

4.0 REASONABLE ALTERNATIVES

4.1 INTRODUCTION

In 2014, Article 5 of the EIA Directive 2011/92/EU, relating to the preparation of an Environmental Impact Assessment Report (EIAR) by the developer, was amended by Directive 2014/52/EU, to state the following should be included regarding alternatives:

“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)(d)).

This is further reinforced in Annex IV which refers to the information to be included in an EIAR (as per Article 5(1)) and states the following:

“2. 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.

In the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018) Article 97 which contains the revised Schedule 6 – information to be contained in EIAR outlines in article 2 (b) that:

“(b) a description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of environmental effects:”

This chapter will examine the alternatives as required above.

4.2 METHODOLOGY

4.2.1 Approach

There is limited European and national guidance on what constitutes a ‘reasonable alternative’. It is noteworthy that the document *Environmental Impact Assessment of Projects - Guidance on the Preparation of the Environmental Impact Assessment Report* (European Union, 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”.

It also states 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”.*

There is also limited guidance on the level of detail to be provided. However, the current *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022) state that (taken from CJEU case 461/17):

The objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with ‘an indication of the main reasons for selecting the chosen option’. 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.

4.2.2 Structure of the Chapter

The 2022 EPA guidance suggest alternatives be considered under the following headings:

- ‘Do Nothing’ Alternative;
- Alternative Locations;
- Alternative Layouts;
- Alternative Design;
- Alternative Processes;
- Alternative Mitigation Measures; and
- Consultation about the consideration of the alternatives.

Each of these is addressed in the following sections.

When considering a wind farm development, given the intrinsic link between layout and design, the two will be considered together in this chapter.

4.3 ALTERNATIVES CONSIDERED

4.3.1 'Do-Nothing' Alternative

An alternative to developing a wind farm at the proposed development site on former peat extraction lands would be to leave the site as it is. Peat extraction ceased at this site in 2003 and the Bellacorick Power Station was decommissioned in 2005. In that scenario those areas which would be occupied by the proposed development would continue to revegetate naturally.

However, in implementing the 'Do-Nothing' alternative for this site on Oweninny bog, the opportunity to capture a significant part of County Mayo's renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources, the consequent reduction of greenhouse gas emissions and increasing the security of energy supply.

The *Climate Action Plan 2023* (CAP23) sets out the government's ongoing and urgent response to the climate crisis. The Plan implements carbon budgets and sectoral emission ceilings, first introduced in 2022 and builds on previous climate action plans, which set a roadmap to halve Ireland's emissions by 2030 and reach net zero no later than 2050. The Plan sets out how Ireland can accelerate the actions that are required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development.

The opportunity to generate local employment, a development contribution, annual rates and investment would also be lost. The development of the chosen option of a wind farm development has already been established and demonstrated as a suitable use of the site through the consenting and construction of Oweninny Wind Farm Phases 1 and 2.

On the basis that the Do Nothing alternative would represent a missed opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources coupled with a consequent reduction of greenhouse gas emissions, including those commitments set out in *Climate Action Plan 2023*, and also a missed

opportunity to increase the security of Ireland's energy supply, the Do Nothing alternative is not favoured.

4.3.2 Alternative Locations

Bord na Móna owns circa 80,000 hectares of land, primarily in the midlands of Ireland. An assessment of potential future uses of this landbank was published by Bord na Móna in 2011 in a document entitled '*Strategic Framework for the Future Use of Peatlands*'. The strategy sets out the company's commitment to transition to peat-free electricity generation by 2030, establishes a framework for the on-going assessment of the company's total land bank of approximately 80,000ha, and provides for the formulation of appropriate strategies, policies and actions. This report also clearly identified the potential for the development of renewable energy (in particular Wind Energy) and other developments on Bord na Móna lands.

In 2015 Bord na Móna published *Sustainability 2030*, which sets out the company's ambition for a sustainable future. The development of renewable energy as an after use for cutaway peatlands is a central part of the vision in *Sustainability 2030*.

The Project Ireland 2040 National Planning Framework identifies a range of key future planning and development, and place-making policy priorities for the Northern and Western Region that includes:

'Harnessing the potential of the region in renewable energy terms across the technological spectrum from wind and solar to biomass and, where applicable, wave energy.'

In light of the above, when considering suitable locations for the proposed development, the assessment was confined to lands within the Bord na Móna landholding only as these lands have been identified in a regional context as being suitable for this type of development. An examination of sites outside of the landholding was not included as part of the process.

The assessment carried out for the determination of a suitable location for proposed renewable energy development was a two-stage process. The first stage comprised the identification of a number of candidate sites while the second phase comprised a site-specific assessment. Each of these stages are described in the following sections.

4.3.2.1 Selection of Candidate Sites

Bord na Móna conducted a technical review of potential candidate sites for wind energy projects nationally across its entire landbank. This exercise reviewed a list of potential project sites, with a typical target capacity of between 50 MW and 100 MW and with the best potential to deliver successful future windfarm projects.

As part of this site selection process, known constraints were applied across the entire land bank to determine areas suitable for potential wind farm development. This involved desk-based studies and on-site surveys of the landbank. Known constraints were then applied across the landbank. The constraints applied were derived from various industry and regulatory guidelines (such as IWEA Best Practice Guidance 2012 and the Wind Energy Planning Guidelines 2006), available Geographical Information Systems (GIS) datasets and on-site surveys (carried out as part of the peat extraction activity), and included the following:

- Planning Policy Context;
- Proximity to Sensitive Receptors;
- Peat Depths;
- Consistent suitable wind speeds;
- Proximity to the national electricity grid; and
- Proximity to Designated sites/Environmental Sensitivities.

This methodology was used to generate a list of potential sites for further consideration.

4.3.2.2 Site Specific Assessment

The site-specific assessment of the candidate sites was guided by the 2013 'Methodology for Local Authority Renewable Energy Strategies' report from the Sustainable Energy Authority of Ireland (SEAI). This key element of this methodology is the identification of facilitators and constraints that influence the siting of this type of development. This approach was adopted in the Bord na Mona site selection process. For the site-specific assessment of candidate sites, criteria (both facilitators and constraints) were chosen which not only covered the broad range of issues which can arise in wind farm development, but also allowed for direct comparison of the candidate sites to each other to determine their relative suitability for wind farm development. The site-specific selection criteria and an outline of the basis for assessment for each criterion and the associated potential environmental effects are listed in Table 4.1

Table 4.1: Site-Specific Selection Criteria

Criterion	Basis for Assessment	Potential Environmental Effect
Grid Access/ Capacity	Grid Access/Capacity means the potential of the National Grid to accommodate future projects on the network. The proximity of the project to suitable grid nodes (i.e., those with spare capacity) should facilitate the selection of a project for a viable grid connection offer.	Direct: Land, Soil and Geology, Hydrology and Hydrogeology, Biodiversity. Indirect: Noise and Vibration, Population and Human Health.
Wind Resource Assessment	The available wind resource (i.e., wind speed) directly translates into how much electrical output is available from the site.	Direct: Air Quality and Climate. Indirect: Air Quality and Climate.
County Development Plans (CDP) and Zoning	County Development Plans typically indicate the areas of a county which are deemed preferred, open to consideration and not suitable for wind farm development.	Direct: Landscape and Visual, Cultural Heritage, Biodiversity.
Proximity to Houses	Proximity to houses refers to how close the wind turbines are to residences.	Direct: Population and Human Health, Noise and Vibration, Shadow Flicker. Indirect: Landscape and Visual.
Environmental Sensitivity	Environmental sensitivity is the ecological sensitivity of the site based on proximity to sensitive areas within or around the site.	Direct: Biodiversity and Ornithology Indirect: Hydrology and Hydrogeology.
Landscape Capacity/ Cumulative Impact	This refers to the landscape's capacity to absorb wind farm developments.	Direct: Landscape and Visual. Indirect: Cultural Heritage.
Aviation	Airspace control and use to be considered. For the assessment, the criterion examines proximity of the site to local and regional airports (including Casement Aerodrome), proximity to National Motorway network, parachute zone, Military Operating Areas, etc.	Direct: Telecommunications, Aviation and Electromagnetic Frequency.

