3 ALTERNATIVES CONSIDERED

3.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) provides a description of the reasonable alternatives assessed by Moanmore Lower Green Energy Ltd (hereafter known as the Developer) which are relevant to the Project and its specific characteristics. It includes summary of the main reasons for the option chosen, taking into account the effects of the Project on the EIAR Study Area/ surrounding environment. Alternatives were assessed in accordance with relevant legislation (EIA Directive) and guidance (Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, EPA 2022). The assessment considers the potential effects during the following phases of the Project:

- Construction of the Project
- Operation of the Project
- Decommissioning of the Project

Common acronyms used throughout this EIAR can be found in **Appendix 1.4.** This chapter of the EIAR is supported by Figures provided in Volume III and by the following Appendix documents provided in Volume IV of this EIAR:

Appendix 3.1: Alternative Grid Route Connection EIAR

3.2 STATEMENT OF AUTHORITY

This Alternatives Chapter has been prepared by Ms. Sarah Moore, with assistance from Mr. Padraig O'Dowd and Ms. Siobhan Roddy of Jennings O'Donovan & Partners Limited (JOD). The final review was conducted by Managing Director Mr David Kiely.

Mr. David Kiely is Managing Director of JOD and holds a BE in Civil Engineering from University College Dublin and MSc in Environmental Protection from IT Sligo. He is a Fellow of Engineers Ireland, a Chartered Member of the Institution of Civil Engineers (UK). David has over four decades of experience in the preparation of EIARs and EISs for environmental projects including Wind Farms, Solar Farms, Wastewater Projects, and various commercial developments. David has also been involved in the construction of over 60 wind farms since 1997.

Ms. Sarah Moore is an Environmental Scientist in JOD with over 18 years of environmental consultancy experience. She has obtained a MSc in Environmental Engineering from Queens University, Belfast, and a BSc in Environmental Science from University of Limerick. Since joining JOD, Sarah has been involved as a Project Environmental Scientist

on a range of renewable energy, wastewater, structures and commercial projects. She has experience in the preparation of Appropriate Assessments, Ecological Impact Assessments, Environmental Impact Assessments and Geographic Information Systems.

Mr. Padraig O' Dowd is a Junior Environmental Scientist at JOD. He holds a BA (Hons) in Creative Design, an MSc in Design Innovation, and a GradDip in Design Thinking for Sustainability. As a Graduate Member of IEMA, his expertise includes EIAR report writing, grant-funded research applications, and data analysis, with a focus on the environmental and renewable energy sectors. He also has research experience with Wind Energy Ireland.

Ms. Siobhan Roddy is a Graduate Environmental Scientist and holds a BSc (Hons) in Environmental Science and Technology from Dublin City University. Siobhan's key capabilities are in report writing, and ArcGIS. She forms part of the Environmental team responsible for preparing the EIAR Chapters and Appropriate Assessments for Wind Farms.

For detailed information on all contributors, including their qualifications and experience, please refer to **Appendix 1.1 Author Qualifications**.

3.3 METHODOLOGY

3.3.1 Requirements for Alternatives Assessment

Article 5(1) of the EIA Directive requires:

"Where an environmental impact assessment is required, the developer shall prepare and submit an environmental impact assessment report. The information to be provided by the developer shall include at least: ...

(d) 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".

Annex IV of the EIA Directive (Information Referred to in Article 5(1) (Information for the Environmental Impact Assessment Report) states that:

"… 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 environmental effects".

In 2022, the Environmental Protection Agency (EPA) published the 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (2022 EPA Guidelines), which states that *"it is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option".*

The EPA guidance documents on EIAR preparation[1] [2], stipulate the following:

"The presentation and consideration of the various alternatives investigated by the applicant is an important requirement of the EIA process… And the alternatives can include:

- *a 'do-nothing' alternative (where appropriate)*
- *alternative locations*
- *alternative layouts*
- *alternative designs*
- *alternative processes*
- *alternative mitigation measures*.

As stated in the 2022 EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports:

> 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[3]. As environmental issues arise during the preparation of the EIAR, alternative designs may need to be considered early in the process, while alternative mitigation options may be explored later, particularly in response to feedback from the scoping exercise. These various alternatives are outlined in **Chapter 3** of the EIAR.

Taking the legislative and guidance requirements into account, this chapter addresses alternatives under the following headings:

- 'Do Nothing' alternative
- Strategic Site selection
- Alternative turbine numbers and specification
- Alternative layout and design
- Alternative transport route and site access
- Alternative Grid Connection
- Alternative mitigation measures

[1] EPA. (2022). Guidelines on the information to be contained in Environmental Impact Statements. Available at https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf. Accessed at [19/08/2024]
[2] EPA. (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports. Available at https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf. Accessed at [19/08/2024]
[3] Ref CJEU Case 461/17.

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

3.3.2 Approach to Alternatives

The Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017) states that reasonable alternatives *"must be relevant to the proposed project and its specific characteristics, and resources should only be spent on assessing these alternatives" and 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"*.

3.4 'DO-NOTHING' ALTERNATIVE

Annex IV, Point 3 of the EIA Directive requires a "*...description of the relevant aspects of the current state of the environment (baseline scenario) and 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. The Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 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."

Ireland has adopted binding agreements to reduce dependency on fossil fuels and increase energy production from sustainable sources, creating a requirement for the nation to transition to a low carbon economy. The binding EU targets have been transposed into Irish National Policy in the 2023 Climate Action Plan which focuses up to 9GW future electricity production on the onshore wind energy sector accounting for 80% of the share of electricity demand by 2030 together with offshore wind (5GW) and solar (8GW). This demonstrates the significance of wind energy in the Irish energy context and highlights the need for the proposed Moanmore Lower Wind Farm in reaching both EU and national renewable energy targets.

