

Chapter 3 Site Selection and Reasonable Alternatives

Slieveacurry Renewable
Energy Development,
Co. Clare

Environmental Impact Assessment
Report (EIAR)



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3. SITE SELECTION AND REASONABLE ALTERNATIVES

3.1 Introduction

Article 5(1)(d) of Directive 2011/92/EU¹ of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (codification) as amended by Directive 2014/52/EU² (the EIA Directive) requires that the Environmental Impact Assessment Report (EIAR) prepared by the developer contains “a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment.”

Article 5(1)(f) of the EIA Directive requires that the EIAR contains “any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.”

Annex IV of the EIA Directive states that the information provided in an EIAR should include a “description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.”

As detailed in Section 1.1.2 in Chapter 1, for the purposes of this EIAR, the following references are used: the ‘Proposed Project’, the ‘Proposed Wind Farm Site’, the ‘Proposed Grid Connection Site’, and ‘Proposed Enhancement Site’ and the ‘Site’. A detailed description of the Proposed Project is provided in Chapter 4 Description of the Proposed Project of this EIAR.

This section of the EIAR contains a description of the reasonable alternatives that were studied by the Applicant, which are relevant to the Proposed Project and its specific characteristics, in terms of site location and other renewable energy technologies as well as site layout incorporating size and scale of the Proposed Project, connection to the national grid and transport route options to the Site. This section also outlines the design considerations in relation to the Proposed Project. It provides an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects. The consideration of alternatives is an effective means of avoiding environmental impacts. As set out in the Environmental Protection Agency (EPA) ‘Guidelines on The Information to be Contained in Environmental Impact Assessment Reports, 2022’ (EPA, 2022)³, the presentation and consideration of reasonable alternatives investigated is an important part of the overall EIA process.

Hierarchy

EIA is concerned with projects. EPA, 2022 states that in some instances neither the Applicant nor the competent authority can be realistically expected to examine options that have already been previously determined by a higher authority, such as a national plan or regional programme for infrastructure.

¹ European Union (2011). Directive 2011/92/EU. European Parliament and European Council.

² European Union (2014). Directive 2014/52/EU. European Parliament and European Council.

³ https://www.epa.ie/publications/monitoring-assessment/assessment/EIAR_Guidelines_2022_Web.pdf

Non-Environmental Factors

EIA is confined to the environmental effects that influence consideration of alternatives. However, other non-environmental factors may have equal or overriding importance to the developer of a project, for example project economics, land availability, engineering feasibility or planning policy.

Site-Specific Issues

EPA, 2022 states that the consideration of alternatives also needs to be set within the parameters of the availability of the land, i.e., the site may be the only suitable land available to the developer, or the need for the project to accommodate demands or opportunities that are site-specific. Such considerations should be on the basis of alternatives within a site, for example design and layout.

3.2 Consideration of Reasonable Alternatives

3.2.1 Methodology

The EU Guidance Document on the preparation of EIAR (EU, 2017) outlines the requirements of the EIA Directive and states that, in order to address the assessment of reasonable alternatives, the Developer needs to provide the following:

- A description of the reasonable alternatives studied; and
- An indication of the main reasons for selecting the chosen option with regards to their environmental impacts.

There is limited European and National guidance on what constitutes a ‘reasonable alternative’ however EU, 2017 states that reasonable alternatives “*must be relevant to the proposed project and its specific characteristics, and resources should only be spent assessing these alternatives*”.

The guidance also acknowledges that “*the selection of alternatives is limited in terms of feasibility. On the one hand, an alternative should not be ruled out simply because it would cause inconvenience or cost to the Developer. At the same time, if an alternative is very expensive or technically or legally difficult, it would be unreasonable to consider it to be a feasible alternative*”.

EPA, 2022 states that “*It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or ‘mini-EIA’) of each alternative is not required.*”

Consequently, taking consideration of the legislative and guidance requirements into account, this chapter addresses alternatives under the following headings:

- ‘Do Nothing’ Alternative
- Alternative Site Locations
- Alternative Renewable Energy Technologies
- Alternative Project Design Options:
 - Alternative Turbine Numbers and Model;
 - Alternative Turbine Layout and Development Design;
 - Alternative Road Layout
 - Alternative Borrow Pit Options
 - Alternative Biodiversity Management and Enhancement Areas
 - Alternative Design of Ancillary Structures
 - Alternative Internal Site Cabling Route

- Alternative Meteorological Mast Location
- Alternative Temporary Construction Compound Locations
- Alternative Turbine Component Delivery Option and Site Access
 - Alternative Ports of Entry
 - Alternative Component Delivery Route
- Alternative Mitigation Measures

Each of these headings and how they relate to the Proposed Project, are addressed in the following sections. When considering the Proposed Wind Farm and Proposed Grid Connection Site, given the intrinsic link between layout and design, the two will be considered together in this chapter.

3.2.2 ‘Do-Nothing’ Alternative

Annex IV, Part 3 of the EIA Directive states that the description of reasonable alternatives studied by the developer should include *“an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.”* This is referred to as the “do nothing” alternative. EU, 2017 states that this should involve the assessment of *“an outline of what is likely to happen to the environment should the project not be implemented – the so-called ‘do-nothing’ scenario.”*

An alternative land use option to developing a renewable energy project at the Site would be to leave the Site as it is, with no changes made to the current land use practices of commercial forestry, agriculture, turf cutting and public road corridor on the Site. In doing so, the environmental effects in terms of emissions are likely to be neutral.

However, by implementing this ‘Do-Nothing’ alternative, the opportunity to capture the available renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions. The opportunity to generate local employment, local authority development contributions, rates and investment in the local area would be lost. Furthermore, the opportunity to implement the measures outlined in the Biodiversity Management and Enhancement Plan (BMEP) as outlined in Appendix 6-4 would also be lost.

As such, on the basis of the positive environmental effects arising from the project when compared to the ‘Do-Nothing’ scenario, the ‘Do-Nothing’ scenario was not the chosen option. The existing land uses can and will continue in conjunction with the Proposed Project. A comparison of the potential environmental effects of the ‘Do-Nothing’ Alternative when compared against the chosen option of developing a renewable energy project at this site are presented in Table 3-1 below.

Table 3-1 Comparison of environmental effects when compared against the chosen option of developing a renewable energy project.

Environmental Consideration	‘Do-Nothing’ Alternative	Chosen Option of developing a renewable energy project
Population & Human Health	<p>No increase in local employment and no long-term financial contributions towards the local community.</p> <p>No potential for shadow flicker and noise to affect sensitive receptors.</p>	<p>Approximately 70 jobs could be created during the construction, operation, and maintenance phases of the Proposed Project.</p> <p>Based on the assessment detailed in Chapter 5 Population & Human Health, and the mitigation measures</p>

Environmental Consideration	'Do-Nothing' Alternative	Chosen Option of developing a renewable energy project
	<p>No potential for effects on visual amenity due to the construction and operation of turbines.</p> <p>No potential for positive effects on air quality and climate change targets.</p> <p>No potential to supply an estimated 49,056 homes with clean renewable electricity</p>	<p>proposed, there will be no significant effects related to shadow flicker and noise from the Proposed Project.</p> <p>As detailed in Chapter 12, residual effects from Noise and Vibration are predominantly not significant for the short-term construction and decommissioning phases. For the Operational Phase, the residual effects are also considered 'Not Significant'.</p> <p>As detailed in Chapter 13 Landscape & Visual, there will be no significant residual effect. All Proposed Turbines exceed the mandatory 500m set-back distance from third party and non-involved receptors set out in the 'Wind Energy Development Guidelines for Planning Authorities' (DoEHLG, 2006) (hereafter referred to as the 'Guidelines (DoEHLG, 2006)⁴ and the 4 times tip height set-back distance set out in the 'Draft Wind Energy Development Guidelines' (December 2019)⁵ (hereafter referred to as the 'Draft Guidelines (DoHPLG, 2019)) for the purpose of protecting visual amenity.</p>
<p>Biodiversity (including Birds)</p>	<p>No habitat loss.</p> <p>No potential for collision risk for birds and bats</p> <p>No potential biodiversity enhancement measures would be put in place.</p>	<p>As detailed in Chapter 6 Biodiversity, and Appendix 6-4 the Biodiversity Management and Enhancement Plan (BMEP) the Proposed Project has been designed to avoid or mitigate impacts on biodiversity, including bats and downstream aquatic receptors.</p> <p>As detailed in the Bat Report in Appendix 6-1 of this EIAR, there is unlikely to be any significant effect in relation to collision risk to bats from the Proposed Project.</p> <p>As detailed in Chapter 7 Ornithology, the Collision Risk Assessment (CRA) indicates that the impact of the Proposed Project on birds corresponds</p>

⁴ <https://assets.gov.ie/static/documents/wind-energy-development-guidelines-2006.pdf>

⁵ <https://assets.gov.ie/static/documents/draft-revised-wind-energy-development-guidelines-december-2019-385c92c2-16f9-4511-80bf.pdf>

Environmental Consideration	'Do-Nothing' Alternative	Chosen Option of developing a renewable energy project
		to a Very Low effect significance. There will be an unlikely long-term imperceptible negative effect, which is Not Significant.
Land, Soils & Geology	No excavation of large volumes of peat and spoil	<p>As detailed in the assessment in Chapter 8 Land Soils and Geology, peat, topsoil and subsoil excavation volumes will be managed within the Proposed Wind Farm Site, and the residual effects on peat, topsoil and subsoil are not significant. Geotechnical investigations followed by careful design will lead to no significant environmental impacts.</p> <p>The peat and spoil management proposals discussed in Chapter 4 Description and Appendix 4-2 of the EIAR sets out the optimal treatment for peat and spoil excavated/generated on site without creating significant impacts for biodiversity, hydrology, land use etc.</p>
Hydrology and Hydrogeology	Neutral	As detailed in the assessment in Chapter 9 Hydrology and Hydrogeology, no significant effects on surface water or groundwater quality will occur.
Air Quality	Neutral. Will not provide the opportunity for an overall increase in air quality or reduction of greenhouse gasses	As detailed in the assessment in Chapter 10 Air Quality, there will be no significant effects on air quality during the construction, and decommissioning phases. There will be a Long-term Moderate Positive Impact on air quality during the operational phase.
Climate	Neutral. Will not provide the opportunity for a contribution to the reduction of greenhouse gases. Will not assist in achieving the renewable energy targets set out in the Climate Action Plan	As detailed in the assessment in Chapter 11 Climate, over the proposed 35-year lifetime of the Proposed Project, 34,791 tonnes of carbon dioxide per annum will be displaced from traditional carbon-based electricity generation. Over the proposed 35-year lifetime of the Proposed Project therefore, 1,217,690 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The addition of an estimated 54MW clean

Environmental Consideration	'Do-Nothing' Alternative	Chosen Option of developing a renewable energy project
		energy to the national grid will be a positive contribution to the States renewable energy targets set out in the Climate Action Plan 2025.
Noise & Vibration	Neutral. No potential for noise impacts on nearby sensitive receptors.	Based on the assessment detailed in Chapter 12 Noise & Vibration, and the mitigation measures proposed, there will be no significant effects on sensitive receptors due to an increase in noise levels from the Proposed Project during the construction and operational phase
Landscape & Visual	Neutral. No potential for landscape and visual impacts on nearby sensitive receptors.	As detailed in the assessment in Chapter 13 Landscape & Visual, the lack of nearby highly sensitive landscape and visual receptors, and the strategic siting of the Proposed Turbines will mitigate any potential for significant landscape and visual effects.
Cultural Heritage & Archaeology	Neutral. No potential for impacts on unrecorded, subsurface archaeology.	As detailed in the assessment in Chapter 14 Archaeological, Architectural and Cultural Heritage, the significance of direct effects will be slight - not significant and no significant effects will occur. There will be no significant direct or indirect impacts on Cultural Heritage and Archaeology.
Material Assets	Neutral	As detailed in Chapter 15, there will be temporary imperceptible to slight negative effect on traffic volumes on the local road network during the construction phase of the Proposed Project. A detailed Traffic Management Plan incorporating all the mitigation measures will be agreed with the roads authority prior to construction works commencing on site
Vulnerability of the Project to Major Accidents and Natural Disaster	No potential to be affected by or to cause major accidents or natural disasters	As demonstrated in Chapter 16, 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).

Environmental Consideration	'Do-Nothing' Alternative	Chosen Option of developing a renewable energy project
		<p>The Proposed Project will be designed and built in accordance with current best practice and, as such, mitigation against the risk of major accidents and/or disasters will be embedded through the design. With the implementation of all mitigation and monitoring measures detailed in the EIAR, there will not be significant residual effects associated with the construction, operation and decommissioning of the Proposed Project.</p>

For the reasons set out above, the proposal for a wind energy development at the Site was progressed over a 'Do-Nothing' scenario despite the potential environmental effects, as it was determined through the iterative design process and site visits carried out by the EIAR team that any potential environmental effects could be eliminated or appropriately mitigated as set out in detail in Chapters 5-16 of this EIAR. By progressing the Proposed Project, there is an opportunity to enhance the employment and investment in the local area and to capture the available renewable energy resource within Co. Clare, thus contributing to meeting national and international climate targets. Please refer to Chapter 5 through to Chapter 16 of this EIAR for further details on the likely significant effects associated with the progression of the Proposed Project.