Criterion	Basis for Assessment	Potential Environmental Effect
Land Use	Internal Bord na Móna consideration relating to the residual peat depth on-site, peat harvesting plans and alternative uses for each bog.	Direct: Cultural Heritage, Land, Soils and Geology, Hydrology and Hydrogeology, Biodiversity.
Communications Infrastructure	Telecoms masts and signals in the vicinity and across the sites to be considered.	Direct: Telecommunications, Aviation and Electromagnetic Frequency.
Flood Plain Analysis	Flood Plain Analysis assesses the wind farm's location in terms of historical flooding data. It also considers if the site is pumped, or gravity drained.	Direct: Hydrology and Hydrogeology. Indirect: Traffic and Transportation.
Supporting Infrastructure	Proximity to national and regional road network Sites with better road access require less modifications or upgrade to the local infrastructure to facilitate construction or delivery of turbine components to site.	Direct: Traffic and Transportation. Indirect: Noise and Vibration, Air Quality and Climate.

These site-specific assessments were conducted by Bord na Móna with input from relevant subject experts where required. Detail was recorded for each site under each criterion and a weighted score was awarded for each. A shortlist of sites deemed suitable for a large-scale wind energy development was compiled. The proposed development site was one of a number of sites to make the final shortlist. Of these sites, the proposed Oweninny Wind Farm Phase 3 site was selected as a site with low potential for environmental effects.

4.3.2.3 Site Specific Assessment Results

A summary of the findings of the site-specific assessment for all potential sites under each criterion is provided in Table 4.2.

Table 4.2: Summary of the Key Findings on the Site Chosen for the Proposed Development

Candidate Sites	Grid Access/ Capacity	Wind Resource Assessment	CDP and Zoning	Proximity to Houses	Environmental Sensitivity	Landscape Capacity/ Cumulative Impact	Aviation	Land Use	Communications Infrastructure	Flood Plain Analysis	Supporting Infrastructure
Proposed Oweninny Site	Scores highly due to location adjacent to the existing Oweninny Wind Farm Phase 1 and Phase 2, and also the existing 110KV Bellacorick Sub-station within Oweninny Bog.	North Mayo has one of the highest average windspeeds along the western seaboard.	Site identified for Tier 1 (Large) wind farms in the Renewable Energy Strategy for County Mayo, which was an ancillary document to the Mayo County Development Plan 2014-2020. This is unchanged in the current Mayo County Development Plan 2022-2028	Closest settlement to the site is Bellacorick village which is located approximately 2km from the southwestern extents of the proposed development. The area around Oweninny Bog is a relatively sparsely populated area	No Natura areas within the site, Lough Dahybaun SAC is located on the southern boundary of the site. Bellacorick Iron Flush SAC is to the north of the proposed development site.	Site is an adjacent development to the two stages of development of the Oweninny Wind Farm, Phase 1 (29 x 3.2MW turbines) Phase 2 (29 x 3.2MW turbines) to the west of Phase 1.	The site is at a significant distance from local and regional airports. It is not located in proximity to the main motorway network.	Peat extraction ceased in 2003 and large parts of the site have revegetated	There are a number of telecommunication links in the vicinity of and crossing the site	Site contains several small watercourses, some potential for fluvial flood risk but can be mitigated through design.	Proven use of local infrastructure for delivery of turbine components to the existing on-site wind farms. Also scores well in terms of proximity to grid infrastructure.

Candidate Sites	Grid Access/ Capacity	Wind Resource Assessment	CDP and Zoning	Proximity to Houses	Environmental Sensitivity	Landscape Capacity/ Cumulative Impact	Aviation	Land Use	Communications Infrastructure	Flood Plain Analysis	Supporting Infrastructure
Littleton	110 kV network runs to the west of the site but there is a lack of available capacity.	The Irish Wind Atlas outlines that wind speeds in midlands bog groups is typically between 7 – 8 m/s. Therefore, this criterion is neutral across all sites.	In an area, open for consideration	This criterion is neutral with respect to the outlined environmental effects as BnM wind farms are generally designed for turbine setback distance of 750m or greater.	No Natura areas within the site, Low to medium number of Natura sites in the wider area, mixture of low, medium and high value habitat within the site	There are nine windfarm sites (either constructed or consented) within 20km of the site.	The site is at a significant distance from local and regional airports. It is located in proximity to the main motorway network.	Significant areas (>75%) of the site have low levels of peat. There is a low level of commercial forestry at the site.	There are a number of masts on the mountains to the east	The site is pumped. It has no recognised flood point in the local area.	The site has restricted access to the regional roads but is on close proximity to the M8.
Ballydermot 1,2,3	110kV network runs to the west and south of Ballydermot bog. Potential available capacity.	The Irish Wind Atlas outlines that wind speeds in midlands bog groups are typically between 7 – 8 m/s. Therefore, this criterion is neutral across all sites.	Site falls across Co. Offaly and Co. Kildare. Offaly area is categorised as “Open for Consideration” for wind energy. Kildare area is categorised as a Medium Risk area for wind.	This criterion is neutral with respect to the outlined environmental effects as BnM wind farms are generally designed for turbine setback distance of 750m or greater.	No Natura areas within the site, one nature site adjacent to the site boundary, low level of Natura sites in the surrounds, mixture of low, medium and high value habitats within the site	There are 7 windfarm sites (either constructed, consented or proposed) within 20km of the site.	The eastern part of the site is in within 5km of Clonbulloge Airfield. Casement Aerodrome is approximately 30km east of the site.	Significant areas (>75%) of the site have low levels of peat. There is a low level of commercial forestry at the site.	There are a maximum of 7 links crossing the site.	The site is pumped. It has no recognised flood point in the local area.	The site has access to the regional and national road network.

Candidate Sites	Grid Access/ Capacity	Wind Resource Assessment	CDP and Zoning	Proximity to Houses	Environmental Sensitivity	Landscape Capacity/ Cumulative Impact	Aviation	Land Use	Communications Infrastructure	Flood Plain Analysis	Supporting Infrastructure
Clorhane 1,2 (Blackwater)	Site is in close proximity to existing grid infrastructure at Shannonbridge with good available grid capacity. A number of 110kV lines run close to the site.	The Irish Wind Atlas outlines that wind speeds in midlands bog groups are typically between 7 – 8 m/s. Therefore, this criterion is neutral across all sites.	Partially in preferred area, partially within buffered area from Clonmacnoise	This criterion is neutral with respect to the outlined environmental effects as BnM wind farms are generally designed for turbine setback distance of 750m or greater.	No Natura areas within the site, high density of Natura sites in the local area, close proximity to the River Shannon, large areas of high value habitat within the site.	There are three windfarm sites (either constructed or consented) within 20km of the site. This site is also located near Clonmacnoise.	The site is at a significant distance from local and regional airports as well as the main motorway network.	Significant areas (>75%) of the site have low levels of peat. There is a low level of commercial forestry at the site and also some areas of biodiversity.	There are a number of masts located in Shannonbridge.	The site is pumped. It has 7 recognised flood points in the local area.	The site has access to the R357 and R444 regional roads.
Coolnamona	110kV network runs to the north of Coolnamona bog but there is poor available capacity.	The Irish Wind Atlas outlines that wind speeds in midlands bog groups are typically between 7 – 8 m/s. Therefore, this criterion is neutral across all sites.	Completely within preferred area	This criterion is neutral with respect to the outlined environmental effects as BnM wind farms are generally designed for turbine setback distance of 750m or greater.	No Natura sites within the site, medium level of Natura sites in the wider area (reasonable proximity to Slieve Bloom SPA). Mainly low with some medium value habitat within the site.	There are two windfarm sites (consented) within 20km of the site.	The site is at a significant distance from local and regional airports. It is located in close proximity to the M7.	Large areas of the site have medium to high levels of peat. There are no other significant uses at the site.	There are two masts adjacent to the site.	The site is not pumped It has no recognised flood point in the local area	The site has access to the regional road R445 and is adjacent to the M7.