Ireland is obliged to ensure that 32% of the total energy consumed in heating, electricity and transport is generated from renewable resources by 2030 and reduce its greenhouse gas emissions by at least 55% by 2030, relative to its 1990 levels, with an overall objective of carbon neutrality by 2050. This is in order to help reduce the nation's CO_2 emissions and to promote the use of indigenous renewable sources of energy. These targets have been incorporated into national policy in the Climate Action Plan 2023 and Climate Action Plan 2024 which aims to:

- Reduce CO_2 eq. emissions from the electricity sector by 62-81%.
- Deliver an early and complete phase-out of coal - and peat - fired electricity generation. (Note although peat-fired electricity generation has ceased in Ireland, coal and oil-fired plants are still operational. Tarbert Power Station (620MW) was scheduled to close by 2023, and Moneypoint Power Station (915MW) was scheduled to close by 2025. These dates have been delayed arising from concerns about security of electricity supply. The delays mean that more carbon emissions will arise. It highlights the urgency of constructing this and other wind farms.
- Increase electricity generated from renewable sources to 80%, indicatively comprised of up to 9 GW onshore wind energy by 2030.

Furthermore, the Climate Action and Low Carbon Development (Amendment) Act (2021) will act to reduce 51% emissions over a ten-year period to 2030, in line with the programme for Government which commits to a 7% average yearly reduction in overall greenhouse gas emissions over the next decade, and to achieving net zero emissions by 2050.

Under a 'Do Nothing' alternative, The Development will not be constructed. The land upon which the Development would occur would remain unchanged. However, the forestry at the Blade Transfer Area is a commercial forestry and would be removed within ten years. Consequently, the environmental impacts, identified in the EIAR, positive and negative, would not occur. However, in the "Do-Nothing" scenario, the prospect of creating sustainable energy through County Clare's wind energy resource would be lost at this Site. The environmental effects of the 'Do-Nothing' scenario compared to the wind farm development is detailed in **Table 3.1**.

The nation's ability to produce sustainable energy and reduce greenhouse gas emissions to meet EU targets and national targets, as set out above, would be stifled. This may result in the nation incurring significant financial penalties from the EU if targets are not achieved. The Development has the potential to prevent approximately between 8,389 tonnes and 10,487 tonnes of CO_2 emissions per annum, or between 335,568 and 419,460 tonnes of

CO_2 emissions will be displaced over the proposed 40-year lifetime of the wind farm, see **Chapter 12: Air Quality and Climate** for details on the Carbon Calculator method. This would otherwise be released to the atmosphere through the burning of fossil fuels in the "Do-Nothing" scenario. This would result in continued global warming and fail to limit warming as agreed to in the Paris Agreement to the United Nations Framework Convention on Climate Change (2015). This will result in continued negative impacts to air quality and climate.

According to EirGrid Group's All-island Generation Capacity Statement 2021 – 2030 (EirGrid, 2021), the growth in energy demand for the next ten years on the Island of Ireland will be between 18% and 43%. In the 'Do-nothing' scenario, importation of fossil fuels to maintain growing energy supply will continue and Ireland's energy security will remain vulnerable. A "Do-nothing" scenario would contribute to the strain on existing energy production and may impact on economic growth if energy demand cannot be met. The delay in closing Tarbert and Moneypoint means we continue to rely on imported fossil-fuels with unpredictable pricing, a vulnerable supply chain and higher carbon emissions.

Under the "Do-Nothing" scenario, the socio-economic benefits associated with the Development will be lost. These benefits include approximately 35 No. jobs, (50 No. jobs at peak construction times) during the construction phase of the project, and between 6 and 8 long-term jobs once operational[4]. Furthermore, under the "Do-Nothing" scenario the local community will not benefit economically from the community benefit fund associated with the Development which could be used to improve physical and social infrastructure within the vicinity of the Project.

The potential environmental effects of the 'Do-Nothing' Alternative when compared against the choice of developing a renewable energy project at this Site are presented in **Table 3.1**. Although the 'Do-Nothing' Alternative is likely to be better for the local environment there are a number of positive effects of the Project at County, National and International level which include overall long-term positive effects on ecology, long-term positive economic benefits to the local area and long-term positive effect on air quality and climate. Refer to each respective chapter for full details of residual impacts.

[4] According to SEAI, there are approximately 0.34 new long-term jobs per MW

Table 3.1: Environmental effects of 'Do-Nothing' compared with a wind farm development

Criteria	Residual Impact of the Project	Do-Nothing Alternatives
Population & Human Health (incl. Shadow Flicker)	Long-term positive economic benefit to local area due to job creation and Community Benefit Fund.	No increase in local employment and no financial gains for the local community.
Terrestrial Ecology	The Project will have a Moderate, Positive impact by increasing unplanted cutover bog, benefiting species like the meadow pipit through the Habitat Enhancement Plan. However, it also causes a Moderate, Negative impact due to the loss of cutover bog at T3. Overall, the long-term ecological impact is expected to be positive.	If no action is taken, the current state of the cutover bog will remain unchanged. Over time, the habitat may degrade due to natural succession or ongoing pressures, potentially reducing its suitability for important species like the meadow pipit. Without intervention, there would be no improvement in habitat quality or expansion of the cutover bog, leading to a missed opportunity for ecological enhancement.
Aquatic Ecology	Neutral	If the Development does not proceed, lands at and in the vicinity of the Site will continue to be used for agricultural purposes. This 'Do-Nothing' scenario would result in no significant change to aquatic ecology and habitats within or downstream of the Site subject to the continuation of current activities and practices.
Ornithology	The predicted effects during the construction phase by loss of cutover bog habitat can be reduced to Not Significant with the implementation of the	The "Do Nothing" alternative avoids immediate construction impacts but allows the cutover bog to degrade further due to natural succession and other

