Planning and Environmental Consultants

Environmental Impact Assessment Report (EIAR)

Briskalagh Renewable Energy Development, Co. Kilkenny

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, Briskalagh Ltd. who intends to apply to Kilkenny County Council (KCC) for planning permission to construct a renewable energy development comprising 7 no. wind turbines, and associated infrastructure in the townlands of Briskalagh and adjacent townlands, near Kilmanagh in Co. Kilkenny, and a 38kV on-site substation and associated works, including underground 38kV cabling to connect to the national grid at Ballyragget 110kV substation, in the townland of Moatpark, Co. Kilkenny.

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 compounds, underground cabling, borrow pit, spoil management, site drainage, biodiversity enhancement 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, this refers to the 38kV onsite substation, associated temporary construction compound and 38kV underground cabling connecting to the existing Ballyragget 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 approximately 1,000 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 Natura Impact Statement ('NIS'), will accompany the planning application for the Proposed Project which will be made to KCC. Both the EIAR and NIS contain the information necessary for KCC to complete the Environmental Impact Assessment and Appropriate Assessment as required for this planning application.

Both the EIAR and NIS take into account the combined impacts of these individual elements of the Proposed Project.

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, Briskalagh Ltd, is an associated company of Enerco Energy Ltd., which is an Irish-owned, Cork-based company with extensive experience in the design, construction and operation of wind energy developments throughout Ireland, with projects currently operating or in construction in Counties Cork, Kerry, Limerick, Clare, Galway, Mayo and Donegal.

By Q3 2024, Enerco associated companies had over 875 Megawatts (MW) of wind generating capacity in commercial operation or in construction, with a further c.400MW of projects at various stages in its portfolio to assist in meeting Ireland's renewable energy targets.

Brief Description of the Proposed Project

The Proposed Project will comprise the construction of 7 no. wind turbines with an overall blade tip height of 185 metres and all associated works, and a 38 kV substation and associated works, including underground 38kV cabling to connect to the national grid at Ballyragget 110kV substation. The full description of the Proposed Project is detailed in Chapter 4 of this EIAR.

The development description for the current planning application as it appears in the public notices is as follows:

The development will consist of the provision of the following:

i. *7 no. wind turbines with an overall turbine tip height of 185 metres; a rotor blade diameter of 163 metres; and hub height of 103.5 metres, and associated foundations and hard-standing areas;*
ii. *A permanent 38kV substation compound (control building with welfare facilities, all associated electrical plant and apparatus, security fencing, underground cabling, storage containers, wastewater holding tank, site drainage and all ancillary works);*
iii. *Permanent underground electrical (38kV) and communications cabling to the existing Ballyragget 110kV substation in the townland of Moatpark (including joint bays, communication and earth sheath link chambers and all ancillary works along the route*). This cabling route is primarily located within the public road corridor which includes a Protected Structure (Kilkenny RPS Ref. C886);
iv. *Underground electrical (33kV) and communications cabling connecting the wind turbines and meteorological mast to the on-site substation;*
v. *3 no. temporary construction compounds (including site offices and welfare facilities*);
vi. *A meteorological mast with a height of 30 metres, security fencing and associated foundation and hard-standing area;*
vii. *A new temporary site entrance on the L1009;*
viii. *A new gated site entrance on the L5024;*
ix. *Upgrade of existing site tracks/ roads and provision of new site access roads, junctions and hardstand areas*;
x. *A borrow pit;*
xi. *Spoil Management;*
xii. *Tree felling and hedgerow removal;*
xiii. *Biodiversity Management and Enhancement Plan measures (including establishment of a riparian buffer and hedgerow enhancement);*
xiv. *Site Drainage;*
xv. *Operational Stage site signage; and*
xvi. *All ancillary works and apparatus*

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 7 MW range, with the generating capacity continuing to evolve upwards as technology improvements are achieved by the turbine manufacturers. For the purposes of this EIAR it is assumed that the wind turbine model installed as part of the Proposed Project will have a generating capacity of 7MW. Therefore, on this basis, the proposed 7 no. wind turbines would have a combined generating capacity of 49MW. The actual turbine procured as part of a competitive tender process may have a generating potential that is

marginally lower or greater than the 7MW turbine 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 provides the opportunity to capture an additional part of County Kilkenny's valuable renewable energy resource. 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.

Commercial rate payments will be provided to KCC 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 approximately €275,000/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 this 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. Consideration of Reasonable Alternatives
4. Description of the Proposed Development
5. Population and Human Health
6. Biodiversity (excluding Birds)
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. Interaction of Effects
18. Schedule of Mitigation Measures

1.2 Background to the Proposed Project

This chapter of the EIAR presents the policies and targets which have been put in place at the various levels of Government including international, national, regional and local in relation to planning, renewable energy and climate change which are relevant to the Proposed Project. It also summarises the EIAR Scoping exercise, the Pre-planning and Community Consultation undertaken and the Cumulative Impact Assessment process.

This chapter should be read in conjunction with the Planning Report which accompanies the planning application.

Local Planning Policy

It is considered that the Proposed Project is consistent with the policies and objectives of the Kilkenny City and County Development Plan 2021- 2027.

Kilkenny City and County Development Plan 2021- 2027

The Kilkenny City and County Development Plan 2021-2027 (KCCDP) came into effect on the 15th of October 2021. The KCCDP incorporates the aims, objectives, policies and guidelines to provide for the proper planning and sustainable development of County Kilkenny.

On the same date of the 15th of October 2021, the Minister of State at the Department of the Housing, Local Government and Heritage, consequent to a recommendation made to him by the Office of the Planning Regulator (OPR) under Section 31AM(8) of the Planning and Development Act 2000 (as amended) (the Act) notified KCC of his intention to issue a Direction to the KCCDP. It states that:

> *"In accordance with Section 31(4) of the Planning and Development Act 2000, those parts of the Kilkenny City and County Development Plan 2021 – 2027 Plan referred to in the notice shall be taken not to have come into effect, been made or amended; namely;*
>
> *Chapter 11 Renewable Energy: Section 11.4 Kilkenny Targets, Section 11.5.1 Current status and targets and Figure 11.4 Wind Strategy areas.*
>
> *The Planning Authority is awaiting a further direction from the Minister in this regard. Consequently, the Renewable Energy policies and Wind Strategy areas as previously set out in the Kilkenny City and County Development Plan 2021- 2027, cannot be taken into account at this time."*

The reason for the draft direction is as follows:

1. The Development Plan as made is inconsistent with Ministerial Guidelines issued under Section 28 of the Act, specifically item 2 of the Specific Planning Policy Requirement contained in the Interim Guidelines for Planning Authorities on Statutory Plans, Renewable Energy and Climate Change (July 2017), which sets out the requirement for the Planning Authority to comply with the aforementioned Specific Planning Policy Requirement under section 28(1C). In particular, the Development Plan fails to identify renewable energy targets (in megawatts) which Kilkenny can contribute in delivering its share of overall government targets on renewable energy and climate change mitigation over the plan period.
2. The Development Plan contains conflicting objectives on renewable energy sustainable development and climate action such that the adopted Plan, without providing sufficient compensatory measures, significantly reduced the extent of the areas indicated as 'acceptable in principle' that were identified in the draft Development Plan as being necessary to achieve the **target of 201MW required to ensure that 100% of electricity**

demand for Kilkenny is met from renewable sources by 2030 and to ensure consistency with the Climate Action Plan.

As the previous County Development Plan has since expired and the parts named above shall be taken not to have come in effect, the Wind Energy Strategy Areas and its associated policies cannot be taken into account. At the time of writing, the Proposed Project has been assessed in line with the adopted KCCDP as there has been no update on the ministerial direction.

The KCCDP provides for the development of indigenous energy resources, with an emphasis on renewable energy supplies. KCC acknowledges the importance of renewable energy in reducing anthropogenic greenhouse gas emissions and the contribution of renewable energy in achieving national and EU target net zero greenhouse gas emissions by 2050.

Climate change mitigation and adaptation objectives have been incorporated into the policies of the KCCDP. This is to ensure that climate change has been consistently integrated into the policy themes addressed by the KCCDP. The strategic aim for climate change as set out in Chapter 2 of the KCCDP is as follows:

> *"Strategic Aim: To provide a policy framework with objectives and actions in this City and County Development Plan to facilitate the transition to a low carbon and climate resilient County with an emphasis on reduction in energy demand and greenhouse gas emissions, through a combination of effective mitigation and adaptation responses to climate change."*

With regard to the Renewable Energy, the KCCDP acknowledges that Ireland and Kilkenny have excellent renewable energy resources, which will be a critical and growing component of Irish energy supply to 2020 and beyond. The strategic aim for renewable energy, set out in chapter 11 of the KCCDP sets a clear, ambitious target:

> *"Strategic Aim: To generate 100% of electricity demand for the County through renewables by 2030 by promoting and facilitating all forms of renewable energies and energy efficiency improvements in a sustainable manner as a response to climate change in suitable locations having due regard to natural and built heritage, biodiversity and residential amenities."*

The Renewable Energy chapter (Chapter 11) sets out the policy context for all renewables and includes an analysis of each type of renewable energy within the county, covering three aspects as follows:

- An analysis of the resource potential,
- An outline of development management guidelines including potential impacts and
- Objectives and policies for their future development.

In this regard, it is an objective of the KCCDP:

> *"**11A**: To support and facilitate the provision of energy in accordance with Ireland's transition to a low carbon energy future by means of the maintenance and upgrading of electricity and gas network grid infrastructure and by integrating renewable energy sources and ensuring our national and regional energy system remains safe, secure and ready to meet increased demand as the regional economy grows over the period of the plan."*

It is estimated that, by 2030, County Kilkenny will use 633 Gigawatt hours (GWh) of electricity, as stated in the KCCDP. If County Kilkenny is to reach its strategic aim of generating 100% of their electricity demand, they will need to install 253MW of energy or "2.09% of the Country's 12.1 GW combined onshore and offshore renewable energy target" as stated in the KCCDP. The Proposed Project will contribute towards achieving this important target by supplying 49MW of energy to the national electricity grid or 19% of the 253MW needed.

