Planning and Environmental Consultants

Environmental Impact Assessment Report

Taurbeg Wind Farm Extension of Operational Life

Chapter 3 – Consideration of Reasonable Alternatives

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3.1 Introduction

Article 5(1)(d) of Directive 2011/92/EU[1] of the European Parliament and of the Council of 13 December 2011 on the assessment of effects of certain public and private projects on the environment (codification), as amended by Directive 2014/52/EU[2] (the EIA Directive), requires that the Environmental Impact Assessment Report (EIAR) 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.*"

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 project. It provides an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

It is important to note that Taurbeg Wind Farm is existing infrastructure that has been operating and supplying electricity to the national grid since 2006. This EIAR has been prepared for the proposal to extend the operational lifespan of Taurbeg Wind Farm, beyond 2026, for a further 10 years (the 'Proposed Lifetime Extension'). No construction or groundworks are proposed as part of the Proposed Lifetime Extension.

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)*[3]*, the presentation and* consideration of reasonable alternatives investigated is an important part of the overall EIA process. The factors of hierarchy, non-environmental factors and site-specific issues may be taken into account in the consideration of reasonable alternatives, as set out below.

Hierarchy

EIA is concerned with projects. The Environmental Protection Agency (EPA) 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (EPA, May 2022), state that

[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] *Environmental Protection Agency (2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports. EPA, Wexford. Available at: https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf*

in some instances neither the applicant nor the competent authority can be realistically expected to examine options that have already been previously determined by means of a Strategic Environmental Assessment (SEA), the higher tier form of environmental assessment.

Non-Environmental Factors

EIA is confined to the potential significant 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 considerations.

Site-Specific Issues

The EPA guidelines state that the consideration of alternatives 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.

3.1.2 Methodology

The European Commission's *'Guidance on the Preparation of the Environmental Impact Assessment Report'* (EU, 2017)[4] 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 in deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required.*"

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

- 'Do-Nothing' Alternative;
- Alternative Locations;
- Alternative Processes;
- Alternative Technologies;
- Alternative Turbine Layouts and Development Design
- Alternative Mitigation Measures.

[4] *European Union (2017) Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU).*

Each of these is addressed in the following sections.

3.2 'Do-Nothing' Alternative

Article IV, Part 3 of the EIA Directive states that the EIAR 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.*"

The existing Taurbeg Wind Farm has been operational since March 2006, with the current planning permission set to expire in 2026. Planning condition no. 7 of the existing permission (Cork Co. Co. Pl. Ref. N/2002/3608) states that:

> "*The structures shall be removed at the expiration of a period of 20 years beginning on the date of commissioning of the development.*"

The 'Do-Nothing' alternative with regard to the Proposed Lifetime Extension, is to decommission the existing wind farm in 2026 when the current permission expires. As part of the decommissioning stage, the existing turbines would be dismantled, and all associated access roads, hardstands and turbine foundations removed; please see Section 4.7 in Chapter 4 of this EIAR for further details regarding decommissioning. The Proposed Lifetime Extension seeks to extend the operational life of the existing wind farm to 2036, at which stage the wind farm would be decommissioned.

Decommissioning activities have evolved since the original planning application was submitted and a Decommissioning Plan has been prepared to account for such updates and is included in Appendix 4-3 of this EIAR. The removal of the wind farm infrastructure such as turbine foundations and site roads under the 'Do Nothing' alternative is not considered to be the most environmentally prudent option. In order to remove this infrastructure, a significant volume of reinforced concrete would have to be removed from the ground. This could result in significant environmental nuisance such as noise, dust and/or vibration, pollution of surface waters and/or groundwaters, soils, traffic, and negative impacts on sensitive habitats within the vicinity of the Site. In addition, removal of the access roads has the potential to create significant noise and dust issues, as well as pollution of surface waters and additional traffic. As the access roads are also currently used for agricultural activities around the wind farm infrastructure, a further consequence would be the installation of farm tracks around the site to mitigate for the loss of the access roads. Therefore, as part of the Decommissioning Plan for the Proposed Lifetime Extension (i.e. decommissioning in 2036), it is only proposed to remove above ground structure from the site, this being the turbines and met mast.