Criteria	Residual Impact of the Project	Do-Nothing Alternatives
	Habitat Enhancement Plan and, in the long-term, potentially Positive as a larger area of cutover bog will be available for important species such as meadow pipit.	factors. This would reduce habitat quality for species like the meadow pipit and miss the chance for long-term restoration and enhancement.
Soils & Geology	After implementing mitigation measures, the residual impacts will be minimal and nearly imperceptible. However, the project will result in changes to the ground conditions at the site, with natural materials like peat, subsoil, and bedrock being replaced by concrete, subgrade, and surfacing materials.	If the Development doesn't proceed, existing agricultural practices will continue, leading to ongoing changes in soil and geology. No restoration or improvement would occur, maintaining the current state without significant change.
Hydrology & Hydrogeology	Non-significant impacts following implementations of mitigation measures.	Should the proposed Development not proceed, the existing land-use practice of agricultural activities will continue with associated gradual alteration of the existing environment and associated pressures on surface water and groundwater quality.
Air & Climate	Slight to moderate temporary localised residual impacts arising from fugitive dust emissions during construction. Long-term positive impact on air quality and climate due to avoidance	There will be no increase in air quality or a reduction of greenhouse gas emissions. By the Development not proceeding, it will not assist in achieving the renewable energy targets set out in the Climate Action Plan 2023

Criteria	Residual Impact of the Project	Do-Nothing Alternatives
	of burning of fossil fuels and the net displacement of between 8,389 and10,487 of CO2 per annum.	and Climate action Plan 2024. Fossil fuel power stations will be the primary alternative to provide the required quantities of electricity resulting in greenhouse gas and other air pollutant emissions.
Noise	There is a 609m setback from sensitive receptors. Construction activities will result in temporary noise impacts ranging from Not significant to Slight. Certain dwellings along the grid route may experience Temporary Moderate impacts during construction. The effects of noise from the operation of the Development has been assessed using 2006 Guidelines with the methodology described in ETSU-R-97 and the IOA Good Practice Guide. Noise levels during operation of the Development have been predicted using the best practice of calculation technique, compared with the noise limits in the 2006 Guidelines and recent 2020 An Bord Pleanála limits and found to be compliant. The closest dwellings to the	There will be no change in the environmental noise.

Criteria	Residual Impact of the Project	Do-Nothing Alternatives
	project may experience Slight noise impacts during the operational phase, but these are considered not significant.	
Landscape & Visual	Mitigation measures for landscape and visual impacts related to the proposed wind farm are considered unnecessary or unlikely to be effective. The project is expected to generate visual effects on local community receptors, but these are assessed as Not significant. This also applies to designated views, population centres, major routes, and tourism, recreational, and heritage features. The overall assessment concludes that these visual impacts are minimal and do not require further mitigation.	The receiving landscape stays in the same or similar condition as it currently is.
Material Assets	Positive impact by offsetting use of fossil fuel. Positive impact due to provisions of electrical infrastructure. No significant effects from waste. Slight negative effect on natural resources in the area.	No provision of additonal renewable electricity generation infrastructure in the local area.
Cultural Heritage	Slight-moderate indirect visual impacts on nearby monuments. No residual impacts envisaged that	There will be no potential for Cultural Heritage effects.

Criteria	Residual Impact of the Project	Do-Nothing Alternatives
	cannot be reversed following Decommissioning.	
Traffic and Transport	Slight to minor localised short-term impact due to construction and Decommissioning activities.	No potential for increased traffic during construction.

3.5 ALTERNATIVE RENEWABLE ENERGY TECHNOLOGIES

Agricultural grazing will continue to be carried out on the Site around the footprint of Development. The only reasonable alternative source of renewable energy considered for the Site following its identification was solar energy. Commercial solar energy production is the harnessing and conversion of sunlight into electricity using photovoltaic arrays (panels). The capacity factor of solar energy is significantly lower than that of onshore wind energy, requiring approximately three times the capacity of the Development (approximately 45MW) to produce the same amount of energy. Solar farms require 1.6-2 hectares per MW, the land area required would be in the region of 24 to 30 hectares for a 15MW solar farm. This compared to a wind turbine footprint of 2.75ha for the three proposed turbines and associated infrastructure.

Table 3.2 outlines a comparison of environmental effects from the wind energy development option chosen with a solar photovoltaic array.

Table 3.2: Comparison of Environmental Effects from the Wind Farm Development chosen with a Solar Photovoltaic Array

Criteria	Solar Photovoltaic	Wind farm
Population & Human Health (incl. Shadow Flicker)	No potential for shadow flicker to affect sensitive receptors.	No glint and glare impacts on local road users.
Biodiversity	Larger development footprint would result in greater habitat loss.	Smaller development footprint resulting in less habitat loss.

Criteria	Solar Photovoltaic	Wind farm
Ornithology	Potential for mimicry of sensory cues i.e., glint and glare similar to water. No risk of collision from turbines, however	No potential for mimicry of sensory cues i.e., glint and glare similar to water. Collision risk from turbines
Soils & Geology	The shallower excavations required for solar PV array development reduce the potential for peat instability.	Wind turbine foundations typically require deeper excavations, which can increase the potential for peat instability.
Hydrology & Hydrogeology	Requires a larger development footprint therefore increasing the potential for silt laden runoff to enter receiving watercourses.	Smaller development footprint therefore reducing the potential for silt laden runoff to enter receiving watercourses.
Air & Climate	Reduced capacity factor of solar PV array technology would result in a longer carbon payback period.	Larger output capacity (MEC) for wind farm results in a shorter carbon payback period when compared with solar farms.
Noise	No potential for operational noise impacts on nearby sensitive receptors.	Potential for operational noise impacts on nearby sensitive receptors.
Material Assets	The larger development footprint will have a greater impact on the land use (Agriculture) of the Site.	Smaller development footprint will have less impact on the land use (Agriculture) of the Site.
Landscape & Visual	Less visible from surrounding area due to screening and topography.	Wind turbines are visible from surrounding area
Cultural Heritage	Neutral	Neutral
Traffic & Transport	Solar construction leads to moderate traffic from equipment deliveries, but overall, it has a lower impact than wind farms, with minimal long-term traffic for maintenance.	Wind farm construction generates temporary traffic from large component deliveries, managed to minimise disruption. Long-term, traffic remains low with only occasional maintenance.