Development Management Guidance

Regarding wind energy Development Management Guidance, the KCCDP states that "*all planning applications for wind energy developments shall be assessed against the DEHLG's Wind Energy Development Guidelines, 2006, (and any subsequent update of these guidelines) and the County Council's Wind Strategy*".

In the absence of KCC's Wind Energy Development Strategy due to the draft ministerial direction on the KCCDP, it is noted that the design and layout of the Proposed Wind Farm follows the recommendations set out in the Guidelines published by the DEHLG in 2006, and the *'Best Practice Guidelines for the Irish Wind Energy Industry'* published by the Irish Wind Energy Association in 2012. The design and layout of the Proposed Wind Farm also has regard to the draft Guidelines published by the DHPLG in 2019. Should the draft Guidelines be adopted in advance of a planning decision being made on Briskalagh Renewable Energy Development, the Proposed Wind Farm will be capable of achieving the requirements of the draft Guidelines as currently proposed.

Kilkenny Wind Energy Development Strategy 2021

The Wind Energy Development Strategy (WEDS) for KCC forms Appendix K of the KCCDP. The WEDS provides a clear framework for the Council's objectives and methodology for identifying suitable locations for wind energy development in the county. By considering the relevant policy context, this strategy aims to guide and streamline the process of wind energy development in a way that aligns with the overall goals and priorities set by the Council. This approach ensures that sustainable and well-planned wind energy projects can be successfully implemented in the county.

Chapter 5 of the WEDS characterises the county into 3 different policy areas aimed at facilitating wind farm growth. These policy areas are based on a sieve mapping approach to identify suitable areas for wind energy developments on a number of characteristics. The Proposed Wind Farm is located within the policy areas designated as 'Acceptable in Principle' (AIP) and 'Open for Consideration' (OTC).

These designations for the Proposed Wind Farm are favourable for wind energy development, given the fact there is *"no significant conflict with environmental designations or sensitivities"* identified within these designated policy areas.

The WEDS states the following in relation to 'large scale wind energy developments', which are classified as wind energy projects above 5MW:

> *"Large-scale wind energy developments will, in usual circumstances, only be considered in 'Acceptable in principle' areas. The rationale behind this policy is to minimise the visual impacts of such large-scale developments, in addition to effects on the environment of County Kilkenny as a whole, as well as to facilitate appropriate grid connections. These will be assessed in accordance with the Wind Energy Development Guidelines."*

This policy effectively limits all wind energy developments (bar small installations below 5MW) to the *'Acceptable in Principle'* areas. However, due to the absence of a local Wind Energy Strategy with a spatial dimension for Kilkenny, this policy cannot be applied to the Proposed Wind Farm, and so in this scenario there cannot be any contravention of this policy.

Furthermore, it was highlighted by the OPR in their submission to the draft Development Plan, that no national policy basis exists for the restrictive policy relating to large scale wind energy developments and that its inclusion in the KCCDP is unjustified, as set out by the OPR below:

> *"It is also noted that in Table 11.3 'Wind Energy Strategy Areas/Policy Approach' large scale wind farm development will only be considered in areas designated as 'acceptable in principle', and that wind energy development in areas 'open for consideration' is subject to restrictions under Section 11.5.2. This means that the amendments to change geographical areas designated in the draft Plan as 'acceptable in principle' to 'open for consideration'*

> ***unreasonably and substantially restrict the opportunity for County Kilkenny to contribute to the national targets for renewable energy set out in the Climate Action Plan 2019.***
>
> *Furthermore the restrictions in relation to the scale of wind farms under section 11.5.2* ***have no national policy basis for such wind development****. This may have implications for the implementation of your plan, including the decisions of An Bord Pleanála in the context of Section 37(2)(b) of the Act"* (**emphasis added**).

In the absence of a local Wind Energy Development Strategy for Kilkenny, it is considered that there is sufficient policy direction at national, regional and local level to enable KCC to assess the Proposed Project on its merits. Despite the absence of a local Wind Energy Strategy for Kilkenny, the provision of the Proposed Project remains supported by local climate change and renewable energy policy within the KCCDP, as it recognises the role that indigenous renewable energy has on increasing Kilkenny's energy sustainability and security by reducing dependence on imported fossil fuels.

In similar circumstances in the absence of specific local policy, Planning Authorities have found that there is a comprehensive range of guidance and policy objectives at a national and regional level generally in relation to wind farm developments, and while certain aspects of the KCCDP are not in effect, this does not imply that there is a complete vacuum or lacuna in policy which precludes the Planning Authority from determining the application before it in accordance with the proper planning and sustainable development of the area.[1]

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) (the Guidelines) have been taken into account during the preparation of the EIAR.

The Guidelines were the subject of a targeted review. The proposed changes to the assessment of impacts associated with onshore wind energy developments were outlined in the document Draft Revised Wind Energy Development Guidelines (Department of Housing, Planning and Local Government (DHPLG), 2019) (the draft Guidelines). A consultation process in relation to the draft Guidelines closed on 19th February 2020. The proposed changes presented in the draft Guidelines give certain focus on the setback distance from residential properties (four times the proposed maximum tip height), along with shadow flicker and noise requirements relative to sensitive receptors.

At time of writing, the draft Guidelines have not yet been adopted, and the relevant guidelines for the purposes of section 28 of the Act, remain to be the Guidelines. Notwithstanding this, however, due to the timelines associated with the planning process for renewable energy projects it is possible that the draft Guidelines may be adopted during the consideration period for the current planning application. Should the draft Guidelines be adopted in advance of a planning decision being made on this application, the Proposed Wind Farm will be capable adhering to the relevant noise and shadow flicker standards. While the final updated Guidelines have not yet been published it should be noted that Noise and Shadow Flicker are entirely controllable and are discussed further in Chapter 12 and Chapter 5 of the EIAR, respectively. The Proposed Wind Farm achieves the recommended distance of 4 times turbine tip height from proposed turbines to third party sensitive receptors, which has become a recognised standard for the purposes of protecting residential visual amenity, as currently outlined in the draft Guidelines.

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Planning History

A planning search was carried out through the National Planning Application Database and An Bord Pleanála's (the Board) online planning portal in December 2024 for relevant planning applications lodged within the past 10 years that fall within the planning application boundary of the Proposed Project.

A planning search was carried out to establish permitted, operational and proposed wind energy developments within 25km of the proposed turbines for the purposes of informing the potential cumulative effects. The search was carried out using the relevant local authority, the Board and EIA planning portals in December 2024 for relevant planning applications. In total, 22 no. applications relating to wind energy were identified within 25km of the proposed turbines, 5 no. of which relate to single turbine development and a further 17 no. of which relate to larger multiple turbine wind farm developments.

Scoping and Consultation

Chapter 2 Section 2.7 of the EIAR presents detail of the EIA Scoping undertaken with regards to the Proposed Project. As part of the constraints mapping process, which is detailed in Chapter 3 of the EIAR, telecommunications operators, were contacted in August 2023 in order to determine the presence of telecommunications links or aviation assets traversing or located in close proximity to the Proposed Wind Farm site. Following this exercise, an EIAR scoping document, providing details of the Proposed Project, was prepared by MKO and circulated to prescribed statutory and non-statutory bodies in November 2023. The scoping document provided details of the Proposed Project and set out the scope of work for the EIAR. Consultees were invited to contribute to the EIAR by suggesting baseline data, survey techniques and potential impacts that should be considered as part of the assessment process and in the preparation of the EIAR.

Chapter 2 Section 2.7 of the EIAR includes details of the pre-planning meetings undertaken prior to the planning application being lodged with the following stakeholders:

- The relevant planning authority KCC under the provisions of Section 247 of the Act.
- The Board under the provisions of Section 37B of the Act.

On the 19th July 2024 the Board wrote to the Applicant and confirmed that consultation was closed and that the Proposed Wind Farm was not considered to be strategic infrastructure within the meaning of Section 37A and the application for approval of the Proposed Wind Farm should be made to KCC.

Community engagement has been undertaken by the applicant, details of which can be found in Appendix 2-1 of the EIAR. A Community Liaison Officer (CLO) was appointed and a number of information packs have been created and distributed to the public in November 2022, May 2023, August 2023, September 2023, April 2024, July 2024, and September 2024 to keep the community updated on the project's progress and benefits. Public Information Exhibitions were held on August 24th 2023 and May 28th 2024, both in Ballycallan Community Hall. A Community Engagement Report has been prepared to accompany the planning application and is included at Appendix 2-1 of the EIAR. In summary, the Community Report was prepared to record the consultation carried out with the local community in respect of the Proposed Project. 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 Environmental Impact Assessment process.

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 project (all of which are considered in the various chapters of the EIAR), the

description of likely significant effects should include an assessment of cumulative impacts that may arise.

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 the 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 the EIAR.

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.

The review of the relevant County Council planning registers documented relevant general development planning applications in the vicinity of the Site, the majority of which relate to the provision and/or alteration of one-off rural housing and the provision of agricultural buildings. These applications and land uses have also been taken account in describing the baseline environment and in the relevant assessments. Furthermore, the cumulative impact assessments carried out in each of the subsequent chapters of this EIAR consider all potential significant cumulative effects arising from all land uses in the vicinity of the Proposed Project. These include permitted and existing wind farms in the area, solar farms, energy storage, ongoing agricultural practices/forestry practices, quarries and extractive industries, intensive production/ processing industries, large infrastructure projects and other projects. The OPW (www.floodinfo.ie) does not record the presence of any Arterial Drainage Schemes or Benefited Lands within the Site.

Overall, the Proposed Project has been designed to avoid and mitigate impacts on the environment and a suite of mitigation measures is set out within the EIAR. The mitigation measures set out in this EIAR will ensure that significant cumulative effects do not arise during the construction, operational or decommissioning phases of the Proposed Project. Additional detail in relation to the potential significant cumulative effects arising and, where appropriate, the specific suite of relevant mitigation measures proposed are set out within each of the relevant chapters of this 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.

