment tables will not be altered.

15 No. photomontage viewpoints were selected to represent a good geographic spread of views from within the 20km LVIA Study Area, focussed in the direction of the proposed turbines. The LVIA determined the potential for "Significant" residual visual effects at one viewpoint, VP14 Tigreenaun. The rating of predicted effects at VP14 is mainly owing to the proximity of residential receptors to the proposed turbines (within 1.3km) and the substantial magnitude of change observed from that vantage point. The number of receptors experiencing these effects is very low as the landscape surrounding the Proposed Wind Farm site has a significantly low population density. The visual effects ratings for the remaining viewpoints range from "Imperceptible" and "Not Significant" at viewpoints greater than 4.5km from the proposed turbines, to "Moderate" at viewpoints as close in as 1km. In terms of visual effects on local (within 3km) residential receptors, the LVIA determined that, in general, when viewing the proposed turbines from the north or south, the narrow field of view causes the perceived scale (height and breadth) of turbines to diminish quickly with distance, thereby mitigating visual impacts.

Other factors contributing to the mitigation of visual impacts include intermittent screening by mature forestry and boundary vegetation, and visual screening by localised undulations in topography which allow a sense of set-back from most receptors. In addition, from a distance, the layout of the proposed turbines ensures a relatively even height profile and even spacing between turbines, with the blades typically viewed above the horizon, slightly staggered among localised low hills, thereby meeting good aesthetic design as recommended in best practice guidance for LVIA and wind energy development.

4 No. designated Landscape Character Units (LCUs) were assessed for effects on landscape character within 15km of the proposed turbines, including cumulative effects. All LCUs were deemed to be Low sensitivity and no Significant landscape effects are predicted to occur. Factors contributing to the mitigation of effects on landscape character included the vast areas of the LCUs where no existing, permitted or proposed wind farms are sited, and the long distance between the proposed turbines and other developments which ensures that material alteration of the landscape is confined to individual areas and that visual connection between developments is minimised. No key sensitivities of the LCUs were found to be affected as a result of the Proposed Project.

1 no. designated protected view G-V42 Glenmaddy Turlough was scoped in for assessment, with a residual visual effect of "Imperceptible." 7 no. settlements, 3 no. recreational destinations and 3 no. transport routes were scoped in for assessment; no "Significant" effects are predicted for any receptors. The LVIA focused on assessing the visual impact on local residential receptors within 3km of the proposed turbines considered high-sensitivity owing to their close proximity and determined that most receptors within 3km—those to the north, east and south of the Proposed Wind Farm site—are likely to experience "Moderate" residual visual effects, which are not significant.

The presence of wind turbines in the rural landscape of Ireland is consistent with evolving national climate policy and the changing character of Ireland's working landscapes. The focus for the LVIA of the Proposed Project was on a combination of distance, arrangement, location and potential disruption to key scenic sensitivities, rather than simply on whether turbines are visible or not from a particular vantage point. The outcome of the LVIA, with regards to the EPA, 2022 definition of significance, is calibrated in the overall context of LVIA of wind energy developments in Ireland and what is acceptable in the context of emerging baseline trends and the acceptability of wind turbines within views as a result of national policy. The Proposed Project is therefore considered acceptable in this context and is in alignment with emerging baseline trends.

1.14 Archaeological, Architectural and Cultural Heritage

IAC Archaeology has prepared Chapter 14 of this EIAR to ascertain the potential impact of the proposed renewable energy development on the archaeological, architectural, and cultural heritage resource that may exist within the area. It was undertaken by Jonny Small and Faith Bailey of IAC Archaeology (IAC), on behalf of Neoen.

The assessment is based on both a desktop assessment of the available cultural heritage and archaeological data and field inspection within the study areas of the Proposed Project. Desktop assessment consists of an analysis of existing written, graphic, photographic, and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage assets. The assessment involved detailed interrogation of the archaeological and historical background of the Proposed Project and study area. The field inspection involved walking the Site and its immediate environs, recording the terrain type and land usage, recording known and previously unknown features of archaeological, architectural or cultural heritage significance

The definition of the study areas utilised for the assessment of the Proposed Project are detailed in Table 14-1.