Wind energy was chosen over the alternative renewable technology, solar, due to insufficient landholding size for solar, wind energy's higher capacity factor and smaller development footprint. Furthermore, the landowners involved in the wind farm project required the continuation of their cattle farming activities, making wind energy a more suitable and compatible option for the site and the landowners.

3.6 STRATEGIC SITE SELECTION

3.6.1 Project Site Requirements

The Developer has conducted an initial macro-level mapping exercise to identify candidate sites for wind energy development on a County by County basis. The purpose of the site identification exercise is to locate suitable viable areas that would be capable of accommodating a wind farm development while minimising the potential for adverse effects on the environment. To satisfy this requirement, a significant landholding is needed to accommodate all elements of a wind farm.

The Developer recognises the complexities of renewable energy site development and has developed a large GIS database that enables them to identify and screen for potential sites. Using this GIS database, the development team focused on lands across Ireland, conducting a County-by-County search to identify viable renewable energy development sites. The GIS database drew upon a wide array of key spatial datasets, including:

- Available wind resource data;
- Proximity to grid infrastructure;
- Access to transport infrastructure;
- Environmental designations such as Natura 2000 and National Designated Sites (SACs, SPA, NHA and pNHA);
- Proximity to residential dwellings;
- Location of operational, extant and pending renewable energy projects;
- Archaeological designations; and
- Landscape and visual designations of County Development Plans.

For County Clare, the GIS strategic search identified three potential sites that met the Developer's commercial MW requirements. The GIS team then refined the screening process focusing in detail on:

- Wind Energy Designations, Clare County Development Plan (CCDP 2023-2029)
- Residential Setbacks/ Housing Density
- Landscape Character Areas, CCDP 2023-2029

- Site area (ha)
- Wind Resource
- Designated European Sites
- Tourism
- Grid proximity and capacity
- Planning Precedence
- Terrain / Land Use

One of the identified sites did not align with the current wind energy designation "*open to consideration*" as set out within the CCDP 2023-2029 but met with all other parameters set. On this basis these two sites did not proceed to feasibility stage. Due to commercial confidentiality the location of this site cannot be identified.

The two other sites, met with all the screening parameters and is located within the current *"open to consideration*" designation for wind energy development. A planning application for the proposed Ballykett Wind farm has been submitted on one of the feasible site. On this basis the subject Site at Moanmore Lower was selected to proceed to feasibility stage.

3.6.2 Suitability of the Candidate Site

The site selection process for the current proposal has been fully informed by national, regional and local policy constraints at a macro level as well as site specific constraints that influence the turbine layout and project design at a micro level. The main policy, planning and environmental considerations for the selection of the proposed Moanmore Lower wind farm site included:

- Site location relative to the Clare County Wind Energy Strategy's classification of areas considered suitable for wind farm development from a planning policy perspective
- Access to the national electricity grid possible within a viable distance
- Location outside areas designated for protection of ecological species and habitats including European Designated Sites
- Location predominantly within agricultural land which allows the site to take advantage of existing access roads
- Consistently high average annual wind speeds;
- Low population density; and
- Visual Amenity

The following Table 3.3 sets out the high level feasibility outcome of the Subject Site following its identification.

Table 3.3: Feasibility results of subject site

Landuse	The site is located on relatively level ground, at elevations ranges from 9 -11 m AOD. The site is generally agricultural land and cutover peat. The proposed Ballyketts Wind Farm is located 0.96km north-east and the operational Moanmore Wind Farm is located 1.7km north-east.
Wind Speed SEAI Atlas	There are reasonable wind speeds at the site ranging from (7.00-7.25m/s at 50m, 8.75-9.00m/s at 100m, and 10.50-10.75m/s at 200m)[5].
Distance to Receptors	Residential and commercial building locations were attained from Eircode's database and by ground truthing. The mandatory buffer of 500m was applied to each property ensuring compliance with the WEGs 2006. Consideration has also been given to the guidance as set out in the DWEGs 2019 and 4 times tip height set back for visual amenity purposes was applied. Using a 150m tip height – resulting in a 600m buffer. All properties in the study area complied with this buffer. The low population density allows for appropriate setback distance from residential dwellings.
Population Density	The population density of the EIAR Study is 14.69 persons per square kilometre. The population density in County Clare was 37.2 persons per square kilometre in 2022. This is significantly lower than the average national population density of 77.6 persons per square kilometre. The lower population density of the Site provides greater capacity for wind energy development, while maintaining appropriate setback distances from dwellings as set out in the WEGs 2006.
Archaeology	There is one monument (Ringfort CL057-037----) located within the site. An enclosure site (CL057-023----) is also located immediately outside the north end of the site.

[5] SEAI Wind Atlas. Available at: https://experience.arcgis.com/experience/adeb20a08bdd477082a3975b3483cce6#data_s=id%3AdataSource_1-1910e3d2e29-layer-5%3A13. [Accessed at: 20/08/2024]

Environmental Designations	The site is not located in, or close to, any European designations such as Special Protection Areas (SPA) or Special Areas of Conservation (SAC), National Heritage Area (NHA) or significant hydrological or geotechnical considerations.
CDP Designations	*Located in an "open to consideration*" designation for wind energy development as set out within the CCDP 2023-2029.
Landscape	The site of the proposed Development is considered to be located within a relatively complex landscape setting that is more consistent with the 'Hilly and Flat Farmland' landscape type than other landscape types from the WEGs 2006 and DWEGs 2019. Under the CCDP 2023-2029 the Site is contained within 'LCA21 – Loop Head' and is contained within the 'Settled Landscapes' category.
Grid	The subject site was deemed suitable to the proximity of substation options from which any proposed wind farm could connect to the national grid. Such substation options include: 1. Tullabrack 110kV substation approximately 2.76km (public roads) 2. Moneypoint 400 kV substation approximately 10.20km (public roads)
Telecoms	There are no telecommunication links located within the site.