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:

- **Environmental Sensitivities**: Located outside of EU Natura 2000 sites; locations outside of National designations; located outside of Article 17 Annex I 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 is located on agricultural land which allows the site to take advantage of the existing access roads (some of which will be upgraded) and highlights the suitability of the Proposed Wind Farm as it can make sustainable use of established items of infrastructure.

The Proposed Wind Farm site is not located within or adjacent to EU or National protected areas, nor does it contain any EU designated Annex I Habitat. The Proposed Wind Farm site is located primarily on agri-pastoral lands, of low ecological value, within a rural setting. Required setbacks from sensitive receptors, as set out above are achievable. The Proposed Grid Connection underground cabling route crosses the River Nore SPA, and the River Barrow and River Nore SAC in Ballyragget. At this location, the proposed underground cabling route will cross the river via horizontal direction drilling, with the drilling commencing within a field of improved agricultural grassland located within the SAC, and finishing in agricultural land, outside of the SAC.

Alternative Renewable Energy technologies

To achieve the same maximum estimated electricity output from solar energy as is expected from the Proposed Wind Farm (c. 49MW), a larger development footprint would be required. The permanent footprint of the Proposed Project measures approximately 8.75ha, which represents approximately

0.875% of the Site. A solar PV array of the scale necessary to provide the same electricity output would require a footprint of approx. 78.4 hectares or 7.84% of the overall Site.

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.

Enerco Energy Ltd has a keen interest in offshore wind farms and has explored potential offshore sites. However, it is considered that due to delays with the regulatory process for offshore development, a combination of both onshore and offshore wind farm development will continue to be required to deliver on the ambitious renewable energy targets set under the Climate Action Plan 2023 which include focusing on onshore wind energy developments to reach the 2025/2030 renewable energy targets. As such, Enerco's primary focus remains to be onshore wind farms and they will continue to explore potential development offshore in tandem with delivering suitable sites onshore such as the Proposed Project.

The Applicant is an associated company of Enerco Ltd, an Irish owned developer with extensive experience in the design, construction and operation of onshore wind energy developments throughout Ireland. The Applicant is committed to playing a key role in helping the State achieve its CAP24 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.

Alternative Turbine Numbers and Model

It is proposed to install 7 no. 7MW turbines at the Proposed Wind Farm which will have an estimated installed capacity of 49 MW. Such a wind farm could also be achieved on the Proposed Wind Farm site by using smaller turbines (for example 2.5 MW machines). However, this would necessitate the installation of over 19 turbines to achieve a similar output. A larger number of smaller turbines would result in the wind farm occupying a greater footprint within the Proposed Wind Farm site, with a larger amount of supporting infrastructure being required (i.e., roads etc) and increasing the potential for environmental impacts to occur.

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, landowners, environmental, hydrological and geotechnical, archaeological specialists and traffic consultants. The aim being to reduce potential for environmental effects while designing a project capable of being constructed and viable.

Following the mapping of all known constraints, detailed site investigations were carried out by the project team.

The ecological assessment of the Proposed Wind Farm site encompassed habitat mapping and extensive surveying of birds and other fauna. This assessment, as described in Chapters 6 and 7 of this EIAR on Biodiversity and Ornithology, optimised the decision on the siting of turbines and the carrying out of any development works, such as the construction of roads. The hydrological and geotechnical investigations of the Proposed Wind Farm site examined the proposed locations for turbines, roads and other components of the Proposed Project, such as the construction compounds. Where specific areas were deemed as being unsuitable for the siting of turbines or roads, etc., alternative locations were proposed and assessed, taking into account the areas that were already ruled out by constraints. The turbine layout for the Proposed Wind Farm has also been informed by the results of noise assessments, landscape and visual and the separation distance to be maintained between turbines. Thus, the baseline environmental assessment of the Proposed Wind Farm site and wind farm design was an iterative process, where findings at each stage of the assessment were used to further refine the design, always with the intention of minimising the potential for environmental impacts.

Alternative Grid Connection Underground Electrical Cabling Route Options

The Proposed Wind Farm will connect to the national grid via underground electrical cabling, located primarily within the public road corridor, with some small sections passing through private agricultural land. Underground electrical cables will transmit the power output from each wind turbine to the proposed onsite 38kV substation, and from there to the existing Ballyragget 110kV substation, via an underground electrical cabling route, measuring approximately 23km in length. A key consideration in determining the grid connection method for a proposed wind energy development is whether the cabling is underground or run as an overhead line. An alternative to the c.23km underground cabling route would be to construct an approx. 18km overhead line from the proposed onsite substation to the existing 110kV Ballyragget substation. While overhead lines are less expensive and allow for easier repairs when required, underground cabling will have no visual impact. For this reason, it was considered that underground cabling would be a preferable alternative to overhead lines. The Guidelines also indicate that underground cables are the preferred option for connection of a wind energy development to the national grid. The chosen underground electrical cabling route will follow a mix of existing public roads and new track across private land, thereby minimising the use of public roads, and will 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.

Additionally, consideration was given to installation of the grid connection within private lands adjacent to the public road network, however, the existing Ballyragget substation is located 18.2km north of the Proposed Wind Farm, as the crow flies. It was considered that this was not a feasible option, due to the likely need for constructing at least 18.2km of new road across private lands to facilitate the construction and operation of the underground cabling. The chosen Proposed Grid Connection design was considered to be the most environmentally prudent and practical option for a grid connection as it was a considerably shorter length of route and avoided the potential cultural heritage receptors identified within Ballyragget.

Alternative Ports of Entry and Site Access

The ports considered for the port of entry of wind turbine components into Ireland for the Proposed Wind Farm include Belview Port, County Waterford, Dublin Port, Shannon-Foynes Port, County Limerick, Cork and the Port of Galway. Shannon Foynes Port is the principal deepwater facility on the Shannon Estuary and caters for dry bulk, break bulk, liquid, and project cargoes. The Port of Galway also offers a roll-on roll-off procedure to facilitate import of wind turbine components. All of the aforementioned ports have been used for the importing of turbine components. There are clear access routes for all five ports utilising the motorway network to the proposed haul route to the site. Regardless of which port is chosen, the components will approach the Site via the M9 to the east. For the purpose of this EIAR, the Belview Port, County Waterford was selected as the port of entry for the proposed turbines.

The Site is located approx. 14.4km east of the M8/R693 junction and, as such, delivery of turbine components from this direction were considered as part of the iterative design process for the Proposed Project. However, after review by the Traffic Consultant and subsequent autotrack assessments, it was concluded that this route would require substantial accommodating works to facilitate the delivery of abnormal loads to the Site. Therefore, the optimal delivery route is considered as the one that utilises the M9, N10, N76, R695, and L1009, which has been subject to autotracks assessment and shows that accommodation works are not required along the delivery route itself, and with the construction of a temporary abnormal load entrance off the L1009.

General Construction and Operational Entrances

There are a number of existing access points to the Site. These comprise private farm access points off the L5024, the L5023, the L10103 and the L1009. An initial review of these existing locations was

carried out to identify the most suitable locations for wind farm construction and operation site entrances.

The existing farm entrances off the L10103 to the east of the Site was deemed unsuitable for construction traffic due to the lack of adequate sightlines and the steep slope of this existing road.

The existing farm entrance on the L1009 was ruled out as a construction phase entrance due to the requirement to bring construction traffic past residential properties within Kilmanagh giving rise to potential dust, noise and traffic impacts.

Therefore, a new construction site entrance off the L5024 which has achieved the necessary sightlines is proposed for general construction and operational access, and was considered suitable as an operational entrance for maintenance staff, ESBN (for substation access) and for continued farm access.

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 and geotechnically unstable areas of the site limits the potential for environmental effects. As noted above, the 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 Wind Farm.

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 planning application for the Proposed Project will be made to KCC. Construction methodologies for the main infrastructural components of the Proposed Project are also included in this chapter (or its associated appendices) of the EIAR. The development description for the current planning application as appears in the public notices is included in Section 1.1 above.

The overall layout of the Proposed Project is shown on Figure 4-1 of the EIAR, this includes the Proposed Wind Farm site and the Proposed Grid Connection. The Proposed Project has been designed to minimise potential environmental effects, while at the same time maximising the energy yield from the Proposed Wind Farm. The Proposed Wind Farm site layout is shown in Figure 4-2. The Proposed Grid Connection layout is shown in Figure 4-3. Detailed site layout drawings of the Proposed Project are included in Appendix 4-1 to this EIAR.

The proposed wind turbine layout has been optimised using wind farm design software (a combination of WAsP and WindPro) to maximise the energy yield from the Site, while maintaining sufficient distances between the proposed turbines 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	640090	655005	171
2	640421	654817	167
3	639527	654696	130
4	640641	654405	159
5	640064	654240	132
6	639538	654087	116
7	639059	653638	111

The turbine model to be installed on the Site will have an overall turbine tip height of 185 metres, a blade rotor diameter of 163 metres and hub height of 103.5 metres. Modern wind turbines from the main turbine manufacturers have evolved to share a common appearance and other major characteristics, with only minor cosmetic differences differentiating one from another. For the purposes of this EIAR, a rated output 7 MW has been chosen to calculate the power output of the proposed 7-turbine renewable energy development, which would result in an estimated installed capacity of 49 MW.

The Proposed Wind Farm site makes use of the existing road network insofar as possible. It is proposed to upgrade approximately 1.8 kilometres of existing roads and tracks, and to construct approximately 6 kilometres of new access road on the Proposed Wind Farm site. It is proposed to construct passing bays along the proposed access road network in order to allow construction traffic to safely pass each other while travelling in opposite directions. Areas such as wide junctions and proposed hardstands will also be used as passing bays throughout the construction phase of the Proposed Wind Farm site.

One metrological (met) mast is proposed as part of the Proposed Wind Farm. The met mast will be equipped with wind monitoring equipment at various heights.

Each turbine will be connected to the on-site electricity substation via underground 33 kV (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 approximately 1.2 metres beneath ground level, along the sides of roadways and/or under the roadways.

It is proposed to manage any excess overburden generated through construction activities locally within the Site, in identified spoil management areas, and in linear berms along access roads where appropriate. Some of the material excavated during the construction of the Proposed Grid Connection underground cabling will be transported to licensed facilities.

