3. CONSIDERATION OF REASONABLE ALTERNATIVES

3.1 Introduction

Article 5(1)(d) of Directive 2011/92/EU 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/EU (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 1.1.1 in Chapter 1, for the purposes of this EIAR, the various project components are described as the 'Proposed Development'. This section of the EIAR contains a description of the reasonable alternatives that were studied by the developer, which are relevant to the Proposed Development 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 project, connection to the national grid and transport route options to the site. This section also outlines the design considerations in relation to the renewable energy development, including the construction compounds and Grid Connection. 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 '*Guidelines on The Information to be Contained in Environmental Impact Assessment Reports' (Environmental Protection Agency, 2022),* the presentation and consideration of reasonable alternatives investigated is an important part of the overall EIA process.

Hierarchy

EIA is concerned with projects. The Environmental Protection Agency (EPA) guidelines state 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.

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

The EPA guidelines state 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 (EU, 2017) on the preparation of EIAR 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 the EU Guidance Document (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".*

The EPA Guidelines (EPA, 2022) state 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 is 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 Turbine Numbers and Model;
- Alternative Turbine Layout and Development Design;
- Alternative Design of Ancillary Structures
- Alternative Grid Connection Cabling Route Options;
- Alternative Transport Route and Site Access; and
- Alternative Mitigation Measures.

Each of these is addressed in the following sections.

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 guidance (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 repowering the site would be to leave the site as it is, with no changes made to the existing operating 28 no. wind turbines and low-intensity agriculture and forestry. In doing so, environmental effects in terms of emissions are likely to be neutral for the short term, however 13 no. of the existing turbines are due to be decommissioned in accordance with their planning permissions in 2029. Once the 13 no. turbines are decommissioned, there will be a negative effect on greenhouse gas emissions. The opportunity to capture the available renewable energy resource would be lost, as would the opportunity to contribute to meeting renewable energy targets. The 15 no, turbines which were commissioned in 2007 will be left in situ. However, these machines are aging and are not as efficient as the newer machines. Although these turbines do not have a decommissioning date, they will eventually break down and have to be decommissioned, thus losing any opportunity to capture the renewable energy resource onsite.

The opportunity to generate local employment and investment would also be lost. It is likely that the trends of population decline and rural deprivation that have been recorded within the Population Study Area would continue in the absence of investment, as discussed in Section 5 of this EIAR on Population and Human Health. Overall, the potential impact of this is considered to be long term, negative and slight.

The existing land uses of low-intensity agriculture and forestry can and will continue in conjunction with the Proposed Development. 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 for developing a renewable project
Population & Human Health	No increase in local employment and no long-term financial contributions towards the local community. The existing community Benefit Fund of €85,000 would be reduced upon the decommissioning of the existing turbines. There are a number of existing turbines on the Existing Kilgarvan Wind Farm which are not bound by shadow flicker conditions. There are a number of existing turbines on the Existing Kilgarvan Wind Farm that operate without being bound by specific noise limits.	Up to approximately 80-100 jobs could be created during the construction, operation, and maintenance phases of the Proposed Development. 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 Development. Based on the assessment detailed in Chapter 11 and the mitigation measures proposed, there will be no significant effects related to noise from the Proposed Development
Biodiversity (Including Birds)	No habitat loss	As detailed in Chapter 6, the development has been designed to

Environmental Consideration	Do-Nothing Alternative	Chosen option for developing a renewable project
	No potential for collision risk for birds and bats No potential biodiversity enhancement measures would be out in place	avoid or mitigate impacts on biodiversity. The existing infrastructure onsite is being reused as much as is feasible. The mitigation and monitoring measures set out within Chapter 6 and Chapter 7 of this EIAR will be effective in ensuring that the residual impacts will likely be slight negative (local) in the temporary to short term upon the terrestrial or aquatic habitats and species that occur in the receiving environment.
Land, Soils & Geology	Neutral	As detailed in the assessment in Chapter 8, the development has been designed to avoid or mitigate impacts on soils and geology. A robust peat probing regime was carried out onsite in order to assess the depth of the peat soils onsite. The disturbance to peat soils and subsoils has also been minimised due to mitigation measures as set out in Chapter 8. This will have a neutral effect on peat soils and subsoils within the site.
Water	Neutral	As detailed in the assessment in Chapter 9, the construction of the Proposed Development will implement new and improved drainage measures with updated technology and specifications. Any existing culverts and pipes which have been deemed as necessary to upgrade will be upgraded and replaced. Existing drains and culverts will also be unblocked and accumulated silt will be removed as necessary during the construction phase.
Air Quality	13 no. of the existing turbines will be decommissioned in 2029. This will mean the opportunity for an overall increase in air quality. Will not assist in achieving the renewable energy targets set out in the Climate Action Plan 2024.	As detailed in the assessment in Chapter 10, wind farms are not a recognised source of pollution. No significant effects on air quality will occur.
Climate	13 no. of the existing turbines will be decommissioned in 2029. This will mean that the opportunity for an overall reduction of greenhouse gases. Will not assist	As detailed in the assessment in Chapter 11, over the proposed 35-year lifespan of the Proposed Development 69,982 tonnes of carbon dioxide will

Environmental Consideration	Do-Nothing Alternative	Chosen option for developing a renewable project
	in achieving the renewable energy targets set out in the Climate Action Plan 2024	be displaced from traditional carbon-based electricity generation.
Noise & Vibration	Noise emissions from the existing turbines are not bound by noise limits conditioned in their planning permission. Existing noise levels were measured at 5 noise sensitive receptors to determine background noise conditions.	Based on the assessment detailed in Chapter 12, and the mitigation measures proposed, there will be no significant effects on sensitive receptors due to an increase in noise levels from the Proposed Development during the construction and operational phase.
Landscape & Visual	The existing 28 no. turbines are largely visible from the surrounding landscape	The proposed 11 no. turbines will be largely visible from the surrounding landscape
Cultural Heritage & Archaeology	No potential for impacts on unrecorded, subsurface archaeology.	As detailed in the assessment in Chapter 14, 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
Material Assets	Neutral	As detailed in Chapter 15, there will be temporary negative impact on traffic volumes during the construction phase of the Proposed Development. Details regarding traffic management are set out in Appendix 4-3 CEMP and Section 15.1 of Chapter 15.
Major Accidents and Natural Disasters	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 natural disaster during the construction of the Proposed Development is considered 'low' in accordance with the 'Guide to Risk Assessment in Major Emergency Management' (DoEHLG, 2010). The Proposed Development will be designated 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 within the EIAR, there will not be significant residual effects associated with the construction, operation and decommissioning of the Proposed Development.

3.2.3 Alternative Site Location

The process of identifying a suitable wind farm site is influenced by a number of factors. While wind speeds, the area of suitable or available lands, proximity to a grid connection point and planning policy are all very important, a wind farm project must be commercially viable/competitive, as otherwise it will never attract the necessary project finance to see it built. In the case of the Proposed Development, the benefits of developing a greenfield site vs. repowering an existing wind farm development were also considered.

3.2.3.1 Previous Site History

The Proposed Development site, as detailed in Chapter 1, Section 1.2, was subject to a number of previous planning applications relating to the Existing Kilgarvan Wind Farm, which is located within the same lands as the Proposed Development. These applications were lodged between 2003 and 2007 for a total of 30 wind turbines (28 no. of which were built), a 110kV substation and associated overhead line connection to Cloonkeen 110 kV substation, and ancillary infrastructure.

3.2.3.2 Strategic Site Selection

The cost of building each megawatt of electricity generating capacity in a wind farm is in the region of €1.5 million. It is therefore critical that the most suitable site for the Proposed Development was chosen.

The site selection process for the Proposed Development has been fully informed by national, regional and local policy at a macro level (see Chapter 2: Background to the Proposed Development), as well as site specific factors that influence the turbine layout and the project design on the site at a micro level (see Section 3.2.6 below).