From the review of the criteria set out above, the Site was identified as a suitable location for the provision of a wind farm of the scale proposed (i.e. three turbine layout). The Site is located predominantly within existing agricultural grazing which allows the Site to take advantage of some existing access tracks (which will be upgraded), this when combined with the proximity to the existing Tullabrack 110kV substation further highlights the suitability of the Site as it can make further sustainable use of these established infrastructure elements.

The Site does not overlap with any environmental designations i.e., is not located in any Natura 2000 designated Site, or other nature designations. Also, it is located in an area with a relatively low population density with appropriate annual wind speeds.

The purpose of the site identification process was to identify an area that would be capable of accommodating a wind farm development while minimising the potential for adverse effect(s) on the environment. To satisfy this requirement, a significant landholding that would yield a sufficient viable area for the siting of each element of the Development was required.

3.6.3 Preliminary Constraints Mapping and Landscape Study

The design and layout of the Development adheres to the recommendations and industry guidelines outlined in the 'Wind Energy Development Guidelines' (Department of the Environment, Heritage and Local Government, 2006) and the 'Best Practice Guidelines for the Irish Wind Energy Industry' (Irish Wind Energy Association, 2012). Additionally, consideration has been given to the Draft Revised Wind Energy Development Guidelines (December 2019) (DWEGs).

The constraints-led design approach consists of the identification of environmental sensitivities within the Site by the design team with a view to identifying suitable areas in which wind turbines may be located. The resulting area is known as the 'developable area'. The constraints identification process included the gathering of information through detailed desk-based assessments, field surveys and consultation. Sensitive receptors were mapped, and the design constraints were applied. Setback buffers were placed around different types of constraints to clearly identify the areas within which no Development works will take place. The size of the buffer zone for each constraint has been assigned using guidance presented in the WEGs 2006 and other relevant Best Practice standards, which are identified in each chapter of this EIAR. The proposed setbacks set out have regard for the WEDGs 2019.

The constraints map for the Site, as shown in **Figure 3.1** encompasses the following constraints and associated buffers:

- 600m buffer of residential dwellings (four times the tip height separation distance from the curtilage of properties in line with the new draft guidelines)
- Operator specific buffer of Telecommunication Links
- 50m buffer of Watercourses (apart from crossing locations) in accordance with the Irish Wind Energy Industry Best Practice Guidelines (IWEA, 2012)
- 50m buffer of Archaeological Sites or Monuments (professional judgement based on experience)

This demonstrates the avoidance of significant effects on the receiving environment through mitigation by design.

The Site layout design builds on the existing Site characteristics and includes the following:

- Available lands for Development
- Separation distance from landowners not involved in the Project
- Distance from designated Sites
- Good wind resource
- Existing access points and general accessibility of all areas of the Site due to existing road infrastructure
- Avoidance of environmental constraints identified from desk studies

The inclusion of the constraints on a map of the Study Area as shown in **Figure 3.1** allowed for a viable development area to be identified. An initial turbine layout was then developed to take account of all the constraints mentioned above, their associated buffer zones and the separation distance required between the turbines.

Following the mapping of all known constraints, detailed Site investigations were carried out by the project team. The ecological assessments of the Site encompassed habitat mapping and extensive surveying of birds and other fauna. These assessments, as described in **Chapter 6: Biodiversity** and **Chapter 7: Aquatic Ecology**, were used to inform the selection of the optimal siting of turbines and associated infrastructure works (e.g. construction of access tracks.).

Similarly, the hydrological and geotechnical investigations of the Site informed the proposed locations for turbines, access tracks and other components of the Development, such as the substation and the construction compound. This included peat depth and peat stability analysis (**Chapter 8: Soils and Geology and Appendix 8.1 Site Investigation & Stability Risk Assessment**) and the identification of watercourses, groundwater constraints, flood risk and wells (**Chapter 9: Hydrology and Hydrogeology**). Where specific areas were deemed as unsuitable (e.g., unstable peat giving high risk for slippage) for the siting of turbines or roads, etc., alternative locations were proposed and assessed, taking into account the areas that were already ruled out of consideration. The turbine layout for the proposed wind farm has also been informed by wind data which has been collected from a lidar measurement and the results of noise assessments as they became available.

As a result of examining the site constraints, it was demonstrated the Site at Moanmore Lower could accommodate three wind turbines.

3.6.4 Planning Policy

As detailed in **Chapter 4: Planning Policy**, there is a positive planning context for the Development as it supports national policy with regard to renewable energy provisions and national renewable electricity targets. The Development is compliant with International, European and National policy on energy security, emissions reductions and renewable energy production. The Climate Action Plan 2024 (CAP2024) sets out a detailed roadmap designed to increase the proportion of renewable electricity up to 80% by 2030, including target of 9 Gigawatts (GW) of onshore wind energy by 2030. The proposed pathway includes a more rapid build-out of renewable generation capacity, including wind power generation technologies. The proposed 3 no. wind turbines have an estimated maximum export capacity (MEC) of approximately 15MW of renewable electricity through the indigenous wind resource at the Site. It is considered that such development would contribute to achieving the Climate Action Plan's target of achieving 80% renewable electricity and reducing greenhouse gas emissions by 51% (based on 2018 levels) by 2030. The nature and export capacity of the Developments accords with National Policy Objective 55 of the National Planning Framework (NPF), which seeks to promote renewable energy use and generation at appropriate locations within the built and natural environment to meet national objectives towards achieving a low carbon economy by 2050.