In implementing the 'Do-Nothing' alternative however, i.e. decommissioning the existing wind farm in 2026, the opportunity to continue utilising the existing renewable energy infrastructure would be lost. So too would the opportunity to continue contributing to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas (GHG) emissions. Taurbeg Wind Farm is capable of suppling approximately 19,524 households with electricity every year based on the calculated power output of the development (see Section 4.3.1.5 in Chapter 4 of this EIAR for calculations).

The opportunity to continue to provide maintenance-related employment, community benefit fund, local authority development contributions, rates and investment in the local area would also be lost.

It is noted that the total current wind farm site, i.e. the EIAR Site Boundary as shown on figures, is approximately 112 hectares (ha). The existing development footprint therefore accounts for approximately 3.76ha or approximately 3% of the total Site area. The remainder of the Site is used for

commercial forestry and agricultural activities. These existing uses can and will continue in conjunction with the Proposed Lifetime Extension.

Should the Proposed Lifetime Extension not occur, the Proposed Offsetting Measures would also not take place. Existing land uses would exist at the Proposed Offsetting lands, comprising of coniferous plantation forestry and agricultural practises. The permanent restoration c.17.7ha of farmland for the benefit of hen harrier and deforestation of c.105.5ha of commercial forestry would no longer take place.

A comparison of the potential environmental effects of the 'Do-Nothing' Alternative when compared against the chosen option of extending the lifetime of the existing wind farm at the Site are presented in Table 3-1 below. On the basis of the positive environmental effects arising from the Proposed Lifetime Extension, when compared to the 'do-nothing' scenario, the 'do-nothing' scenario was not the chosen option.

Table 3-1 Comparison of environmental effects of 'Do-Nothing' alternative when compared against the chosen option (maintaining the existing wind farm at this site)

Environmental Consideration	'Do-Nothing' Alternative i.e. decommissioning of the existing wind farm in 2026
Population and Human Health (including Shadow Flicker)	Short term increase in local employment due to decommissioning works, followed by long-term loss of maintenance related employment, and loss of long-term financial contributions towards the local community via the Community Benefit Fund. Potential short-term negative effects on health and safety of construction workers due to the demolition work which is to occur during the decommissioning phase. Short term effects on residential amenity due to increases in traffic, noise and dust associated with the demolition works as part of the decommissioning plan.
Biodiversity and Ornithology	Decommissioning of the turbines will remove the collision risk for bat and birds. This is considered to have a potentially long-term positive effect on these receptors.
Land, Soils and Geology	Decommissioning of the wind farm will involve demolition and groundworks, which could result in short-term, slight negative environmental effects on land, soils and geology in the immediate vicinity of the decommissioning works. No potential for impact on subsoils and peat at the Proposed Offsetting lands due to erosion during no deforestation taking place. No potential for impact on peat stability due to deforestation.
Geotechnical	Decommissioning of the wind farm involves the removal of turbines and met mast, which could result in short-term, slight negative environmental effects of the geotechnical stability of the site within the immediate vicinity of the existing wind farm infrastructure. No potential for impact on subsoils and peat at the Proposed Offsetting lands due to erosion during deforestation. No potential for impact on subsoils at the Proposed Offsetting lands due to potential contamination of soil during leakages and spills. No