3.2.3 Alternative Site Locations

To ensure that the levelised costs of building each megawatt of electricity-generating capacity on a wind farm is controlled efficiently, it is incumbent on the design team to ensure that the most suitable site for development of a wind farm development is chosen. The process of identifying a suitable location for a development such as the Proposed Project is influenced by a number of factors. While wind speeds, the extent of suitable or available land, proximity to the grid connection point, and planning policy are all very important, a wind farm project must be commercially viable/competitive, as otherwise it will not attract the necessary project finance required to see it built.

3.2.3.1 Previous Site History

The Site, as detailed in Chapter 1, Section 1.2, was subject to two previous planning applications in 2020 and 2021 for an 8 no. turbine renewable energy development.

The Site had previously been identified as having potential for a wind energy development as a result of a nationwide search of suitable lands. The previous planning applications were constraints and facilitators led, with multiple design iterations considered so as to determine the most suitable site location for the development infrastructure. 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. The Proposed Project has also undergone a constraints and facilitators led approach to design, all while being cognisant of any previous application data. A constraints analysis was undertaken and included avoidance of environmental designations (Natura 2000 sites), review of national, regional and local policies and objectives, suitable wind speeds, adequate

setbacks from sensitive receptors, proximity to national grid nodes, avoidance of direct impacts on known cultural heritage assets, access, and constructability.

The Proposed Wind Farm Site has always been deemed as ‘Strategic’ in both the Clare County Development Plan (CDP) 2017-2023 and the Clare CDP 2023-2029 relevant Wind Energy Strategies. Further detail on the currently adopted CDP is included below in Section 3.2.3.2.1.

3.2.3.2 Strategic Site Selection

As the cost of building each megawatt of electricity generating capacity in a wind farm is in the region of €1.5 million, it is critical that the most suitable site for the Proposed Project is chosen.

As set out in Section 1.4 of Chapter 1 of this EIAR, the Applicant company, Slieveacurry 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 Q4 2025, Enerco associated companies had over 975 Megawatts (MW) of wind generating capacity in commercial operation and under construction, with a further c.400MW of projects at various stages in its portfolio to assist in meeting Ireland’s renewable energy targets. Enerco Energy Ltd. invests a significant amount of time and resources identifying and investigating sites for renewable energy proposals throughout the Country.

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

- **Local Policy:** alignment with the wind energy strategy (i.e., in an area deemed ‘strategic’) of the relevant local authority
- **Environmental Sensitivities:** Located outside areas designated for protection of ecological species and habitats;
- **Grid Connection:** Access to the national electricity grid possible within a viable distance;
- **Sensitive Receptors:** Capable of complying with required setbacks from sensitive receptors.
- **Site Scale:** Sufficient area of unconstrained land that could potentially accommodate a wind farm development and turbine spacing requirements;

The criteria above will be explained further below in so far as they influenced the site selection exercise undertaken.

3.2.3.2.1 Planning Policy

Section 2.5.4 of Chapter 2 of this EIAR sets out in detail the planning policies of Clare County Council with regards to wind energy development. The Proposed Project is situated within the administrative area of Clare County Council and is therefore subject to the planning policies and objectives set out in the Clare CDP 2023-2029. Clare County Council’s ‘*Wind Energy Strategy*’ is set out in Volume 6⁶ of the CDP and identifies areas within the county according to a hierarchy, from the most optimal down to areas that are not generally considered suitable in relation to wind energy. There are four categories within the Wind Energy Strategy:

⁶Clare County Development Plan 2023-2029, Volume 6 Clare Wind Energy Strategy. <https://clarecdp2023-2029.clarecoco.ie/stage3-amendments/adoption/volume-6-clare-wind-energy-strategy-clare-county-development-plan-2023-2029.51390.pdf>

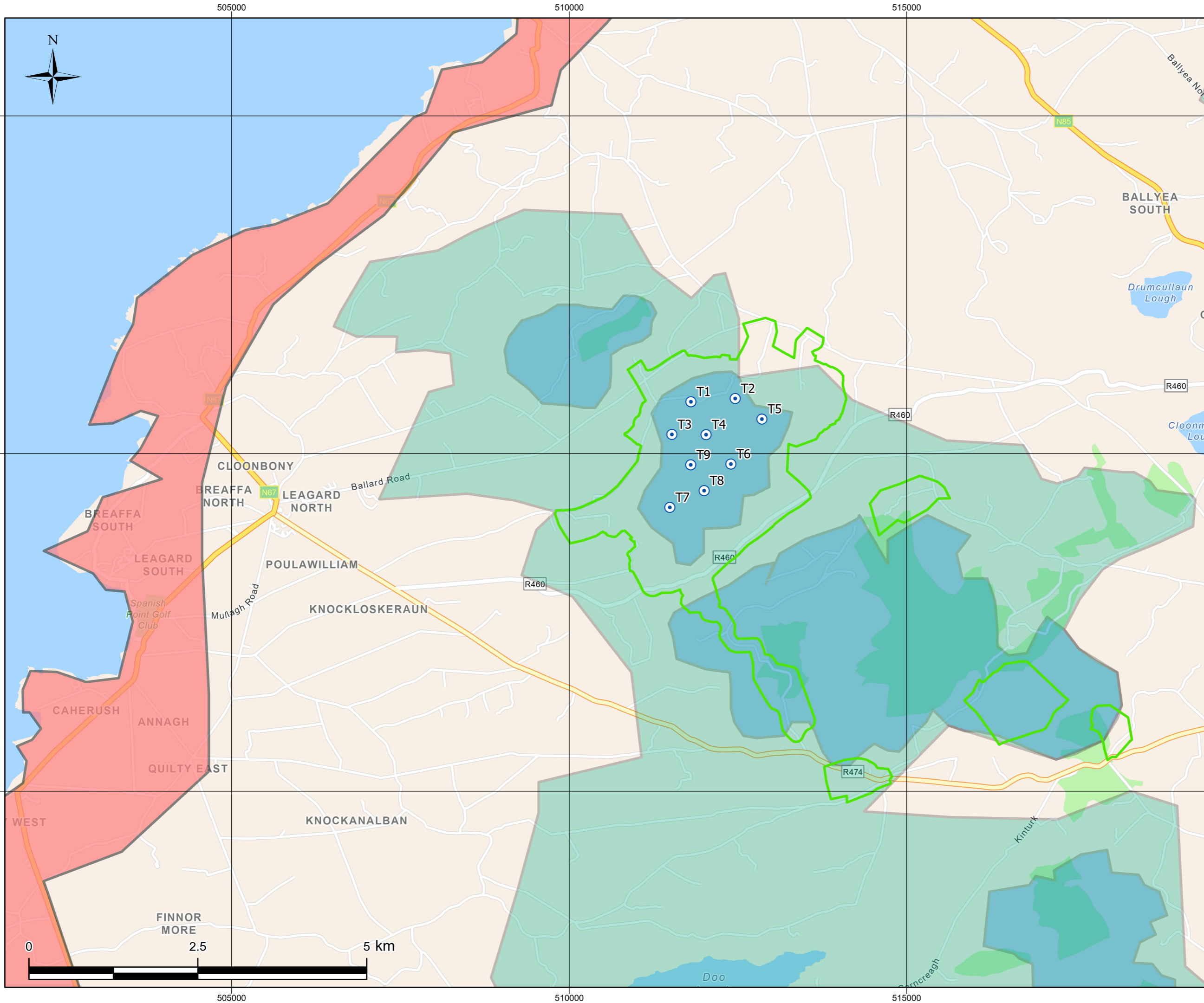
- > Strategic Areas
- > Acceptable in Principle
- > Open to Consideration
- > Not Normally Permissible

The Proposed Wind Farm Site is located in an area designated as ‘Strategic’ under the CDP’s Wind Energy Strategy. Areas that are Strategic are *‘considered to be eminently suitable for wind farm development and are of strategic importance because of:*

- *Good / excellent wind resources;*
- *Access to grid;*
- *Distance from properties and outside any Natura 2000 sites.’*

Wind turbines located in strategic areas are therefore open to development, subject to conformance with the Wind Energy Strategy and the proper planning and sustainable development of the area. The Proposed Wind Farm Site was therefore deemed to have favourable potential to support a wind energy development from a planning policy perspective.

Further elaboration on the policies that identify the Proposed Wind Farm Site as being suitable for wind energy development are detailed in Section 2.5.4 of Chapter 2.



Map Legend

- EIA Site Boundary
- Proposed Turbines

Clare WES 2023-2029

- Acceptable in principle
- Not normally permissible
- Strategic Areas

SITE LOCATION - NOT TO SCALE

Drawing Title		
Clare Wind Energy Strategy		
Project Title		
Slieveacurry Renewable Energy Development		
Project No.	Drawing No.	Scale
240718	3-1	1:52,000
Drawn By	Checked By	Date
MVN	BT	27/04/2026

Email: info@mkofireland.ie / Website: www.mkofireland.ie

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3.2.3.2.2 Environmental Sensitivities

The Site is not located within any Nationally Designated or Natura 2000 sites.

The nearest Natura 2000 site, i.e. Special Area of Conservation (SAC) or Special Protection Area (SPA), is the Inagh River Estuary SAC which is located approx. 6.2km north of the Site at its nearest point. The nearest national designated site, i.e. Natural Heritage Area (NHA) or proposed Natural Heritage Area (pNHA) is the Slievacallan Mountain Bog NHA, located approx. 0.25km east of the Site at its nearest point and is of conservation significance due to the presence of peatlands.

3.2.3.2.3 Grid Connection

It is proposed to connect the Proposed Project to the national electricity grid via 33kV underground cabling which will connect the Proposed Turbines to the proposed extensions to the existing Slievacallan 110 kV substation, located approximately 3.9km kilometres to the south of the Proposed Wind Farm Site. Of the 7.1km of 33kV underground cabling, approx. 4.0km is within private access roads for Slievacallan Wind Farm. Details regarding potential alternative grid connection options are considered and presented in Section 3.2.5.6.

3.2.3.2.4 Sensitive Receptors

The Applicant sought to identify an area with a relatively low population density. Having reviewed the settlement patterns in the vicinity, the study area has emerged as suitable to accommodate the Proposed Project. The population density of the Population Study Area, as described in the Population and Human Health section in Chapter 5 of this EIAR, is 17.4 persons per square kilometre. This is considerably lower than the average national population density of 73.3 persons per square kilometre, and lower than the population density of Co. Clare, recorded as 37.1 persons per square kilometre. The Proposed Turbines achieve the recommended setbacks from third-party inhabitable dwellings in both the Guidelines (DoEHLG, 2006) and the Draft Guidelines (DoHPLG, 2019).

The nearest settlement to the Proposed Turbines is the town of Miltown Malbay, which is located approximately 5.8km west of the nearest proposed turbine (T07) and is classified as a Small Town in the settlement hierarchy of the Clare CDP⁷.

3.2.3.2.5 Site Scale

The Site, which covers a total of 1,260 hectares and comprises a mix of coniferous forestry, agriculture, turf cutting and public road corridor, has an elevation range of 67 AOD (Above Ordnance Datum) to 261m AOD. Land use is predominantly the same on adjacent lands. The Proposed Wind Farm Site benefits from some existing forestry and agricultural roads (approx. 2.3km). The Proposed Wind Farm Site will be easily accessible off the L6230 local road, via an upgrade to existing access junction. As discussed above, the Site comprises habitats of varying ecological value, with the majority of the permanent built infrastructure footprint of the Proposed Project located within habitats of low ecological value, and appropriate setback distances from sensitive ecological receptors where possible has been a key consideration during the iterative design process.

As such, with its proximity to grid, accessibility, and achievable setbacks from sensitive receptors, the Proposed Project affords a large-scale area that is sufficiently unconstrained to accommodate a

⁷ Clare County Development Plan Volume 2 – Maps (April 2023) < <https://clarecdp2023-2029.clarecoco.ie/stage3-amendments/adoption/volume-2-maps-clare-county-development-plan-2023-2029-51395.pdf> >

9-turbine renewable energy development. The constraints and facilitators mapping process is outlined in Section 3.2.5.2.1.

3.2.3.2.6 Summary

Based on the criteria set out above, the Site was identified as being a suitable location for the provision of a renewable energy development of the scale proposed. A portion of the Proposed Wind Farm Site is located on commercial forestry land which allows the Proposed Wind Farm Site to take advantage of the existing access roads (which will be upgraded) and highlights the suitability of the Proposed Project as it can make sustainable use of these established items of infrastructure.

The Proposed Wind Farm Site is designated as 'Strategic' under the Clare CDP's Wind Energy Strategy, and as such are '*considered to be eminently suitable for wind farm development and are of strategic importance*'.

The Site is not located within or adjacent to EU or National protected areas. The Site does however contain habitats that are designated as Annex I Habitats within the EU Habitats Directive (Council Directive 92/43/EEC). Sections of the Site are located on areas of Wet Heath (HH3) and Upland Blanket Bog (PB2) which conform to the following Annex I habitat types: 4010 Wet Heath and 7130 Blanket Bog (Active). The majority of the permanent built infrastructure footprint of the Proposed Project lies within habitats of low ecological value. The Proposed Wind Farm Site primarily consists of commercial forestry, pastoral agriculture and blanket bog, within a rural setting. A detailed BMEP forms part of the Proposed Project to ensure that an overall biodiversity net gain is achieved. Required setbacks as set out above are achievable and wind speeds in the area are considered commercially viable for wind energy development.

The Proposed Grid Connection Site 33kV underground cabling was identified as being suitable to connect the Proposed Turbines to the national grid. The Proposed Grid Connection Site is located primarily within the public road corridor and existing private access tracks. No instream works are proposed as part of the proposed 33kV underground cabling construction, and no likely significant effects have been identified.