The key policy, planning and environmental considerations for the selection of a potential wind farm site included:

- Site location relative to the Kerry County Development Plan (2022 – 2028).
- Low potential for impact on Designated Sites
- Consistent wind speeds
- Available set back distance from sensitive receptors
- Access to the National Grid
- Protection of visual amenity
- Low population density
- Sufficient area of unconstrained land that could potentially accommodate wind farm development and turbine spacing requirements.

These criteria are explained further below in so far as they influenced the site identification exercise undertaken in respect of the decision to repower the Existing Kilgarvan Wind Farm. From an early stage in the design process, it was considered optimal to seek a site capable of accommodating a large number of turbines within reasonable proximity to each other. This would limit the geographical spread of the turbines, consolidate supporting infrastructure and also reduce the number of clusters of turbines that may be required. The development of multiple, separate wind farm sites spread throughout a wider area would require supporting infrastructure (i.e., roads and cabling etc.) to run from each wind farm site to the connecting substation thereby increasing the amount of infrastructure required for development and increasing the potential for environmental impacts to occur. It was instead decided that it would be far more preferable to utilise the existing site infrastructure and consolidate the design around this. Therefore, the provision of a centralised location would concentrate the necessary infrastructure into a single geographic area, i.e. the Existing Kilgarvan Wind Farm site.

The decision was made by the Applicant to seek to repower the site rather than seeking an extension of duration on 13 no. of the existing 28 no. turbines due to the availability of newer, more efficient turbine

technology. The planning permission for 13 no. of the existing 28 no. turbines is due to expire in 2029. Following this, the remaining 15 no. turbines without an expiration date will have to be decommissioned in the following years as they will eventually become less efficient.

It was also decided that the Proposed Development be located onshore at this location rather than offshore, as the status of the location of the Proposed Development has long been established as being suitable for wind energy, due to the Existing Kilgarvan Wind Farm.

It was decided that the more environmentally prudent and economically sound option was to apply to repower the site.

3.2.3.2.1 *Planning Policy*

Section 2.2, in Chapter 2 of this EIAR sets out in detail the planning policies of the Kerry County Development Plan 2022 – 2028 with regard to wind energy development. As detailed in Chapter 2 and below, and as seen in Figure 3-1, the site of the Proposed Development is located within a 'Repower Area' as designated by Kerry County Council.

The Kerry County Development Plan 2022 – 2028 was adopted on the 4th July 2022 and came into effect on 15th August 2022. The Plan was subsequently subject to a Ministerial Direction on the 5th December 2022. It incorporates the Planning and Development (Kerry County Development Plan 2022 – 2028) Direction 2022, dated 5th December 2022.

Chapter 12 of the Kerry County Development Plan 2022 – 2028 deals with Energy. Chapter 12 sets out a number of policies which detail its aims and objectives regarding energy. It is an objective of the Council to:

- **KCDP 12-1:** Support and facilitate the sustainable provision of a reliable energy supply in the County, with emphasis on increasing energy supplies derived from renewable resources whilst seeking to protect and maintain biodiversity, archaeological and built heritage, the landscape and residential amenity and integration of spatial planning in the county.

It is an aim of the Kerry County Development Plan 2022 – 2028 to ensure access to secure, clean and affordable energy, which it states is essential for the future economic and social development of the county. The council will continue to facilitate and support the sustainable development of the renewable energy sector in line with the strategy goals set out by the Department of Communications, Climate Action and the Environment whilst balancing the need for new development with the protection of the environmental, cultural and heritage assets of the county.

Repower Areas are also specially assessed within the Kerry County Development Plan 2022 – 2028. As wind turbine technology continues to advance, existing wind farms, such as the Proposed Development, have the potential to greatly increase efficiency and capacity by upgrading turbines with more efficient technology or their replacement with larger capacity turbines in the future.

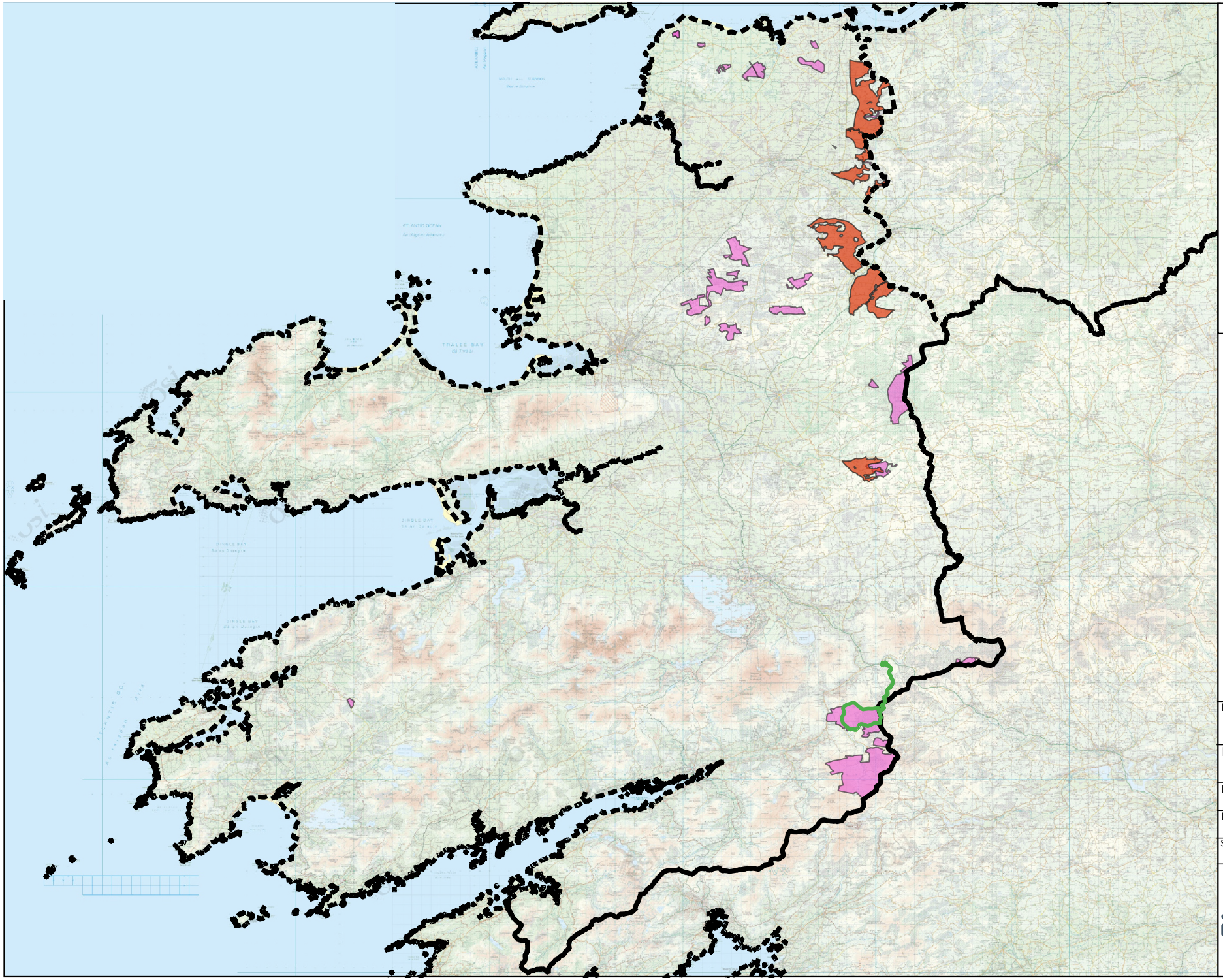
In relation to repower areas, it is an objective of the Council to:

- **KCDP 12-21:**
  - (a) Facilitate the sustainable replacement of turbines or repower energy projects in areas shown as 'Repowering areas' and areas 'Open to consideration'. Such proposals will be required to comply with Article 6 of the Habitats Directive.
  - (b) Ensure that repowering proposals within or in proximity to SPAs designated for Breeding Hen Harrier shall not result in insufficient habitat for the Hen Harrier in line with the conservation objectives of the SPA. As

part of this re-powering, proposals will not be permitted to result in the taking out of additional Hen Harrier foraging habitat within the SPA.
- (c) Ensure that all mitigation measures outlined in a Natura Impact Statement, submitted in support of Repowering proposals within or in proximity to SPAs designated for Breeding Hen Harrier shall be certain beyond all reasonable scientific doubt and shall be supported by robust evidence including at least 2 years of annual ornithological survey.
- (d) Ensure that repowering proposals within or in proximity to SPAs designated for Breeding Hen Harrier do not constitute an unacceptable collision risk to Hen Harrier. As part of this, early engagement with statutory and non-statutory holders of ecological data should be undertaken, including with the Irish Hen Harrier Winter Survey.