	potential for impact on peat stability at the Proposed Offsetting Lands due to deforestation.
Water	Decommissioning of the wind farm will involve demolition and groundworks, which could result in short-term, slight negative impacts upon local surface water and groundwater due to the proximity of the site to these sensitive receptors. No potential for impact on downstream hydromorphology, downstream surface water quality or designated sites due to deforestation.
Air and Climate	Decommissioning of the wind farm will involve short-term, imperceptible negative impacts on air quality from exhaust emissions and dust production. The decommissioning of the wind farm will prevent the extension of the opportunity for an improvement in air quality or reduction of greenhouse gases. The decommissioning will also not assist in achieving the renewable energy targets set out in the Climate Action Plan 2025[5]. Deforestation proposed as part of the Proposed Offsetting Measures does not take place. No change on air quality, due to no carbon emissions associated with deforestation works.
Noise and Vibration	Potential short-term, slight negative noise impacts on nearby sensitive receptors, associated with the decommissioning phase. No potential for further noise effects once the existing turbines are decommissioned. No potential for noise impacts associated with deforestation.
Landscape and Visual	There will be no further landscape and visual and visual effects related to turbines, once removed. There will be no impact on landscape and visual effects.
Cultural Heritage and Archaeology	There will be no effects on known, recorded archaeological sites and/or monuments due the decommissioning works. There will be no impact on archaeological sites/ monuments.
Material Assets	Decommissioning of the wind farm will involve short-term, slight negative impacts on local road users. No potential for material assets impacts associated.

[5] *Department of Environment, Climate and Communications (2025). Climate Action Plan 2025.*

3.3 Alternative Locations

3.3.1 Site Selection Process

It is considered appropriate to extend the operational phase of the existing wind farm at the Site for the following reasons:

- Taurbeg Wind Farm has been operating successfully at its current location since 2006 when it was first commissioned. The Site has proven to have reliably good wind speeds, maintained good generating capacity and delivered significant levels of renewable energy into the Irish national grid.
- While the turbine technology on the Site is dated, it is known that the existing 11 no. Bonus (now Siemens) SWT 2.3MW model turbines can continue to operate effectively for a further 10 years without a significant loss in total generating capacity of 25.3 megawatts (MW). As outlined in Chapter 1 of this EIAR, all 11 no. turbines which make up the existing Taurbeg Wind Farm are set to be decommissioned in of 2026, under the current permission. At this point, the turbines will have only been in operation for approx. 19 years, which is several years below their operational expectancy of approximately 30 years. The Applicant carried out technical feasibility assessments in consultation with Siemens to determine the qualitative remaining useful life of the Taurbeg Wind Farm turbines, which allow for the Applicant to safely extend the lifetime of the turbine components from a mechanical and operational safety perspective.
- The existing wind farm infrastructure on the Site, including the substation and site roads, can continue to be used for the extended operational period, which reduces environmental effects when compared to an undeveloped greenfield site, particularly in relation to landscape and visual effects and effects on locally important habitats.
- The wind farm site entrance can continue to be used without any alterations or upgrades needed.
- Taurbeg Wind Farm can comply with policies and principles outlined in Chapter 1: Introduction (of this EIAR) in terms of need for additional renewable energy in Ireland.
- Taurbeg Wind Farm can continue to contribute to the achievement of national energy targets and can continue to provide significant social and economic benefits for the local area (direct and indirect employment, community development fund) and the wider region.
- Repowering of the existing wind farm site (replacement of old turbines with new turbines to increase generating capacity) would likely require the use of a smaller number of significantly larger turbines. Repowering of the site with considerably larger turbines was not deemed feasible due to existing site constraints, in particular the proximity of existing residential dwellings to the site, and therefore increased potential effects from noise, shadow flicker and landscape and visual impacts.
- Having been previously permitted under the provisions of Pl. Ref. N/2002/3608, the principle for wind energy development and associated infrastructure on this site is already well established and has been proven to be in accordance with the proper planning and sustainable development of the area. Chapter 2 of this EIAR outlines the strategic planning context and provides further details of the Proposed Lifetime Extension's alignment with national, regional, and local policies, frameworks, guidelines and plans.