Factoring all required environmental constraints into the project design, a site of considerable scale, with an estimated installed capacity of 54MW, and potential to power approximately 40,546 Irish households with renewable energy and displace 34,791 tonnes of carbon dioxide per annum (1,217,690 tonnes over the 35-year operational life) was established. The Site is considered appropriate for wind energy development and represents a positive contribution to National and EU climate action targets.

It can be demonstrated by the above information, and the assessment undertaken within the chapters of this EIAR, that the Site is suitable for wind energy and in accordance with current planning policy of Co. Clare.

After identifying a suitable location for the Proposed Project, the Applicant engaged with the relevant landowners to secure the land required. Through these site assembly discussions, the Site was established and advanced as a cohesive and viable area of sufficient scale to accommodate the Proposed Project.

While the outcome of the site selection process has identified the Proposed Wind Farm Site as a suitable location for a renewable energy development of the nature proposed, it does not preclude other sites within the vicinity being brought forward for consideration in the future.

Throughout the design process, the layout of the Proposed Project has been revised and refined to take account of the findings of all desk-based assessments, site surveys/investigations and baseline assessments, including all relevant previous planning application data, which have brought the

design from its first initial layout to the current proposed layout; please see Section 3.2.5 below for further details.

3.2.4 Alternative Renewable Energy Technologies

The Proposed Project will be located in a site where low intensity agriculture and commercial forestry will continue to be carried out around the permanent built infrastructure footprint.

Both onshore and offshore wind energy development will be required to ensure Ireland reaches the target set in the Climate Action Plan 2025 (CAP 25) to source 80% of our electricity from renewable energy by 2030. It is not a case of ‘either’ ‘or’. CAP 25 has set out the following targets for electricity generation:

- Share of electricity demand generated from renewable sources to up to 80% where achievable and cost effective, without compromising security of electricity supply;
- Onshore Wind Capacity: up to 9GW
- Offshore Wind Capacity: 5GW (minimum)
- Solar PV Capacity: 8GW

When considering other renewable energy technologies in the area, the Applicant considered offshore wind and commercial solar energy production as an alternative to the Proposed Project.

3.2.4.1 Offshore Wind

Although the screening exercise was based on identifying lands for onshore wind development; another alternative source of renewable electricity generation is 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 out under CAP25 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 committed to playing a key role in helping the State achieve its CAP25 objectives while building upon its proven record of generating clean renewable energy to the national grid. As such, the option of an offshore project is not considered to be a reasonable alternative at this time.

3.2.4.2 Solar Energy

The Proposed Project will be located on a site where agriculture and commercial forestry will continue to be carried out around the footprint of the Proposed Wind Farm Site. Commercial solar energy production is the harnessing and conversion of sunlight into electricity using photovoltaic (PV) arrays (panels). To achieve the same maximum estimated electricity output from solar energy as is expected from the Proposed Project (c. 54MW), a larger development footprint would be required. As detailed in Section 1.1.2 in Chapter 1, the EIAR Site Boundary encompasses an area of approximately 1,260ha and the permanent built infrastructure footprint of the Proposed Project measures approximately 8.7ha, which represents approximately 0.7% of the Site.

The amount of electrical energy output from renewable generation is generally described in terms of capacity factor. The capacity factor relates to the amount of energy that may be achieved from a renewable technology over the period of one calendar year. Generally solar PV has a lower capacity factor than wind generation. One factor in the energy yield difference is that solar PV does not produce electrical energy at night, but the wind can blow at any time of the day or night. The Proposed Wind Farm Site is located within the D wind region for Ireland, as outlined in the EirGrid report ‘*Enduring Connection Policy 2.3 Solar and Wind Constraints Report: Assumptions and Methodology*’⁸. The capacity factor for wind in this region is 36% (0.36). If solar PV was to be deployed on the Proposed Wind Farm Site, it would be located within the Solar South region of Ireland as outlined in the same EirGrid report. The capacity factor for solar in this region is 13.3% (0.133).

A solar PV array of the scale necessary to provide the same electricity output as the Proposed Wind Farm Site would require a footprint of approx. 233 ha⁹ or 18.5% of the overall Site. In addition, a solar development of this scale, would have a higher potential environmental effect on Traffic and Transport (construction phase), Air Quality (construction phase) and Biodiversity and Ornithology (habitat loss), a greater potential for direct impacts on unknown subsurface archaeology (construction phase) and glint and glare at the Site (operational phase). Furthermore, the implementation of a solar development would require the removal of the existing forestry, resulting in additional environmental and landscape impacts. In contrast, a wind energy development allows for the continued co-existence of the forestry, thereby minimising land use change and preserving existing habitats.

Taking into account the factors outlined above, and considering the farming practices in the area, it has been determined that wind energy is the most suitable renewable energy technology for the Site with the lesser potential for significant, adverse environmental effects.

A comparison of the potential environmental effects of the development of a solar PV array when compared against the chosen option of developing the Proposed Project at the Site are presented in Table 3-2 below.

Table 3-2 Comparison of environmental effects when compared against the chosen option (wind turbines)

Environmental Consideration	Solar PV Array (with up to 54MW Output)	Chosen Option
Population & Human Health (incl. Shadow Flicker)	<p>Relatively lower long-term financial contributions towards the local community (i.e., community benefit fund) on a per MWh basis</p> <p>Lower potential for noise and vibration effects. Lower potential for visual obstructions in the skyline due to solar farms being low lying structures.</p> <p>No potential for shadow flicker to affect sensitive receptors.</p>	<p>Higher long-term financial contributions towards the local community (i.e., community benefit fund) on a per MWh basis</p> <p>Greater potential for noise and vibration during construction operational and decommissioning phases.</p> <p>No potential for glint and glare impacts on local receptors</p>

⁸ EirGrid (2024) *Enduring Connection Policy 2.3 Solar and Wind Constraints Report: Assumptions and Methodology* <<https://cms.eirgrid.ie/sites/default/files/publications/ECP-2.3-Solar-and-Wind-Constraints-Report-Assumptions-and-Methodology-v1.1.pdf>>

⁹ Approximately 1.6 - 2 ha are required for each MW of solar panels installed based on approximately 4000 panels per MW (taken from the Sustainable Energy Authority Solar Energy FAQ publication which can be accessed here: https://www.seai.ie/publications/FAQs_on_Solar_PV.pdf). For the purposes of comparison, a minimum value of 1.6 ha has been assumed.

Environmental Consideration	Solar PV Array (with up to 54MW Output)	Chosen Option
	<p>Potential for glint and glare impacts on local receptors.</p> <p>Based on the renewable energy outputs associated with solar PV, using solar PV at the Site would have a positive effect on human health due to the production of clean renewable energy and the offsetting of emissions (e.g., nitrogen, sulphur dioxide) which are produced from fossil fuel powered sources of electricity.</p>	<p>Greater potential for visual effects during operational phase. No material difference between the two options during construction and decommissioning.</p> <p>Based on the assessment detailed in Chapter 5 and the mitigation measures proposed, there will be no significant effects related to shadow flicker from the Proposed Project.</p> <p>Based on the assessment included in Chapter 10 and Chapter 11, the Proposed Project will have a long term moderate positive effect on human health due to the production of clean renewable energy and the offsetting of emissions (e.g., nitrogen, sulphur dioxide) which are produced from fossil fuel powered sources of electricity.</p>
<p>Biodiversity (including Birds)</p>	<p>Larger built infrastructure footprint would result in greater potential habitat loss.</p> <p>No potential for collision risk for birds.</p> <p>Potential for glint and glare impacts on birds.</p>	<p>Smaller built infrastructure footprint would result in a smaller habitat loss.</p> <p>As detailed in Chapter 6 Biodiversity, the development has been designed to avoid or mitigate impacts on biodiversity including bats and downstream aquatic receptors.</p> <p>The Proposed Project includes for a BMEP, providing a local boost to biodiversity. Please see Appendix 6-4 for details.</p> <p>With the implementation of the mitigation measures described in Chapter 7 Ornithology, the residual effects for collision risk are not significant. No potential for glint and glare impacts on birds.</p>
<p>Land, Soils & Geology</p>	<p>Shallower excavations involved in solar PV array developments would result in reduced volume of spoil to be excavated.</p>	<p>As detailed in the assessment in Chapter 8, the design measures incorporated into the Proposed Project, in particular the avoidance of deeper peat areas combined with the 'low' importance of the deposits means that the residual effect is considered</p>

Environmental Consideration	Solar PV Array (with up to 54MW Output)	Chosen Option
		<p>Negative, direct, slight, Likely, permanent impact on peat, subsoil and bedrock.</p> <p>No significant effects on peat, subsoil and bedrock will occur.</p> <p>The peat and spoil management proposals discussed in Chapter 4 sets out the optimal treatment for peat and spoil excavated/generated on site without creating significant impacts for biodiversity, hydrology, land use etc.</p>
Water	<p>Shallower excavations involved in solar PV array developments would result in reduced volume of spoil to be excavated, therefore reducing the potential for silt-laden runoff to enter receiving waterbodies.</p>	<p>Project design specific drainage design removes the potential for significant environmental effects. As detailed in the assessment in Chapter 9, no significant effects on surface water or groundwater quality will occur.</p>
Air Quality	<p>Increased potential for dust and other noxious emissions due to larger volume of transport movements to and from site and larger volume of plant and ground works on site due to the larger footprint.</p>	<p>Reduced potential for dust and other noxious emissions due to smaller volume of plant and ground works on site due to a smaller footprint.</p> <p>As detailed in the assessment in Chapter 10, no significant effects on air quality will occur.</p>
Climate	<p>Reduced capacity factor of solar PV array technology would result in less carbon offset</p>	<p>Greater capacity factor of wind will result in a higher carbon offset and a shorter carbon payback period.</p> <p>As detailed in the assessment in Chapter 11 Climate, over the proposed 30-year lifetime of the Proposed Wind Farm, 1,217,690 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The addition of an estimated 67.2MW clean energy to the national grid will be a positive contribution to the States renewable energy targets set out in the Climate Action Plan 2025.</p>
Noise & Vibration	<p>Potential for short term noise impacts on nearby sensitive receptors during the construction phase.</p>	<p>Based on the assessment detailed in Chapter 12 and the mitigation measures proposed, there will be no significant effects on sensitive receptors</p>

Environmental Consideration	Solar PV Array (with up to 54MW Output)	Chosen Option
	<p>Larger traffic movements and increased plant on site due to the larger footprint/ground disturbance could lead to larger noise and vibration output during the construction phase.</p>	<p>due to an increase in noise levels from the Proposed Project during the construction and operational phase.</p>
<p>Landscape & Visual</p>	<p>Panelling potentially less visible from surrounding area due to the screening by vegetation and topography</p>	<p>Greater visibility due to the vertical scale of the Proposed Turbines. As detailed in the assessment in Chapter 13, the landscape value of the Proposed Wind Farm Site is deemed to be of 'Low' value and sensitivity and the strategic siting of infrastructure will mitigate any potential for significant landscape and visual effects.</p>
<p>Cultural Heritage & Archaeology</p>	<p>Larger built infrastructure footprint would increase the potential for impacts on unrecorded, subsurface archaeology.</p>	<p>Smaller built infrastructure footprint would decrease the potential for impacts on unrecorded, subsurface archaeology.</p> <p>As detailed in Chapter 14, there will be no significant direct or indirect effects on known or unknown archaeology and cultural heritage during the construction, operation and decommissioning phases. Archaeological monitoring under licence of the smaller built infrastructure footprint will be implemented during the construction phase.</p>
<p>Material Assets</p>	<p>Potential for greater traffic volumes during construction phase due to the number of solar panels required to achieve the same output.</p> <p>Greater potential for impacts on waste management due to increased plant on site giving rise to increase in hazardous waste materials.</p> <p>No material difference for impacts on gas, water, aviation.</p> <p>No potential for impacts on telecommunications.</p>	<p>As detailed in Chapter 15, there will be short term negative, slight impact on traffic volumes during the construction phase of the Proposed Project. A detailed Traffic Management Plan incorporating all the mitigation measures will be agreed with the roads authority prior to construction works commencing on site.</p> <p>No material difference for impacts on gas, water, aviation. Buffers implemented on telecommunication links.</p> <p>There will be a positive effect on electricity supply with the provision of</p>

Environmental Consideration	Solar PV Array (with up to 54MW Output)	Chosen Option
		an estimated 54MW to the national grid and powering of 40,546 Irish households with renewable electricity per year.
Vulnerability of the Project to Major Accidents and Natural Disasters	<p>Larger development footprint would result in a higher risk in relation to major accidents and natural disasters due to increased land disturbance.</p> <p>Lower potential risk in relation to bridge/structural collapse due to the lighter project components required.</p>	<p>As detailed in Chapter 16, the risk of a major accident and/or disaster during the construction of the Proposed Project is considered 'low'. The highest risk scenarios to the Proposed Project (i.e., contamination and fire/explosion) are considered to be unlikely to occur at any phase of the Proposed Project.</p> <p>A detailed risk assessment on potential risks relating to major accidents and natural disasters is provided in Section 16.4 of Chapter 16 of this EIAR.</p>

While there are positive and negative environmental aspects of both renewable energy development options, neither is likely to have significant adverse effects; however, given the particular suitability of the Site for wind energy development, the lesser area of land required and the greater positive impact of wind energy generation from a climate and air quality perspective, it was considered the more suitable option and the most efficient method of electricity production with the lesser potential for significant environmental effects.