- **KCDP 12-22:** Ensure that all applications are accompanied by a Natura Impact Statement under Article 6 of the Habitats Directive if the site is located within or within close proximity to a (candidate) Special Area of Conservation or Special Conservation Area or if the site is within the catchment of a (candidate) Special Area of Conservation.

Volume 4 of the Kerry County Development Plan 2022 – 2028 presents various zoning maps for the County. Map 12.4 displays the Wind Zoning for the county. The site of the Proposed Development is located entirely within the 'Potential Repowering Area'.


Map Legend
EIAR Site Boundary
County Boundaries
Kerry County Wind Energy Designations 2022-2028
Open to Consideration
Repowering Areas
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Ordnance Survey Ireland. All rights reserved. Licence number CYAL50267517
Drawing Title
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Project Title
Proposed Repowering of Existing Kigravan Wind Farm
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Figure 3-1
Scale
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Date
2024-04-29
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The European Commission has proposed an outline of a plan to make Europe independent from Russian fossil fuels, starting with gas, due to the high volatile energy prices, and security of supply concerns following the unprecedented act of Russia's Military attack on Ukraine. The REPowerEU Plan (2022) seeks to lessen the EU's dependence on Russian fuel imports. Currently, the EU imports 90% of its gas consumption, with Russia providing around 45% of those inputs. Russia also accounts for around 25% of oil and 45% of coal imports. Phasing out dependence on fossil fuels can be done well before 2030, increasing the resilience of the EU-wide energy system based on two pillars:

1. *Diversifying gas supplies, via higher Liquefied Natural Gas (LNG) and pipeline imports of biomethane and renewable hydrogen production and imports from non-Russian suppliers*
2. *Reducing faster the use of fossil fuels by boosting energy efficiency, increasing renewables and addressing infrastructure bottlenecks.*

The RePowerEU plan has called out the repowering of existing wind farms as an important instrument in achieving the goals as set out in the report.

With full implementation of the measures in REPowerEU Plan, at least 155 bcm of fossil gas use could be removed, which is equivalent to the volume imported from Russia in 2021. Nearly two thirds of that reduction can be achieved within a year. A part of this plan includes *'Speeding up renewables permitting to minimise the time for roll-out of renewable projects and grid infrastructure improvements'*. This will make the sector more efficient and reach the set goals faster. As such, it is noted that the Proposed Development is strongly supported by EU energy policy.

One of the key initiatives aimed at speeding up renewables permitting is the Renewable Energy Directive, which was revised in 2023. The revised directive sets an overall renewable energy target of at least 42.5% by 2030 and includes provisions to simplify administrative procedures, reduce the time and cost of obtaining permits, and increase transparency in the permitting process. This would require a maximum deadline of six months for the granting process in repowering projects including all relevant environmental assessments. The directive also includes a requirement for member states to establish clear and transparent procedures for granting permits for renewable energy projects, with clear timeframes for decision-making.

3.2.3.2.2 Designated Sites

The Proposed Development site is not located within any area designated for ecological protection.

The nearest Natura 2000 site to the Proposed Development, i.e. Special Area of Conservation (SAC) or Special Protection Area (SPA) is Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC which is located 1.3km to the northwest of the Proposed Development at its closest point.

The nearest national designated site to the Proposed Development. i.e. Natural Heritage Area (NHA) or proposed Natural Heritage Area (pNHA) is the Roughty River pNHA, which is located approximately 340m to the southwest of the Proposed Development at its closest point.

3.2.3.2.3 Wind Speeds

The Irish Wind Atlas produced by Sustainable Energy Ireland shows average estimated wind speeds for the country. A suitable wind regime and consistent wind speeds are required for the development of a wind energy project. Wind speeds in the southwest of the country are typically between 6 to 10m/s. The wind resource of Irelands south-west region is among the best in the country and is very productive in comparison to many parts of Europe. Onsite monitoring of the wind resource, which has been ongoing for many years due to the presence of the existing 28 no. turbines which have been in operation since 2007 and 2009. The wind monitoring will further verify that the turbine envelope that is being applied for will lead to a site that is commercially viable.

3.2.3.2.4 Available Set Back from Sensitive Receptors

The applicants sought to identify an area with a relatively low population density. Having reviewed the settlement patterns in the vicinity of the Existing Kilgarvan Wind Farm, it emerged that there was a sufficient viable area to repower the site with 11 no. turbines. As described in Chapter 5 of this EIAR, the population density of the Population Study Area is 7.65 persons per square kilometre. This is significantly lower than the average national population density of 70.05 persons per square kilometre. Further to this, the closest dwelling to the Proposed Development is located 899m south of the nearest turbine. This exceeds the requirements as set out in the Guidelines for a setback distance from sensitive receptors of 4 x tip height from a turbine (i.e. 800m in this case). There are 4 no. sensitive located within 1km of the proposed turbines, all of which are participating in the Proposed Development.

3.2.3.2.5 Access to the National Grid

The Existing Kilgarvan Wind Farm is connected to the National Grid via the existing Coomagearlahy 110kV substation, which in turn connects to the existing 110kV overhead electrical cable to Cloonkeen 110kV Substation. It is intended that the Proposed Development reutilise this electrical overhead line connection to Cloonkeen, which will require no upgrade works. As detailed in Section 3.2.8 below, there were no other options for grid connection considered due to the presence of the existing connection.

3.2.3.2.6 Existing infrastructure and Site Access

The applicants sought to utilise as much of the existing infrastructure, including site roads, site entrance, grid connection and areas of hardstanding, as possible. The reduction in additional infrastructure needing to be constructed to facilitate the Proposed Development will lead to fewer environmental impacts and has been deemed to be the more environmentally sensitive approach.

3.2.3.2.7 Visual Amenity

The Kerry County Development Plan 2022 – 2028 identifies the value of the landscape character within the county and the Landscape and the Landscape Character Assessment (LCA) is also one of the main policy areas which will inform the issue of suitability within the county. The Proposed Development is sited between 2 no. Landscape Character Areas (LCAs); the Clydagh River, the Paps and Derrynasaggart Mountains and the Kilgarvan and Roughty River Valley. Both of these LCAs are designated as having a Medium to High sensitivity rating. Given the fact that there are currently 28 no. existing turbines constructed and visible in the same area, it can be considered the more sensitive approach to remove the existing 28 no. turbines and construct 11 no. turbines in their place. For further detail relating to landscape sensitivity and visual amenity, please refer to Chapter 13 of this EIAR.

3.2.3.2.8 Summary

For the review of the criteria set out above, the site of the Proposed Development was identified as a suitable location for the repowering of the existing wind farm of the scale proposed. The site of the Proposed Development is located on the same site as the Existing Kilgarvan Wind Farm which encompasses some smaller areas of forestry and hosts some low intensity agriculture. The Proposed Development will take advantage of the existing road network, electrical infrastructure and some areas of hardstanding. The Proposed Development is located in an area designated as being a 'Potential Repower Area' under the Kerry County Development Plan 2022 – 2028.