As part of the Proposed Project, it is proposed to increase the ecological condition of 3,640m of existing hedgerow via cutting and enhancing through additional planting of native species, create approximately 270m of new native hedgerow and to create a new native riparian buffer zone (approx. 1.7ha) adjacent the Tullaroan stream within the Proposed Wind Farm site. Please see Appendix 6-4 Biodiversity Management and Enhancement Plan for details.

The forestry felling activities required as part of the Proposed Wind Farm will be the subject of a Limited Felling Licence (LFL) application to the Forest Service in accordance with the Forestry Act 2014 and the Forestry Regulations 2017 (SI 191/2017) and as per the Forest Service's policy on granting felling licenses for wind farm developments. Further details on tree felling required is detailed in Chapter 4 and Chapter 6 of this EIAR.

A general construction entrance will be constructed on the L-5024 at the north of the Site. This entrance will be used as the main entrance for construction traffic throughout the construction phase. Appropriate sightlines will be established at the proposed Site entrance for the safe egress of traffic during the construction phase. On completion of the construction phase, this Site entrance will be reduced in size and gated for security and will be used as an operational Site entrance.

A temporary access road will be constructed on the L-1009 in the south of the Site. This will facilitate the delivery of abnormal loads and concrete deliveries for the turbine foundations. This new entrance was subject to an autotrack assessment to identify the turning area required, as described in Chapter 15, Section 15.2 of the Traffic and Transport Assessment. Appropriate sightlines will be established to the east and west of the temporary access road for the safe egress of traffic. Following the turbine commissioning, this entrance will be reinstated. This temporary access road will not be used for general construction traffic, or HGV deliveries (except concrete deliveries).

In order to facilitate the construction of the Proposed Project, the majority of rock and hardcore material that will be required during the construction of the Proposed Wind Farm will be sourced from an on-site borrow pit with the remaining rock and hardcore material sourced from local, appropriately authorised quarries.

It is proposed to construct a 38kV electricity substation within the Proposed Wind Farm site, as shown in Figure 4-1, Figure 4-2 and Figure 4-3 of the EIAR. The proposed onsite 38kV substation is located within agricultural land and will be accessed via the Proposed Wind Farm access roads.

It is proposed to connect the onsite 38 kV substation to the existing 110 kV Ballyragget substation in Moatpark, Co Kilkenny via 38 kV underground electrical cabling. The underground electrical cabling route is illustrated in Figure 4-3, is approximately 23km in length and located primarily within the public road corridor, with a short section (approximately 260m) located within a private road southwest of the proposed on-site substation and another short section (approximately 660m) passing through a number of agricultural fields and a private access track north of the Ballyragget substation.

An important part of a renewable energy development, which Briskalagh Ltd has been at the forefront of developing, is its Community Benefit Package. Briskalagh Ltd. is endeavouring to develop new ways to direct increased gain towards the local community with particular focus on those living closest to the Proposed Wind Farm. The applicant company has given careful consideration to the issue of community gain arising from the Proposed Wind Farm, if permitted and constructed. Community gain from significant development proposals, including wind farms, whilst a relatively recent approach is now a common consideration for developers and, indeed, planning authorities. This approach recognises that, with any significant wind farm proposal, the locality in which the Proposed Wind Farm is situated is making a significant contribution towards helping achieve national renewable energy and climate change targets, and the local community should derive some benefit from accommodating such a development in their locality.

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

The Proposed Wind Farm is expected to have a lifespan of approximately 35 years. As part of this planning application, permission is being sought for a 35-year operation period commencing from the date of full operational commissioning of the Proposed Project. 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.

Following the end of their useful life, the equipment may be replaced with a new technology, subject to planning permission being obtained, or the 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 Site is located within a rural setting in northwest Kilkenny, approximately 8.5km west of Kilkenny City. The settlement of Kilmanagh is located directly south of the Site, and the settlement of Tullaroan is located approximately 2.7km north of the nearest proposed turbine

The land uses within the Site is predominantly comprised of agricultural areas and pastures, as well as small scale commercial forestry. The primary surrounding land use within the Population Study Area is that of agricultural and residential/commercial.

It is proposed to construct the wind farm and grid connection concurrently which would require approximately 100 employees in total, with an estimated 80 jobs focussing on the construction phase of the Proposed Wind Farm, and 20 jobs focusing on the construction phase of the Proposed Grid Connection. Up-skilling and training of local staff in the particular requirements of the wind energy industry is likely to lead to additional opportunities for those staff as additional wind farms are constructed in Ireland. This will have a long-term slight positive indirect effect.

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 2006 WEDGs 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. It is further noted that at distances greater than 10 rotor diameters from a turbine, the potential for shadow flicker is very low, and therefore the shadow flicker study area is set at 1.63km (10 x rotor diameter 163m). There are 164 no. properties located within 1.63 km of the proposed turbine locations

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 29.44% was applied. Of the 164 no. properties modelled; it is predicted that 41 Sensitive Properties may experience shadow flicker that exceeds the 2006 WEDGs thresholds of 30 minutes per day or 30 hours per year. However, this prediction does not consider wind direction or screening provided by intervening vegetation and topography

Where shadow flicker exceedances are experienced, suitable mitigation measures as outlined in Chapter 5 will be employed at the potentially affected properties to ensure that the limits set out in the Guidelines are not exceeded at any dwelling within the Shadow Flicker Study Area. It is also noted that the Proposed Project can be brought in line with the requirements of the draft Guidelines should they be adopted while this application is in the planning system, through a stricter implementation of mitigation measures outlined in Chapter 5.

Impacts on human beings during the construction, operational and decommissioning phases of the Proposed Project are described in Chapter 5 in terms of health and safety, employment and investment, population, land-use, noise, dust, traffic, tourism, residential amenity, renewable energy production and reduction in greenhouse gas emissions, shadow flicker and interference with communication systems. 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, Flora and Fauna, and sets out the mitigation measures proposed to avoid, reduce or offset any potential significant effects that are identified.

A comprehensive desk study and suite of field surveys were carried out to inform the assessment. Multidisciplinary walkover surveys were undertaken across 2023 and 2024. Excluding two survey events in February and March 2024, the habitat surveys covered the recognised optimum period for vegetation surveys/habitat mapping, i.e. April to September (Smith et al., 2011). Dedicated species/habitat specific surveys including for, bats, and protected mammals and detailed habitat assessment surveys were carried out, during which any incidental records of other species were also recorded. In addition, baseline aquatic habitat, fisheries and 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 Site 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 within 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). Grassland habitats have also been categorised to plant communities from the National Survey of Upland Habitats (Perrin et al. 2014) and the Irish Vegetation Classification.

Grasslands makes up a significant proportion of the habitats within the Proposed Wind Farm site, which comprises large areas of improved agricultural grassland (Fossitt code GA1). The areas of improved agricultural grassland have primarily been intensively managed for livestock grazing, and almost all fields surveyed have been reseeded with perennial ryegrass. A network of Hedgerows (WL1), Treelines (WL2) and Drainage Ditches (FW4) occur throughout the Proposed Wind farm site and delineate the field boundaries. Other habitats also recorded within the Proposed Wind Farm site include Conifer Plantation (WD4), Wet Grassland (GS4). and (Mixed) Broadleaved Woodland (WD1). The Tullaroan River is located within the centre of the Proposed Wind Farm site and is classified as an Eroding/Upland River (FW1), with small meandering sections as Depositing/Lowland River (FW2). Several smaller tributaries and drainage features flow into the Tullaroan River.

The majority of the lands on either side of the road along the length of the Proposed Grid Connection underground cabling route is made up of improved agricultural grassland, with associated Hedgerow (WL1) and Treelines (WL2). Depositing/Lowland Rivers (FW2) and drainage ditches (FW4) also cross the underground cabling route at a number of locations.

Approximately 1.39km of hedgerow will be permanently removed to accommodate the Proposed Project, including turbines and associated bat buffers.of for the protection of bats, from the turbines to the canopy of the nearest habitat feature, as recommended by the Natural England (2014) and NatureScot (2021). Approximately 3.57ha of conifer forestry (WD4) and approximately 0.73ha of mixed broadleaved/conifer woodland (WD2) habitat will be felled as part of the Proposed Wind Farm. In order to mitigate against the loss of hedgerow, treeline and mixed broad-leaved woodland habitats, approximately 3,640m of heavily managed hedgerow will be enhanced through additional planting with native species. It is proposed to plant some native tree species within the hedgerow habitat to further increase the biodiversity value within the Proposed Wind farm site. New native hedgerow habitat will be created in the south and north of the Proposed Wind farm site, approx. 270m. In addition, it is proposed to incorporate a native vegetated riparian buffer zone adjacent the Tullaroan stream within

the Proposed Wind Farm site. A total of approximately ~1.7ha of riparian planting is proposed to be planted on both banks of the Tullaroan stream. The creation of the riparian buffer zone and the enhancement of hedgerow habitats will create a diverse habitat mosaic for terrestrial biodiversity and help improve water quality. In addition to the above biodiversity nhancement measures, it is also proposed to install breeding and roosting boxes for Pine Martens, Red Squirrel and Bats

Bat species composition and abundance recorded during detailed bat surveys undertaken at the Proposed Wind Farm site was found to be typical of the geographic location and nature of the area and is utilised 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 Proposed Wind Farm 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, an adaptive monitoring and mitigation strategy has been devised for the Proposed Project in line with NatureScot Guidance (2021), which will ensure that there is no potential for significant residual effects on local bat populations during the operational phase of the Proposed Project.

The habitats recorded within the Site provide suitable habitat for protected mammal species, such as badger and Otter. Whilst evidence of these species was recorded during the ecological surveys undertaken, the Proposed Project has been designed to avoid significant effects on any mammal species. From a precautionary perspective, a pre-commencement mammal surveys will be undertaken in accordance with standard best practice guidance prior to the commencement of construction works.

In relation to designated sites, two nationally designated sites (River Nore/Abbeyleix Woods Complex pNHA, Inchbeg pNHA) have been identified as being within the Zone of Influence, on a precautionary basis. No potential for residual adverse impacts on these pNHAs has been identified following implementation of mitigation measures in relation to potential effects on rivers/streams and sensitive aquatic faunal species and therefore no significant effects on the pNHA's are anticipated.