Candidate Sites	Grid Access/ Capacity	Wind Resource Assessment	CDP and Zoning	Proximity to Houses	Environmental Sensitivity	Landscape Capacity/ Cumulative Impact	Aviation	Land Use	Communications Infrastructure	Flood Plain Analysis	Supporting Infrastructure
Lemanaghan	Site is within reasonable proximity to existing grid infrastructure at Shannonbridge with good available grid capacity.	The Irish Wind Atlas outlines that wind speeds in midlands bog groups are typically between 7 – 8 m/s. Therefore, this criterion is neutral across all sites.	Predominantly within area open for consideration	This criterion is neutral with respect to the outlined environmental effects as BnM wind farms are generally designed for turbine setback distance of 750m or greater.	No Natura areas in the site, low number of Natura sites in the wider area, Mainly low value habitat on the site	There are four windfarm sites (either constructed or consented) within 20km of the site.	The site is at a significant distance from local and regional airports as well as the main motorway network.	A significant portion of the site has medium levels of peat. There are no other significant uses at the site.	There is a mast at Cor Hill with potential links through the site.	The site is pumped. It has 1 recognised flood point in the local area.	The site has direct access to the N62
Derryarkin	Site is within reasonable proximity to existing 110 kV grid infrastructure with potential available grid capacity.	The Irish Wind Atlas outlines that wind speeds in midlands bog groups are typically between 7 – 8 m/s. Therefore, this criterion is neutral across all sites.	Within High risk for Westmeath, low risk area for Offaly.	This criterion is neutral with respect to the outlined environmental effects as BnM wind farms are generally designed for turbine setback distance of 750m or greater.	No Natura areas in the site, low to medium number of Natura sites in the wider area, Mixture of low, moderate and high value habitat on the site	There are four windfarm sites (either constructed or consented) within 20km of the site.	The site is at a significant distance from local and regional airports. It is located in close proximity to the M6.	Significant areas (>75%) of the site have low levels of peat. There is a low level of commercial forestry at the site and also some areas of quarrying.	There is a mast in Derrygreenagh works with 5 identified links through the site.	The site is not pumped. It has no recognised flood point in the local area	The site has access to the R400 and is adjacent to the M6.

Candidate Sites	Grid Access/ Capacity	Wind Resource Assessment	CDP and Zoning	Proximity to Houses	Environmental Sensitivity	Landscape Capacity/ Cumulative Impact	Aviation	Land Use	Communications Infrastructure	Flood Plain Analysis	Supporting Infrastructure
Garryhinch	Site is within reasonable proximity to existing 110 kV grid infrastructure with potential available grid capacity.	The Irish Wind Atlas outlines that wind speeds in midlands bog groups are typically between 7 – 8 m/s. Therefore, this criterion is neutral across all sites.	Within area open for consideration	This criterion is neutral with respect to the outlined environmental effects as BnM wind farms are generally designed for turbine setback distance of 750m or greater.	No Natura areas in the site, low number of Natura sites in the wider area, Mixture of low to moderate value habitat on the site	There are three wind farm sites (constructed) within 20km of the site.	The site is at a significant distance from local and regional airports as well as the main motorway network	Significant areas (>75%) of the site have low levels of peat. There are no other significant uses at the site.	There is a major telecoms hub on the Sliabh Blooms and two masts adjacent to the site with multiple links.	The site is pumped. It has no recognised flood point in the local area.	The site has limited access to the regional and national road network.
Timahoe 2 (Timahoe South)	110kV network runs to the north of Timahoe South bog (i.e., through Timahoe North bog) with potential available capacity	The Irish Wind Atlas outlines that wind speeds in midlands bog groups are typically between 7 – 8 m/s. Therefore, this criterion is neutral across all sites.	In medium risk area	This criterion is neutral with respect to the outlined environmental effects as BnM wind farms are generally designed for turbine setback distance of 750m or greater.	No Natura areas in the site, low number of Natura sites in the wider area, Mixture of low, moderate and high value habitat on the site	There are two wind farm sites (either constructed or consented) within 20km of the site.	This site is also close to Casement Aerodrome. It is located proximate to the M4.	Large areas of the site have low levels of peat. The site is also used for waste processing and as an engineered landfill.	There are some links on the northern boundary.	The site is pumped. It has no recognised flood point in the local area.	The site has direct access to the R415

Candidate Sites	Grid Access/ Capacity	Wind Resource Assessment	CDP and Zoning	Proximity to Houses	Environmental Sensitivity	Landscape Capacity/ Cumulative Impact	Aviation	Land Use	Communications Infrastructure	Flood Plain Analysis	Supporting Infrastructure
Ballybeg	110 kV grid infrastructure runs to south of Ballybeg with potential available grid capacity.	The Irish Wind Atlas outlines that wind speeds in midlands bog groups are typically between 7 – 8 m/s. Therefore, this criterion is neutral across all sites.	Partially in preferred, partially with scenic buffer zone (Croghan Hill)	This criterion is neutral with respect to the outlined environmental effects as BnM wind farms are generally designed for turbine setback distance of 750m or greater.	No Natura sites within the boundary, Low number of Natura sites in the wider area, mixture of low and high value habitats within the site.	There are four wind farm sites (either constructed or consented) within 20km of the site.	The site is at a significant distance from local and regional airports. It is located in relative proximity to the M6.	Significant areas (>75%) of the site have low levels of peat. There are no other significant uses at the site.	It has 5 links that cross the site.	The site is pumped. It has no recognised flood point in the local area.	The site has access to the R400.

The criteria outlined in Table 4.2 can be regarded as either a constraint to the proposed development or a facilitator for the proposed development. For example, the level of flooding at the site may reduce the available 'buildable' area or the lack of flooding may highlight the suitability of the site. The environmental effect of significant flooding may arise due to a requirement for deeper and more extensive drainage leading to potential downstream surface water impacts. In the case of Bord na Móna lands the existing onsite drainage is a facilitator to the project as surface water is already managed in accordance with the EPA administrated IPC licence.

It is noteworthy that the process described in the preceding paragraphs is not a one-off process for ranking the candidate sites in terms of their suitability for wind energy developments. The site selection process is revisited in its entirety for each individual project selection and the criteria updated to take account of any changes that have occurred (i.e. policy, legislative, environmental etc.) since the previous site selection process was conducted.

The proposed development site for the Oweninny Wind Farm Phase 3 was considered to be suitable for the development of a wind farm in terms of potential environmental sensitivities and in with no obvious commercial barrier to its development.

4.3.3 Alternative Layouts / Design

During the EIAR stage, the study area (as outlined in the Biodiversity and Ornithology chapters, Chapters 7 and 8) was surveyed in detail to establish the baseline environment. All site constraints were identified and updated as further detailed assessment was undertaken. The locations of county roads, streams, residential dwellings, landowner boundaries, telecommunication links, ecologically sensitive areas, areas of deep subsoil and peat depositions, archaeological sites and visually sensitive areas were noted. Separation distances to identified constraints were determined using a Geographical Information System (GIS) (refer to Chapter 3, Description of the Proposed Development).

The site layout design stage considered the size, number and positioning of turbines and layout of associated site infrastructure i.e. internal roads, temporary construction compounds, met masts, substations, borrow pits etc. Alternatives considered for each of these elements are documented in the following sections. It was an iterative process comprising input from the design team, environmental specialists, internal and external stakeholders. As an iterative process, environmental effects were reduced or eliminated through changes to the design, where possible. The final layout of the proposed development is shown on Figure 4.1.