While the outcome of the site selection process has identified the Proposed Development site as a suitable location for a proposed repowering project of this nature, it does not preclude other sites within the vicinity being brought forward for consideration in the future.

From the review of the criteria set out above, the Proposed Development was identified as a suitable location for repowering. It was deemed that the existing 110kV grid connection was suitable for the repowering of the site.

3.2.4 Alternative Renewable Energy Technologies

Both onshore and offshore wind energy development will be required to ensure Ireland reaches the target set in the Climate Action Plan 2024 to source 80% of our electricity from renewable energy by 2030. It is not a case of 'either' 'or'.

The Proposed Development is located on the site of the Existing Kilgarvan Wind Farm. The site of the existing wind farm also hosts small areas of forestry and some low-intensity agriculture. The Proposed Development will be located entirely within the footprint of the Existing Kilgarvan Wind Farm. It would not be suitable based on the existing site already being utilised for a wind farm, to consider alternative technologies, such as solar. It was deemed at an early stage in the project development that replacing the existing turbines with solar PV array would not be an environmentally sensitive option for this site.

Solar energy would require a larger development footprint. It was the aim of the Applicant to utilise as much of the existing wind farm footprint as possible in order to facilitate the Proposed Development. The larger footprint required for solar energy would lead to additional environmental effects due to the presence of Annex 1 habitats and the nature of other peaty habitats that are present onsite. In addition, a solar development would have a higher potential environmental effect on Traffic & Transport (construction phase) and Biodiversity and Birds (habitat loss) at the site.

For the reasons set out above, the proposal for a wind energy development at the wind farm site was considered to be the most efficient method of electricity production with the lesser potential for significant environmental effects.

3.2.5 Alternative Turbine Numbers and Model

The proposed turbines will have a potential power output in the 5 – 7MW range. It is proposed to remove the existing 28 no. turbines and install 11 no. turbines at the site of the Proposed Development which could achieve approximately 6.6 MW output (mid-range capacity).

Such a wind farm could be achieved on the site of the Proposed Development by replacing the existing turbines with turbines of the same dimensions. However, this would necessitate the construction of 28 no. turbines to achieve a similar output. Furthermore, the use of smaller turbines would not make efficient use of the opportunity to reduce the footprint of the Proposed Development. The turbine models and their associated technologies are now deemed outdated; they are also no longer available on the commercial market as they have been superseded by more efficient and advanced models. The use of more efficient turbine models for the proposed repowering of this site is also allowing the developer to significantly reduce the number of turbines to be constructed, while also achieving a similar generation output.

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 Development. The 11-turbine layout selected for the Proposed Development has the smallest development footprint of the other alternatives considered and makes use of existing infrastructure from the Existing Kilgarvan Wind Farm as much as possible. The other alternatives considered included a 15-turbine layout which is discussed in further detail in Section 3.2.6 below.

The range of turbine dimensions being applied for as part of this EIAR is set out in Chapter 1. This EIAR provides a robust assessment of candidate turbines within that range of dimensions.

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 wind farm site is presented in Table 3-2 below.

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

Environmental Consideration	Larger number of smaller turbines	Chosen option of an 11 turbine Layout
Population & Human Health (incl. Shadow Flicker)	Potential for increased levels of shadow flicker due to the higher number of turbines commissioned over a wider area. A larger number of turbines could be located closer to sensitive receptors.	Based on the assessment detailed in Chapter 5 and the mitigation measures proposed, there will be no significant effects related to shadow flicker related to the Proposed Development.
Biodiversity & Ornithology (Terrestrial and Aquatic)	Larger development footprint would result in greater potential for habitat loss	As detailed in Chapter 6 and Chapter 7 of this EIAR, the Proposed Development has been designed to avoid or mitigate impacts on biodiversity including bats, birds, terrestrial habitats and species, aquatic habitats and species. As per Chapter 6 and Chapter 7 of this EIAR, there are no significant long-term negative effects expected on biodiversity receptors. The Proposed Development includes for a peatland restoration plan, providing a local boost to the peatland habitats and species on a local level. Please see Appendix 6-8 for further details. With the implementation of mitigation and monitoring measures as outlined in Chapter 6 , the residual effects for collision risk are not significant. With the implementation of mitigation measures outlined in Chapter 7, there will be no significant residual effects on water quality or aquatic habitats.

Environmental Consideration	Larger number of smaller turbines	Chosen option of an 11 turbine Layout
		The smaller development footprint will result in areas of the existing development being left to rewild and regenerate. As detailed in Chapter 6, the development has been designed to avoid or mitigate impacts on biodiversity.
Land, Soils & Geology	Neutral	The Proposed Development will utilise as much of the infrastructure as possible, leading to a smaller volume of spoil to be excavated. As detailed in the assessment in Chapter 8, no significant effects on soils and subsoils will occur.
Water	The 28-turbine layout of the Existing Kilgarvan Wind Farm includes 6 no watercourse crossings. The larger development footprint leads to increased potential for silt-laden runoff to enter receiving watercourses.	The proposed 11 turbine layout includes 4 no. watercourse crossings. The smaller footprint leads to reduced potential and opportunities for silt-laden runoff to enter receiving watercourses. A new drainage design will be implemented, with new measures imposed and current drainage improved in respect of the 11-turbine layout As detailed in the assessment in Chapter 9, no significant effects on surface water or groundwater quality will occur.
Air Quality	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.	Reduced potential for dust and other noxious emissions due to smaller volume of plant and ground works on site due to a smaller footprint.
Climate	Larger amount of turbines would lead to larger development footprint with the potential for increased vehicle	As detailed in the assessment in Chapter 11 – Climate; over the Proposed 35-year lifetime of the Proposed Development 69,982

Environmental Consideration	Larger number of smaller turbines	Chosen option of an 11 turbine Layout
	emissions and excavations of peat.	tonnes of caron dioxide will be displaced from traditional carbon-based electricity generation. The continuation of approximately 72.6MW of clean energy to the national grid will be a positive contribution to the State's renewable energy targets, as set out in the Climate Action Plan 2024.
Noise & Vibration	Potential for increased noise impacts on nearby sensitive receptors.	Potential for less noise impacts on nearby sensitive receptors during the construction and operational phase. Based on the assessment detailed in Chapter 11 and the mitigation measures proposed, there will be no significant effects on sensitive receptors due to an increase in noise levels from the Proposed Development during the construction and operational phase
Landscape & Visual	Neutral – the majority of the existing 28 no. turbines are at least partially visible from the surrounding landscape.	Neutral – the majority of the proposed 11 no. turbines will be at least partially visible from the surrounding landscape.
Cultural Heritage & Archaeology	Increased potential for encroachment on previously undiscovered national monuments and associated buffers.	As detailed in the assessment in Chapter 14, 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
Material Assets	Potential for greater traffic volumes during construction phase due to larger development footprint and requirement for more construction materials and turbine components	Less traffic volumes due to smaller footprint and less component deliveries. As detailed in Chapter 15, there will be a slight to moderate and temporary negative effect on traffic volumes during the construction phase of the Proposed Development. Traffic management proposals are

Environmental Consideration	Larger number of smaller turbines	Chosen option of an 11 turbine Layout
		detailed within Chapter 15, Section 15.1 and the CEMP (Appendix 4-3).
Major Accidents and Natural Disasters	No material difference between the two options	No material difference between the two options

3.2.6 Alternative Turbine Layout and Development Design

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

Throughout the preparation of this EIAR, the layout of the Proposed Development 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 organisations, the local community and local authorities as detailed in Section 2.5 of Chapter 2.

3.2.6.1 Constraints and Facilitators Mapping

The design and the layout of the Proposed Development follows the recommendations and guidelines set out in the *'Wind Energy Development Guidelines'* (Department of the Environment, Heritage and Local Government, 2006) (the Guidelines) and the *'Best Practice Guidelines for the Irish Wind Energy Industry'* (Irish Wind Energy Association, 2008).