Table 1-2 Study area definitions

Proposed Project Element	Study Area	Site Types
Proposed Turbines	10 km from the proposed turbines	All sites of national significance, including National Monuments under state care or guardianship and any sites subject to a Preservation Order.
Proposed Turbines	5 km from the proposed turbines	All archaeological, architectural and cultural heritage assets subject to statutory protection, including sites listed in the RMP and RPS, NIAH structures and demesne landscapes.
Proposed Turbines	2 km from the proposed turbines	All previously unrecorded sites or structures of cultural heritage merit, such as buildings of architectural heritage merit (not included in the RPS/NIAH) and archaeological sites not included in the RMP.
Proposed Grid Connection	50m	All recorded and previously unrecorded cultural heritage sites.
Works proposed on the Turbine Delivery Route (TDR)	50m	All recorded and previously unrecorded cultural heritage sites.

1.14.1.1 Baseline Environment

A review of the Excavations Bulletin (1970–2025) has shown that no previous archaeological fieldwork has been carried out within the Proposed Project.

There is one recorded archaeological site within the Proposed Wind Farm site, comprising an 18th/19th century house (AH91), located 160m to the east of Turbine 8. There are a further 90 archaeological

sites, or groups of sites, within the 5km study area (of the Proposed Wind Farm site), 11 of which include redundant records.

There are 14 recorded structures of architectural merit within the 5km study area of the Proposed Wind Farm site, including 10 protected structures. Additionally, 54 previously unrecorded sites of cultural heritage significance have been identified within the 2km study area of the Proposed Wind Farm site as part of this assessment. Four sites are within the footprint of proposed works associated with the Proposed Project (CH40, post-1892 vernacular building; CH14, a stone retaining wall with a round-arch culvert; CH58, the site of a vernacular building and well and extant upstanding drystone walls; CH63, a curvilinear anomaly of unclear origin identified from aerial photography).

Three archaeological sites, or groups of sites, are located within 50m of the Proposed Grid Connection, along with three built heritage sites and 23 previously unidentified sites of cultural heritage significance.

One site of previously unidentified cultural heritage significance is located within the proposed TDR accommodation works area.

1.14.1.2 Likely Effects and Associated Mitigation Measures

Direct Effects on the Proposed Project

The construction of the Proposed Project will not result in any direct, negative effects on the recorded archaeological or architectural heritage resource as none of these sites are located within the footprint of the development that require excavations and ground works.

Four previously unidentified cultural heritage receptors (CH14, CH40, CH58, CH63) will be directly impacted by the construction of the Proposed Wind Farm:

- CH14: within the route of the proposed TDR accommodation works. Prior to mitigation, these works will have a direct negative (permanent) effect on CH14. The effect will be slight.
- CH40: partially within the route of the proposed new road. Prior to mitigation, construction activities will have a direct negative (permanent) effect on CH40. The effect will be moderate.
- CH58: within the location of the proposed substation. Construction of the substation will have a (permanent) effect on CH58. Prior to mitigation, the effect will be moderate.
- CH63: partially within the location of the proposed temporary construction compound and the route of the proposed new road. At this stage it is unknown whether the anomaly is of anthropogenic or natural origin, and its sensitivity is unknown. Construction activities have the potential for a direct, negative (permanent) effect to this potential cultural heritage receptor. Prior to the application of mitigation measures, effects may vary from moderate to significant.

The Proposed Grid Connection passes through the Zone of Notification of two archaeological heritage receptors: bridge AH2 and vernacular building AH3. The laying of the cable route has the potential to have direct, negative (permanent) effects on features that may be associated with AH3. Direct effects to bridge AH2 will be avoided through the use of directional drilling although this method involves the excavation of launch and reception pits, which have the potential for direct, negative (permanent) effects to previously unrecorded archaeological features. Prior to the application of mitigation effects to AH2 and AH3 have the potential to range from slight to moderate, depending on the sensitivity of any such archaeological features.