An Appropriate Assessment Screening Report and Natura Impact Statement (NIS) accompany accompanies this application. 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 Appropriate Assessment Screening Report identified the potential for significant effect on one European Site (River Barrow and River Nore SAC and River Nore SPA). 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.

It is therefore judged that, provided that the Proposed Project is constructed and operated in accordance with the design, best practice and mitigation that is described within this application, significant residual impacts on biodiversity, flora and fauna will not occur. The biodiversity enhancement measures outlined for the Proposed Project will result in an improvement of the existing ecological conditions of the Proposed Wind Farm site. .

1.7 Birds

This chapter assesses the likely significant effects that the Proposed Project may have on bird species. Firstly, a brief description of the Proposed Project is provided. This is followed by a comprehensive description of the methodologies that were followed in order to obtain the information necessary to complete a thorough assessment of the potential effects of the Proposed Project on bird species. Field surveys were undertaken during the survey period April 2021 – May 2023, consisting of 2 breeding seasons (April – September) and 2 non-breeding seasons (October – March). The survey data is presented in full in the Environmental Impact Assessment Report (EIAR) appendices with a summary of the information presented within this chapter. An analysis of the results is then provided, which discusses the ecological significance of the birds recorded within the study area. The potential effects of the Proposed Project are then described in terms of the construction, operation and decommissioning phases of the Proposed Project. An accurate prediction of the effects is derived following a thorough understanding of the nature of the Proposed Project along with a comprehensive knowledge of bird activity within the Proposed Wind Farm site. The identification of Key Ornithological Receptors (KORs) and the assessment of effects follow a precautionary approach.

The following KORs were identified: kingfisher, little egret, kestrel, snipe, buzzard and sparrowhawk.

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. The only effect greater than a long-term slight negative effect (EPA, 2022) and low effect significance (Percival, 2003) relates to potential disturbance to breeding kingfisher during works within 100m of the Tullaroan Stream during the construction phase. Specific mitigation measures are detailed to avoid any potential for significant effects.

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

1.8 Land, Soils and Geology

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

The land, soils and geology of the Site has been characterised using a combination of desk study and site investigation data. Several walkover inspections of the Proposed Wind Farm site have been completed as well as trial pit excavations, borehole drilling and laboratory analysis of recovered soil samples. A visual assessment of exposed soils, subsoil and bedrock and topographic changes along the Proposed Grid Connection underground cabling route was also completed.

Proposed Wind Farm

The Proposed Wind Farm is located in the valley of the Tullaroan Stream and comprises of agricultural grasslands and conifer plantations. Elevations within the Proposed Wind Farm site range from ~110mOD to ~200mOD (metres above Ordnance Datum) with the lowest elevations located along the course of the Tullaroan Stream.

Based on site investigations, peat is not present at the Proposed Wind Farm site. The Proposed Wind Farm site is predominantly underlain by glacial till described as sandy, gravelly or silty CLAY. More cohesive granular SANDs were encountered overlying the tills at several investigation locations. Thick granular subsoils (13.4 to 18.7m) were encountered in the low-lying areas adjacent to the Tullaroan Stream. The subsoils encountered during the site investigations correspond to the local GSI mapped subsoils which consist of till derived from Namurian sandstones and shales in the north and gravels derived from limestones in the vicinity of the Tullaroan Stream.

Depth to bedrock is relatively shallow across much of the Proposed Wind Farm site however thicker overburden deposits are present on the lower ground in the vicinity of the Tullaroan Stream. Weathered siltstone bedrock was encountered in several trial pit excavations at depths ranging from 0.4 to 3.3mbgl on the higher ground in the north of the Proposed Wind Farm site. Meanwhile, borehole drilling revealed a depth to rock of 13.4 to 18.7m in the south and in the vicinity of the Tullaroan Stream.

The Proposed Project will involve the removal of soils, subsoils (spoil) and the excavation of bedrock for the construction of the internal cable network, hardstanding emplacement, turbine foundations, substation, crane hardstands and construction compounds. Rock for construction purposes will be sourced from the proposed onsite borrow pit.

Excavated spoil will be stored in the proposed onsite borrow pit, the designated spoil management areas and in linear berms along access roads and turbine hardstands where appropriate. The handling and storage of spoil will be done in accordance with the spoil management methodology.

Storage and handling of hydrocarbons/chemicals will be carried out using best practice methods. The base of the substation transformer will bunded and capable of holding 110% of the stored oil volume. Turbine transformers are fully bunded located within the enclosed turbines, so any leaks would be contained within the turbine and there is no potential pathway to receptors associated with the Land, Soils and Geological environment. Measures to prevent soil and subsoil erosion during excavation and reinstatement will be undertaken to prevent water quality effects.

The Proposed Project has a very small development footprint when compared to the overall area of the Site. Therefore, no significant effects on land will occur during the construction, operation or decommissioning phases of the Proposed Project.

The mineral soil/subsoil deposits at the Proposed Wind Farm site are not designated in this area (i.e. they do not form part of a designated site). For this reason, and with the implementation of the

mitigation measures detailed in this EIAR and the best practice measures detailed in relation to spoil management, no significant effects on soils or subsoils will occur during the construction, operation or decommissioning phases of the Proposed Wind Farm.

Similarly, with the implementation of the mitigation measures outlined in this EIAR, no significant effects on the underlying siltstone bedrock geology will occur during the construction, operation or decommissioning phases of the Proposed Wind Farm.

An assessment of the impacts associated with any potential piling works concluded that, with the implementation of the prescribed mitigation measures, and due to the small footprint of the piles, there will be no significant effects on the land, soils and geology environment.

An assessment of potential cumulative effects associated with the Proposed Project and other developments on land, soils and geology has been completed. The land, soils and geology assessment confirms there will be no significant cumulative effects on land, soil and geology as a result of the Proposed Wind Farm.

Proposed Grid Connection

Excavation of soil and subsoil will be required for the formation of the proposed substation and adjacent temporary construction compound, and trenches to accommodate the Proposed Grid Connection underground cabling route connection to Ballyragget. This will result in the removal of some soil and subsoil at most excavation locations, however the soil and subsoil will be accommodated within the spoil management areas or borrow pit re-instatement on the Proposed Wind Farm site. Some of the excavated materials will be transferred to an appropriately licenced facility as required. This is dependent on the road makeup at locations along the underground cabling route and the distance from to the Proposed Wind Farm site. Storage and handling of hydrocarbons/chemicals will be carried out using best practice methods. Measures to prevent soil and subsoil erosion during excavation and reinstatement will be undertaken to prevent water quality impacts.

No significant effects on the land, soil and geology along the Proposed Grid Connection underground cabling route will occur during the construction, operation, or during decommissioning phases.

The land, soils and geology assessment confirm there will be no significant cumulative effects on land, soil and geology as a result of the Proposed Grid Connection underground cabling route.

Overall, the land, soils and geology assessment confirms that with the implementation of the appropriate mitigation measures, there will be no significant effects due to the Proposed Project.

1.9 Hydrology and Hydrogeology

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.

Proposed Wind Farm

The Proposed Wind Farm site currently comprises of a mix of pastoral agricultural land and small-scale forestry operations. The Proposed Wind Farm is located to the east of the Slieve Ardagh Hills, with local topography generally sloping towards the Tullaroan Stream which dissects the site. Ground elevations range from ~100 to ~200mOD and are greatest in the northeast and fall towards the Tullaroan Stream.

On a regional scale, the Proposed Wind Farm site is located within the Nore surface water catchment, within Hydrometric Area 15 of the South Eastern Irish River Basin District. On a more local scale, the Proposed Wind Farm site is predominantly located within the Munster_SC_010 sub-catchment. A small area in the northeast is mapped in the Nore_SC_090 sub-catchment but no infrastructure is proposed in this area of the Proposed Wind Farm site. The Proposed Wind Farm site is drained by the Tullaroan Stream and its tributaries. The Tullaroan Stream dissects with Proposed Wind Farm site and continues southwards before discharging into the Munster River ~5.7km to the south. Further downstream the Munster River discharges into the King's River to the northwest of Callan, whilst the King's River discharges into the Rover Nore ~17km to the southeast.

The bedrock underlying the Proposed Wind Farm site is classified as a Poor Aquifer. This means that the underlying bedrock has little or no open cracks which means groundwater movement within the aquifer is very localised. Depth to bedrock is relatively shallow on the elevated ground within the Proposed Wind Farm site with the rock overlain by low permeability glacial till subsoils. However, the depth to rock is deeper in the vicinity of the Tullaroan Stream where thick glaciofluvial sand and gravel subsoils were encountered. These subsoils form part of a Regionally Important Gravel Aquifer. Therefore, groundwater is particularly sensitive at the Proposed Wind Farm site.

The River Barrow and River Nore SAC is located ~5.9km downstream of the Proposed Wind Farm site and is hydrologically connected via the Tullaroan Stream. This designated site can be considered to be very sensitive in terms of potential effects. The River Nore SPA is also mapped ~14.1km downstream of the Proposed Wind Farm site. Following implementation of the appropriate mitigation measures as outlined in the EIAR no significant effects on this designated site will occur as a result of the Proposed Project.

1 no. drinking water protected surface watercourse was identified downstream of the Proposed Wind Farm site on the River Nore. Given the distant location of this drinking water protected area from the Proposed Wind Farm site and following implementation of the appropriate mitigation measures as outlined in the EIAR no significant effects on this drinking water protected area will occur as a result of the Proposed Project.

Several Public and Group Water Schemes have been identified in the area of the Proposed Wind Farm site. These include the Callan PWS, the BallyCallan Sand and Gravel GWS and the BallyCallan Shale GWS. With the implementation of the prescribed mitigation measures combined with the filtration capacity of the sands and gravels, there will be no significant effects on these groundwater resources.