The '*Wind Energy Development Guidelines for Planning Authorities'* (DoEHLG, 2006) (the Guidelines) were the subject of a targeted review. The proposed changes to the assessment of impacts associated with onshore wind energy developments were outlined in the document Draft Wind Energy Development Guidelines (December 2019) (draft Guidelines). A consultation process in relation to the draft Guidelines closed on 19th February 2020. The proposed changes presented in the draft Guidelines give certain focus on the setback distance from sensitive receptors (four times the proposed maximum tip height), along with shadow flicker and noise requirements relative to sensitive receptors. At time of writing, the draft Guidelines have not yet been adopted, and the relevant guidelines for the purposes of section 28 of the Planning and Development Act 2000, as amended, remain those issued in 2006. 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.

Notwithstanding this, however, due to the timelines associated with the planning process for renewable energy projects and the commitment within the Climate Action Plan 2024 to publish the final version of the draft Guidelines in 2024 (refer to Section 1.5.1.1 in Chapter 1), it is possible that the draft Guidelines are adopted during the consideration period for the Proposed Development. Should the draft Guidelines be adopted in advance of a planning decision being made on the Proposed Development, the wind farm site will be capable of achieving the requirements of the draft Guidelines as currently proposed.

The constraints map for the Proposed Development, as shown in Figure 3-2, was produced following a desk study of all site constraints. Figure 3-2 encompasses the following constraints and associated buffers:

- Sensitive receptors plus a minimum 800-metre buffer (achieving the requirement for a 4 x tip height separation distance from sensitive receptors in line with the new draft Guidelines).
- Natura 2000 sites plus 200-metre buffer
- Telecommunications links plus operator-specific buffers;
- Natural Watercourses plus 50-metre buffer;
- Archaeological Sites or Monuments, 30-metre buffer, plus 'Zone of Notification' as required by the National Monuments Service (ROI).

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

- Available lands for development
- Good wind resource
- 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 constraints on a map of the study area allows for a viable area to be identified. An initial turbine layout is then developed to take account of all the constraints mentioned above and their associated buffer zones and the separation distance required between the turbines. Following the mapping of all known constraints, detailed site investigations were carried out by the project team.

The ecological assessment of the Proposed Development site encompassed habitat mapping and extensive surveying of birds and other fauna. This assessment, as described in Chapter 6 of this EIAR on Biodiversity, optimised the decision on the siting of turbines and the carrying out of any development works, such as the construction of roads.

The hydrological assessment of the Proposed Development site encompassed detailed drainage mapping of the site, surface water sampling, field hydrochemistry assessments and grab sampling. The hydrological assessment of the Proposed Development utilised the results of the site surveys and outputted a detailed assessment of the potential impacts on the Zone of Impact due to the Proposed Development. This assessment, as described in Chapter 9 of this EIAR on Water, optimised the decision on the siting of turbines, roads and the existing onsite110kV Coomagearlahy substation.

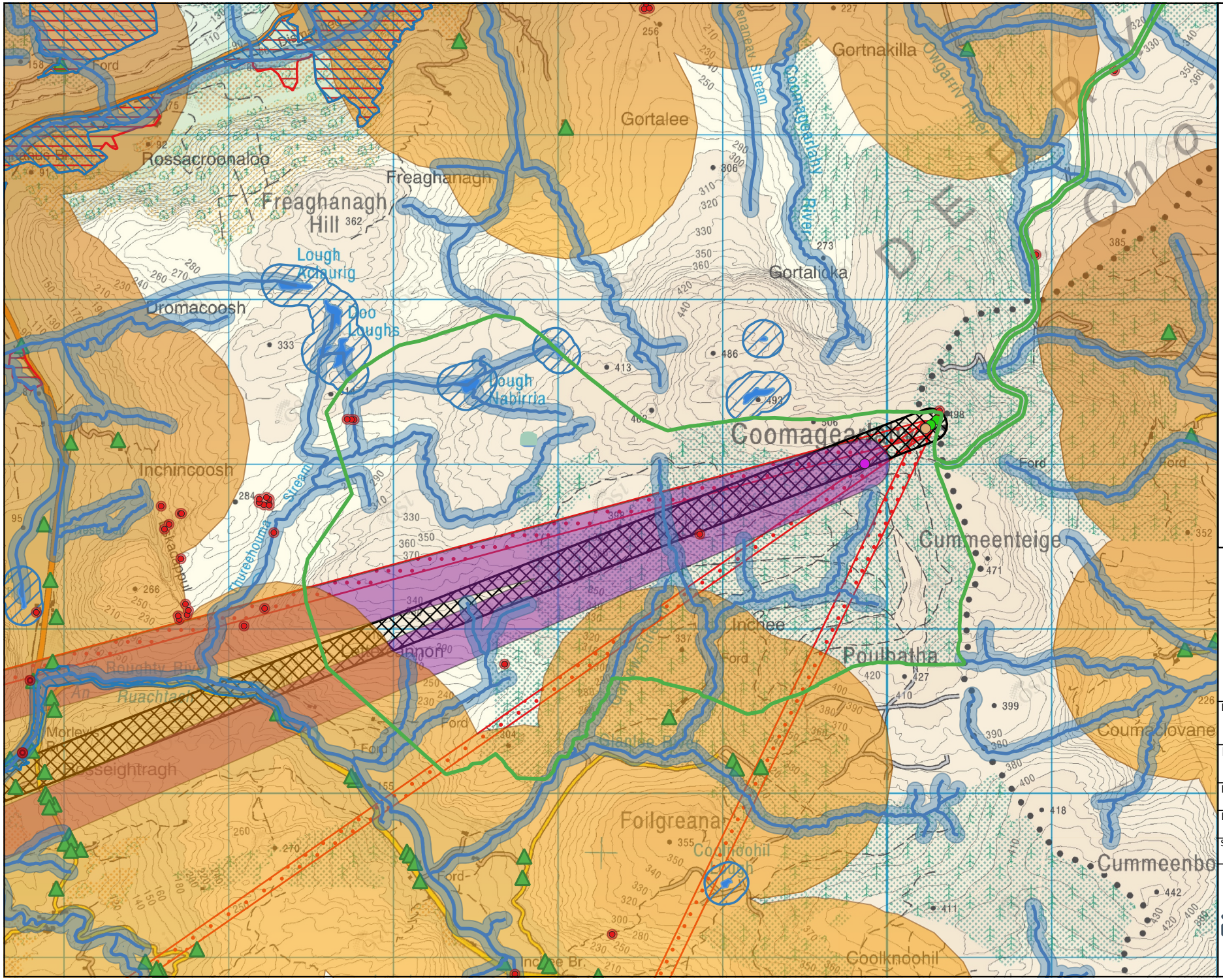
Where specific areas were deemed as being unsuitable for the siting of turbines or roads, etc., alternative locations were proposed and assessed, taking into account the areas that were already ruled out of consideration. The turbine layout for the site has also been informed by the results of noise, landscape and visual and shadow flicker assessments as they became available.

3.2.6.2 Turbine Layout

The final proposed turbine layout takes account of all site constraints and the distances to be maintained between turbines and from houses, roads, etc. The layout is based on the results of all site investigations that have been carried out during the EIAR process. As information regarding the Proposed Development site was compiled and assessed the number of turbines and the proposed layout have been revised and amended to take account of the physical constraints of the Proposed Development site and the requirement for buffer zones and other areas in which no turbines could be located. The selection of turbine number and layout has also had regard to wind-take, noise and shadow flicker impacts and the separation distance to be maintained between turbines. The EIAR 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 Development layout has resulted in following feedback from the various studies and assessments carried out as well as ongoing negotiations and discussions with landowners and the local community.