3.2.5 Alternative Project Design Options

3.2.5.1 Alternative Turbine Numbers and Model

Modern wind turbines have a potential power output in the 4 - 7 megawatt (MW) range. It is proposed to install 9 no. turbines at the Proposed Wind Farm Site which will have an estimated installed capacity of 54MW. Such a wind farm could 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 21 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. The proposed number of turbines takes account of all site constraints and the distances to be maintained between turbines and features such as roads and houses, while maximising the wind energy potential of the Proposed Wind Farm. The 9-turbine layout selected for the Proposed Project has the smallest feasible permanent built infrastructure footprint of the other alternatives considered, while still achieving the optimum output at a more consistent level than would be achievable using different turbines.

The turbine model to be installed on the Proposed Wind Farm Site will have an overall ground to blade tip height of 175m; a rotor diameter 150m; and a hub height of 100 metres. The use of alternative smaller turbines at the Proposed Wind Farm Site would not be appropriate as they would fail to make the most efficient use of the wind resource passing over the Proposed Wind Farm Site and would potentially require a larger built infrastructure footprint. This alternative would potentially lead to additional environmental effects.

A comparison of the potential environmental effects of the installation of a larger number of smaller wind turbines when compared against the chosen option of installing a smaller number of larger wind turbines on the Proposed Wind Farm Site is presented in Table 3-3 below.

Table 3-3 Comparison of environmental effects when compared to the chosen option (9 no. wind turbines, higher MW output)

Environmental Considerations	Larger number of smaller turbines	Chosen option of a 9-turbine layout
<p>Population & Human Health (incl. Shadow Flicker)</p>	<p>Greater potential for shadow flicker and noise impacts on nearby sensitive receptors due to the increased number of turbines. However, these can be curtailed to meet threshold criteria.</p> <p>Smaller turbines would be less visually obstructive in the skyline; however, the larger development footprint would spread further across the landscape potentially occupying a larger portion of a viewpoint.</p>	<p>There is no potential for significant shadow flicker effects from the Proposed Turbines. Shadow flicker effects can be mitigated to meet threshold criteria. Further detail can be found in Section 5.5.1.8 of Chapter 5: Population and Human Health of this EIAR.</p> <p>There is no potential for significant noise and vibration effects from the proposed turbines. Furthermore, noise emissions can be curtailed to meet threshold criteria. See Section 12.6.3.1 of Chapter 12: Noise and Vibration for further detail.</p> <p>As detailed in Chapter 13, the landscape type and character of the area where the Proposed Turbines are sited comprises modified working landscape types of low sensitivity and can effectively accommodate wind energy development. Of the 17 no. viewpoints (VPs) assessed 2 no. were deemed not significant, 7 no. were deemed slight, and 8 no. were deemed moderate. The number of receptors experiencing these effects is very low as the landscape surrounding the Proposed Turbines has a significantly low population density. Visual effects will decrease with distance from the Proposed Turbines.</p>
<p>Biodiversity (including Birds)</p>	<p>Larger built infrastructure footprint would result in greater potential for habitat loss.</p>	<p>As detailed in Chapter 6 Biodiversity, the development has been designed to avoid or mitigate impacts on biodiversity including bats and downstream aquatic receptors.</p> <p>As per Chapter 6 of this EIAR, there are no significant long-term negative</p>

Environmental Considerations	Larger number of smaller turbines	Chosen option of a 9-turbine layout
		<p>effects expected on biodiversity receptors.</p> <p>With the implementation of the mitigation measures described in Chapter 7: Ornithology, the residual effects for collision risk are not significant.</p>
Land, Soils, & Geology	<p>Larger built infrastructure footprint would result in greater volume of spoil to be generated, excavated and sorted.</p> <p>Neutral – Geotechnical investigations followed by careful design would lead to no significant environmental impacts.</p>	<p>As detailed in Chapter 4 and 8, the Proposed Project has been designed to utilise the existing roads to minimise ground disturbance where possible.</p> <p>The peat and spoil management proposals discussed in Chapter 4 sets out the optimal treatment for peat and spoil excavated/generated on site without creating significant impacts for biodiversity, hydrology, land use etc.</p> <p>Neutral – Geotechnical investigations followed by careful design would lead to no significant environmental impacts.</p> <p>As detailed in the assessment in Chapter 8, no significant effects on peat, subsoil and bedrock will occur.</p>
Water	<p>Neutral – Project design specific drainage design removes the potential for significant environmental effects.</p> <p>Larger built infrastructure, therefore, increasing the potential for silt-laden runoff to enter receiving waterbodies.</p>	<p>Neutral – Project design specific drainage design removes the potential for significant environmental effects.</p> <p>Smaller built infrastructure footprint would result in less potential for silt laden run-off to enter a waterbody.</p> <p>As detailed in the assessment in Chapter 9, no significant effects on surface water or groundwater quality will occur.</p>
Air Quality	<p>Increased potential for vehicle and construction dust emissions due to an increased volume of construction material and turbine component deliveries to the site, giving rise to a reduced air quality locally for the construction phase.</p>	<p>Decreased potential for vehicle emissions and dust emissions due to a decreased volume of construction material and turbine component deliveries to the Site.</p> <p>As detailed in Chapter 10, there will be no significant effects on air quality during the construction, and</p>

Environmental Considerations	Larger number of smaller turbines	Chosen option of a 9-turbine layout
		decommissioning phases. There will be a Long-term Moderate Positive Impact on air quality by during the operational phase.
Climate	Increased potential for vehicle emissions and dust emissions due to an increased volume of construction material and turbine component deliveries to the Site.	Decreased potential for vehicle emissions and dust emissions due to a decreased volume of construction material and turbine component deliveries to the Site. As detailed in the assessment in Chapter 11 Climate, over the proposed 35-year lifetime of the Proposed Project, 1,217,690 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The addition of an estimated 54MW clean energy to the national grid will be a positive contribution to the States renewable energy targets set out in the CAP25.
Noise & Vibration	Potential for increased noise impacts on nearby sensitive receptors due to reduced separation distance between sensitive receptors and turbine locations and additional turbine generators.	Potential for decreased noise levels at nearby sensitive receptors due to increased separation distance between sensitive receptors and turbine locations. Based on the assessment detailed in Chapter 12, there will be no significant effects on sensitive receptors during the construction operational and decommissioning phases from the Proposed Project.
Landscape & Visual	Smaller turbines may be less visually intrusive on the landscape. Equally, a larger number of smaller turbines would be spread over a wider area, taking up a greater portion of a viewpoint	The Proposed Project is an appropriately designed and suitably scaled project. As detailed in Chapter 13, the landscape type and character of the area where the Proposed Turbines are sited comprises modified working landscape types of low sensitivity and can effectively accommodate wind energy development. Of the 17 no. viewpoints (VPs) assessed 2 no. were deemed not significant, 7 no. were deemed slight, and 8 no. were deemed moderate.
Archaeology, Architectural and Cultural Heritage	Larger built infrastructure footprint would increase the potential for impacts on	As detailed in the assessment in Chapter 14 (Archaeological, Architectural and Cultural Heritage),

Environmental Considerations	Larger number of smaller turbines	Chosen option of a 9-turbine layout
		A detailed risk assessment on potential risks relating to major accidents and natural disasters is provided in Section 16.4.1.6 of Chapter 16 of this EIAR.

For the reasons set out above, the proposal for a 9-no. turbine layout with larger turbines was considered to have the least amount of environmental effects when compared to a larger number of smaller turbines.

3.2.5.2 Alternative Turbine Layout and Development Design

The design of the Proposed Project 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. All have had the objective of reducing the potential for environmental effects while designing a project that is capable of being constructed and viable.

Throughout the preparation of this EIAR, the layout of the Proposed Project has been revised and refined to take account of the findings of all site investigations, which have brought the design from its first initial layout to the current proposed layout. The design process has also taken account of the recommendations and comments of the relevant statutory and non-statutory consultees, the local community and local authorities, as well as any feedback associated with the previous applications as detailed in Chapter 2 of the EIAR, while still seeking to ensure a viable project which can ultimately be constructed and connected to the national grid.

3.2.5.2.1 Constraints and Facilitators Mapping

The design and layout of the Proposed Project follow the recommendations and guidance set out in the Guidelines (DoEHLG, 2006) and the *‘Best Practice Guidelines for the Irish Wind Energy Industry’* (Irish Wind Energy Association, 2012)¹⁰.

The Guidelines (DoEHLG, 2006) 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 Draft Guidelines (DoHPLG, 2019). The proposed changes presented in the Draft Guidelines (DoHPLG, 2019) give certain focus on the setback distance from residential properties, along with shadow flicker and noise requirements relative to sensitive receptors. The consultation on the Draft Guidelines (DoHPLG, 2019) closed on 19th February 2020, but at time of writing, they have not yet been adopted. CAP25 states that new draft wind energy guidelines were intended to be adopted in Q1 2025, however the Guidelines (DoEHLG, 2006) remain the relevant guidelines for the purposes of Section 28 of the Act. Please see Section 1.3.2 of Chapter 1 for further information on the wind energy development guidelines.

The constraints mapping process involves the placing of buffers around different types of constraints so as to clearly identify the areas within which no development works will take place. The size of the buffer zone for each constraint has been assigned using guidance presented in the Guidelines (DoEHLG, 2006). Should the Draft Guidelines (DoHPLG, 2019) be adopted in advance of a decision being made on this planning application, the Proposed Project will be capable of achieving the requirements of the Draft Guidelines (DoHPLG, 2019) as currently proposed.

¹⁰ <https://windenergyireland.com/images/files/9660bdfb5a4f1d276f41ae9ab54e991bb600b7.pdf>

Previous constraints maps for the Site were reviewed and a revised constraints map for the Proposed Project was produced, as shown in Figure 3-2, following an up-to-date desk study of all site constraints. Figure 3-2 encompasses the following constraints and associated buffers:

- **Sensitive Receptors:** a minimum 500m setback from all sensitive receptors achieving the Guidelines (DoEHLG, 2006) recommended setback of 500m and a minimum 700-metre setback from third party sensitive receptors achieving the Draft Guidelines (DoHPLG, 2019) recommended setback of 4 x tip height separation distance from third party sensitive receptors.
- **Natura 2000** sites plus 200-metre buffer;
- **Hydrology:** Watercourses plus 50 metre buffer to Proposed Turbines;
- **Archaeological Sites or Monuments;** 30-metre buffer, plus ‘Zone of Notification’ as required by the National Monuments Service (ROI)
- **Habitats and Biodiversity:** Species specific buffers. Siting of infrastructure so as to minimise loss of habitats of Local Importance (higher value) and higher. Avoidance of Article 17 habitat, and Annex I habitat where possible.
- **Telecommunications:** Telecommunication Links plus operator specific buffer;
- **Existing Wind Turbines:** Consideration of existing renewable energy developments in proximity to the Site to avoid turbulence and wake effects.

Facilitators at the Site build on the existing advantages and include the following:

- Available lands for development;
- Acceptable wind resource;
- Proximity to national grid node;
- Opportunity to win construction materials on site, minimising the potential for additional traffic (and associated environmental impacts) and cost generation by acquiring all materials offsite;
- Existing access points and general accessibility of all areas of the Site due to existing road infrastructure; and,
- Limited extent of constraints.

The inclusion of the constraints on a map of the Proposed Project allowed for the viable area to be confirmed. Being that previous layouts have been constraints led for the Site, these were utilised in the first instance. This layout was then considered and took into account all the constraints mentioned above, their associated buffer zones and the separation distance required between the Proposed Turbines. Following the mapping of all known constraints, updated detailed site investigations were carried out by the project team.