The Proposed Grid Connection passes road bridge BH2. Direct effects will be avoided by the use of directional drilling.

Construction activities associated with the Proposed Wind Farm site will have direct, negative (permanent) effects to TB3 (a road) and TB6 (a ditch with an existing crossing at the location of the proposed new road). The effects will be limited to small sections of the townland boundaries, with sections preserved to either side of the new roads. The effects will be slight.

Although much of the Proposed Wind Farm site has been disturbed by turbary peat extraction activities it remains possible that previously unknown archaeological sites and features may survive below the current ground level across the area, particularly in areas of pasture that have not been previously disturbed. Ground disturbances associated with the Proposed Wind Farm have the potential to result in direct, negative (permanent) effects on any such remains that may be present. Additionally, groundworks along the c. 55m of greenfield required for TDR accommodation works have the potential to result in direct, negative (permanent) effects on possible sub-surface archaeological remains. Prior to the application of mitigation these effects have the potential to range from moderate to significant, depending on the sensitivity of any such archaeological features.

Mitigation and Monitoring Measures During Construction Phase

Prior to the commencement of construction, a programme of targeted geophysical survey will be carried out at the location of the proposed temporary construction compound to investigate CH63, a curvilinear anomaly identified from aerial photography. The geophysical survey will be carried out under licence to the National Monuments Service of the DHLGH. Dependent on the results of the geophysical survey, further mitigation may be required. Any further mitigation will require agreement from the DHLGH.

Prior to the commencement of construction, a programme of targeted archaeological test trenching will be carried out at the accessible locations of proposed infrastructure, including the proposed turbine hardstands, temporary construction compound, 110kV substation and BESS compound and along the access roads and TDR accommodation area. Archaeological test trenching will also assess the site of previously unidentified cultural heritage receptor CH58. Archaeological test trenching will be carried out under licence to the National Monuments Service of the DHLGH. Dependent on the results of the testing assessment, further mitigation may be required, such as preservation by record or in-situ and/or archaeological monitoring. Any further mitigation will require agreement from the DHLGH.All interventions that are required along townland boundaries, as part of the construction of the Proposed Project, will be subject to archaeological monitoring, to include a full record of the sections of townland boundaries that are removed. This work will be carried out under licence to the National Monuments Service of the DHLGH.

All topsoil stripping associated with the Proposed Wind Farm, including site investigation, will be subject to archaeological monitoring. This work will be carried out under licence to the National Monuments Service of the DHLGH. If archaeological remains are identified during the course of these works further mitigation may be required, such as preservation by record or in-situ. Any further mitigation will require agreement from the DHLGH.

The excavation of the Proposed Grid Connection within the Zone of Notification of AH2 and AH3 will be monitored. This work will be carried out under licence to the National Monuments Service of the DHLGH. If archaeological remains are identified during the course of these works further mitigation may be required, such as preservation by record or in-situ. Any further mitigation will require agreement from the DHLGH.

Upstanding elements of cultural heritage receptors subject to direct, negative (permanent) impacts (CH14, CH40, CH58) will be surveyed and a written and photographic record compiled prior to the commencement of construction.

Significance of Effects

Following the completion of the mitigation measures, there will be no significant negative residual effects on the archaeological, architectural and cultural heritage resource.

Indirect Effects on the Proposed Project

No significant negative operational effects are predicted upon Archaeological Heritage sites, Built Heritage sites, Designed Landscapes or Cultural Heritage sites. Moderate effects are predicted on seven Archaeological Heritage sites (AH86, AH90, AH91, AH92, AH93, AH95, AH96) and eight Cultural Heritage sites (CH21, CH23, CH24, CH31, CH37, CH41, CH42, CH50) due to the proximity of the proposed turbines.

The remaining operational effects upon Archaeological Heritage sites, Built Heritage sites, Designed Landscapes and Cultural Heritage sites vary between imperceptible and slight negative, with a number of sites not subject to any effects due to the fact that the Theoretical Zone of Visibility mapping indicates that the turbines will not be visible from certain locations within the study area.