During each phase of the Proposed Wind Farm development (construction, operation, and decommissioning) a number of activities will take place at the Proposed Wind Farm site, some of which will have the potential to significantly affect the hydrological/hydrogeological regime or water quality at or downstream of the Proposed Wind Farm 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 Proposed Project design to minimise significant effects on water quality (surface and groundwater), downstream designated sites and water resources. A self-imposed 50m watercourse 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 wind farm runoff into local watercourses or into the existing site 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 effects to surface water (quality and flows) and groundwater (quality and quantity, and any local groundwater wells) will occur as a result of the Proposed Wind Farm 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 base of the substation transformer will bunded and capable of holding 110% of the stored oil volume. Turbine transformers are fully bunded located within the enclosed turbines, so any leaks would be contained within the turbines. The proposed wind farm drainage system will be designed to slow surface water runoff from the 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.

An assessment of the impacts associated with any potential piling works concluded that, with the implementation of the prescribed mitigation measures, and due to the small footprint of the piles, there will be no significant effects on the water environment.

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.

No significant effects on the water environment will occur during the construction, operation or decommissioning of the Proposed Project.

Proposed Grid Connection

The Proposed Grid Connection underground cabling route from the proposed onsite 38kV substation to the existing Ballyragget 110kV substation is ~23km and is located within the largely within the carriageway of the existing road network. The proposed substation and the underground cabling route are located entirely within the River Nore surface water catchment and the route passes through a total of 4 no. river sub-catchments (Munster_SC_010, Nore_SC_060, Nore_SC_070 and Nore_SC_080). There are a total of 12 no. existing watercourse crossings along the Proposed Grid Connection underground cabling route, with one new crossing location where it is proposed to cross under the river Nore via Horizontal Directional Drilling (avoiding any in-stream works).

Designated sites located near and downstream of the Proposed Grid Connection underground cabling route include the River Barrow and River Nore SAC and the River Barrow and River Nore SPA. Due

to the minor and transient nature of the proposed works, coupled with the prescribed mitigation measures, there will be no significant effects on downstream designated sites.

Approximately 11km of the Proposed Grid Connection underground cabling route is underlain by a Regionally Important Karst Aquifer. However, due to the minor, shallow and transient nature of the works, the lack of any mapped karst features in the vicinity of the Proposed Grid Connection underground cabling route and the prescribed mitigation measures, there will be no significant effect on karst features or the underlying karst aquifer.

Several public water supplies (Tullaroan GWS and Callan PWS) are also mapped in the vicinity of the Proposed Grid Connection underground cabling route. However, due to the minor, shallow and transient nature of the works and the prescribed mitigation measures, there will be no significant effect on these water supplies.

An assessment of the construction, operational and decommissioning phases has been completed, along with a cumulative assessment for each phase. Based on the above, and with implementation of the outlined mitigation measures, no significant effects on the surface water and groundwater environments will occur.

Overall, the hydrology and hydrogeology assessment confirms that with the implementation of the appropriate mitigation measures, there will be no significant effects due to the Proposed Project.

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 Site 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 designated four Air Quality Zones for Ireland:

- Zone A: Dublin City and Environs
- Zone B: Cork City and Environs
- Zone C: 16 urban areas within 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 Proposed Project is typical of that of rural areas 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 most recent report on air quality in Ireland, 'Air Quality in Ireland 2022' was published by the EPA in 2023. The EPA reports provide SO_2, PM_{10}, NO_2 and O_3 concentrations for areas in Zone D. These can be seen in Section 10.2 of Chapter 10.

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

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. In addition, turbines and construction vehicles will be transported to the Site on specified haul routes only, which will be regularly inspected for cleanliness and cleaned as necessary.

There will be no net carbon dioxide (CO_2) emissions from operation of the Proposed Project. By providing an alternative to electricity derived from coal, oil or gas-fired power stations, the Proposed Project will result in emission savings of carbon dioxide (CO_2), oxides of nitrogen (NO_x), and sulphur dioxide (SO_2). The production of renewable energy from the Proposed Project will have a Long-Term Moderate Positive effect on air quality due to the offsetting of approximately 31,578 tonnes of Carbon Dioxide (CO_2) per annum, or 1,105,230 tonnes of carbon dioxide over the proposed 35 year lifecycle of the Proposed Wind Farm.

1.11 Climate

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

The aim of the Proposed Project, when in operation, is to reduce the input of carbon intensive energy into the national grid and reduce the amount of greenhouse gas emissions being released to the atmosphere that are associated with electricity generation and use. Harnessing more energy by means

of renewable sources will reduce dependency on fossil fuels, thereby resulting in a reduction in harmful emissions that can be damaging to human health and the environment. 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.

Although variation in climate is thought to be a natural process, the rate at which the climate is changing has been accelerated rapidly by human activities. Climate change is one of the most challenging global issues facing the world today and is primarily the result of increased levels of greenhouse gases in the atmosphere. Increasing human emissions of carbon dioxide and other greenhouse gases cause a positive radiative imbalance at the top of the atmosphere, meaning energy is being trapped within the climate system. The imbalance leads to an accumulation of energy in the Earth system in the form of heat that is driving global warming.[2,3] Greenhouse gases come primarily from the combustion of fossil fuels in energy use.

In March 2024 the European Environment Agency (EEA) published the European Climate Risk Assessment.[4] This assessment states that Europe is the fastest warming continent on the planet and is warming at about the twice the global rate. The average global temperature in the 12-month period between February 2023 and January 2024 exceeding pre-industrial levels by 1.5°C. 2023 was the warmest year on record in more than 100,000 years, at 1.48°C above pre-industrial levels, with the world's ocean temperature also reaching new heights.

The Environmental Protection Agency (EPA) publish Ireland's greenhouse gas emission projections and at the time of writing, the most recent report, *'Ireland's Greenhouse Gas Emissions Projections 2023-2050* was published in May 2024. The report includes an assessment of Ireland's progress towards achieving its emission reduction targets out to 2030 set under the ESR.

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 assumes that no additional policies and measures, beyond those already in place by the end of 2020. This is the cut off point for which the latest national greenhouse gas emission inventory data is available, known as the 'base year' for projections. 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 2024 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.[5] 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

[2] *Hansen, J.; Sato, M.; Kharecha, P. et al. Earth's Energy Imbalance and Implications. Atmospheric Chemistry and Physics 2011, 11 (24), 13421–13449.* https://doi.org/10.5194/acp-11-13421-2011
[3] *von Schuckmann, K.; Palmer, M. D.; Trenberth, K. E. et al. An Imperative to Monitor Earth's Energy Imbalance. Nature Clim Change 2016, 6 (2), 138–144.* https://doi.org/10.1038/nclimate2876.
[4] *European Environment Agency (2024) European Climate Risk Assessment* <https://www.eea.europa.eu/publications/european-climate-risk-assessment>
[5] *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>

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 GHG 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 and is currently available as Version 1.8.1 which was last updated in December 2023. The tool provides a transparent and easy to follow method for estimating the impacts of wind farms on the carbon dynamics of peatlands. 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.

The full life cycle and embodied carbon of the Proposed Project 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 features of the site are considered using the Transport Infrastructure Ireland (TII) Carbon Tool (TII 2022)[6]. 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.

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 Proposed Project will result in the loss of 89,717tCO_2e during the construction phase, the details of these carbon losses are provided in Table 11-6 of Chapter 11 of the EIAR. Please note, that in completion of these calculations a number of assumptions have been made under theoretical precautionary conditions; all assumptions are detailed in Appendix 11-1 Carbon Calculations. Therefore, it can be determined that the actual carbon losses associated with the Proposed Project will likely be less than the values provided in Table 11-6 of Chapter 11.

The Proposed Project will have an installed generating capacity of approximately 49MW and therefore will help contribute towards the achievement of national and international emission reduction targets, provide much needed grid infrastructure, and the capacity to offset 31,578tCO_2e per annum, or 1,105,230tCO_2e over its operational lifetime, thereby resulting in an overall positive effect on climate. Carbon losses to the atmosphere due to changes in soil and ground conditions and due to the construction and operation of the Proposed Project will be offset by the Proposed Wind Farm in approximately **34** months (2.8 years) of operation. Please see Section 11.5.3.2 for details on carbon savings/offset calculations.

Following construction of the Proposed Project, 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.

[6] *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

AWN Consulting Limited has been commissioned to conduct an assessment into the likely environmental noise and vibration impacts of the Proposed Project.

The background noise environment has been established through noise monitoring surveys undertaken at 6 no. noise sensitive locations (NSLs) surrounding the Proposed Wind Farm site. Typical background noise levels for day and night periods at various wind speeds have been measured in accordance with best practice guidance contained in the Institute of Acoustics document 'A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise' (IOA GPG). The results of the background noise survey have been used to derive appropriate noise criteria for the development in line with the guidance contained in 'Wind Energy Development Guidelines for Planning Authorities 2006.

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

The assessment of construction and decommissioning noise and vibration and has been conducted in accordance with best practice guidance contained in BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise and BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration. Subject to good working practice and mitigation measures as recommended in the EIAR Chapter, it is not expected that there will be any significant noise and vibration impacts associated with the construction phase and the likely noise from construction activity at the nearest NSLs is expected to be within recommended threshold values. The Proposed Project associated construction noise and vibration impacts are not expected to cause any significant effects.

A turbine noise prediction model was prepared for the Proposed Wind Farm. The predicted turbine noise levels have been calculated in accordance with the IOA GPG recommendations. The assessment has confirmed that, once the appropriate mitigation measures are implemented, the residual turbine noise levels associated with the Proposed Wind Farm will be within the best practice noise criteria curves recommended in Irish guidance document 'Wind Energy Development Guidelines for Planning Authorities 2006. Therefore, it is considered that no significant effect is associated with the Proposed Project.

No significant vibration effects are associated with the operation of the Proposed Project.

In summary, the noise and vibration impact of the Proposed Project is not significant.

1.13 Landscape and Visual

Chapter 13 includes a Landscape and Visual Impact Assessment (LVIA), it addresses the likely significant effects of the Proposed Project on the landscape and visual amenity. A key focus of the LVIA was comprehensive assessment of the proposed turbines as the essential aspect of the Proposed Project likely to give rise to significant landscape and visual effects within a 20km study area – the 'LVIA Study Area'. The LVIA is supported by site visits and various best practice tools for LVIA, such as the production of verified photomontages, ZTV mapping, a Route Screening Analysis and an impact assessment methodology which follows best practice guidance for LVIA.