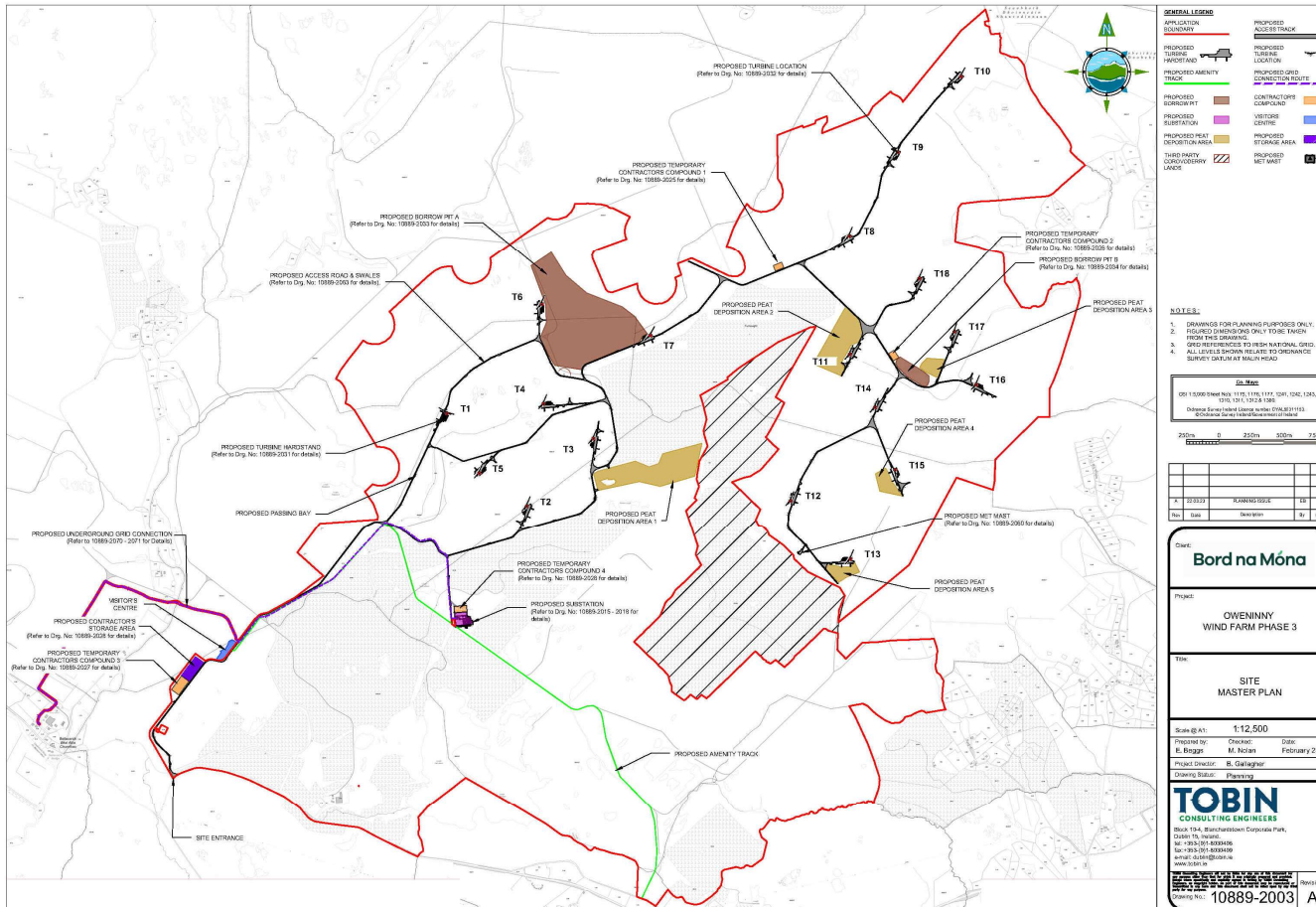


Figure 4.1: Site Master Plan

4.3.3.1 Turbine Layouts

In 2013 a layout for a proposed wind farm for the Oweninny Bog was developed. In June 2016, An Bord Pleanála granted planning permission (An Bord Pleanála Ref PA0029) for the development of Oweninny Wind Farm consisting of 50 turbines with an overall tip height of up to 176m.

The development site for the 2013 layout included the lands that form the application site for this Oweninny Wind Farm Phase 3 development. That portion of the overall site in the 2013 layout included a total of 50 turbines, at the locations shown below.

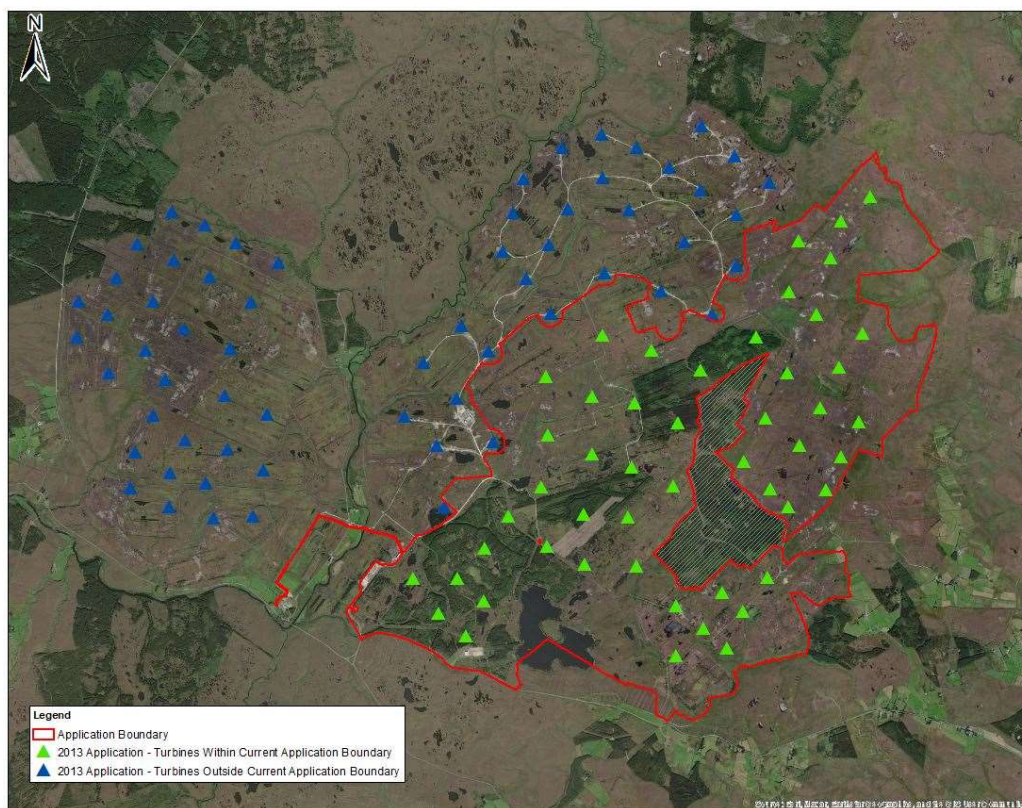


Figure 4.2: Turbine Locations in the 2013 Site Layout

The 2013 layout was initially examined in terms of suitability for Oweninny Phase 3 Wind Farm but was not considered appropriate on the basis of environmental constraints and the capacity of existing grid infrastructure.

Subsequent to this initial examination of the 2013 layout, an iterative process commenced to determine the optimum turbine layout, taking account of all significant site constraints and the

distances to be maintained between turbines and from houses (includes existing and draft guidance), roads, etc.