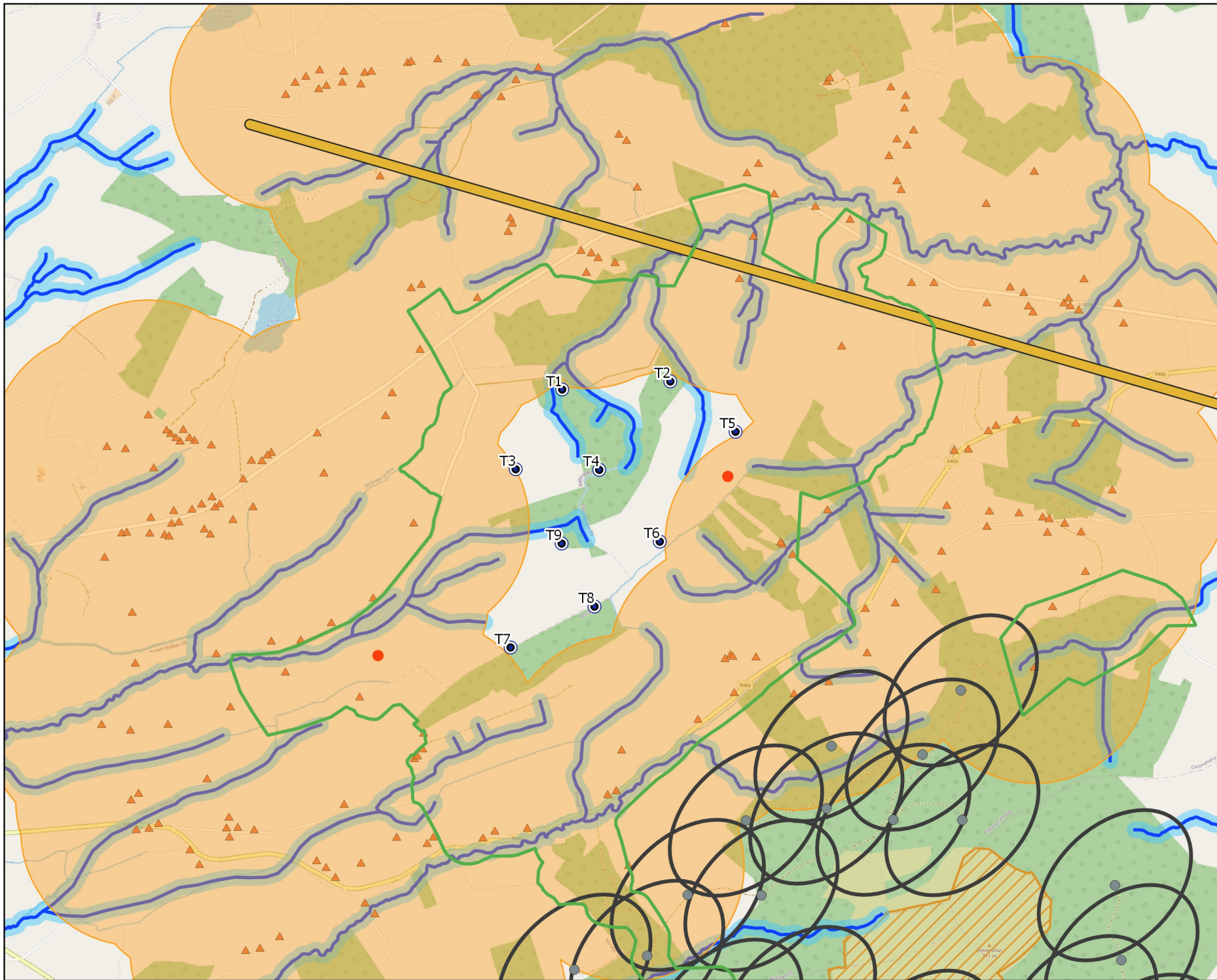
The ecological assessment of the Site encompassed habitat mapping and extensive surveying of birds and other fauna. These assessments, as described in Chapter 6 and 7 of this EIAR on Biodiversity and Ornithology respectively, optimised the decision on the siting of turbines, carrying out of any development works such as the construction of roads, and optimum locations for proposed biodiversity enhancement measures.

The hydrological assessments of the Site included walkover surveys and hydrological mapping, peat and mineral soil lithology investigation, field hydrochemistry measurements, surface water flow measurement and surface water sampling. As detailed in Chapter 9, this data, which was collected over 6 years, was used to design the turbine foundations and other infrastructure on the Site.

Additional geotechnical investigations were also undertaken on the Site in 2025, to provide further detail and clarity on the nature and extent of subsoils and bedrock as a means of characterising the Proposed Wind Farm Site. This allowed for the identification of suitable areas for the Proposed Turbines, borrow pit, and new access roads to be sited in relation to the underlying bedrock. 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 layout for the Proposed Turbines has also been informed by the results of updated noise assessments, landscape and visual assessments, and the separation distance to be maintained between turbines. Thus, the baseline environmental assessment of the 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.



Map Legend

- EIAR Site Boundary
- Proposed Turbines
- Watercourses
- 50m Buffer from Watercourses
- 3rd Party Inhabitable Dwellings
- 700m Buffer from 3rd Party Inhabitable Dwellings
- 30m Buffer from National Monuments
- Natural Heritage Areas
- Telecommunications Link Buffer
- Existing Slievecallan Wind Farm Turbines
- Existing Slievecallan Wind Farm Turbine Ellipses



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Drawing Title Proposed Wind Farm Site Constraints	
Project Title Slievecurry Renewable Energy Development, Co. Clare	
Drawn By MVN	Checked By BT
Project No. 240718	Drawing No. Figure 3-2
Scale 1:30,000	Date 24/04/2026
MKO Planning and Environmental Consultants <small>Tuam Road, Galway Ireland, H91 VV88 +353 (0) 91 235111 email: info@mkofireland.ie Website: www.mkofireland.ie</small>	

3.2.5.2.1 **Alternative Proposed Project Layout Iterations**

The final design of the Proposed Project, including the layout of the Proposed Turbines, takes account of all previous application layouts, site constraints and the distances to be maintained between turbines and from houses, roads, etc. The layout is based on the results of all site investigations since 2016 that have been carried out during the EIAR process, as well as updated constraints and design scoping process with statutory and non-statutory consultees. As information regarding the Site was compiled and assessed, the proposed layout has been revised and amended to take account of the physical constraints of the Proposed Wind Farm Site and the requirement for buffer zones and other areas in which no turbines could be located. The selection of the turbine number and layout has also had regard to wind-yield and the separation distance to be maintained between turbines, as well as landscape and visual, noise and shadow flicker impacts. The EIAR and Proposed Wind Farm Site design process 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.

The development of the final Proposed Wind Farm Site layout has resulted following feedback from the various studies and assessments carried out as well as ongoing negotiations and discussions with landowners and the local community.

Following consideration of the reasons for refusal as outlined in Chapter 1 Section 1.1.1 of the EIAR, the previously proposed turbine layout was reviewed against all site constraints and items raised in the refusal. While the initial turbine layout was similarly 9 no. turbines, the final 'proposed layout' was refined, and turbines were relocated following the scoping exercise and hydrological constraints identified at various locations on the Site. The Proposed Project went through 5 no. separate iterations. Due to their similarities, and given the minor amendments to the layouts, all 5 no. turbine layout iterations have not been discussed individually, but Figures 3-3 to 3-5 below gives an indication of how the design of the turbine layout evolved during the design process. All aspects of the Proposed Project, including both those utilising the design elements proposed in the previous application as well as revised design elements as detailed below were subject to detailed site investigations and a geotechnical and peat stability risk assessment in order to ensure the entirety of the permanent built infrastructure the Proposed Project has a suitable factor of safety value and overall low risk of peat instability.

Proposed Project Layout Iteration No. 1

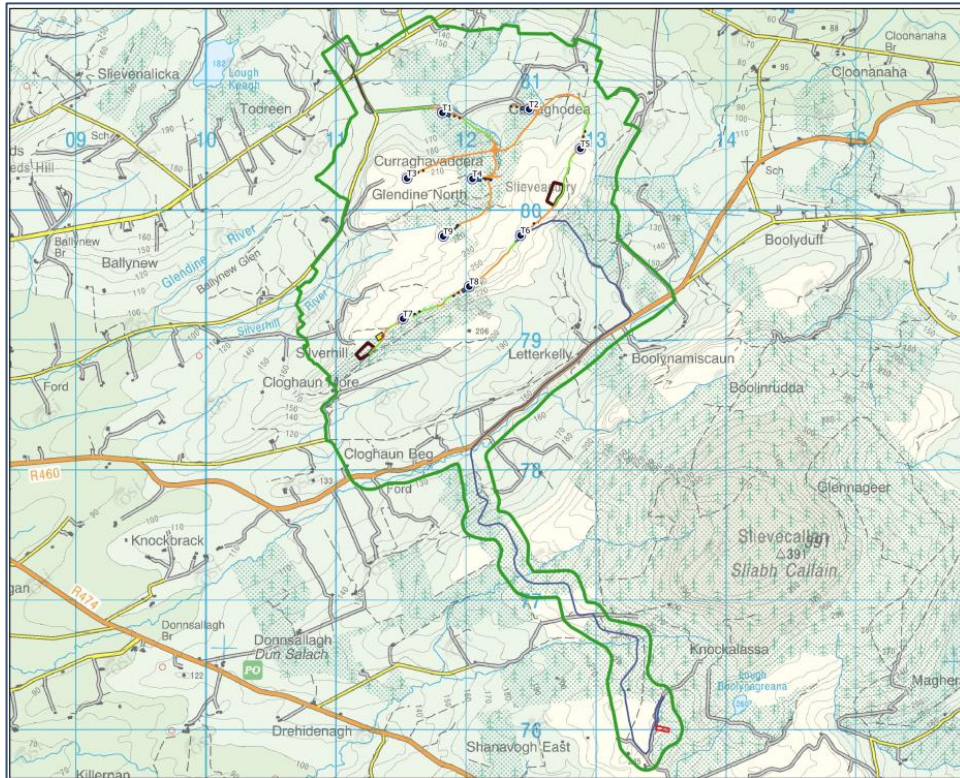


Figure 3-3 Proposed Project Layout Iteration No. 1

The Site is extensively studied and well understood, with surveys having been carried since 2016 by the Applicant. A 9 no. turbine layout was initially considered in 2020 with sufficient constraints and facilitators considered to progress, however prior to the previous applications lodged within the Site as outlined in Chapter 2 of the EIAR, turbine T09 was dropped due to land availability and the layout subsequently brought down to 8 no. turbines. This land has since been made available and has brought back in for the Proposed Project as a facilitator for the inclusion of T09 within this application. The Proposed Project layout has sought to avoid areas of deep peat on site and other environmental sensitivities, whilst also utilising existing roads where possible. The results of a desk study helped optimise the layout, ensuring all Proposed Turbines were located outside all mapped environmental sensitivities buffers (e.g 50m hydrological feature buffers). However, the turbine locations did not change significantly from the initial layout considered for the Proposed Project.

Iteration No.1, as shown above in Figure 3-3, comprises the initial layout for the Proposed Project, which is a combination of the 8 no. turbine layout subject to the previous 2021 application within the Site (Planning Ref. 21/1226) and the inclusion of T09 due to land availability as discussed above. As can be seen in the figure above, this layout comprised of 9 no. turbines with a maximum overall ground-to-blade tip height of 175 metres, rotor diameter range of 149 to 155 metres, hub height of 97.5 to 100.5 metres, hardstands, access roads, 2 no. temporary construction compounds, 2 no. borrow pits, a meteorological mast location and underground electrical cabling to the permanent extension to the existing Slievecallan 110kV substation, which is further detailed in Section 3.2.5.4.1.

Iteration No. 1 was presented to the project team for detailed investigations and assessment. These investigations included detailed habitat mapping, ecological surveying, hydrological and geotechnical investigations of the Site. Based on results and feedback from the above surveys, amendments were made to Iteration No. 1, and these are further detailed below.

Proposed Project Layout Iteration No. 2



Figure 3-4 Proposed Project Layout Iteration No. 2

Iteration No. 2, as shown above in Figure 3-4, comprises 9 no. turbines with a maximum overall ground-to-blade tip height of 175 metres, rotor diameter range of 149 to 155 metres, hub height of 97.5 to 100.5 metres, hardstands, access roads, 2 no. temporary construction compounds, 1 no. borrow pit, peat and spoil management areas, a meteorological mast, and 33kV underground cabling to the permanent extension to the existing Slievecallan 110kV substation, which is further detailed in Section 3.2.5.6.1

Following detailed environmental site walkovers including the project hydrologists and geotechnical engineers, and updated constraints mapping, as well as further feedback from the project team and receipt of scoping responses, T01 was microsituated in order to better align with existing roads proposed to be upgraded and ensure a 700m setback from the nearest sensitive receptor. The hardstanding area for T09 was adjusted slightly in order to ensure no infrastructure or works will occur within 50m of the watercourse north of the turbine, as well as suitably accommodate peat and spoil storage around the turbine.

Following further geotechnical investigations, the proposed borrow pits were redesigned such that the second borrow pit and associated access road were removed, with all material proposed to be extracted from the main centralised borrow pit which resulted in an overall reduction in the permanent footprint of the Proposed Project and is detailed further in Section 3.2.5.4 below. This Iteration No. 2 also included the provisional peat and spoil management areas around the Proposed Turbines and adjacent to the onsite borrow pit following an updated geotechnical stability risk assessment completed for the Site. Potential locations for biodiversity management and enhancement areas were also identified within various areas of the Site which were subject to additional surveys and assessment by the project team and are presented in Iteration No. 3 below.

Proposed Project Layout Iteration No. 3 – Final Layout

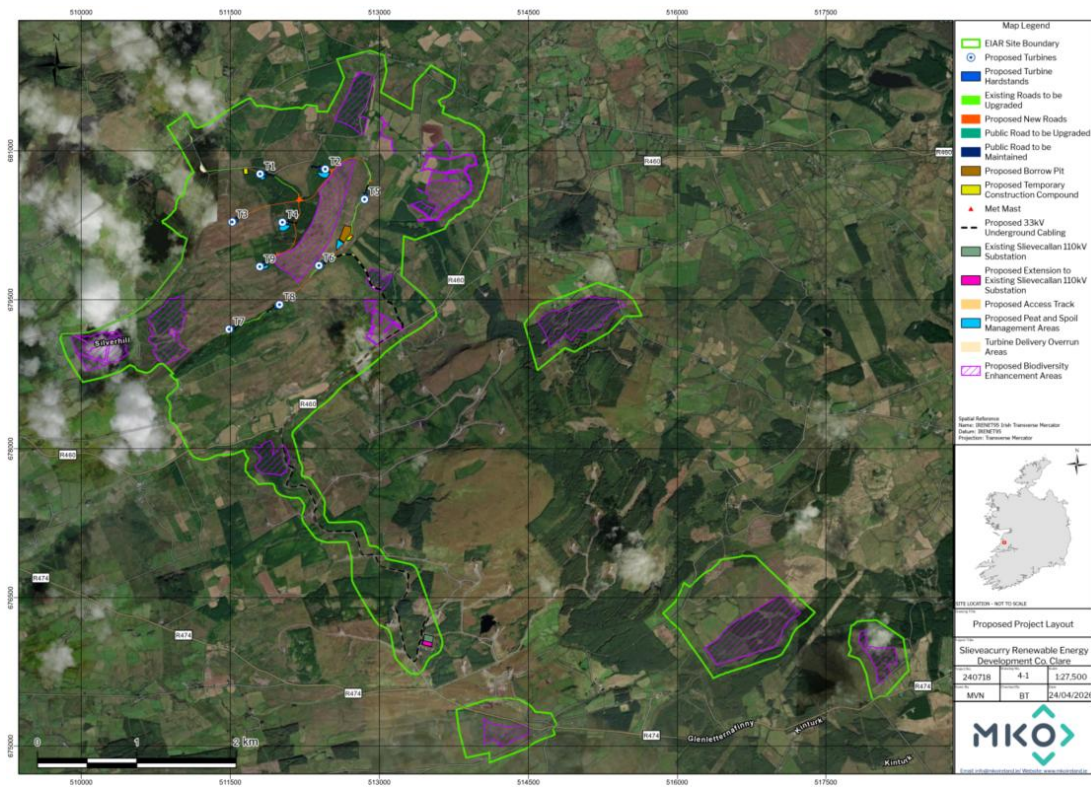


Figure 3-5 Proposed Project Layout Iteration No. 3 – Final Layout

Iteration No. 3, as presented in Figure 3-5 above, is comprised of 9 no. turbines with an overall ground-to-blade tip height of 175 metres, rotor diameter of 150 metres, hub height of 100 metres, one met mast (30m), 2 no. temporary construction compounds, 1 no. borrow pit, peat and spoil management areas, 33kV underground cabling to the permanent extension to the existing Slievecallan 110kV substation which is further detailed in Section 3.2.5.6.1 and proposed biodiversity management and enhancement areas which are further detailed in Section 3.2.5.5.