The final layout of the Proposed Wind Farm is the result of an iterative and collaborative design process with the aim of eliminating and reducing significant landscape and visual effects. The proposed turbines are strategically sited within a modified working landscape, ensuring limited visibility from high-sensitivity receptors within the LVIA Study Area. The mountainous terrain provides both topographical enclosure of the Proposed Wind Farm site and visual screening from within vast areas of

the wider landscape. The turbine layout is designed for visual coherence, with consistent spacing in line with the Guidelines for Hilly and Flat Farmland Landscape Types. Setback distances adhere to minimum requirements, including 500 meters from residential receptors and four times the tip height from third-party properties. The Proposed Wind Farm is sited within densely a vegetated agricultural landscape where mature boundary vegetation limits visual exposure from many receptors in the surrounding landscape setting. Additionally, the layout of the proposed infrastructure minimises the loss of valuable landscape receptors and biodiversity corridors on the Proposed Wind Farm site itself.

ZTV mapping shows extensive theoretical visibility within 5km of the proposed turbines, especially in lower lying areas. Theoretical visibility decreases beyond 5km due to the characteristics of local topography enclosing the Proposed Wind Farm site, with minimal theoretical visibility in large areas of the LVIA Study Area to the west and northwest. While some areas within the 20 km LVIA Study Area may have theoretical visibility, on-site assessments and photomontage visualisations (including photowires) indicate that the proposed turbines are most visible and visually prominent within the small river valley where it is located. However, the assessments determined that the mature vegetation within the local landscape surrounding the site substantially limits visibility from many visual receptors such as roads and small settlement clusters.

Site visits and photomontage visualisations were used to support the assessment of effects on designated landscape receptors as well as designated Landscape Character Areas (LCAs). The proposed turbines are situated within LCA A of County Kilkenny – Slieveardagh Hills (South), which has a "Class 3 – Normal" sensitivity rating according to the Kilkenny Landscape Character Assessment (LACK). It is noted that there is a number of other existing and permitted turbines in this upland area which has landscape characteristics suitable for absorbing and accommodating multiple wind energy developments. This LCA is considered to have a low sensitivity to wind energy development. As detailed in full in Appendix 13-2, a 'Slight' residual effect on the landscape character for this LCA is deemed to arise.

For the wider LCA Study Area (15km study area for effects on landscape character – see Section 13.2.1), no Significant landscape effects will arise in relation to other designated LCAs. Views of the proposed turbines are primarily limited to isolated elevated locations, resulting in 'Not Significant' residual effects on landscape character. The largest magnitude of change (Moderate) will occur within Kilkenny LCA A1 – Slieveardagh Hills (South) as the proposed turbines will materially alter the physical fabric of the landscape of this LCA. It is noted that due to the Grid Connection underground cabling route, other LCAs will undergo a 'Slight' magnitude of change. However, as the cabling is located underground, it will not give rise to any significant landscape or visual effects. No significant effects were deemed to arise on the special characteristics or qualities of any high sensitivity landscape receptors and it is determined that the addition of the Proposed Project is consistent with the landscape policies set out in local planning policy.

The landscape of the Proposed Wind Farm site, with its current land use, has a 'Low' sensitivity to wind energy developments (see Section 13.4.3.4 of Chapter 13). The combination of 'Low' sensitivity and a 'Substantial' magnitude of change results to long-term landscape effects of 'Moderate' significance upon the physical fabric of the landscape of the Proposed Wind Farm site (See LVIA Methodology, Appendix 13-1). Effects on the perceptual and aesthetic character of the Site are also deemed to be of 'Moderate' significance.

Cumulative effects on landscape character are included in the impact assessment outlined in Appendix 13-2. Cumulative visual effects are also discussed and summarised in the LVIA Chapter. There are 15 existing, permitted and proposed wind energy developments located within 20km of the proposed turbines. These developments are located in separate clusters to the north (Lisdowney), northwest (Lisheen II), west (Ballybay, Farranrory, Foyle, Kyleballyoughter, An Cnoc, Gurteen, Ballincurry 1 and Ballinacurry 2, Lisheen and Knockroe) and east (Freenystown) of the Proposed Wind Farm. With regards to designated LCAs, the greatest cumulative effects on landscape character were deemed to arise in KK-LCA A1 – Slieveardagh Hills (South) where, as detailed in full in Appendix 13-2, a 'Slight' residual effect was deemed to arise, incorporating cumulative landscape effects.

The assessment of landscape and visual effects was informed by photomontage visualisations produced in accordance with best practice guidance. Imagery was captured from a total of 37 no. viewpoints in the LVIA Study Area for the production of photomontages and photowire visualisations. These visualisations were used to inform the assessment of the landscape and visual effects of the proposed turbines on all receptors scoped in for assessment during preliminary analysis using ZTV mapping. Out of 37no. viewpoints in total, 16 no. viewpoints (VP01–VP16) were selected for photomontage production and full visual impact assessment in the EIAR Volume 2: Photomontage Booklet, and the remaining 21 no. viewpoints (PW-A to PW-U) were produced as photowires to aid in visual impact discussions, presented in Appendix 13-5: Photowire Visualisation Booklet.

The visual assessment found no Significant residual effects at any of the viewpoints, while others resulted in 'Moderate' (6), 'Slight' (4) and 'Not Significant' (6). The visual assessment of protected and scenic views found no Significant effects within the LVIA Study Area. Residual effects are deemed as 'Moderate', 'Slight', or no visual effects. In terms of other sensitive visual receptors, such as recreational, cultural heritage and tourist destinations, settlements and transport routes, visual effects were predominantly deemed either 'Slight', 'Not Significant', or 'Imperceptible'. A 'Moderate' effect is deemed to arise for visual receptors in close proximity to the Proposed Wind Farm.

The LVIA reported in Chapter 13 identified that the greatest visual effects are likely to arise at local residential receptors in close proximity to the Proposed Wind Farm. The Proposed Project aligns with the recommended 500m and 4 times tip-height set-back distances (from third party receptors) in the Guidelines and the draft Guidelines.

Cumulative visual effects are included in the impact assessment of photomontage viewpoints outlined in Appendix 13-3. In general, cumulative visual effects are limited due to separation distances between the proposed turbines and the cumulative turbines. The most notable views occur where the proposed turbines are seen in combination with cumulative turbines, particularly in close proximity to the proposed turbines. These views are primarily between the Foyle and Kyleballyoughter wind farms and the proposed turbines, due to their proximity (2.5-3.3 km) to the proposed turbines. While the proposed turbines increase the total number of turbines within the landscape (e.g. VP8 and VP9), they do not extend beyond the Slieveardagh Hills landscape. Instead, they are viewed within the same landscape as the cumulative turbines, as shown in VP3.

For cumulative turbines located within the wider LVIA Study Area, there are limited locations where the proposed turbines will be visible in combination or succession views. However, due to the distance involved, no significant cumulative visual effects are expected to arise. Overall, the vegetated landscape within the LVIA Study Area and the enclosure provided by the surrounding landform effectively minimizes the visual extent of the proposed turbines, allowing the landscape to accommodate multiple wind energy developments, as detailed in Appendix 13-3.

Overall, the Proposed Project is effectively accommodated within the landscape without any Significant effects on the key scenic or landscape sensitivities of receptors identified in the 20km LVIA Study Area. The assessment (Chapter 13) has determined that the landscape of the Proposed Wind Farm site is highly suitable and capable of effectively accommodating the Proposed Project. The Proposed Project is appropriately designed and suitably scaled, and it has been demonstrated that no significant landscape and visual effects will arise as a result or the Proposed Project.

1.14 Cultural Heritage

This chapter was prepared by Tobar Archaeological Services Ltd. It presents the results of an archaeological, architectural and cultural heritage impact assessment of the Proposed Project. The assessment was based on desktop research, field survey, GIS based mapping, ZTV and was also assisted by representative photomontages and photowire images. A detailed examination of the available baseline data was undertaken in addition to a comprehensive site inspection. The latter

comprised a walk-over survey of the Proposed Wind Farm site and any proposed infrastructure therein and a windscreen survey and walk-over survey of the Proposed Grid Connection.

Where potential effects have been identified, such as to potential sub-surface archaeology and to potential sub-surface remains associated with recorded monuments, appropriate mitigation measures have been recommended in order to minimise any such impacts. Recommended mitigation includes pre-development archaeological testing of the Proposed Project infrastructure (turbine bases, hardstands, compounds, new roads, in undisturbed greenfield ground) and archaeological monitoring during the construction stage of the Proposed Project including the areas of archaeological potential at Freshford along the Proposed Grid Connection underground cabling route.

There are no UNESCO World Heritage Sites or those on a Tentative List located within 25km of the nearest proposed turbine. Potential indirect effects on the setting of any, National Monuments within 10km, recorded monuments within 5km and RPS/NIAH structures within 5km were included in order to assess potential effects on setting in the wider landscape. The ZTV demonstrates theoretical visibility of the proposed turbines from the majority of cultural heritage assets within 5km and from National Monuments and those subject to a preservation order within 10km. Both the distance to the nearest turbine and the number of turbines visible from each cultural heritage asset were used to arrive a level of potential effect on setting. Potential effects on setting are based on the worst case scenario in that natural screening, boundaries, buildings and vegetation are not taken into account in the ZTV model and in reality the potential effect is likely to be less. Furthermore, many of these monuments may not be readily discernible in the landscape which further ameliorates effects on setting.

All cultural heritage assets within 100m of the Proposed Grid Connection underground cabling route were assessed for potential effects to same. Potential direct effects to sub-surface features associated with the historic town of Freshford and the graveyard associated with St Lachtain's church at Freshford are identified. Mitigation in the form of licensed archaeological monitoring of all ground works associated with the Proposed Grid Connection underground cabling is proposed as mitigation. Monitoring of ground works within the Zone of Notification for other recorded monuments along the route is also proposed.