3.3.2 Review of Alternative Sites

As part of the Applicant's review of site alternatives, consideration was made to using a new greenfield site and construction of a new wind farm. In order to compare the potential for environmental effects, a

notional greenfield site of 112 ha site is was considered and development at this site would involve construction of 11 no. turbines with an output of 25.3 MW, the same as in the existing Taurbeg Wind Farm.

The construction of a new wind farm at an alternative greenfield site could have potentially greater environmental effects on hydrology and hydrogeology, traffic & transport, landscape and biodiversity (habitat loss) compared to the Proposed Lifetime Extension. Furthermore, there would be significant capital investment required in developing a new site, as opposed to extending the lifetime of an existing wind farm.

A comparison of the potential environmental effects of developing an alternative site for a new wind energy development when compared against the chosen option of extending the lifetime of the existing Taurbeg Wind Farm are presented in Table 3-2 below. On the basis of the positive environmental effects arising from the Proposed Lifetime Extension, when compared to constructing a new wind farm at an alternative site, this scenario was not the chosen option.

Table 3-2 Comparison of environmental effects of alternative site when compared against the chosen option (maintaining the existing wind farm at this site)

Environmental Consideration	Alternative wind farm at alternative site (with a 25.3MW output)
Population & Human Health (incl. Shadow Flicker)	Potential for shadow flicker and noise to affect sensitive receptors.
Biodiversity & Ornithology	Potential for collision risk for bats and birds Greater habitat loss associated with construction phase
Land, Soils and Geology	Greater levels of disturbance to soils and geology in order to develop new site infrastructure for new wind farm.
Geotechnical	Excavations involved in constructing new wind farm. More site disturbance due to construction works.
Water	Potential for silt-laden runoff to enter receiving watercourses associated with construction of a new wind farm.
Air Quality and Climate	The construction phase will result in dust emissions and temporary reduction in air quality. Also, the new wind farm will have to operate for a period of time before the embodied carbon generated during its manufacture and construction has been paid back.
Noise and Vibration	Potential for noise impacts on nearby sensitive receptors during the operational phase. Increased potential for noise impacts on nearby sensitive receptors during the construction phase of a new wind farm.
Landscape and Visual	Potential for landscape and visual impacts associated with a wind farm development. Alters landscape character.

Cultural Heritage & Archaeology	Potential for negative effects on cultural heritage sites due to construction of a new wind farm.
Material Assets	Potential for traffic volumes during construction phase and requirement for more construction materials.

Furthermore, the Applicant has undertaken a review of their operational wind farm portfolio on sites approaching expiry of permission, with a view to determine if they should be decommissioned, the operational life extended or if they were suitable for repowering. It was then decided which of the sites should be first selected for extension of operation.

Taurbeg Wind Farm was considered suitable for extension of operation due to the success of the existing site, the good condition and performance of the existing turbines and site infrastructure, the wind regime on the Site and the existing grid connection infrastructure. The turbines at Taurbeg Wind Farm have been operational since 2006 and are still in good operational condition.

The landowners of the existing wind farm and substation development have a long-term lease agreement with the Applicant for utilisation of the lands. This application is for an extension of life of the operational Taurbeg Wind Farm and therefore, further detailed assessment of alternative locations was not considered to be applicable in this instance.

3.4 Alternative Processes

The activities that affect the volumes and characteristics of emissions, residues, traffic and the use of natural resources has formed part of the consideration of alternatives through the Proposed Lifetime Extension.

No construction activities, groundworks or alterations to the existing wind farm infrastructure is proposed as part of the Proposed Lifetime Extension. There are no processes which have the potential to be carried out alternatively. Due to the absence of a construction stage, alternative processes designed to reduce emissions and use of resources during the construction stage are not required. During the operational phase, the processes required at the Site are relatively benign. There are no manufacturing processes per se with the potential for the generation of significant emissions to any environmental media, the use of finite natural resources or the generation of wastes or traffic volumes. On this basis, alternative processes designed to reduce emissions and use of resources during the operational stage are not required.