The final layout is based on the results of all site investigations and environmental assessments that have been carried during the development of this EIAR. As information regarding the site of the proposed development was compiled and assessed, the number of turbines, the size of turbines and the proposed layout were revised and amended to take account of the physical constraints of the site and the requirement for buffer zones and other areas which were not favourable for turbine location.

The selection of turbine number, size 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 and wind farm design process was an iterative process, where findings at each stage of the assessment were used to further refine the design, always with the intention of minimising the potential for environmental impacts. The development of the final proposed wind farm layout has resulted from feedback from the assessments carried out during preparation of this EIAR, statutory consultation, site walkovers by competent experts and information supplied from an extensive Public Consultation process with local communities (2020 - 2022) in the vicinity of the proposed site.

The various considerations that were taken into account include:

- Turbine proximity to dwellings;
- Turbine size;
- Noise and shadow flicker guidelines;
- Distance from archaeological sites;
- Distance from sensitive habitats;
- Distance from water bodies to turbine locations and other site infrastructure;
- Peat Depths
- Turbine spacing;
- Avoidance of any interference with telecommunications systems;
- Visibility of the proposed development in the landscape;
- Site characteristics;
- Internal road layout;
- Distance from the site boundary to turbine locations; and
- Proximity of met masts to dwellings

Consideration was also given to relevant guidance, namely the Wind Energy Development Guidelines (DoEHLG, 2006), Best Practice Guidelines for the Irish Wind Energy Industry (IWEA, 2012); *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022) and guidelines and recommendations from the relevant local authority's County Development Plans and wind energy strategies.

The initial constraints study identified a significant viable area within the proposed development site, in which a potential turbine layout was developed. This turbine layout was then refined a number of times following feedback from the project team during detailed site investigations and from consultees, including public consultation. These iterations resulted in the number of turbines reducing from 37 in the initial design, down to 20 in the interim layout and down to 18 in the proposed final layout (as shown in Figure 4.2). The adjustments resulted in a reduction in the number of turbines, and also placement changes to turbines to ensure sufficient distances were maintained from sensitive receptors and constraints, excavation of peat volumes would be minimal and to maintain the required separation distances between turbines. The positive environmental effects of the reduction of the number of turbines include the following: a decrease in the amount of materials used in the construction of the wind farm (stone, concrete, steel) and associated traffic movements, a reduction in the length of the internal road network and the disturbance and movement of peat within the site, a reduction in the potential disturbance and collision risk for those species using the site, a decrease in the overall impact on the habitats within the site and a reduction in the level of potential visual impact. On this basis, the proposed 18 turbine layout is the chosen option.

4.3.3.2 Alternative Turbine Configurations

The proposed wind farm will have an estimated power output of approximately 90 Megawatts (MW). Having regard to the available wind resource and the selected power output for the proposed wind farm, it is proposed to install 18 No. turbines at the site using wind turbines in the circa 4.5 – 6.5MW range. Such a wind farm could also be achieved on the proposed site by using smaller turbines (for example 2MW machines). However, this would necessitate the installation of 45 No. turbines to achieve the same site output.

Furthermore, the use of smaller turbines would be a less efficient use of the wind resource available having regard to the nature of the site. A larger number of smaller turbines would result in the wind farm occupying a greater footprint within the site, with a larger amount of supporting infrastructure being required (i.e. roads, internal collector cables etc.) and increasing the potential for negative environmental effects to occur. The proposed number of turbines takes

account of all site constraints and the distances to be maintained between turbines and features such as roads and houses, while maximising the wind energy potential of the site. The 18-turbine layout selected for the site has the smallest development footprint of the other alternatives considered, while still achieving the required output.

The turbine model to be installed on the site will be the subject of a competitive tendering process.

The use of alternative significantly smaller turbines would not be appropriate as they would fail to make the most efficient use of the wind resource passing over the site. Furthermore, the increased use of materials, excavation and movement of peat and increase in visual impact associated with a larger number of smaller turbines would result in a higher level of negative environmental effects than the chosen option.

4.3.3.3 Site Entrances

In the first iteration of the proposed development, three site entrances were proposed to the site. The first entrance (existing) off the N59 national road is on the westernmost boundary of the site and currently provides access to Oweninny Wind Farm Phase 1. The second entrance (also existing) is approximately 1.2km further east along the N59 and provides access to the Oweninny Works site. A third existing entrance further east leads onto an unsurfaced track which joins the N59 at two points, 1.6km and 2.7km east of the second entrance. This entrance would require significant upgrade works to be suitable for construction and operational traffic.

The current design as shown on Figure 4.3 will use only the most western entrance during both construction and operation. The location of the previously proposed third entrance off the unsurfaced track will only be used as an access point to the proposed amenity track (see Section 4.3.3.7).

4.3.3.4 Internal Access Roads

The development of the wind farm will require the construction of internal access roads on-site. Access roads are required to allow plant and machinery access to the turbine locations, transport of turbines and construction materials to each of the turbine locations and also to allow service vehicles traverse the site during the operational phase. Such tracks must be of a gradient and width sufficient to allow safe movement of equipment and vehicles.

Access road layout and design is also an iterative process. The layout was designed to minimise construction of new roads by following the existing access tracks where possible and linking

turbine locations via the most direct route, avoiding environmental (higher value habitat) and archaeological constraints.

The initial design was further developed by applying the required vehicle turning radii. The road layout was modified with each revision of the turbine layout. Passing bays were designed for selected locations along the internal roads. These bays were located in specific areas to ensure minimum environmental effect by locating the passing bays away from higher value habitat and also in a configuration that facilitates the design of the amenity pathways/cycleways.

Finally, upgrading of an amenity path was added linking the overall development to public access points to the site which are close to the Western Way (Slí an Iarthair) Trail which runs along the N59 and continues north to Ballycastle, along the western periphery of the Bellacorick Bog Complex, as shown on Planning Drawing 10889-2064.

4.3.3.5 Substation Locations and Grid Connection

Two potential substation locations were examined, both located north of Lough Dahybaun and within 100m of each other. This general area was examined for locating the substation as it would result in the minimum disturbance to the area and consequently the lowest environmental impact. Both locations would involve similar cable routes to the existing Bellacorick substation, so the impact of the cable route was not a key consideration in selecting the substation location. The location furthest west was considered less favourable following a review of data from the ground investigations undertaken, and for this reason it was discounted from further consideration.

The proposed wind farm will connect to the grid at Bellacorick substation via an underground cable through Bord na Móna lands. The proposed cable route from the on-site substation to Bellacorick substation is shown on Planning Drawings 10889-2050 to 10889-2053.

4.3.3.6 Borrow Pits

The use of onsite borrow pits, would represent an efficient use of existing onsite resources and would also significantly reduce the need to transport large volumes of construction materials along the surrounding public road network to the site. Consequently, a review of potential borrow pit locations was carried out in consultation with internal Bord na Móna personnel with input from field studies and external geotechnical experts who were familiar with the site. Existing GIS data was also considered, namely aerial photography and peat depths etc. Arising from this process, three initial borrow pit locations were identified (See Figure 4.3).