An assessment of potential cumulative effects was also undertaken taking into consideration other planning applications and identified cumulative wind farm projects within 20km of the proposed turbines. While some potential cumulative visual effects to the wider setting of cultural heritage assets is possible when considered with the identified cumulative wind farm projects, no significant cumulative effects have been identified and no cumulative effects to the immediate setting of cultural heritage assets will occur.

No significant direct or indirect effects to the recorded cultural heritage resource as a result of the Proposed Project have been identified. Where potential direct effects to sub-surface archaeology have been identified appropriate mitigation measures are proposed in order to ameliorate this potential effect.

1.15 Material Assets

1.15.1 Traffic and Transport

An assessment of the traffic effects on the local highway network was undertaken for the 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 12 to 18 months to construct, the proposed 7 turbine wind farm, the proposed grid connection route linking to the existing 110kV Ballyragget 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 delivery route to the Proposed Wind Farm site for the abnormally sized loads transporting the large turbine components commences at Belview Port in Waterford City. From Belview Port the route travels north on the N29 for approximately 4kms before heading west on the N25 for approximately 6 kms. The route then turns off the N25 at the Grannagh Roundabout to access the N9 heading west for a further 0.8 kms to the Quarry Roundabout that connects with the M9. From the Quarry Roundabout the route heads north on the M9 for approximately 35kms exiting at Junction 9 onto the N10. From this point the route travels north on the N10 for approximately 7.2 km to the Waterford Roundabout on the southern section of the Kilkenny City ring road. The route then heads northwest on the N76 Kilkenny City ring road for approximately 1.2 km to the Callan Road roundabout. From the Callan Road roundabout the Turbine Delivery Route (TDR) travels southwest on the N76 for approximately 14.2 km to the junction with the R695 just north of the town of Callan. At this point the route turns right off the N76 and heads north on the R695 for approximately 9.4 km to the priority junction with the local L1009 in Kilmanagh. At this junction the TDR turns left to head west for approximately 0.2 km to a point where the abnormally sized loads will turn right off the L-1009 to access the Proposed Wind Farm Site at a temporary access junction.

The abnormal loads will be delivered in convoys of 3 vehicles per night over 19 separate nights. It is proposed that this temporary access off the L-1009 will also be used on 7 separate days for concrete deliveries during the construction of the turbine foundations. This junction will then be closed and the existing boundary re-instated to its existing condition and opened only in the event that a large turbine component requires to be replaced.

All other construction related traffic will gain access to the site via a new access road off the L-5024 located on the northern boundary of the Proposed Wind Farm site. Construction activity at this junction will continue for an estimated 222 working days, after which it is proposed that this access will be retained to provide for maintenance staff once the Proposed Wind Farm is in operation.

The Proposed Grid Connection underground cabling route connects to the existing Ballyragget 110kV Substation, located in the townland of Moatpark, County Kilkenny, and measures approximately 23km. It is estimated the route will take approximately 230 days to construct. Some road closures will be required along the route with the maximum diversion incurred being approximately 6.9kms.

Vehicle types and network geometry

The types of vehicles that will be required to deliver the turbine plant will be up to 86.9 metres long and will carry a blade 81.5 metres in length.

An assessment of the geometric requirements of the delivery vehicles was undertaken on the TDR. The assessment confirmed that no remedial works are required to accommodate the vehicles associated with the Proposed Project. 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

For 222 days, when general construction works will take place at the same time as the construction of the Propose Grid Connection underground cabling route, an additional 123 PCUs will travel to/from the Proposed Wind Farm site. Proposed Project generated general construction traffic will avoid the TDR through the settlement of Kilmanagh, with potential routes via Kilkenny identified for general construction traffic in Section 15.1.2.3 of this EIAR. During these days it is forecast that the increase in traffic volumes will range from +1.3% on the N10 between the M9 and Kilkenny (Link 1), to +1.2% on the N76 just to the east of Callan (Link 2) and +3.5% on the R695 just to the north of Callan (Link 3). Travelling north toward the site background traffic volumes decrease resulting in a 13.6% increase on the R695 approaching Kilmanagh (Link 4), a 9.3% increase on the L-1009 just west of Kilmanagh. It is forecast that this will have a temporary slight negative effect for existing traffic on the delivery routes and on the route of the Proposed Grid Connection underground cabling route and at the Proposed Wind Farm access junction on the L5024.

For 7 days when the standard HGV delivery of smaller turbine components are made to the site by at the same time as the remaining 7 days required for the construction of the Proposed Grid Connection underground cabling route, it is forecast that an additional 85 PCUs will travel to/from the Proposed Wind Farm site. On these days it is forecast that the increase in traffic volumes will range from +0.9% on the N10 between the M9 and Kilkenny (Link 1), to +0.8% on the N76 just to the east of Callan (Link 2) and +2.4% on the R695 just to the north of Callan (Link 3). Travelling north toward the site it is forecast that there will be a 9.4% increase on the R695 approaching Kilmanagh (Link 4), a 6.4%% increase on the L-1009 just west of Kilmanagh (Link 5). It is forecast that this will have a temporary slight negative effect for existing traffic on the delivery routes and on the route of the Proposed Grid Connection underground cabling route and at the proposed access junction on the L5024.

For 7 days when concrete is delivered to the site for the construction of the turbine foundations via the TDR and the temporary junction on the L1009 west of Kilmanagh, an additional 584 PCUs will travel to/from the Proposed Wind Farm site. On these days it is forecast that the increase in traffic volumes will range from +6.0% on the N10 between the M9 and Kilkenny (Link 1), to +5.6% on the N76 just to the east of Callan (Link 2) and +16.5% on the R695 just to the north of Callan (Link 3). Travelling north toward the site it is forecast that there will be a 64.5% increase on the R695 approaching Kilmanagh (Link 4) and a 44.2% increase on the L-1009 just west of Kilmanagh (Link 5). It is forecast that this will have a temporary moderate negative effect for existing traffic on the delivery route and at the temporary access junction on the L-1009.

On the 19 nights that the abnormal loads carrying the large turbine components travel to the Proposed Wind Farm, an additional 105 PCUs will travel to/from the site. On these days the volumes of traffic will remain at similar level in terms of pcus when it is forecast that the increase in traffic volumes will range from +1.1% on the N10 between the M9 and Kilkenny (Link 1), to +1.0% on the N76 just to the east of Callan (Link 2) and +3.0% on the R695 just to the north of Callan (Link 3). Travelling north toward the site it is forecast that there will be a 11.6% increase on the R695 approaching Kilmanagh (Link 4) and an 8.0% increase on the L-1009 just west of Kilmanagh (Link 5). It is forecast that this will have a temporary moderate negative effect for existing traffic on the TDR and at the temporary access junction on the L-1009.

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

1.15.2 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.

No operators have links within the Proposed Wind Farm site. Only one operator (Three Ireland Ltd) has links in proximity to the area of the Proposed Wind Farm site, however, these links are directed away from the Proposed Wind Farm and do not cross the Proposed Wind Farm site. Further correspondence with this operator confirmed that there is no potential for impacts on their links.

There are no airports or aerodromes located within or adjacent to the Site. The nearest airport to the Site is the Kilkenny Airport, located at Holdensrath, Co. Kilkenny. This airport is located approximately 6.6km east of the Proposed Wind Farm. The closest large international airport to the Proposed Project is Cork Airport, which is located approximately 114km southwest of the Proposed Wind Farm. Notification will be given to the Irish Aviation Authority 30 days prior to erection of the turbines and a data share of turbine coordinates and dimensions will be provided, as requested.

1.15.3 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 Project.

There are no 110kV or 38kV overhead electricity lines within or adjacent to the Proposed Wind Farm. The Proposed Grid Connection underground cabling route passes under 38kV and 110kV overhead electricity lines in the townland of Moatpark, Co. Kilkenny. There are no 38kV or higher known existing underground electricity cables present on the Proposed Wind Farm site or along the Proposed Grid Connection underground cabling route.

There is no Gas Network Ireland infrastructure within or near the Site.

A water main runs along the L1009 located within the southern extent of the EIAR Site Boundary, adjacent to the temporary access road. An additional water main runs from the L1011 east of the Site and enters the Site passing through agricultural fields. An approximately 200m length of this water main is located within the Site although there is no proposed infrastructure that overlaps with the water main or which is located within 300m. The Proposed Grid Connection underground cabling route also crosses a number of water mains within Tullaroan and Freshford.

There are no EPA-licensed or local authority-authorised waste facilities or activities located within the Site. The closest, authorised municipal waste facility is located approximately 10km northeast of the Site in Dunmore, Co. Kilkenny. A Waste Management Plan (WMP) has been prepared and forms part of the Construction and Environmental Management Plan (CEMP) in Appendix 4-2 of the EIAR.

With the implementation of best practice measures and all mitigation and monitoring measures set out in Chapter 15, the effects on utilities and waste management will be imperceptible for the short-term construction, operationaland decommissioning phases.

1.16 Major Accidents and Natural Disasters

This section of the EIAR describes the likely significant 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.

Major accidents or natural disasters are hazards which have the potential to affect the Proposed Project and consequently have potential impacts on the environment. These include accidents during construction and operation caused by operational failure and/or natural hazards. The assessment of the risk of major accidents and/or disaster considers all factors defined in the EIA Directive that have been considered in this EIAR, i.e., population and human health, biodiversity, ornithology, land, soil, water, air quality, climate and material assets, cultural heritage and the 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 of this EIAR,

The scenario with the highest risk score in terms of the occurrence of major accident and/or disaster was identified as ‘Contamination’ of the Site and risk of Fire/Gas Explosion’ during the construction phases, ‘Fire/Gas Explosion’ during operational phase and ‘Contamination’ during the decommissioning phase.

The Proposed Project has been designed and will be built in accordance with the best practice measures set out in this EIAR and, as such, mitigation against the risk of major accidents and/or disasters is embedded through the design.

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 Effects

Chapter 17 of this EIAR identifying the potential significant environmental effects that may occur in terms of Population and Human Health, Biodiversity, Birds, Land, Soils and Geology, Water, Air Quality, Climate, Noise and Vibration, Landscape and Visual, Cultural Heritage, Material Assets and Major Accidents and 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.