Mitigation and Monitoring Measures During Operational Phase

It is noted that natural screening, boundaries, buildings and vegetation are not taken into account in the ZTV model and therefore potential visual effects are likely to be less severe. It is noted that indirect effects are not permanent and would be removed following the decommissioning and removal of the turbines.

It is not possible to mitigate indirect effects on the archaeological, architectural and cultural heritage resource, due to the nature and scale of the proposed turbines within the landscape. It is noted that effects are not permanent and would be removed following the decommissioning and removal of the turbines.

Significance of Effect

There will be no significant negative residual effects on the archaeological, architectural and cultural heritage resource.

Cumulative Effects on the Proposed Project

No negative cumulative effects have been identified. Whilst several wind farms within 20km of the Proposed Project will be visible in the wider landscape, no cumulative impacts have been identified that are greater than impacts already predicted as part of each development. No significant negative cumulative impacts have been identified.

1.15 Material Assets

1.15.1.1 Traffic and Transport

Introduction

An assessment of the traffic effects on the local highway network was undertaken for the proposed Cooloo Wind Farm (Proposed Project). The assessment considers the likely impacts on the transport delivery route to the site resulting from the additional traffic movements that will be generated by the Proposed Project during the construction, operational and decommissioning phases.

An assessment of the geometry of the delivery route was also undertaken in order to ensure that the abnormally sized vehicles required to deliver the turbine plant to the site are accommodated.

The Proposed Project will take 18-24 months to construct the proposed 9 turbine wind farm, the proposed grid connection route linking to the existing Cloon 110kV substation, and associated development, during which all turbine components and all other associated materials will be transported to the site.

Traffic Route & Study Area

The proposed wind farm and grid connection route are located within County Galway.

The delivery route to the site for the abnormally sized loads transporting the large turbine components commences at Galway Port in Galway City.

From the Port of Galway the turbine delivery route travels from Galway Harbour through Galway city onto the N6 via the L5048 Lough Atalia Road, the L5034 and the R336 Tuam Road. The route than travels east on the N6 passing through junctions with the R865 at Ballybrit and the R339 Monivea Road at Briarhill, before heading southeast to the Coonagh Roundabout. From the Coonagh Roundabout the route heads east on the N6 and M6 , to Junction 18 of the M6 with the M17. The route then travels north on the M17 before turning off at Junction 19 onto the N63. The turbine delivery route then travels east on the N63 passing through Abbeyknockmoy and Dereen to the junction with the R332. The turbine then turns left off the N63 to travel northwest on the R332 before turning right into the Proposed Wind Farm site entrance.

Access to the Proposed Wind Farm site will be provided during the construction stage via a new access junction of the R332 Regional Road at a location approximately 2.2km west of the existing R332 / N63 junction. This access will provide for all vehicle types during the construction and decommissioning phases of the Proposed Wind Farm.

During construction of the Proposed Wind Farm, access through the Proposed Wind Farm site will be gained by means of upgraded sections of existing tracks and new section of access road which will cross existing L6506 and L6301 local roads.

Once operational the Proposed Wind Farm will be accessed via access points from an existing track off the R332 within the Proposed Wind Farm site and 2 no. access points along the L6301 local road.

The Proposed Grid Connection includes for underground 110V cabling from the onsite 110kV substation, in the townland of Dangan Eighter, Co. Galway, to the existing Cloon 110kV substation in the townland of Cloonascragh, Co. Galway. The total length of the Proposed Grid Connection underground cable route, measures approximately 20.9km in length with approximately 2.6km located within the Proposed Wind Farm site.

Vehicle types and network geometry

The types of vehicles that will be required to negotiate the local network will be up to 86.3 metres long and will carry a blade 81.0 metres in length.

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 Project are highlighted, with the extent of remedial works identified. 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.