The low level of operation and maintenance (O&M) activities required at the Site will require the use of relatively minimal quantities of raw materials in the form of energy to supply plant and machinery, standard building materials including stone, metals pipework, concrete, electrical and oils, greases and other components and consumables. Raw materials are also utilised in the manufacture of wind turbine components and electrical infrastructure that may require replacement. The use of these resources will be controlled by the employment of best practice O&M techniques including waste management practices.

During the proposed decommissioning phase, the processes required on Site have evolved from what was conditioned under the original wind farm planning permission (Pl. Ref. N/2002/3608). The decommissioning processes are seen as the most environmentally sensitive, and activities which are required on Site which have the potential to generate emissions or significant traffic volumes or involve the use of finite resources have been chosen in line with best practice decommissioning methods.

The purpose of the Proposed Lifetime Extension is to generate electricity from an infinite renewable source which will offset the use of finite fossil fuels. The baseline scenario without implementation of the Proposed Lifetime Extension is not to provide a renewable energy source at this suitable location, therefore failing to contribute to climate change and energy policy objectives. Such an approach would neither be optimal nor appropriate.

3.5 Alternative Technologies

The current Site is developed as a wind farm capable of generating up to 25.3 MW of renewable energy. The Proposed Lifetime Extension will maintain this level of renewable energy generation with little additional capital investment required and no significant increases in operating costs.

The existing Site could potentially be redeveloped with an alternative renewable energy technology with solar photovoltaic (PV) array, or a solar/ wind energy mix deemed suitable to this location.

Redevelopment of this Site as a large-scale solar farm capable of generating enough energy to be economically viable would drastically change the existing character of the land, as it would have a significantly larger footprint. According to the Sustainable Energy Authority of Ireland (SEAI), approximately 1.6 – 2.0 hectares (ha) of solar array area is required for each Megawatt generated. Therefore, in order for a solar farm to deliver at least 25.3 MW (the current wind farm generating capacity) a footprint area of approximately 40.5 –50.6ha of solar array would be required. In comparison, the current wind farm (turbines, substation, roads, and hardstanding areas) footprint is 3.76 ha.

Additionally, the construction of a solar development could have a potential environmental effect on Hydrology & Hydrogeology, Traffic & Transport (construction phase) and Biodiversity (habitat loss) at the site compared to extending the lifetime of the existing wind farm, due to the additional requirement for land.

In consideration of the existing site constraints, significant capital investment required in order to redevelop the current wind farm site as a solar farm, increased development footprint, and the ability of the existing wind turbines to perform for a further 10 years, it was not deemed suitable to further pursue this alternative land use option. Further assessment is provided in Table 3-3 below.

Table 3-3 Comparisons of environmental effects of Alternative Land Use of Solar Energy when compared against the chosen option (maintaining use of wind turbines)

Environmental Consideration	Solar PV Array (with a 25.3MW output)
Population & Human Health (incl. Shadow Flicker)	No potential for shadow flicker to affect sensitive receptors. Potential for glint and glare impacts to local residents and road users.
Biodiversity & Ornithology	No potential for collision risk for bats and birds Larger development footprint would result in greater habitat loss.
Land, Soils and Geology	Conversion of Site to a solar farm would result in greater levels of disturbance to soils and geology in order to develop new site infrastructure suitable for a solar farm.
Geotechnical	Excavations and piling involved in Solar PV array developments. More site disturbance due to construction works.