The peat and spoil management areas underwent detailed multidisciplinary site-surveys to ensure that the proposed areas were suitable from a geotechnical, hydrological, and ecological perspective. After all surveys were completed, the proposed peat and spoil management areas were redesigned and reduced in size to ensure that they do not encroach on any ecological constraints or hydrological buffers, avoidance of placement within deeper areas of peat and were sited upslope of proposed infrastructure elements only to ensure overall geotechnical stability.

As part of the final design iteration, enhancement and replanting measures were developed in order to ensure a net gain of biodiversity will occur as a result of the Proposed Project, and that the Proposed Project results in a positive effect on local biodiversity. Measures such as the management of existing marsh fritillary habitat, removal of conifer plantation in areas away from the Proposed Turbines and restoration of wet grasslands are proposed as part of the Proposed Project, with further details provided below in Section 3.2.5.5 and Appendix 6-4: Biodiversity Management and Enhancement Plan.

The final proposed turbine layout as presented in Figure 3-5 takes account of all site constraints (e.g. ecology, ornithology, hydrology, archaeology, etc) and design constraints (e.g. setback distances from houses and distances between turbines on site etc). The layout also takes account of the results of all site investigations and baseline assessments that have been carried out during the EIAR process since 2016.

The final chosen turbine layout is considered the optimal layout given it has the least potential for environmental effects.

A comparison of the potential environmental effects of initial iterations of the turbine layout as compared against the final turbine layout are presented in Table 3-4 below.

Table 3-4 - Comparison of environmental effects of the Initial Proposed Wind Farm site layout when compared to the chosen option.

Environmental Consideration	Proposed Project Layout Iteration No.1	Proposed Project Layout Iteration No. 3 – Final Layout
<p>Population & Human Health (incl. Shadow Flicker)</p>	<p>Similar potential for shadow flicker when compared to other considered turbine layouts</p>	<p>Similar potential for shadow flicker when compared to other considered turbine layouts.</p> <p>Based on the assessment detailed in Chapter 5, Chapter 12, Chapter 13, and the mitigation measures proposed, there will be no significant effects on population and human health from shadow flicker, noise and vibration and visual amenity during the construction, operation and decommissioning phases of the Proposed Project.</p>
<p>Biodiversity & Ornithology</p>	<p>Larger built infrastructure footprint would result in greater potential habitat loss in Proposed Project Layout Iteration No. 1</p> <p>Similar collision risk when compared to other considered turbine layouts.</p>	<p>As detailed in Chapter 6 Biodiversity, the development has been designed to avoid or mitigate impacts on biodiversity including bats and downstream aquatic receptors.</p> <p>The Proposed Project includes for a BMEP, providing a local boost to biodiversity. Please see Appendix 6-4 for details.</p> <p>As detailed in Chapter 7, the Collision Risk Assessment (CRA) indicated that the impact of the Proposed Turbines on birds corresponds to a Very Low effect significance. With the implementation of the mitigation measures described in Chapter 7 Ornithology, the residual effects for collision risk are not significant.</p>
<p>Land, Soils & Geology</p>	<p>Larger built infrastructure footprint would result in greater volume of spoil to be generated, excavated and sorted.</p> <p>Geotechnical investigations followed by careful design would</p>	<p>As detailed in the assessment in Chapter 8, peat, topsoil and subsoil excavation volumes will be managed within the Site, and the residual effects on peat, topsoil and subsoil are not significant.</p>

Environmental Consideration	Proposed Project Layout Iteration No.1	Proposed Project Layout Iteration No. 3 – Final Layout
	lead to no significant environmental impacts.	<p>Geotechnical investigations followed by careful design will lead to no significant environmental impacts.</p> <p>A peat and spoil management plan is included in Appendix 4-2 which sets out the optimal treatment for peat and spoil excavated/ generated on site without creating significant impacts for biodiversity, hydrology, land use etc.</p>
Water	<p>Larger built infrastructure would result in a greater potential for silt-laden runoff to enter natural watercourses within and around the Proposed Project Layout Iteration No. 1 (2 no. borrow pits)</p> <p>Project design specific drainage design removes the potential for significant environmental effects.</p>	<p>Project design specific drainage design removes the potential for significant environmental effects.</p> <p>As detailed in the assessment in Chapter 9, no significant effects on surface water or groundwater quality will occur.</p>
Air Quality	<p>Increased potential for impacts on air quality due to an increased vehicles emissions and dust emissions due to an increased volume of material during the construction phase for Proposed Project Layout Iteration No. 1 (2 no. borrow pits)</p>	<p>As detailed in Chapter 10, there will be no significant effects on air quality during the construction, and decommissioning phases. There will be a Long-term Moderate Positive Impact on air quality by the Proposed Project during the operational phase.</p>
Climate	<p>Climate related emission effects (losses and savings) are neutral for Proposed Project Layout Iteration No. 1.</p>	<p>As detailed in the assessment in Chapter 11 Climate, over the proposed 35-year lifetime of the Proposed Project, 1,217,690 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The addition of an estimated 54MW of clean energy to the national grid will be a positive contribution to the State’s renewable energy targets set out in CAP 25.</p>
Noise & Vibration	Neutral	<p>Based on the assessment in Chapter 12 and the mitigation measures proposed, there will be no significant effects on sensitive</p>

Environmental Consideration	Proposed Project Layout Iteration No.1	Proposed Project Layout Iteration No. 3 – Final Layout
		<p>receptors due to an increase in noise levels from the Proposed Project during the construction, operational and decommissioning phase. Predicted noise levels from the chosen layout indicate that the Proposed Project noise levels fall within best practise noise criteria as recommended in the Guidelines (DoEHLG, 2006).</p>
<p>Landscape & Visual</p>	<p>Neutral</p>	<p>The final layout adheres to the relevant setback from dwellings (500m from all dwellings, 700m for third-party inhabitable dwellings in the case of the Proposed Project).</p>
<p>Cultural Heritage & Archaeology</p>	<p>Larger built infrastructure footprint would increase the potential for impacts on unrecorded, subsurface archaeology for Proposed Project Layout Iteration No. 1 (2 no. borrow pits)</p>	<p>As detailed in the assessment in Chapter 14, there will be no significant direct or indirect effects on known or unknown archaeology and cultural heritage during the construction, operation and decommissioning phases.</p> <p>Archaeological monitoring under licence will be implemented during the construction phase.</p>
<p>Material Assets</p> <p>Material Assets- Utilities, Waste Management, Telecommunications and Aviation</p>	<p>No material difference between the Proposed Project layout Iteration no. 1, 2 and 3 for gas, water, waste management, telecommunications and aviation.</p>	<p>As detailed in Chapter 15, there will be short term negative imperceptible to slight impact on traffic volumes during the construction phase of the Proposed Project. A detailed Traffic Management Plan (Appendix 15-2) incorporating all mitigation measures will be agreed with the roads authority prior to construction commencing on site.</p> <p>No material difference between the Proposed Project Layout Iteration no. 1, 2 and 3 for gas, water, waste management, telecommunications and aviation.</p>

Environmental Consideration	Proposed Project Layout Iteration No.1	Proposed Project Layout Iteration No. 3 – Final Layout
Vulnerability to Major Accidents Natural Disasters	Impacts from major accidents and natural disasters are considered to be neutral for Proposed Project Layout Iteration No. 1.	As detailed in Chapter 16 the risk of a major accident and/or disaster during the construction of the Proposed Project is considered 'low'. The highest risk scenarios to the Proposed Project (i.e., contamination and fire/explosion) are considered to be unlikely to occur at any phase of the Proposed Project. A detailed risk assessment on potential risks relating to major accidents and natural disasters is provided in Section 16.4 of Chapter 16 of this EIAR.

3.2.5.3 Alternative Road Layout

Access roads (or tracks) are required onsite in order to enable transport of infrastructure and construction materials within the Proposed Wind Farm Site. Such roads must be of a gradient and width sufficient to allow safe movement of equipment and vehicles. Approximately 5.2km of new internal roads are required for the Proposed Project along with approximately 2.5km of existing roads that are currently used for commercial forestry activities. These roads will require upgrading/widening to facilitate the movement of abnormal loads through the Proposed Wind Farm Site.

As the turbine layout was finalised, the most suitable routes between each component of the Proposed Project were identified, taking into account the shortest routes and existing forestry tracks and filtering out the physical and environmental constraints of the Proposed Wind Farm Site and the associated buffers, and utilising the most direct route between turbines in order to minimise the footprint. Additionally, turning areas were designed and sited for minimum environmental effect along internal roads. As noted in Section 3.2.5.2.1 above, 2 no. borrow pits were initially considered for the Proposed Project, however, these were redesigned to 1 no. borrow pit in a more centralised location within the Site. The removal of the second borrow pit resulted in the reduction in upgrades to existing roads by approx. 180m and new roads by 130m, thereby reducing the development footprint of the Proposed Project.

An alternative option to making maximum use of the existing road network within the Proposed Wind Farm Site would be to construct a new road network, having no regard to existing roads or tracks. This approach was not favoured, as it would require unnecessary disturbance to the Proposed Wind Farm Site and create the potential for additional cut and fill material to be used in the construction of new road networks. Please see Table 3-5 for a comparison of environmental effects when compared against the chosen option.

Table 3-5 Comparison of environmental effects when compared against the chosen option (maximising the use of the existing road network)

Environmental Consideration	New Road Network	Use and Upgrade/Resurface of Existing Site Tracks/Local Roads
Population & Human Health	Potential for increased impacts on residential amenity due to increased disturbance during the construction stage.	The road upgrades will have potentially less of an impact on population and human health.

Environmental Consideration	New Road Network	Use and Upgrade/Resurface of Existing Site Tracks/Local Roads
Biodiversity & Ornithology	Larger permanent built infrastructure footprint would result in greater habitat loss compared to the chosen option.	Smaller permanent built infrastructure footprint will result in a smaller habitat loss.
Land, Soils & Geology	Larger permanent built infrastructure footprint would result in greater volumes of spoil to be excavated and stored. Larger volume of stone required for road construction. No material difference between the two options for geotechnical/stability.	Smaller permanent built infrastructure footprint which leads to a reduction in spoil volumes to be excavated. No material difference between the two options for geotechnical/stability.
Hydrology and Hydrogeology	More excavation works required, more potential runoff from larger permanent built infrastructure footprint	Less excavation works, less potential runoff from smaller permanent built infrastructure footprint
Air Quality	More ground disturbance, potential for greater emissions due to more plant on site and longer construction phase would result in increased dust and other emissions.	Less ground disturbance therefore potential for fewer emissions due to fewer plant on site and shorter construction phase.
Climate	No material difference between the two options.	No material difference between the two options.
Noise & Vibration	Potential for increased noise impacts on nearby sensitive receptors during the construction of the new roads.	Potential for less noise impacts on nearby sensitive receptors during the construction of the road upgrades.
Cultural Heritage & Archaeology	Larger permanent built infrastructure footprint would increase the potential for impacts on unrecorded, subsurface archaeology.	Smaller permanent built infrastructure footprint would decrease the potential for impacts on unrecorded, subsurface archaeology.
Landscape & Visual	There is potential for increased visual impacts for sensitive receptors due to the presence of additional roads being constructed	There will be a slight reduction in potential for visual impacts during the construction phase due to the decreased presence of plant on site.
Material Assets	Potential for greater traffic movements on site during construction phase due to larger permanent built infrastructure footprint. No material difference between the two options in potential for impact on gas, water, telecommunications aviation assets.	Smaller permanent built infrastructure footprint results in a reduced construction traffic movements on site due to smaller development footprint. No material difference between the two options in potential for impact on gas, water, telecommunications aviation assets.
Vulnerability to Major Accidents Natural Disasters	No material difference between the two options.	No material difference between the two options.

3.2.5.4 Alternative Borrow Pit Options

The use of onsite borrow pits represents an efficient use of existing onsite resources and reduces the need to transport large volumes of construction stone materials along the local public road network to the Site. The use of onsite resources, that would only be developed for the Proposed Wind Farm Site, reduces the use of off-site existing quarry material assets.