Traffic impact on local network

During the 9 days when the concrete foundations are poured, the effect on the surrounding road network will be that an additional 584 PCUs will travel to/from the Proposed Wind Farm site. On the delivery route it is forecast that the increase in traffic volumes on these days will range from between +6.5% and +11.8% on the N63. On the R322 leading to the Proposed Wind Farm site where background traffic flows are lower, it is forecast that traffic flows will increase by 30.4%. On these busiest 9 days it is estimated that this will have a temporary, negative and slight effect on the N63 and R332.

During the remaining 314 days when the construction of the Proposed Wind Farm continues, including the site preparation and groundworks and construction of the , an additional 329 PCUS will travel to and from the Site. It is forecast that the increase in traffic volumes on these days will be between +3.6% and 6.7% on the N63. On the R332 leading to the Proposed Wind Farm site it is forecast that traffic flows will increase by 17%. On these 341 days it is estimated that this will have a temporary, negative and slight effect on the N63 and R332 leading to the Proposed Wind Farm site.

With respect to the traffic volumes that will be generated during the construction of the underground electrical cabling route, it is estimated that there will be approximately 30 daily return trips made by trucks removing spoil and transporting materials to the site, and 4 return trips made by a car to transport construction staff, to and from the Site. By its nature the effect impacts of these additional trips on the network will be transient and will therefore be temporary and slight.

During the 24 days / nights that the abnormal loads carrying the large turbine components travel to the Proposed Wind Farm site, an additional 105 PCUs will travel to/from the Proposed Project. It is forecast that the increase in traffic volumes on these days will be between +1.2% and 2.1% on the N63, while on the R322 leading to the Proposed Wind Farm site it is forecast that traffic flows will increase by 5.5% on these 24 days / nights. It is forecast that there will be a temporary, slight negative effect on the TDR as the delivery of the abnormally sized loads is undertaken at night.

For 9 days an additional 64 PCUs will travel to/from the Proposed Wind Farm site delivering smaller component parts using standard HGVs, it is forecast that the increase in traffic volumes on these days will range 0.7% and +1.3% on the N63. On the R322 leading to the site it is forecast that traffic flows will increase by 3.3%. On these 9 days it is considered that the additional traffic will have a temporary imperceptible negative effect on the N63, and a temporary slight negative effect on the R339 leading to the site.

No significant traffic related effects are forecast during the construction of the Proposed Project.

Once the Proposed Project is operational the traffic impact created by maintenance staff will be imperceptible.

1.15.1.2 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.

During the development of any large project that holds the potential to affect telecoms or aviation, the Developer is responsible for engaging with all relevant Telecoms Operators and the relevant Aviation Authorities to ensure that the proposal will not interfere with television or radio signals by acting as a physical barrier. In the event of any potential impact, the Developer for each individual project is responsible for ensuring that the necessary mitigatory measures are in place.

Consultation regarding the potential for electromagnetic interference from the Proposed Project was carried out with the relevant national and regional broadcasters, fixed line and mobile telephone operators and other operators. ESB and Three Ireland links were identified within the Proposed Wind Farm site.

Ai Bridges was commissioned by MKO to evaluate the possible impacts that the Proposed Wind Development could have on the operators telecommunications networks. Mitigation measures were proposed and a full Telecommunications Impact Assessment report can be found in Appendix 15-4 of this EIAR. A further Letter of Reliance with additional mitigation measures is included in Appendix 15-5.

The nearest operational airport is Galway Airport located approx. 26.6km southwest of the Proposed Wind Farm site and the nearest operational airfield is Craughwell Airfield which is located approx. 25.9km south of the Proposed Wind Farm site. The published Corine Land Cover Maps (www.epa.ie) identify that the closest international airport to the Proposed Wind Farm site is the Ireland West Airport Knock, located approximately 46.5km north of the Proposed Wind Farm. Other airports/airfields in the vicinity of the Proposed Wind Farm include Shannon Airport, which is located approximately 87km south of the Proposed Project. Connemara Airport, located over 59km to the west of the Proposed Wind Farm site, and the University of Galway helipads which are both located approximately 34.6km to the west of the Proposed Wind Farm site. All airports listed above are outside the range at which such issues would be expected

1.15.1.3 Other Material Assets

This section of the Material Assets chapter considers other utilities or built services in the area such as electricity supply and transmission, water, gas and underground telecommunications. This section also considers waste management during the construction, operational and decommissioning phases of the Proposed Development.