Water	Construction of a larger development footprint required, therefore increasing the potential for silt-laden runoff to enter receiving watercourses. Large-scale solar PV array has the potential to alter drainage patterns in the immediate vicinity.
Air Quality and Climate	The construction phase will result in dust emissions and temporary reduction in air quality. Also, the solar farm will have to operate for a period of time before the embodied carbon generated during its manufacture and construction has been paid back. Over a 10-year period a 25.3MW solar farm will not produce the same amount of electricity as a 25.3MW windfarm, due to a lower capacity factor, and therefore will not offset the same level of carbon emissions during that period.
Noise and Vibration	Lower potential for noise impacts on nearby sensitive receptors during the operational phase. Increased potential for noise impacts on nearby sensitive receptors during the construction phase of a new solar farm.
Landscape and Visual	Potentially less visible from surrounding area due to screening from vegetation and topography. Alters landscape character.
Cultural Heritage & Archaeology	Potential for negative effects on cultural heritage sites due to construction of larger development footprint of solar.
Material Assets	Potential for greater traffic volumes during construction phase due to larger development footprint and requirement for more construction materials.

3.6 Alternative Turbine Layouts and Development Design – Repowering Option

Each of the 11 no. existing wind turbines at Taurbeg Wind Farm have a potential power output of 2.3MW to deliver a total generating capacity of up to 25.3MW. It is proposed to extend the operational lifespan of the 11 no. existing turbines of 108.2m blade tip-height at the site. A similar generating capacity could also be achieved on the existing site by using a significantly larger turbine technology (for example, 6.3MW machines). This would necessitate the installation of at least 4 no. new turbines of approximately 185m total height to achieve a similar output. Taking into account the spacing required between turbines of this scale, it is unlikely that there is a sufficient viable area within the lands that are currently under the control of the applicant to accommodate 4 no. turbines with a tip height of 185m.

The use of significantly larger turbines at the Site, while likely to reduce the development footprint has the potential to be problematic in terms of potential negative noise impacts, shadow flicker, ornithology/biodiversity impacts, and landscape and visual impacts to the surrounding residential receptors. The construction of larger turbines at the Site at this time would necessitate significant road upgrades and potential realignments, in order to accommodate delivery of larger turbine components, increasing the potential for negative environmental effects on biodiversity, hydrology and traffic and transportation

It should be noted that no alterations to the pre-existing turbine model installed on the Site is proposed for this lifetime extension application. The maximum height of the turbines is 108.2m when measured from ground level to blade tip. For the purposes of this EIAR this is the turbine size which has been assessed (e.g., existing turbine dimensions used for visual impact, shadow flicker etc.). The EIAR therefore provides a robust and accurate assessment of the turbines considered within the overall development description.

A comparison of the potential environmental effects of the installation of a smaller number of larger wind turbines when compared against the chosen option of maintaining a larger number of smaller wind turbines are presented in Table 3-4 below.

Table 3-4 Comparison of environmental effects when compared against the chosen option (smaller wind turbines)

Environmental Consideration	Smaller Number of Larger Turbine Models
Population and Human Health (incl. Shadow Flicker)	Greater potential for shadow flicker impacts on nearby sensitive receptors due to the increased height and overall size of turbines and increased Shadow Flicker Study Area.
Biodiversity and Ornithology	Likely impacts from construction (excavations, rock-breaking, increased traffic volumes) required to install larger turbines on the Site present an increased potential to negatively impact biodiversity due to disturbance and displacement effects. The development footprint would likely be similar in size due to the requirement to space larger turbines further apart from one another and increased foundation size and hardstanding areas. Habitat loss of fewer number of larger turbines is likely to be neutral. There is a greater potential collision risk for birds due to the presence of turbines up to 70% higher than those currently existing, encompassing a larger blade length and swept area.
Land, Soils and Geology	Larger development footprint would result in greater volumes of soil/rock/spoil to be excavated and managed.
Water	Larger development footprint, therefore, increasing the potential for silt laden runoff to enter receiving watercourses.
Air and Climate	Increased potential for vehicle emissions and dust emissions due to an increased volume of construction material and turbine component deliveries to the site.
Noise and Vibration	Potential for increased noise impacts on nearby sensitive receptors due to reduced separation distance between residential dwellings and turbine locations.
Landscape and Visual	Although a smaller number of turbines would be present, the significantly greater turbine height would have a potentially greater landscape and visual impact.
Cultural Heritage and Archaeology	Larger development footprint relating to road widths, hardstanding and foundation areas likely to increase the potential for impacts on upon any unrecorded, subsurface archaeology.