At a regional level, the Regional Spatial & Economic Strategy (RESS) for Southern Regional Assembly supports the delivery of renewable energy s set out in the Regional Policy Objectives (RPO):

RPO 99: "Renewable Wind Energy; To support the sustainable development of renewable wind energy (onshore and offshore) at appropriate locations and related grid infrastructure in the Region in compliance with national Wind Energy Guidelines."

The nature of the Development is consistent with this objective.

At local level, the CCDP 2023-2029 supports the development of wind energy projects in appropriate areas. The CCDP 2023-2029 supports wind energy as a renewable energy source which can play a vital role in achieving national targets in relation to reductions in fossil fuel dependency and greenhouse gas emissions.

The relevant objectives of the WES of the CDP are as follows:

- Identify 'Strategic Areas' for wind energy developments having regard to the Wind Energy Development Guidelines, Guidelines for Planning Authorities (DoEHLG, 2006) (the Planning Guidelines issued by the Department of Environment, Heritage, and Local Government).
- To more closely align the County's wind generation policy to the existing wind energy resources.
- To support a planned approach to wind energy development in County Clare predicated on the optimal harnessing of the County's wind energy resource, and at a minimum, requiring that 40% of the County's electricity needs can be met from wind farms.
- To identify strategic areas for wind energy development of Regional and National importance.
- To recommend that a working target of 550MW of wind energy is harnessed in County Clare, to enable the County to make the initial steps toward a low carbon economy by "2020(sic)".
- To support County Clare in reducing the CO_2 emissions associated with energy production, as identified in the Limerick Clare Climate Change Strategy (Limerick Clare Energy Agency 2006) and subsequent Mid-West Regional Climate Change Strategy (2008).
- To promote economic development through wind energy and other renewables in the County, underpinning the need for energy security, the promotion and establishment of a low carbon economy and the development of green business within the County.
- To ensure the production of wind energy is consistent with and takes account of nature conservation and environmental legislation and targets, including the conservation and protection of the Designated Natura 2000 Sites in the County.

Relevant general objectives for wind energy developments are as follows:

- **WES One: Development of Renewable Energy Generation** It is the objective of the Council to support, in principle and in appropriate scales and locations, the development of wind energy resources in County Clare. It is an objective of the Council to ensure the security of energy supply by accommodating the development of wind energy resources in appropriate areas and at appropriate scales within the County.

- **WES Four: Response to National Policy** The White Paper on Energy has set a target of 40% of electricity to be generated from renewable sources by 2020. In the Mid-West Regional Climate Change Strategy, County Clare is identified as having a potential 600MW energy produced from renewables by "2020(sic)". Clare County Council will aim

to achieve a minimum target of 550MW from wind energy by the conclusion of this Strategy.

Wind Energy Irelands shows County Clare currently has 246MW of installed wind energy[6]. This is a shortfall of 304MW (55%) of the 2030 target. the Development will help Clare County Council achieving the target of 550MW by the end of the WES.

- **WES Six: Infrastructure Development Proposals** Proposals for the development of infrastructure for the production, storage and distribution of electricity through the harnessing of wind energy will be considered in appropriate Sites and locations, subject to relevant policy, legislation and environmental considerations.
- **WES Ten: 'Open to Consideration'** Wind energy applications in these areas will be evaluated on a case-by-case basis subject to viable wind speeds, environmental resources and constraints and cumulative impacts.

The objectives of the Council in relation to wind energy are as follows:

- **CDP2.16** - It is an objective of Clare County Council: a) To support and encourage the development of community owned energy initiatives at appropriate locations across the County; b) To support communities seeking designation as 'Sustainable Energy Communities'; and c) To explore the potential of designating Shannon Town Centre as a 'Sustainable Energy Community' during the lifetime of the Plan.
- **CDP6.17** - It is an objective of Clare County Council: a) To contribute to the economic development and enhanced employment opportunities in the county by: i) Enabling the development of a self-sustaining, secure, reliable and efficient renewable energy supply and storage for the County in line with CDP Objective 3.1; ii) Facilitating the county to become a leader in the production of sustainable and renewable energy for national and international consumption through research, technology development and innovation; and iii) Supporting on-land and off-shore renewable energy production by a range of appropriate technologies in line with CDP Objective 3.1.

3.7 ALTERNATIVE TURBINE NUMBERS

The proposed wind turbines will have a potential power output in the 4-5MW range. It is proposed to install three turbines which could achieve up to 15MW output. A wind farm with the same potential power output could also be achieved on the Site by using a greater number of smaller turbines (for example 2.5MW machines). Due to the small developable area defined at the preliminary constraints mapping stage this was ruled out.

[6] Wind Energy Ireland https://www.windenergyireland.com/about-wind/wind-energy-by-county [Accessed 07/04/2025]

The three-turbine layout selected has the smallest development footprint, while still achieving the optimum output at a more consistent level than would be achievable using different turbines.

Vestas turbines were selected as the preferred turbine by the Applicant from a limited pool of suppliers in the Irish market, as their product most closely aligned with the planning and constraints identified during the feasibility stage of the project. The Two turbine models considered were the Vestas 136 and Vestas 150. The Vestas V136 is often preferred over other models due to its optimisation for higher wind speeds and superior cost-performance ratio. Its compatibility with existing grid capacities further enhances its efficiency, making it a more effective choice for this wind energy project. The Vestas V136 (4.5MW) turbine has been chosen. Although Vestas V150 turbines were considered, they were deemed less suitable for the Site. The height of the turbines that will be installed on the Site will have an overall ground to blade tip height of 150m.