There were several reviews of the specific locations of the various turbines during the optimisation of the Proposed Development layout. The initial constraints study identified a significant viable area within the overall study area of the Proposed Development site. The initial turbine layout comprised 15 no. turbines within the confines of the Existing Kilgarvan Wind Farm. However, the proposed 11 turbine layout was refined following feedback from the project team, telecoms service providers, and the need to ensure appropriate set-back distances are maintained for on-site constraints. The Proposed Development site went through 8 separate iterations. All turbine layout iterations have not been included, but Figure 3-3 to Figure 3-5 below gives an indication of how the design of the turbine layout evolved during the design process.



Map Legend

- EIAR Site Boundary

Designated Areas

- Special Area of Conservation
- Proposed Natural Heritage Ar
- National Monuments
- National Monuments 30m Buffer
- Eir Telecoms Link Plus Buffer
- ESB Telecoms Link Plus Buffer
- Vodafone Telecoms Link Plus Buffer
- Watercourses
- Watercourse 50m Buffer
- Lakes
- Lakes 50m Buffer
- Dwellings
- 800m Buffer of Dwellings (4 x Tip Height)

Drawing Title

Constraints & Facilitators

Project Title

Proposed Repowering of Existing Kilgravan Wind Farm

Drawn By	Checked By
EL	NMcH
Project No.	Drawing No.
211107	Figure 3-2
Scale	Date
1:30,000	2024-05-07

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3.2.6.2.1 Proposed Layout Iteration No. 1

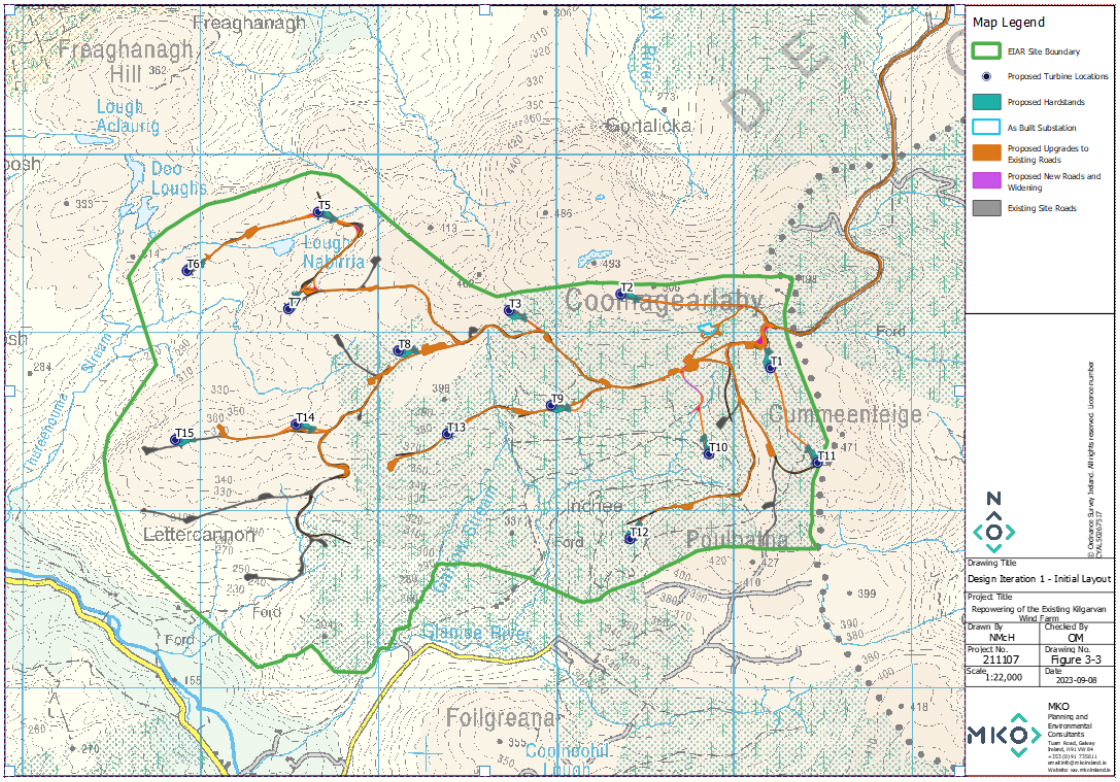

Figure 3-3: Proposed Layout Iteration No. 1

The initial design that was developed by the Applicant included 15 no. turbines, the locations of which followed the existing road network and required a few areas of road widening and additional stretches of access roads. This initial layout can be seen in the above figure, Figure 3-3.

A desk-based constraints study was carried out on this layout, and constraints including telecoms, hydrology, archaeology, ecology and relevant setback distances from sensitive receptors were taken into account. As well as this, photomontages were captured from areas of sensitivity in the surrounding landscape, and the proposed turbine layout was modelled as overlying wireframes in order to assess the visual impact. Recommendations were provided to the applicant with a view to lessening potential visual impacts from sensitive receptors. Based on the above constraints, and the recommendations from a landscape and visual point of view, the layout was reconfigured.

3.2.6.2.2 Proposed Layout Iteration No. 2

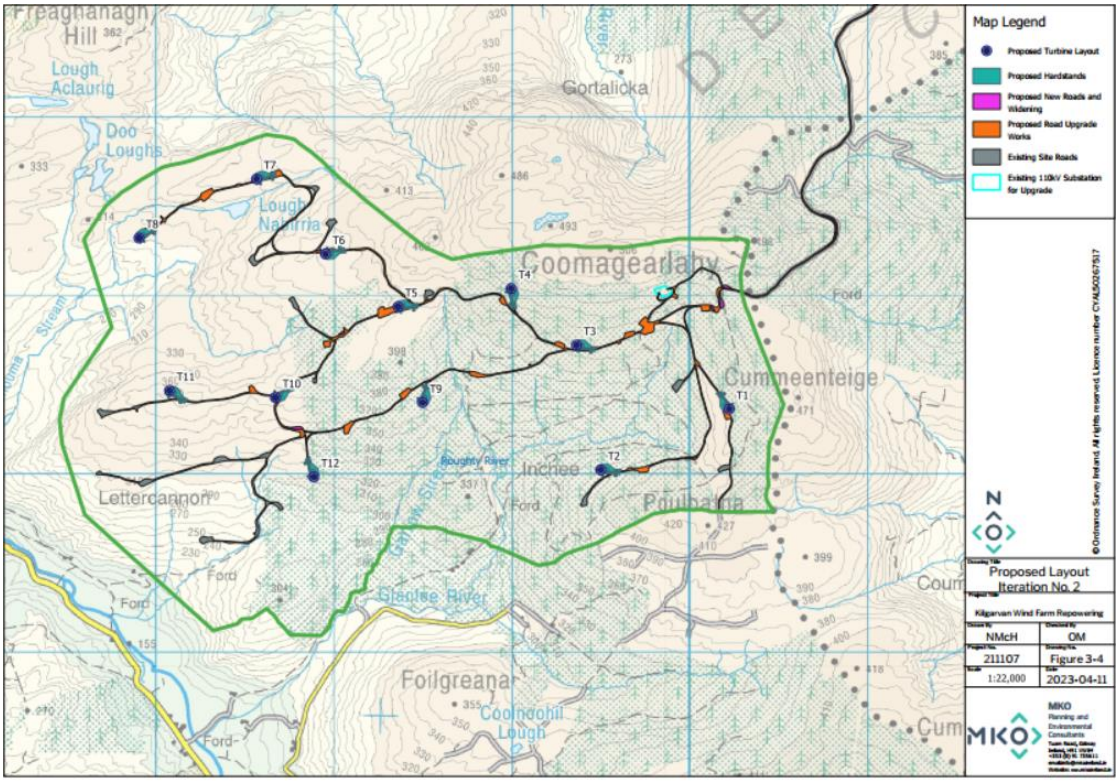

Figure 3-4: Proposed Layout Iteration No. 2

Based on the recommendations provided to the Applicant on the Design Iteration No. 1, a second design iteration was developed, which took into account constraints that had been identified from desk-based surveys, as well as recommendations made from a landscape and visual point of view.