Material Assets	Greater traffic volumes during construction phase due to requirement for more construction materials and turbine components.

3.6.1 Location of Ancillary Structures

The ancillary infrastructure required for the operation of the Proposed Lifetime Extension includes a substation, site roads, hardstanding areas and underground cabling. No alterations are proposed to the locations of the existing site structures, as detailed in Chapter 4: Description of the Proposed Project and Figure 4-1.

These structures were initially situated based upon the constraints of the Site, and these constraints have not changed significantly in the intervening period.

The Taurbeg Wind Farm is connected to the national electricity grid at the existing Glenlara 110kV Substation. The grid connection has been assessed cumulatively with the rest of the wind farm infrastructure, as part of the EIAR.

3.7 Alternative Offsetting Measures

As detailed in Chapter 4, Chapter 7 and Appendix 7-7, offsetting measures have been put forward which aim to reduce the potential effects of the Taurbeg Wind Farm on hen harrier. The Proposed Offsetting Lands are located approximately 8km east of Castleisland, Co. Kerry in the townlands of Coom and Knockatee and c. 12km east of the Taurbeg Wind Farm Site in Co. Kerry. The Proposed Offsetting Measures comprise the permanent removal of c. 105.5 ha of coniferous plantation forestry and the restoration of c.17.7 ha of farmland for the benefit of hen harrier.

The Proposed Offsetting Measures have been specifically designed to target the two key threats/pressures of high importance on hen harrier, these being forestry and agricultural intensification to offset the potential for impacts associated with the Proposed Lifetime Extension of the wind farm. The Proposed Offsetting Measures aim to provide an increase in the availability of passerine prey within the Proposed Offsetting lands to offset for the loss of the foraging habitat due to the ongoing operation of the existing Taurbeg Wind Farm.

As part of the selection process for the Proposed Offsetting Lands, large forestry plots were identified, occurring on peatland that could be converted to more suitable upland habitats for foraging hen harrier by deforestation. Farmland was also identified that could offer opportunities to significantly improve their ecological value to foraging hen harrier. Rationale for selecting the chosen Proposed Offsetting lands was based on the largest parcels of land identified that would be suited for hen harrier habitat creation which was available to the Applicant within the Stack's to Mullaghareirk Mountains, West Limerick Hills and Mount Eagle SPA. Further detail on selection process of these lands is provided in Chapter 7 Ornithology and Appendix 7-7.

The land chosen as the Proposed Offsetting lands fulfils the requirement to maintain the overall coherence of the Natura 2000 network. The two key elements that have been addressed are the proportionality and ecological functionality of the Proposed Offsetting lands.

The alternative to the Proposed Offsetting Measures is to either not propose these measures or proposed measures/ lands which are not suitable and not in line with best practise. Neither of these options are preferable when compared to the chosen option.

3.8 Alternative Mitigation Measures

The best practice 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.

Due to the nature of the Proposed Lifetime Extension (existing wind farm with no construction works, groundworks or land use change proposed), the greatest potential for environmental effects exists during the extended operational phase. During the extended operational phase, there are no significant ongoing emissions to any environmental media (water, air, soil, etc) and the overall general environmental risk associated with the existing infrastructure is low. Further alternative mitigation measures for this phase are therefore not necessary for further consideration, in most instances.

The proposed Decommissioning Plan (Appendix 4-3) is seen as the most environmentally prudent option, as to remove the structures and return the site to its original condition would involve removal of site roads and turbine foundations, which would require significant excavation and ground works. The proposed decommissioning phase mitigation measures follow current technologies, methods and best practice, and thus further alternative mitigation measures are not considered necessary.