A review of potential construction phase borrow pit locations was carried out by geotechnical experts, Fehily Timoney & Company Ltd. between 2020 and 2025, with on-site geophysical investigations carried out by Minerex in 2025. Site surveys were undertaken and existing GIS data and environmental

constraints were also considered, namely aerial photography, soil and subsoil cover, biodiversity (habitats), onsite drainage and hydrogeology, proximity to the existing and proposed internal road network, and proximity to sensitive receptors. 7 no. trial pit locations were selected over the Proposed Wind Farm Site, 2 no. of which were undertaken at the proposed borrow pit location centralised within the Proposed Wind Farm Site, which was further subject to a geophysical survey in March 2025.

Following geophysical and environmental assessments it was concluded that the site possessed the necessary stone required for the Proposed Project and therefore only 1 no. borrow pit location was identified to supply the stone requirements while keeping the borrow pits at a reasonable size. The proposed second borrow pit location was not deemed required for the Proposed Project and the design of the Proposed Wind Farm Site removed this element as well as the access road and relocated the proposed second temporary construction compound and meteorological mast (see Section 3.2.5.6.2 below). This reduced the overall permanent built infrastructure footprint of the Proposed Project

The findings of the geotechnical site investigations concluded the proposed borrow pit was capable of providing 100,000m³ of construction stone material for the Proposed Project. Please see Chapter 4 Figure 4-19 for the proposed borrow pit details. The design of the proposed borrow pit was also refined following the site investigations and findings of geotechnical and peat stability risk assessment in order to ensure the entirety of the permanent built infrastructure the Proposed Project has a suitable factor of safety value and overall low risk of peat instability. The extraction of material from the borrow pits will occur during the construction phase of the Proposed Project only and will be a temporary operation carried out over a short period of time. Rock breaking and blasting are potential methods of extracting material from the borrow pits. Processing and crushing of stone material will also be required to achieve the grading requirements for use in construction. The estimated maximum volume to be extracted from the borrow pit for the Proposed Project is up to 100,000m³. The final volumes to be removed from the borrow pits will be confirmed at the time of construction and following detailed pre-construction site investigation works.

The proposed borrow pit for the Proposed Project was ultimately chosen due to its strategic location adjacent to existing access roads within the centre of the Proposed Wind Farm Site. The proposed borrow pit offers adequate quantities of suitable rock and benefits from some existing hard surfacing, which will reduce the need for new ground disturbance. Overall, the proposed borrow pit presents the best balance of geophysical suitability, environmental responsibility, and operational practicality.

An alternative to using an onsite borrow pit was the option of sourcing all stone and materials from a licensed quarry or quarries in the vicinity of the Site. The movement of the volume of material required for the construction of a 9 no. turbine wind farm would result in a significant increase in construction traffic and heavy loads, in combination with a potential for an increase in noise and dust emissions along the haul routes and was therefore considered a less preferable option. The cost of importing the required volume of crushed stone was also a factor in choosing to obtain stone from the onsite borrow pits.

A comparison of the potential environmental effects when comparing the sourcing of all stone from local, off-site quarries against the chosen option (onsite borrow pit) is presented in Table 3-6 below.

Table 3-6 Comparison of environmental effects of sourcing all materials off site when compared against the chosen option – onsite borrow pits

Environmental Consideration	Sourcing all stone from local, off-site quarries	Use of onsite borrow pit
Population & Human Health	Potential for increased vehicular, noise and dust emissions from increased traffic movements, due to the volume of rock to be transported to the site along the public road network, which	Lower dust and noise emissions, and traffic volumes due to reduced requirement for daily HGV presence on site during the construction phase. Temporary dust and noise emissions

Environmental Consideration	Sourcing all stone from local, off-site quarries	Use of onsite borrow pit
	could be a nuisance to local residents along the haul route.	<p>related to borrow pit extraction however, due to vegetation screening and distance from sensitive receptors, the residual effects are not significant.</p> <p>As identified in Chapter 5 Population and Human Health, residual effects on health and residential amenity from dust and noise emissions during the construction phase of the Proposed Project will be not significant.</p>
Biodiversity & Ornithology	Reduced habitat loss and ground disturbance for flora, fauna and birds.	<p>Increase in habitat loss due to borrow pit footprint however, as assessed in the Biodiversity chapter, this is habitat of low ecological value which comprises the majority of the Site and surrounding landscape. Furthermore, the borrow pit will be left to naturally revegetate post construction.</p> <p>The Proposed Project includes for a biodiversity management and enhancement plan providing a local boost to biodiversity and water quality. Please see Appendix 6-4 for details.</p>
Land, Soils & Geology	<p>Slight reduction in spoil to be excavated, however, additional spoil placement areas would be required as an on-site borrow pit would not be available for the placement of excavated spoil.</p> <p>No material difference between the two options in relation to geotechnical and stability concerns. Geotechnical investigations followed by careful design would lead to no significant environmental impacts.</p>	<p>Reduction in requirement for spoil placement areas.</p> <p>No material difference between the two options in relation to geotechnical and stability concerns. Geotechnical investigations followed by careful design would lead to no significant environmental impacts.</p> <p>As identified in Chapter 8, the findings of the detailed Geotechnical and Peat Stability Risk Assessment (Appendix 8-1) completed for the Proposed Project have demonstrated that there is a low risk of peat failure, at the Site and there are no significant effects on land, soils, subsoils or bedrock</p>
Hydrology and Hydrogeology	Smaller permanent built infrastructure footprint and reduced potential for silt	Larger permanent built infrastructure footprint and increased potential for

Environmental Consideration	Sourcing all stone from local, off-site quarries	Use of onsite borrow pit
	laden runoff to enter receiving watercourses	<p>silt laden runoff to enter receiving watercourses</p> <p>As identified in Chapter 9 Hydrology and Hydrogeology, no significant effects on the surface water quality will occur as a result of the Proposed Project.</p>
Air Quality	Potential for increased vehicular and dust emissions from increased traffic movements within the site, due to the volume of rock to be imported.	<p>More ground disturbance due to onsite borrow pit which can give rise to dust emissions however, lower traffic volumes arriving and departing site per day and reduced onsite traffic volumes therefore reducing dust and noxious emissions overall.</p> <p>As identified in Chapter 10 Air Quality, the effects on air quality from dust emissions arising from the construction of permanent built infrastructure of the Proposed Project during the construction phase of the Proposed Project are considered to be Not Significant.</p>
Climate	No material difference between the two options.	No material difference between the two options.
Noise & Vibration	Increased potential for noise and vibration effects on local sensitive receptors due to arrival and departure of heavy goods vehicles during the construction phase and reduced potential for noise and vibration effects on local sensitive receptors due to no breaking or crushing of materials won from onsite borrow pit.	<p>Reduced potential for noise and vibration effects on local sensitive receptors due to arrival and departure of heavy goods vehicles during the construction phase and increased potential for noise and vibration effects on local sensitive receptors due to breaking or crushing of materials won from onsite borrow pit.</p> <p>As identified in Chapter 12: Noise and Vibration there are no significant residual effects associated with the construction of the proposed onsite borrow pit.</p>
Cultural Heritage & Archaeology	Smaller permanent built infrastructure footprint would reduce the potential for impacts on unrecorded, subsurface archaeology.	<p>Larger permanent built infrastructure footprint would increase the potential for impacts on unrecorded, subsurface archaeology.</p> <p>As identified in Chapter 14: Cultural Heritage, the Proposed Project will result in no significant residual effects</p>

Environmental Consideration	Sourcing all stone from local, off-site quarries	Use of onsite borrow pit
		on unrecorded monuments and sub-surface archaeology.
Landscape & Visual	Reduced landscape and visual effects temporarily as no open rock face would be visible from certain viewpoints. Increased visual impact due to frequent arrival and departure of HGVs to and from the Site.	Potential for increased landscape and visual effects temporarily due to open rock face which may be visible from certain viewpoints. However, there would be a reduced HGV presence on site and on the local road network as materials will be won onsite. Furthermore, the borrow pit will be reinstated onsite once exhausted.
Material Assets	Significantly higher HGV traffic volumes on the public road network during construction phase due to the volume of crushed stone required to be transported to the site and empty HGVs leaving the site. No material difference between the two options in potential for impact on waste management, telecoms, aviation, electricity, water or gas.	Reduced volume of HGVs traffic volumes on the public road network during construction as a considerable portion of materials will be won on site. Decreased potential for noise, dust and emissions due to the reduced volumes of HGV traffic on the roads. No material difference between the two options in potential for impact on waste management, telecoms, aviation, electricity, water or gas.
Vulnerability to Major Accidents Natural Disasters	No material difference between the two options.	No material difference between the two options.

3.2.5.5 Alternative Biodiversity Management and Enhancement Mitigation Proposals

Similar to the Proposed Wind Farm Site layout, the Proposed Enhancement Site was subject to an iterative design process. The Proposed Project will result in a loss of species rich wet grassland, cutover/blanket bog and other peatland habitats, see Chapter 6 Biodiversity for further details. The loss of any key habitats will be offset through a BMEP (further detailed in Appendix 6-4).

To choose what habitats to enhance/mitigate, consideration was given to species and habitats of relevant to the Site. As outlined in Section 1.1.1 of Chapter 1 Introduction, potential effects on Annex II species including marsh fritillary were a key consideration of the design of the Proposed Project. Cumulative effects on species of ornithological value were also a key consideration in the design and assessment of the Proposed Project, with findings from the ornithological assessment (see Chapter 7: Ornithology) also being incorporated into the BMEP.

Proposed Enhancement Site Iteration No. 1

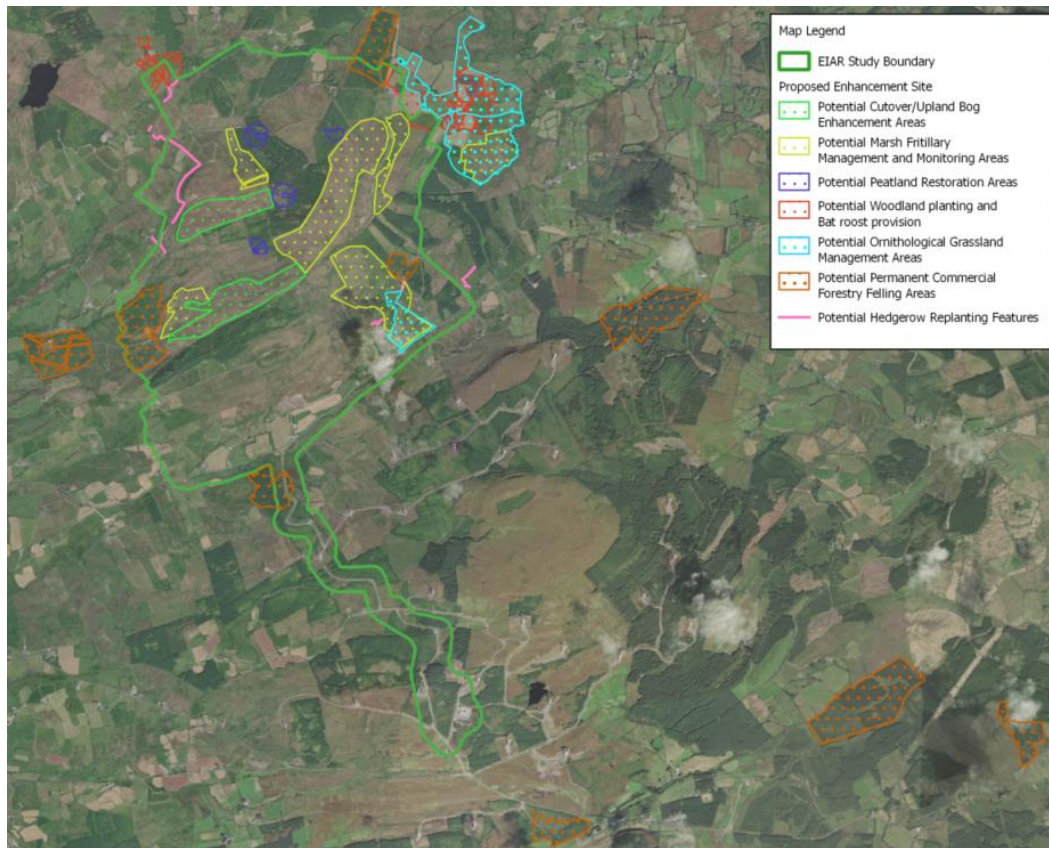


Figure 3-6 Proposed Enhancement Site Layout Iteration 1

Desk-based studies and site surveys identified that many habitats within the Site have potential for inclusion in the BMEP for the Proposed Project. Figure 3-6 presents the initial broad areas within which potential habitat enhancement opportunities were identified and assessed. The primary objective of these areas was to improve existing habitat conditions within and around the permanent built infrastructure of the Proposed Project, as well as create new suitable habitat for species of high ornithological value outside suitable setback distances from the Proposed Turbines and other existing or proposed turbines in the wider area. The creation of new suitable habitat, primarily through the removal of conifer plantation, is proposed as a means to compensate for the local population habitat loss and allow for population expansion and extensive areas around the Site were considered. Following further detailed surveys and assessment, the Proposed Enhancement Site was refined and is detailed further below.