3.8 ALTERNATIVE LAYOUT AND DESIGN

The design of the Development has been informed by the designers, developers, engineers, landowners, environmental, hydrological and geotechnical, archaeological specialists, telecommunication specialists, and traffic consultants. The aim of this is to reduce potential for environmental effects while designing a project capable of being constructed and viable. Throughout the preparation of the EIAR, the layout of the Development has been revised and refined to take account of the findings of all site investigations, which have brought the design from its first initial layout to the current proposed layout. The design process has also taken account of the recommendations and comments of the relevant statutory and non-statutory organisations, the local community and local authorities as detailed in **Chapter 1: Introduction, Section 1.10** and in **Appendix 1.3** of this EIAR.

3.8.1 Turbine Layout

The final proposed turbine layout of the Development takes account of all site constraints and the distances to be maintained between turbines and from houses, roads, etc. The layout is based on the results of all site investigations that have been carried out during the EIAR preparation process. As information regarding the Site was compiled and assessed, the number of turbines and the proposed layout have been revised and amended to take account of the physical constraints of the Site.

The wind farm design process and related EIAR were an iterative process. Findings at each stage of the assessment were used to further refine the design, always focused on

minimising the potential for environmental effects. The initial wind farm layout is shown in **Figure 3.3.** The development of the final proposed wind farm layout reflects the findings, and recommendations from a range of site surveys and assessments in addition to ongoing negotiation and discussions with the landowners. There were several reviews of the specific locations of the three turbines during the optimisation of the Site layout.

While it can be confirmed that the area where T1 and the road to T1 has not experienced flooding in the living memory of the landowners, the T1 design process has proactively prioritised the establishment of flood compensation areas based on detailed software analysis of the flood zone, the CCDP 2023-2029 and OPW technical specifications and guidance notes. The infrastructure within the flood zone are shown in **Figure 3.1 Constraints Map** and **Chapter 9 Hydrology and Hydrogeology** – **Appendix 9.1 Flood Risk Assessment**.

Recognising the importance of precautionary measures, the design incorporates strategies to effectively manage potential water movement. Compensatory measures have been implemented to preserve existing flood storage capacity, and specific areas have been designated for floodwater absorption.

To enhance natural drainage, strategically placed culverts will facilitate the movement of water in and out of the flood zone. Furthermore, certain areas will be elevated when being constructed to replicate natural topography, which bolsters resilience against any future flooding events. The design also deliberately avoids connecting separate flood zones, thereby mitigating the risk of unintended water flow between them.

These comprehensive measures demonstrate a commitment to environmental responsibility and ensure that the development aligns with best practices for flood risk management.

The T2 design process was carefully developed to minimise the environmental impact of road construction on the surrounding bog landscape. Recognising the sensitivity of the nearby bog, measures were taken to prevent any significant encroachment. The turbine area was strategically relocated north into cutover sections of the bog that had already been disturbed, providing a more suitable and less impactful location. Additionally, the road alignment was adjusted to avoid deeper, more vulnerable sections of the bog, further mitigating potential environmental impacts. This design approach ensures that the project

proceeds in a manner that is both environmentally responsible and sustainable. Ensuring environmental effects are considered Not significant.

Although no Marsh Fritillary butterflies were found onsite, this area has potential for supporting the species. Turbine T3 has been relocated to the northwest border of Block A to avoid this area. The move enhances habitat management, improving biodiversity potential and supporting conservation efforts. All of which will be incorporated into a Habitat Monitoring Plan; see attached the **Appendix 6.3 Marsh Fritillary Report**.

The Site compound underwent minimal iterations, as it was initially considered to be in an optimal position.

Similarly, the Substation experienced only minor adjustments. It was relocated slightly to the north-east to accommodate drainage in the western corner.

The final design is the most appropriate option, as it takes into account surrounding receptors, utilities, and other existing services. By carefully positioning turbines, minimising environmental impact, and managing flood risks, it achieves operational efficiency while respecting environmental and community concerns.

Once the final turbine layout was decided the Redline Boundary of the Site for the purposes of the EIAR was defined. The preliminary redline boundary was amended to incorporate the final layout and all necessary constraints and to include part of the Turbine Delivery Route. The final proposed turbine layout as presented in **Figure 1.2a and 1.2b** takes account of all Site constraints (e.g. ecology, ornithology, hydrology, peat depths etc.) and design constraints (e.g. setback distances from houses and third-party lands/infrastructure and distances between turbines on-Site etc.). The layout also takes account of the results of all Site investigations and baseline assessments that have been carried out during the EIAR preparation process. A comparison of the potential environmental effects of the layout as presented in the initial iteration when compared against the final layout are presented in **Table 3.4**.

Table 3.4: Environmental Effects from Initial to Final Layout

Criteria	Initial Layout (Figure 3.3)	Final Layout (Figure 1.2a and 1.2b)
Population & Human Health (incl. Shadow Flicker)	No material environmental difference for population or human health.	No material environmental difference for population or human health.
Biodiversity	No significant environmental effects	Less environmental effects on the Marsh Fritillary habitat. No significant environmental effects
Ornithology	No significant environmental effects	No significant environmental effects
Soils & Geology	Slight increase in the volume of peat and spoil to be managed.	This layout was amended following initial geotechnical investigations to reduce areas of deep peat and reduce the volume of peat and spoil to be managed.
Hydrology & Hydrogeology	Longer length of access track in or near hydrological buffer increases potential for silt laden runoff to watercourses.	No access tracks located within the 50m hydrological buffer in hydrological buffer zone.
Air & Climate	Neutral	Reduced carbon losses due to the minimisation of bog removal.
Noise	Neutral	Neutral
Material Assets	Potential for impact to existing telecoms links traversing the Site.	Neutral
Landscape & Visual	Neutral	Neutral
Cultural Heritage	Neutral	Neutral
Traffic and Transport	New entrance onto busy Regional Road	Neutral

3.8.2 Site Access Track Layout

Site access tracks are required to enable transport of infrastructure and construction materials within the Site. Tracks must be of a sufficient gradient and width to allow safe movement of equipment and vehicles. It was decided during the initial design of the Development existing roads would be utilised where possible to minimise the potential for impacts by constructing new tracks as an alternative. This has meant that where possible, the proposed access tracks have followed the existing turbary access tracks on Site.