The Design Iteration No. 2 was composed of 12 no. turbines, indicative locations for 2 no. temporary construction compounds, areas of the existing roads to be widened, some short stretches of new access roads, and the existing site roads to be upgraded, as seen in Figure 3-4 above.

Site visits were conducted by the team on this layout. These site visits included peat probing, archaeological surveys, hydrological surveys, and ecological surveys. Any constraints that were found onsite were compiled and taken into account of the context of the overall development. Where necessary, it was agreed with the client that any infrastructure which encroached on the buffers of new constraints be relocated and moved away from these sensitive areas. Following the completion of all site surveys, infrastructure was microsited due to the discovery of an unmarked watercourse, and the discovery of some deeper areas of peat.

The constraints, as found onsite and mentioned above, were taken into account when finalising the frozen layout for the Proposed Development.

3.2.6.2.3 *Proposed Layout Iteration No. 3 – Final Layout*

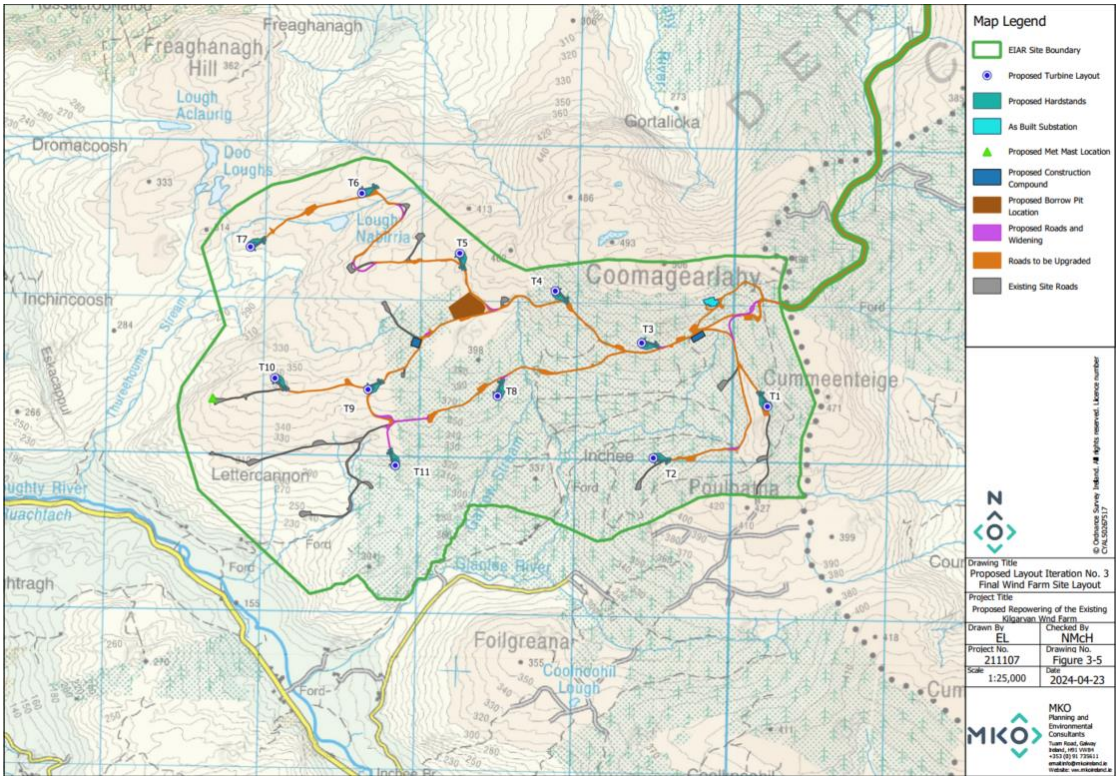

Figure 3-5: Proposed Layout Iteration No. 3

During finalisation of the above layout, elements of the site design such as, turbine hardstanding areas, drainage design, extension of the existing borrow pit, temporary construction compounds and internal cabling were all confirmed. The final proposed site layout can be seen on Figure 3-5 above. The final 11 no. turbine layout, as seen on Figure 3-5, makes use of the existing road network, and areas of existing hardstanding, while also avoiding sensitive areas identified during the constraints mapping and site visits.

The final proposed turbine layout takes account of all site constraints detailed above and the distances to be maintained between turbines and houses, watercourses, roads etc. In addition to the above identified constraints, the selection of the turbine dimensions and number also had regard to wind-take, noise and shadow flicker impacts. The layout was also optimised once the cut and fill assessment had been completed in order to minimise the volume of material to be excavated in order to facilitate the Proposed Development. On this basis, the road between T5 and T6 was slightly altered, as seen above in Figure 3-5. Similarly, the hardstand of T6 was pivoted slightly to minimise the volume of excavated material at this location.

The final proposed turbine layout is considered the optimal layout as it has the least potential for environmental effects. A comparison of the potential environmental effects of the previous alternative layouts versus the final proposed layout is presented in Table 3-3 below.

Table 3-3 Comparison of environmental effects when compared against the chosen option (final layout)

Environmental Consideration	Initial Turbine Layouts and all associated Infrastructure	Chosen Option of the Final 11 no. Turbine Layout and all associated infrastructure
Population & Human Health (incl. Shadow Flicker)	Likely potential for increased shadow flicker impacts on nearby sensitive receptors due to the increased number of turbines	Potential for reduced shadow flicker impacts on nearby sensitive receptors due to the reduced number of turbines 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 Development.
Biodiversity & Ornithology	Larger development footprint would result in greater potential habitat loss. Greater potential impact on identified sensitive ecological receptors due to location of infrastructure within designated set-back buffers	As detailed in Chapter 6, the development has been designed to avoid or mitigate impacts on biodiversity. As detailed in Chapter 6 also, the monitoring and mitigation commitments will be effective in ensuring that the residual impacts will likely be slight negative (local) in the temporary to short-term upon the terrestrial habitats and species that occur in the receiving environment
Land, Soils & Geology	Larger development footprint would result in greater volumes of peat and spoil to be excavated and managed.	Smaller footprint would result in smaller volume of soils to be excavated and managed. As detailed in the assessment in Chapter 8, no significant effects on soils and subsoils will occur.
Water	Larger development footprint, therefore, increasing the potential for silt laden runoff to enter receiving watercourses	Neutral
Air Quality	Increased potential for vehicle emissions and dust emissions due to an increased volume of material and turbine component deliveries to the site during the construction phase.	Decreased potential for vehicle emissions and dust emissions due to a decreased volume of construction material and turbine component deliveries to the site.

Environmental Consideration	Initial Turbine Layouts and all associated Infrastructure	Chosen Option of the Final 11 no. Turbine Layout and all associated infrastructure
		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 during the operational phase
Climate	There would be an 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 Development 69,982 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The continuation of an estimated 72.6MW clean energy to the national grid will be a positive contribution to the States renewable energy targets set out in the Climate Action Plan 2024
Noise & Vibration	A larger number of turbines could have a greater noise impact.	Based on the assessment detailed in Chapter 12 and the mitigation measures proposed, there will be no significant effects on sensitive receptors due to an increase in noise levels from the Proposed Development during the construction and operational phase.
Landscape & Visual	A larger number of turbines could have a greater visual impact	As detailed in the assessment in Chapter 13, the lack of highly sensitive landscape and visual receptors, and the strategic siting of infrastructure will mitigate any potential for significant landscape and visual effects.

Environmental Consideration	Initial Turbine Layouts and all associated Infrastructure	Chosen Option of the Final 11 no. Turbine Layout and all associated infrastructure
Cultural Heritage & Archaeology	Neutral	Neutral
Material Assets	Neutral	Neutral
Major Accidents and Natural Disasters	No material difference between the two options	No material difference between the two options

3.2.7 Alternative Design of Ancillary Structures

The ancillary structures required for the Proposed Development include road layout, turbine hardstands, temporary construction compounds, borrow pit, met mast, substation and underground electrical cabling.