Proposed Enhancement Site Iteration No. 2

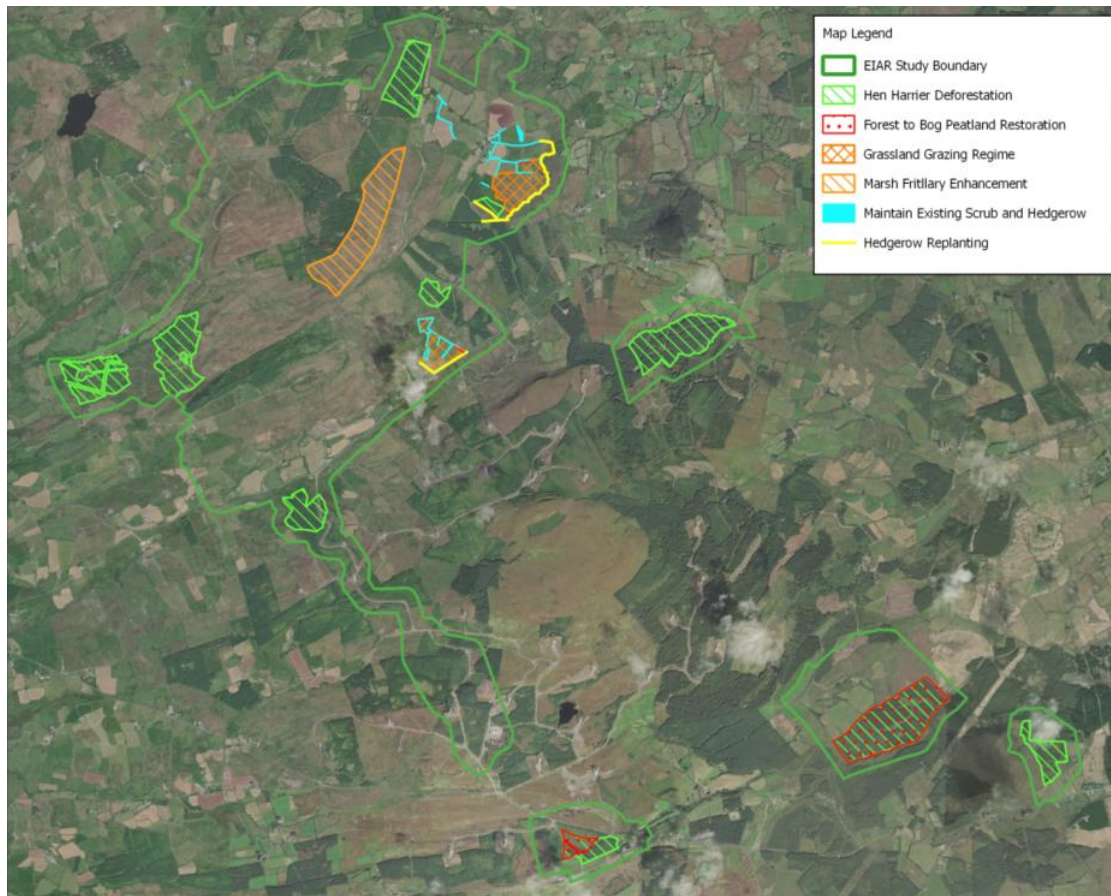


Figure 3-7 Proposed Enhancement Site - Final Layout

The final iteration of the Proposed Enhancement Site shown in Figure 3-7 outlines refinements to the areas within the Proposed Enhancement Site following extensive environmental and ecological assessment, including hydrological connectivity and geotechnical peat stability. The BMEP included in Appendix 6-4 covers areas within the Proposed Wind Enhancement Site that will be managed for hen harrier habitat enhancement and monitored to support marsh fritillary habitat. It also outlines detailed grassland management measures for bird species of high ornithological importance, ensuring adequate setbacks from the Proposed Turbines. In addition, it includes off-site permanent conifer felling in relation to existing or planned turbines in the wider area, restoration of peatland habitats, and the linear replanting of hedgerows to.

The proposed biodiversity management and enhancement areas have been constraints and facilitators led in their design. For example, creation of peatland habitat will only be developed in areas which have a suitable factor of safety value and negligible risk rating based on existing ground conditions and topography within the geotechnical and peat stability risk assessment included as Appendix 8-1 of the EIA. Full details on BMEP measures are included in Appendix 6-4.

3.2.5.6 Alternative Design of Ancillary Structures

The ancillary structures required for the Proposed Project include underground electrical cabling, the onsite meteorological (met) mast, and temporary construction compounds.

3.2.5.6.1 Alternative Internal Site Cabling Route and Substation

The Proposed Project will connect to the national grid via 33kV underground cabling of approx. 7.1km in length, located on existing private access tracks, forestry, agricultural land and within the public road

corridor. The proposed 33kV underground cabling will transmit the power output from each wind turbine to the existing Slievecallan 110 kV substation, located approx. 3.9 km south of the Proposed Wind Farm Site.

A key consideration in determining the grid connection method for a proposed wind energy development is whether the cabling is undergrounded or run as an overhead line. While overhead lines are less expensive and allow for easier repairs when required, underground cables will have no visual impact. Underground grid connection routes are also considered to be the preferred option of connecting Wind Energy Developments to the national grid. For this reason, it was considered that underground cables would be a preferable alternative to overhead lines. The Draft Guidelines (DoHPLG, 2019) also indicate that underground cables are the preferred option for connection of a wind energy development to the national grid. The proposed 33kV underground cabling will follow, insofar as possible, the route of existing private access tracks on existing forestry and agricultural land and public roads, thereby minimising the amount of ground disturbance required.

The proposed 33kV underground cabling as presented in Figures 3-3 to 3-5 takes account of all site constraints (e.g., ecology, archaeology, hydrology, peat depths etc.) and design constraints (e.g., third party lands). The route also takes account of the findings from the site investigations and baseline assessments that have been carried out during the EIAR process.

As mentioned in Section 3.2.1.2, it is proposed to extend the existing Slievecallan 110kV substation to accommodate the connection of the Proposed Project. An alternative to extending the existing substation would be to construct a new standalone substation adjacent to the Proposed Turbines. Whilst this would reduce the extent of underground cabling between the Proposed Turbines and the substation, any new on-site substation would also require grid connection cabling, either via underground cabling or overhead line. This would also result in a larger permanent built infrastructure footprint for the Proposed Project.

In considering the connection of the Proposed Project to the national grid via the provision of a new onsite substation, the generating capacity of the Proposed Project is such that it needs to connect to an offsite 110kV electrical substation. 2 no. 110kV substations were analysed when considering the alternate grid connection.

- Booltiagh 110kV substation – approx. 23.2km south of the Site
- Ennis 110kV substation – approx. 29.2km east of the Site

Based on the need for an additional onsite 110kV substation and the length of the grid connections required to connect to either of the 2 no. offsite substations identified above, it was considered preferable to construct an extension to the existing Slievecallan Wind Farm 110kV substation as part of the Proposed Project.

The proposed 33kV underground cabling to the proposed substation extension is an efficient means of connecting the Proposed Turbines to the national grid, predominately following proposed and existing roads/ tracks. The extension to the existing Slievecallan 110kV substation occupies a significantly smaller footprint than that of a standalone substation. Furthermore, it is entirely located on an existing cleared and level area. When compared to the alternative standalone option, the proposed means of connection to the national grid was deemed to represent the most efficient option.

The layout of the proposed underground cable connection has been revised and refined to take account of the findings of the site investigations and baseline assessments, which is incorporated into the final layout as presented in Figures 3-3 to 3-5.

3.2.5.6.2 **Alternative Meteorological Mast Location**

The proposed meteorological (met) mast is located in the southern section of the Proposed Wind Farm Site within the footprint of a proposed temporary construction compound. As shown in Figure 3-3

above, the proposed met mast was originally sited along a proposed new road southwest of turbine T07. As the design of the Proposed Project progressed, and the internal road layout was updated to negate the need of the second onsite borrow pit as detailed in Section 3.2.5.2 above, the location of the met mast was moved approximately 1.7km northwest.

The proposed met mast location has been constraints and facilitators led in its design. An appropriate setback distance from the Proposed Turbines was incorporated during the design process. While other locations to situate the proposed met mast within the Proposed Wind Farm Site were examined, the above location was deemed to be most suitable due to the low ecological value of the habitat and its location within the proposed temporary construction compound footprint, thereby further reducing the overall footprint of the Proposed Project

3.2.5.6.3 **Alternative Temporary Construction Compounds Location**

The temporary construction compounds will be used for the storage of construction materials, staff facilities, and car-parking areas for staff and visitors. The use of 2 no. temporary construction compounds was deemed preferable to the alternative of a single large compound. Principally, it will result in shorter distances for traffic movements within the Proposed Wind Farm Site during construction. As the Proposed Project layout became more defined, the temporary construction compounds were sited to facilitate the most efficient flow of construction processes within the Site.

The 2 no. temporary construction compounds are located strategically within the northern and southern sections of the Proposed Wind Farm Site to facilitate the construction of the various infrastructure components and to avoid sensitive habitats and other onsite constraints as identified in Section 3.2.5.2.1 above. As a result, vehicle emissions and the potential for dust arising will be reduced and the proposed 2 no. temporary construction compounds will have no impact on sensitive ecological habitat or other identified onsite constraints.

3.2.6 **Alternative Transport Route and Site Access**

Wind turbine components (blades, nacelles and towers) are not manufactured in Ireland and therefore must be imported from overseas and transported overland to the Proposed Wind Farm Site. Alternative ports of entry were considered and with regard to the selection of a transport route to the Proposed Wind Farm site, in relation to the turbine delivery route and associated site access locations.

3.2.6.1 **Port of Entry**

The alternatives considered for the port of entry of wind turbines into Ireland for the Proposed Project included Port of Galway, Shannon Foynes Port and Dublin Port. Shannon Foynes Port is the principal deepwater facility on the Shannon Estuary and caters for dry bulk, break bulk, liquid and project cargoes. Port of Galway and Dublin Ports also offer a roll-on roll-off procedure to facilitate import of wind turbines. All three ports and indeed others in the state, offer potential for the importing of turbine components. The primary chosen port of entry is Shannon Foynes due to its proximity and accessibility from the port to the national and regional roads towards the Proposed Project. Shannon Foynes represents to closest port to the Proposed Project and would therefore result in less vehicular emissions due to turbine component delivery, less alterations to the existing road network or private lands to facilitate the delivery of turbine components, as well as less potential for traffic and transport impacts due to the shorter distance to the Proposed Project.

3.2.6.2 **Turbine Delivery Route**

For turbine components and other abnormal loads (e.g., prefabricated buildings for construction compound areas etc.) transport, cognisance was taken of the haul routes used for other wind farm developments in the local area in addition to the general preference to minimise the requirement for significant accommodation or widening works along the public road network and associated

environmental effects. Multiple turbine delivery routes, as well as methods of transport were considered when deciding a preferred route.

In assessing the most suitable route for turbine transport, two routes were considered:

- Option 1: Access to the Proposed Wind Farm Site from the north via the M18, N85 National Secondary Road, the R460 Regional Road and the L1074 Local Road.
- Option 2: Access to the Proposed Wind Farm Site from the south via the M18, N85 National Secondary Road and the R460 Regional Road.

Option 1 would see turbine deliveries travel via Inagh along the R460 Regional Road and the L1074 Local Road to the site entrance, accessing the Proposed Wind Farm Site from the northwest. A review has been completed for this route in Chapter 15, Section 15.1.9, showing that it would be feasible for turbine delivery vehicles to travel along this route.

Option 2 follows the same route as Option 1, but the delivery vehicles will continue along the R460 Regional Road accessing the Proposed Wind Farm Site from the south via additional sections of new site access roads and a new site entrance located on the R460.

These routes have been proven suitable for the transport of turbine components, and the transport analysis (as presented in Section 15.1 of this EIAR), shows that only minor accommodation works will be required to accommodate the turbine delivery. The turbine transport route will utilise the national and primary roads available to ensure the road network holds the capacity to manage large loads. When considering turbines transport routes, alternative routes comprising of a more direct route with greater stretches of secondary and local roads were considered less optimal due to the increased possibility of road and roadside disruption and a greater need to carry out works.

While Option 1 requires for more use of the local road network north of the Proposed Wind Farm Site and accommodation works to overcome the vehicle turning constraints, Option 2 also requires accommodation works and construction of additional new roads to access the Proposed Wind Farm Site within areas of steep terrain which this would result in a larger development footprint for the Proposed Project. As a result, Option 1 was considered the preferred turbine delivery route to the Proposed Wind Farm Site.

Turbines will be delivered to site using a Super Wing Carrier as detailed in Section 15.1.5 of this EIAR. When considering turbines transport routes, alternative modes of transport were also considered. Alternatively, depending on the selected turbine delivery route and the turbine manufacturer, a blade transporter may also be used, if deemed appropriate, for delivery of turbines to the Proposed Wind Farm Site.

It should be noted that all component deliveries (abnormal loads) will be undertaken as described in the Traffic Management Plan in Appendix 15-2 of the EIAR, which will be submitted and agreed with the local authorities and roads authorities upon consent of this application. All component deliveries will be subject to escort by An Garda Síochána. All manoeuvres around junctions and into the Proposed Wind Farm Site entrances will be supervised by a qualified team of turbine delivery experts. The abnormal load entrance will be temporary in nature, over a short period of the construction phase only. The abnormal load entrance will be reinstated after all abnormal loads have been delivered to the Site. However, should replacement components be required, this entrance will be temporarily reopened to facilitate such works. Please see Section 15.1 of Chapter 15: Material Assets for further details.

3.2.7 **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 at the Site, this has been offset with the proposal of habitat enhancement and creation of new habitat within the Proposed Enhancement Site.

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 are sustainable.