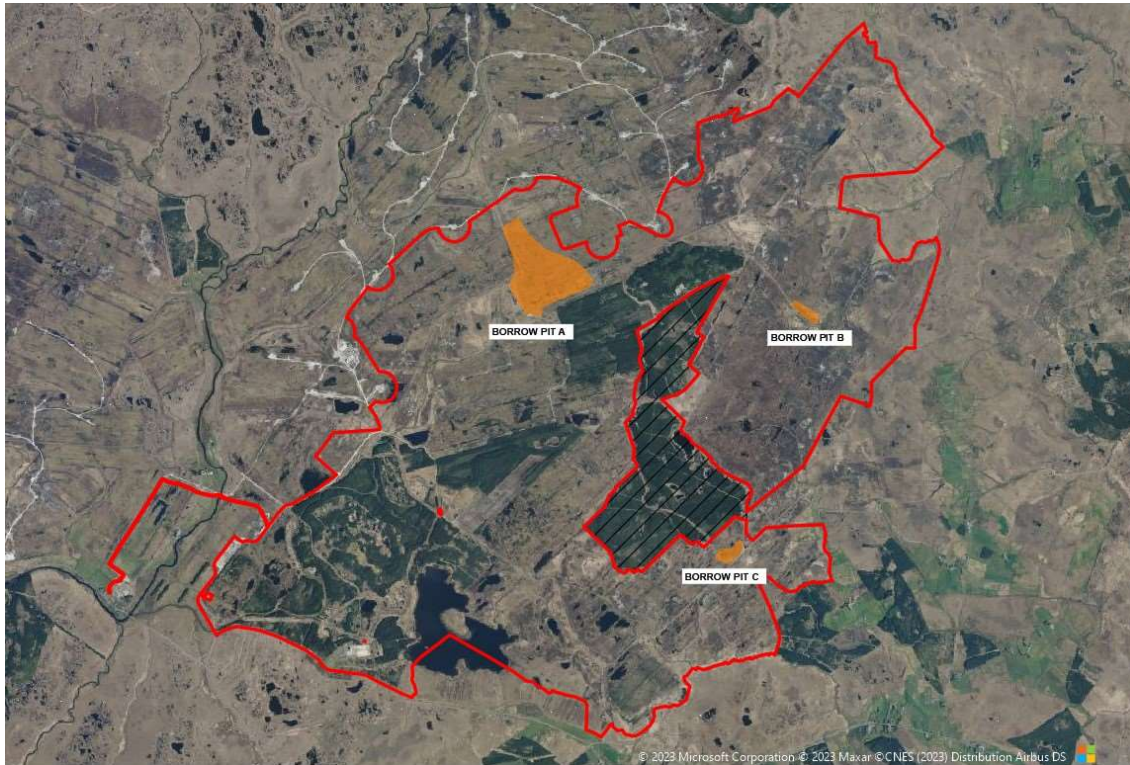


Figure 4.3: Initial Borrow Pit Locations

The borrow pit selection was based on the following factors:

- Avoidance of potential ecological receptors including intact blanket bog and fens
- Avoidance of deeper peat where possible
- Location near areas of known sand and gravel deposits or gravelly till

Based on the historical maps, previous and current site data, ground conditions generally consist of peat cover sand/gravel or boulder clay over boulder clay/glacial gravels over sandstone/siltstone/bioclastic limestone bedrock (Downpatrick Formation).

The peat at the Oweninny site has been extensively harvested resulting in large areas of minimal (<0.5m) peat depths. Some undeveloped peat areas remain on the site, and these were not considered as suitable borrow pit areas. Additionally, several areas of gravels, as delineated on the GSI mapping, were not considered due to ecological constraints such as the presence of undisturbed blanket bog.

Extraction could be undertaken by dry or wet excavation.

Dry excavation would require dewatering and the use of initial drainage channels to reduce the hydraulic head, followed by sump dewatering in the pit or well dewatering. However, as the

gravel area is surrounded by lower permeability materials, the volume of groundwater encountered for the short-term use of the pit may be limited.

There may be circumstances where pumping may not be required, and wet working can be carried out:

- shallow workings (e.g., sand and gravels) from which the mineral can be dredged;
- shallow quarries where the water table is close enough to the surface to allow the installation of passive drainage measures.
- quarries where there is a general lowering of the water table as a consequence of mineral extraction providing there is some natural outlet for groundwater drainage.

With a shallow excavation in the area, material up to 4m bgl or 2.5m below the water table are accessible with conventional excavators or if required long reach excavators. Wet working can help to limit the impact on local groundwater resources.

A summary of the potential volumes is included below. In terms of suitability, Area B is the most suitable material. This assessment is based on the site investigation carried out which identified the potential for the most suitable deposit for construction purposes in that area.

Table 4.3: Summary of Potential Volumes from Borrow Pits

Area	Approx. Peat depth	Main soil type	Bedrock Present	Area (ha)	Potential Vol. m ³	Overburden	Ecological/ Other constraints
A	<0.5m	Slightly silty gravelly SANDs	No	43 – Assume 10 hectares for optimum extraction to the south and central section of Area 1.	>320,000 tonnes >200,000m ³ (2m x 100,000m ²) 200,000m ³ x 1.6t/m ³	(1m x 100,000m ²) 100,000m ³	No significant lakes/former lakes on site, no archaeological features encountered.
B	<0.3m	Slightly gravelly SAND with some gravel lens	No	3.3	>160,000 tonnes 100,000m ³ (3 m x 33,000m ²) 100,000m ³ x 1.6 t/m ³	(0.2m x 33,000m ²) 6,600 m ³	No significant lakes/former lakes on site, no archaeological features encountered.
C	>0.5m	Soft gravelly SILT	No	9.5	>270,000 tonnes 170,000m ³ (1.8m x 95,000m ²) 170,000m ³ x 1.6t/m ³	(0.5m x 95,000m ²) 47,500 m ³	No significant lakes/former lakes on site, no archaeological features encountered.

Area C was not chosen for the following reasons:

- Access to the borrow pit would require a significant upgrade of a long section of existing rail bed to form the access road.
- Access to the borrow pit would be from a local road running parallel to the N59. This would require significant upgrade and would result in a very significant increase in traffic movement along the local road.
- The access road would utilise the existing amenity pathway and result in its closure for the duration of the construction phase.

4.3.3.7 Peat Deposition Areas

Five potential peat deposition areas were identified as detailed below.

- PDA1, the largest of the potential peat deposition areas, is located to the south of coniferous forestry and to the south east of T3. This comprises a cutover peat area.
- PDA 2 is located to the west of T11 and to the east of a coniferous forestry plantation. PDA 2 comprises a cutover peat area with a former peat railway running southwest to northeast through the area.
- PDA 3 is located to the north of Borrow Pit B and to the south of T17. PDA 3 comprises a cutover peat area.
- PDA 4 is located to the south of coniferous forestry and to the south west of T15. PDA 4 comprises a cutover peat area.
- PDA 5 is located to the north of coniferous forestry and to the south east of T13. PDA 5 comprises a cutover peat area.

Areas of deeper peat were not considered for borrow pit areas.

Potential peat deposition areas (PDAs) were assessed iteratively basis based on the following factors:

- Avoidance of potential ecological receptors including intact blanket bog and fens/flushes;
- Location near the source excavation area.

4.3.3.8 Oweninny Wind Farm Visitor Centre Access

The Oweninny Visitor Centre was completed in 2019. Due to the impact of the Covid restrictions that centre has not yet been opened to the public. The centre will act as an information hub for renewable energy along with showcasing the rich heritage in the region of both ESB and Bord na Móna over many decades.

The construction of a parallel amenity pathway from the N59 to the main entrance was considered. However, due to health & safety, traffic and ecological considerations this alternative was not considered to be optimum.

An access path to the Visitor Centre is incorporated into the proposed site layout, as shown on Planning Drawing 10889-2003. The path will start from the public roads network (N59) at the location of the easternmost site entrance described in above and run across the site following existing tracks as far as the Visitor Centre, which will be located at the boundary between the Oweninny Phase 1 and Oweninny Phase 3 sites.

During the construction phase a shuttle service for visitors to the visitor centre will be in operation. Visitors to the centre will utilise a shuttle bus that will originate at the hardstanding area adjacent to the existing Oweninny works buildings. The shuttle bus will transport the public from the works area along the N59 and access the visitor centre through the existing Oweninny Wind Farm Phase 1 entrance.