The Proposed Project has been designed to avoid identified services and utilities where insofar as possible. Prior to commencement of construction detailed site investigations will be carried out to confirm design assumptions and undertake additional surveys to identify any new services and utilities and ensure they will not be impacted by the Proposed Project. The construction of the Proposed Grid Connection would also be subject to a Road Opening License (ROL). The timing of these works would therefore be controlled by the ROL process with the relevant Local Authority.

It is not anticipated that any significant volume of waste will be generated within the Site during the operational phase of the Proposed Project as only a small number of operational and maintenance personnel will be present on within the Proposed Wind Farm site certain times. Any waste generated due to the operation and maintenance of the Proposed Project will be disposed of in a covered skip, located within the on-site substation compound. The waste material will be transferred to a Materials Recovery Facility (MRF) by a fully licenced waste contractor where the waste will be sorted into individual waste stream for recycling, recovery or disposal.

1.16 Major Accidents and Natural Disasters

This chapter of the Environmental Impact Assessment Report (EIAR) describes the likely significant adverse effects on the environment arising from the vulnerability of the Proposed Project as detailed in Chapter 4 to risks of major accidents and/or natural disasters, as well as the potential of the Proposed Project itself to cause potential major accidents and/or natural disasters.

Major accidents or natural disasters are hazards which have the potential to affect the Proposed Project and lead to environmental effects directly or indirectly. These include accidents during construction, operation and decommissioning of the Proposed Project caused by operational failure and/or natural hazards. The assessment of the risk of major accidents and/or natural disaster is considered in relation to the information required to be provided in the EIAR, i.e. population and human health, biodiversity, land, soil, water, air, climate and material assets, cultural heritage and landscape.

A desk-study has been completed to establish the baseline environment for which the proposed risk assessment is being carried out. This will influence both the likelihood and the impact of a major accident or natural disaster. Local and regional context has been established prior to undertaking the risk assessment to develop an understanding of the vulnerability and resilience of the area to emergency situations.

Further detail on the baseline environment is provided in Section 16.3.

The scenario with the highest risk score in terms of the occurrence of major accident and/or disaster during construction, operation and decommissioning was identified as 'Contamination' of the site and risk of 'Fire/Explosion' occurring at the Proposed Project.

The Proposed Project will be designed and built in line with current best practice and, as such, mitigation against the risk of major accidents and/or disasters will be embedded through the design. A Risk Management Plan will be prepared and implemented at the Proposed Project to ensure an effective response to disasters or the risk of accidents. The plan will include sufficient preparedness and emergency planning measures.

The risk of a major accident and/or disaster during the construction of the Proposed Project is considered 'low' in accordance with the '*Guide to Risk Assessment in Major Emergency Management*' (DoEHLG, 2010).

When the implementation of best practise measures and all proposed mitigation and monitoring measures detailed in the EIAR is implemented, the residual effect(s) associated with the construction, operation and decommissioning of the Proposed Project are not significant.

1.17 Interaction of the Foregoing

Chapter 17 of this EIAR identifying the potential significant environmental effects that may occur in terms of Population & Human Health, Biodiversity, Birds, Land, Soils & Geology, Hydrology & Hydrogeology, Air Quality, Climate, Noise & Vibration, Landscape & Visual, Archaeological, Architectural & Cultural Heritage, Material Assets and Major Accidents & Natural Disasters, as a result of the Proposed Project. All potential significant effects of the Proposed Project 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 17 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 the construction, operational and decommissioning phases of the Proposed Project. Where any potential interactive impacts have been identified, appropriate mitigation is included in the relevant sections (Chapters 5–16) of the EIAR.