3.2.7.1 Road Layout

Access roads are required onsite in order to enable transport of infrastructure and construction materials within the Proposed Development site. Such roads must be of a gradient and width sufficient to allow safe movement of equipment and vehicles. It was decided at an early stage during the design process, that the roads belonging to the Existing Kilgarvan Wind Farm would be utilised to facilitate the movement of construction and maintenance vehicles where possible within the Proposed Development, to minimise the potential for impacts by using new roads as an alternative.

As the overall Proposed Development layout was finalised, the existing road layout was used as a marker for the location of the turbine locations, taking into account the existing infrastructure and site constraints, in order to ensure suitable linkages within the Proposed Development site.

An alternative option to making maximum use of the existing road network within the Proposed Development site would be to construct a new road network, having no regard to existing roads. This approach was not favoured, as it would require unnecessary disturbance to the wind farm site and create the potential for additional environmental impacts to occur. It would also result in an unnecessary requirement for additional cut and fill material to be used in the construction of new roads.

3.2.7.2 Turbine Hardstands

A hardstand is required for each turbine in order to facilitate construction and provide a stable foundation for the turbine to be placed on. The turbine hardstands have been arranged in such a way as to avoid all site constraints, including 50-metre watercourse buffers, areas of deeper peat, sensitive habitats, etc. Hardstands were also oriented in such a way as to avoid excessive cut or fill volumes. Where possible, areas of existing hardstanding were used to facilitate hardstands for the proposed turbines.

3.2.7.3 Construction Compounds

The temporary construction compounds will be used for the storage of all construction materials, turbine components, staff facilities and car parking areas for staff and visitors. The use of two 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 each section of the construction of the various infrastructure components. The construction compounds are strategically

located on existing areas of hardstanding at two opposite ends of the site to facilitate the construction of the site. As a result, vehicle emissions and the potential for dust arising will be reduced.

3.2.7.4 Borrow Pit

The decision was made at an early stage in the project to re-use and extend the existing borrow pit onsite for the Proposed Development if it was determined that it contained sufficient materials to facilitate the Proposed Development. The re-use of this borrow pit was deemed to be the most environmentally sensitive approach, as it is located in the centre of the site along an existing access road. This borrow pit is strategically located to facilitate the construction of the site. As a result, vehicle emissions and the potential for dust arising will be reduced.

3.2.7.5 Met Mast

The proposed met mast will be located on an area of existing hardstanding which is currently being used as a turbine hardstanding for the Existing Kilgarvan Wind Farm. The met mast will be located on the western boundary of the Proposed Development. The re-use of this area of hardstanding will prevent the need to add an additional area of hardstanding and additional access roads. This proposed met mast location is fully accessible from the existing wind farm site.

3.2.7.6 Substation

The decision was made at an early stage in the project to re-use the existing onsite110kV Coomagearlahy substation for the Proposed Development. The existing Coomagearlahy 110kV substation is located within the Proposed Development site and is connected via an existing overhead line to Cloonkeen 110kV substation, which is located at the site access road entrance off the N22. This was deemed the most environmentally sensitive approach as the internals of the substation will require upgrade, but the footprint will remain the same, so no additional groundworks or construction will occur. The upgrade works will be confined to the existing footprint of the Coomagearlahy 110kV substation and will be carried out to ensure that the existing onsite 110kV Coomagearlahy substation is in compliance with current EirGrid specifications.

3.2.8 Alternative Grid Connection Cabling Route Options

In this case, it was deemed that there was no requirement for alternative grid route options to be considered, as it was deemed more appropriate to re-use the existing onsite 110kV Coomagearlahy substation with it's existing connection to the national grid. The existing grid infrastructure is of a standard that it can be re-used with no major upgrades needed. As detailed in Section 3.2.7.5 above, this was deemed the most environmentally sensitive approach as all of the necessary infrastructure is existing and will not require additional groundworks or construction which could give rise to environmental impacts.

3.2.9 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 Development site. With regard to the selection of a transport route to the Proposed Development site, alternatives were considered in relation to turbine components, general construction-related traffic, and site access locations.

3.2.9.1 Port of Entry

The alternatives considered for the port of entry of wind turbines into Ireland for the Proposed Development include the Port of Shannon Foynes. Shannon Foynes Port is the principal deepwater

facility on the Shannon Estuary and caters for dry bulk, break bulk, liquid and project cargoes. The primary chosen point of entry is Ringaskiddy Port due to its connection to the National Road Network namely the N22, on which the site entry for the Existing Kilgarvan Wind Farm is located.

3.2.9.2 Delivery to Site

From the selected Port of Entry, Ringaskiddy Port, the turbines will be transported northwest on the M28 towards Cork City, then west on the N40 on the outskirts of Cork city, and finally west-northwest again on the N22 towards the Existing Kilgarvan Wind Farm site entrance at Cloonkeen. From the site entrance to the Existing Kilgarvan Wind Farm off the N22, there is a 7.5 km long access road which leads to the site. This option includes placement of turbine blades on a blade adaptor vehicle as they are being transported from Ringaskiddy Port to the Proposed Development site. This strategy would not require any facilitation or upgrade works along the turbine delivery route.

Another option which is being considered, is to utilise a section of the old N22, approximately 4km east of the existing site entrance, to switch the blade over from a blade trailer to a blade adapter, as an alternative to utilising a blade adapter vehicle all the way from the Port of Entry. While there are no enabling works being applied for as part of this strategy, any potential impacts associated with this strategy will be assessed within this EIAR. In order to utilise this method, existing soil berms, fences, gates and some vegetation will need to be removed. The turbine transport vehicles would then reverse back into this section of the N22 from the Killarney side. In this case, it will also be necessary to remove some soil berms and place some hardcore surfacing on the verge of the new road section. The removal of these elements is assessed within Chapters 5-16 of this EIAR as appropriate.

If the strategy of swapping the blade in the set down area off the N22 is to be utilised, it will be subject to a separate future planning application

Traffic movements generated by the Proposed Development are discussed in Section 15.1 of Chapter 15, Material Assets This route has been proven suitable for the transport of turbine components for the Existing Kilgarvan Wind Farm, and the transport analysis (as presented in Section 15.1 of this EIAR), shows only minor accommodation works will be required to accommodate the proposed turbines. The turbine transport route will utilise the national and primary roads available to ensure the road network holds the capacity to manage large loads. The route selected was the most direct and most viable option of any route considered.

All construction traffic will use the designated haul routes only. An alternative to this would be to allow for more direct access to the site using multiple approach routes; however, this is more likely to give rise to additional traffic and road impacts.

3.2.10 Alternative Mitigation Measures

Mitigation by avoidance has been a key aspect of the Proposed Development's evolution through the selection and design process. Avoidance of the most ecologically sensitive areas of the site limits the potential for environmental effects. As noted above, the site layout aims to utilise as much of the existing infrastructure (i.e. road network, areas of hardstanding, electrical substation) and avoid any environmentally sensitive areas. Where the loss of habitat occurs on the site, this has been mitigated with the proposal of a habitat enhancement plan and a biodiversity net gain proposal. Any forestry felled within the footprint of the Proposed Development will be replaced offsite, with no net loss. The alternative to this approach is to construct new wind farm infrastructure and to encroach on environmentally sensitive areas of the site and accept the potential environmental effects and risk associated with this.

The best practice design and mitigation measures set out in this EIAR will contribute to reducing any risks and have been designed to break the pathway between the site and any identified environmental

receptors. The alternative is to either not propose these measures or propose measures which are not best practice and effective and neither of these options is sustainable.

3.3 Conclusion

A description of the reasonable alternatives in terms of project design, technology, location, size and scale, which are relevant to the Proposed Development and its specific characteristics, and an indication of the main reasons for selecting the chosen option with regard to each, including a comparison of the environmental effects, has been provided in the preceding sections. The consideration and assessment of alternatives has been carried out throughout the project design so as to avoid adverse environmental impact.