4.3.4 Alternative Processes

4.3.4.1 Alternative Land-uses

As peat production has ceased, Bord na Móna is presented with the opportunity to allow or facilitate new landscapes to develop. Research work, mainly in the form of demonstration projects, has been ongoing since the 1970's. The research and demonstration projects informed the understanding of the nature of industrial peatlands and facilitated the development of a knowledge base that has been built up over decades. The alternative uses that have been examined over that timeframe include renewable energy (in particular, wind energy), biomass, coniferous forestry, horticulture, grassland, cereal growing, growth of cranberries and blueberries, biodiversity/ecosystem services and amenity/tourism related after uses.

Wind farm development on Bord na Móna lands commenced in 1992 with the construction and operation of the Bellacorick Wind Farm, Co. Mayo. Since then, additional wind farms were constructed and became fully operational in 2015 at Bruckana and Mountlucas, in 2019 at Oweninny Phase 1, and in Clooncreen in 2022. Construction on the Oweninny Wind Farm Phase 2 has been completed but is not yet operational. This alternative use of cutaway peatlands has been clearly demonstrated to be successful and have a low level of environmental effects.

Short rotation forestry trials carried out in the 1970s directly on cutaway bog, without intrusive conversion of the growing medium, did not survive and died out within a few years. Further trials in 2005 on well prepared cutaway failed to provide the necessary yield to make the growing of willow biomass viable. The yield was less than 20% of the yield attainable on good arable land.

Afforestation was initially envisaged as the most favourable commercial option for the after-use of post-production peatlands. Trials on this particular use date back to 1955. The initial trials were favourable; however, the growing performance was poor. In 1996, the BOGFOR research programme was set up by a group of organisations that included Bord na Móna, Coillte, the COFORD Council for Forest Research and Development and University College Dublin. Arising from this research, a further 10 trial sites have been developed in the last 15 years. None of the sites have demonstrated 100% the required commercial success. A further trial using a bedding

plough was established in 2010. Trials of this type of after use are ongoing. The trials have not progressed sufficiently to provide conclusive results.

Coillte managed forestry plantations are evident within the site and in the wider landscape. These plantations require large areas and therefore further plantations within the site would have a significant effect on the rehabilitated peatlands.

Horticultural trials were carried out at Lullymore during the 1960's up to the 1970's. A range of field vegetables were successfully grown during the trials. However, it was not possible to replicate the success of the trial at other locations. The specific peat type at Lullymore had particular characteristics and the research did not transfer to other demonstration sites.

The techniques for the conversion of cutaway bogland to grassland was developed during the 1970s and 1980s. A total of 1,500 hectares of cutaway was successfully converted and subsequently sold to the private sector. The ability to convert cutaway to grassland requires specific conditions and it is estimated that a small percentage of cutaway (10%) would be suitable for this use. Furthermore, due to the level of cost associated with this type of conversion, the economic circumstances are presently not favourable.

Cereal growing was also examined. However due to the specific mixture of macro and micro nutrients required at certain stages of its growth, this option did not prove successful.

Cranberries and blueberries both require acidic media for their growth and were therefore trialled on deep acidic peat. Despite the successful establishment of cranberries, the necessary weather conditions to promote the development of fruit did not prevail and are not typical of the midland region. Neither plant is considered to be a viable option.

The potential Biodiversity and Ecosystem Services that may arise from the careful management of rehabilitated cutaway peatlands has been recognised in the development of the 2010-2015 Bord na Móna Biodiversity Action Plan and the more recent Biodiversity Action Plan 2016-2021. Bord na Móna has rehabilitated close to 12,000 hectares of the company's boglands which amounts to over fifteen percent of its total landholding to date. As part of that work, the company has actively restored over 7,000 hectares of raised bog since 2009 and aims to increase this figure in the next six years.

The flagship project that demonstrates the amenity and tourism potential of cutaway peat lands is Lough Boora Parklands in Co. Offaly (<http://www.loughboora.com/>). The parklands include a range of tourism and amenity activities, including walking and cycling trails, fishing and angling

amenities and opportunities for bird watching. The amenity use of the Mount Lucas Wind Farm (over 50,000 visits in 2022) in conjunction with the production of renewable electricity illustrates that the after use of cutaway peatlands may comprise more than one use and may also facilitate additional developments.

In addition to the alternative land uses listed above, Bord na Móna is also exploring the potential to site solar farms within those areas that are post peat production. In April 2017, Bord na Móna and ESB publicly announced a joint venture to develop 500MW of solar energy on cutaway peatlands. The selection of a solar farm site requires a solar development specific set of constraints/facilitators to be examined. The first location selected for potential development is the Timahoe North Bog located in Co. Kildare. This project was fully consented in 2020 and is currently under construction.

However, notwithstanding the range of uses considered and explored by Bord na Móna over its lands, the proposal to develop the Oweninny Wind Farm Phase 3 has been identified as the most appropriate and sustainable use of the cutaway bog at the proposed site. The use of Oweninny Bog as an optimum location for a wind farm development has been demonstrated through the construction and operation of Oweninny Phase 1 and 2 Wind Farms.

As Bord na Móna continues to pursue its 'Brown to Green' strategy the former peat production lands will be developed for alternative land uses. Bord na Móna's *'Strategic Framework for the Future Use of Peatlands'* (2011) sets out a strategic framework for the future potential uses of cutaway peatlands. The document is available to view at www.bordnamona.ie and is currently being updated to take account of policy change since its publication.

4.3.4.2 Alternative Sources of Energy

Currently, most of Ireland's energy is produced using fossil fuels such as gas, oil, coal and peat. The large-scale use of carbon intensive fossil fuel releases large quantities of carbon dioxide (CO₂) and other pollutants into the atmosphere, which contribute to the process of climate change and other detrimental health and environmental effects.

Renewable energy resources include wind, solar, water (hydropower, wave and tidal), heat (geothermal) and biomass (wood, waste) energy. These sources are constantly replenished through the cycles of nature, unlike fossil fuels, which are finite resources that are becoming increasingly scarce and expensive to extract. Renewable energy resources offer sustainable alternatives to our dependency on fossil fuels as well as a means of reducing greenhouse gas emissions and opportunities to reduce our reliance on imported fuels. These resources are

abundantly available in Ireland, yet only a fraction has been tapped so far (Sustainable Energy Authority of Ireland (SEAI) website, www.seai.ie).

A gradual shift towards increasing our use of renewable energy resources would result in:

- Reduced carbon dioxide emissions;
- Secure and stable energy for the long-term;
- Reduced reliance on fuel imports; and
- Investment and employment in our indigenous renewable energy projects; often in rural and underdeveloped areas.

When weighed against all of the alternatives and constraints/facilitators outlined in this chapter, the proposed Oweninny Wind Farm Phase 3 site has been found to be a highly suitable location for a wind farm site with regard to a number of criteria including wind speed, environmental effects, distance from dwellings and landscape character. The location is particularly appropriate with regard to the foregoing and with regard to ease of access, proximity to the grid connection and strategic renewable energy zoning.

When considering wind energy as an energy source, it is important to place its development in an international, national and local policy context from the perspectives of environment, energy and planning. Numerous legislative mechanisms and requirements from a global to local level have been formulated to support the generation of energy from renewable sources and reduce the dependency on fossil fuels and these are discussed in further detail within Chapter 5 Policy, Planning and Development Context.

At a national level, in December 2015 the Government published an Energy White Paper, entitled '*Ireland's Transition to a Low Carbon Energy Future 2015 - 2030*'. It is set firmly in the Global and European context, which has put energy security and climate change among the most urgent international challenges. This paper sets out the Government's Energy Policy from now until 2030. The three core objectives (the 'three energy pillars') are sustainability, security of supply and competitiveness. The target is that GHG emissions will be reduced by 80% to 95% below 1990 levels by 2050 and to zero or below by 2100. This will be achieved by a range of measures including changes of behaviour, greater efficiency, use of renewable indigenous resources etc.

A key target of the Climate Action Plan 2023 is to increase the share of electricity demand generated from renewable sources to 80% where achievable and cost effective, without compromising security of electricity supply. A key element of this ambition is a target of 9GW of

installed onshore wind energy by 2030. Large scale wind energy projects continue to be seen as providing a significant contribution to achieving this target. The proposed wind farm will help in the delivery of growth in the renewable energy sector, by delivering approximately 90MW of capacity.

The primary alternative is to continue to generate electricity using finite, fossil fuel resources beyond 2030. This will further contribute to greenhouse gas and other emissions and hinder Ireland in its commitment to meet its target to increase electricity production from renewable sources and to reduce greenhouse gas emissions.

Bord na Móna is continuing to diversify its portfolio of renewable energy assets as it transitions from its former activity of the harvesting and combustion of peat. This transition is evident across the land bank and will progress with the potential development of additional wind farms, solar farms, increased use of Biomass in the co-firing with peat, landfill gas, Biogas, battery storage and potentially hydrogen production. A key input to ensuring a successful and sustainable transition is the selection of the correct technology for the correct site.

With respect to the listed technologies for production of renewable energy, the reasons why the use of wind energy technology on this particular site produces the lowest level of environmental effects are as follows:

- Large scale solar farms require a significantly higher footprint than wind farms to produce the equivalent level of electricity. This technology can therefore have a greater impact on sensitive habitats. In the context of the Oweninny site, the use of wind energy technology reduces the potential environmental effects with respect to this particular aspect.
- Co-firing of peat and biomass is an activity that is proposed to utilise the existing peat fired power stations and is dependent on the continuation of peat extraction. As the Bellacorick power station no longer exists, the alternative for Oweninny would be the construction of a new peat/biomass power station and recommence peat extraction. This would result in additional environmental effects above the activity of the existing power stations. In addition, peat harvesting has ceased and therefore there is no potential for peat stocks to be generated for this activity.
- Landfill gas production is only possible through colocation with an existing municipal landfill. Therefore, this is not an option for Oweninny.
- Biogas production facilities generally have a relatively small footprint and tend to be located adjacent to the national gas network to facilitate gas injection. Utilisation of this

site for this purpose is possible and it could form an additional use of the site. The Oweninny site has a number of benefits such as its relative remoteness in comparison to the surrounding agricultural land, it is a single connected land bank and it is a brownfield site. If the site was not used for wind energy production, then another less suitable (less remote, disconnected and greenfield) site may be required in order to meet the required renewable electricity targets for 2030 that would result in a higher level of environmental effects.

Bord na Móna lands by their relatively remote nature can facilitate large scale developments such as wind farms. As previously outlined, a detailed constraints/facilitators analysis has been carried out that demonstrates that the Oweninny site is a highly suitable location for the deployment of wind energy.

4.3.5 Alternative Mitigation Measures

The mitigation measures proposed in relation to the elements of the project are detailed in the chapters to follow and are also summarised in Chapter 20 Schedule of Mitigation and Monitoring Measures. The mitigation measures proposed are considered to be proven and best practice. The level of mitigation proposed is determined to be proportionate to the potential impact. On this basis, the chosen mitigation measures are those that are considered to have the least environmental effects.

4.3.6 Consultation about the Consideration of Alternatives

Details of the consultations held in respect of the proposed development are listed in Chapter 1 and in Appendix 1.2. All meetings, public consultations and submissions received to date have been reviewed and incorporated into the design and layout process, as appropriate.

4.4 SUMMARY

Table 4.4 below summarises the alternatives considered and compares these alternatives on the basis of key considerations.

Table 4.4: Summary of Alternatives Considered

Alternative	Summary
'Do-Nothing' Alternative	The Do-Nothing alternative would represent a missed opportunity in terms of Ireland meeting its commitments under the Climate Action Plan 2023, and also in terms of energy security
Alternative Locations	All suitable sites within the Bord na Móna landholding were assessed for their potential for renewable energy developments. The proposed development site was one of a number of sites to make the final shortlist. Of these sites, the proposed Oweninny Wind Farm Phase 3 site was selected as a site with low potential for environmental effects.
Alternative Layouts	A number of turbine layouts were assessed as part of an iterative process that took into consideration the size, number and positioning of turbines and the layout of associated site infrastructure. The final layout chosen represents the optimum layout in terms of the impact on receptors, constructability and delivery of the required output from the wind farm.
Alternative Design	<u>Turbine Configurations</u> The optimum design envisages 18 No. turbines in the 4.5 – 6.5MW range. Smaller turbines (for example 45 No. 2 MW machines could also achieve the same site output, but the use of smaller turbines would be a less efficient use of the wind resource available having regard to the nature of the site <u>Site Entrances</u> Three possible site entrances were examined.

Alternative	Summary
	<p>The existing entrance off the N59 national road currently provides access to Oweninny Wind Farm Phase 1.</p> <p>A second entrance 1.2km further east along the N59 provides access to the Oweninny Works site.</p> <p>A third existing entrance further east leads onto an unsurfaced track which joins the N59 at two points.</p> <p>It was concluded that the existing entrance off the N59, which currently provides access to Oweninny Wind Farm Phase 1, is suitable for access to the proposed Oweninny Wind Farm Phase 3 and other entrances would require significant upgrade works to be make them suitable for construction and operational traffic.</p> <p><u>Internal Access Roads</u></p> <p>A number of internal road layouts were examined as part of the iterative process for selection of the optimum turbine configuration. The final layout was chosen to minimise construction of new roads by following the existing access tracks where possible and linking turbine locations via the most direct route.</p> <p><u>Substation Locations</u></p> <p>Two potential substation locations were examined, both located north of Lough Dahybaun and within 100m of each other.</p> <p>The location furthest west was considered less favourable following a review of data from the ground investigations undertaken and in terms of environmental impact, and for this reason it was discounted from further consideration.</p> <p><u>Borrow Pit Locations</u></p> <p>Three potential borrow pit locations were identified and two were chosen. The material in Area B was considered to provide the most suitable material at the required volumes.</p>

Alternative	Summary
	<p><u>Visitor Centre Access</u></p> <p>A number of options for accessing the Oweninny Visitor Centre, which was completed in 2019, were examined. The chosen route for the access path utilizes the existing internal tracks across the site and was considered to be the most favourable in terms of impact on the existing environment.</p>
Alternative Processes	<p><u>Land Uses</u></p> <p>A number of alternative uses for cutaway peatlands, including Oweninny bog, have been examined by Bord na Mona over the years. These include:</p> <ul style="list-style-type: none"> • <i>Forestry</i>. Trials have proven to be poor performance in terms of growth potential. • <i>Horticulture</i>. Early successes in some trials were difficult to replicate on other sites. • <i>Grassland/cereals/berries</i>. None of these alternative uses were found not to be economical. <p><u>Sources of Energy</u></p> <p>A number of alternative sources of energy for the Oweninny bog have been examined by Bord na Mona, as follows:</p> <ul style="list-style-type: none"> • <i>Solar</i>. Large scale solar farms require a significantly higher footprint than wind farms to produce the equivalent level of electricity and this technology can therefore have a greater impact on sensitive habitats. • <i>Co-firing of peat and biomass</i>. This utilises existing peat fired power stations and is dependent on the continuation of peat extraction. As the Bellacorick power station no longer exists the option is not feasible for the development • <i>Landfill gas production</i>. This is only possible through colocation with an existing municipal landfill and is not an option for Oweninny. • <i>Biogas production</i>. This is a viable alternative use of the site but is dependent on the availability of feedstock within a commercially viable distance. Due to the relatively small footprint, this option would not rule out the development of the site for wind energy.

Alternative	Summary
Alternative Mitigation Measures	The chosen mitigation measures are those that are considered to have the least environmental effects.

All reasonable alternatives were assessed as part of this consideration, including alternatives in respect of the project as a whole, and alternatives relating to specific aspects of the design of the development.