To minimise environmental impact, the plan initially aimed to utilise an existing access track. An existing road extends approximately 480m west from the entrance, of which 420m will be used for the Development as shown in **Chapter 2: Project Description**. From there, the track turns north-west for an additional 400m. These roads will be used to access the substation and T3 and T2 while minimising impact on habitats. However, these tracks are currently in poor condition and will require development without disturbing the nearby ring fort.

Floating roads were compared with cut and fill road designs. Floating roads were selected as the preferred option. Floating roads will be utilised to grant access throughout the Site, offering a range of benefits. These roads enhance accessibility. They will contribute to environmental preservation by minimising disruption of the bog whilst avoiding raised bog. Preserving natural habitats and ecosystems, thus reducing the ecological footprint of wind energy projects.

3.8.3 Location of Ancillary Structures

The ancillary infrastructure required for the proposed Development include a Temporary Construction Compound, Electrical Substation and Grid Connection.

3.8.3.1 Temporary Construction Compound

The Temporary Construction Compound will be used as a secure storage area for construction materials and to contain temporary site units for sealed staff welfare facilities. The compound will contain cabins for offices space, meeting rooms, canteen area, a drying room, parking facilities, and similar personnel type facilities. The Temporary Construction Compound is located on the east of the Site near the entrance from the local road (L2034). Details of the temporary Construction Compound can be seen in **Drawing No 6778_JOD_MM_XX_0102**. The use of a single temporary construction compound instead of two smaller compounds located in different areas of the Site will result in less disturbance to the Site and reduced visual impact. A number of locations were assessed for the location

of the temporary compound. The current proposed location is considered the most suitable due to its location close to the Site entrance and its avoidance of disruption to areas of ecological value and peatland on other parts of the Site.

A comparison of the potential environmental effects of constructing a single, large construction compound when compared against constructing two smaller compounds is presented in **Table 3.5**.

Table 3.5: Environmental Effects from Constructing Two Smaller Construction Compounds Compared to One Large Construction Compound

Criteria	Comment
Population & Human Health (incl. Shadow Flicker)	N/a
Biodiversity	Potential for a greater impact to the Site ecology by constructing two construction compounds in different areas of the Site.
Ornithology	Potential for a greater impact to the Site ornithology by constructing two construction compounds in different areas of the Site.
Soils & Geology	Increased amounts of peat extraction required if constructed on other part of the Site.
Hydrology & Hydrogeology	The use of multiple construction compounds Sites has the potential to increase the risk of erosion and increase risk to watercourses.
Air & Climate	The use of multiple construction compounds Sites has the potential to increase the number of potential dust sources on the Site.
Noise	Potential for increased noise impacts on nearby sensitive receptors.
Material Assets	More building materials required
Landscape & Visual	Potential for greater visual and landscape impacts due to the construction of tracks.
Cultural Heritage	Neutral
Traffic and Transport	Less efficient movement and management of material across the Site.

3.8.3.2 Electrical Substation

To enhance flexibility for the electrical network provider and make use of existing road infrastructure, relocating the Electrical Substation to a position south of the Site was deemed most favourable. It should also be noted that while the operational lifespan of the proposed turbines is expected to be 40 years (following which they may be replaced or decommissioned), the electricity substation and associated infrastructure will become an ESBN asset. It will then be a permanent feature of the proposal as it will be required to continue to form part of the electrical infrastructure of the area. This will be in the event that the remainder of the Site is Decommissioned. The current location was chosen for its strategic position on the southern part of the Site, which avoids potential flood zones and areas of ecological value. This decision supports effective risk management and minimises environmental impact.

3.8.3.3 Grid Connection

A key consideration in determining the Grid Connection Route (GCR) for a proposed wind energy development is whether the cabling is undergrounded or run as an overhead line. While overhead lines are less expensive and allow for easier repairs when required, underground lines will have no visual impact. For this reason, it was considered that underground lines would be a preferable alternative to overhead lines. The WEGs 2006 also indicate that underground cables are the preferred option for connection of a wind energy development to the national grid. Therefore, the preferred Grid Connection options are an underground cable duct. These underground cables will extend from the onsite 38kV Electrical Substation along existing roads for 2.76km to the east, reaching the 110kV Tullabrack substation. Thus, minimising land disruption and ecosystem impact.

For the three-turbine development, it has been determined that installing a 38kV Electrical Substation is the most effective solution. This substation will facilitate the efficient operation of the turbines by managing the electrical output generated. To ensure a reliable connection to the existing electrical infrastructure, the new substation will be linked to the Tullabrack 110kV substation through underground cable ducting. This approach not only minimises visual impact and land disturbance but also enhances the safety and reliability of the power transmission, allowing for seamless integration into the existing grid.

A high-level study by BFA Consulting (see **Appendix 2.2**) assessed the feasibility of connecting to the Moneypoint 400 kV substation. While this route was viable, the Tullabrack 110 kV substation was ultimately deemed more favorable due to its closer proximity to the

proposed development. Following this, BFA Consulting was contracted to conduct a detailed review of grid connection route (GCR) options. As part of the initial design process, two underground grid connection (UGC) route options were evaluated for inclusion in the planning application, as illustrated in **Figure 3.2.**

- **Underground Grid Connection (UGC) Option 1** - UGC from *Tullabrack Substation to Moanmore Lower Wind Farm* utilising sections of UGC in public roads. [UGC: 2.76km]
- **Underground Grid Connection (UGC) Option 2** - UGC from *Moneypoint Substation to Moanmore Lower Wind Farm* utilising sections of UGC in public road, primarily regional and local roads. [10.2km]

Option 1 was thoroughly assessed in the Background and Feasibility Analysis (BFA) report (**Appendix 2.2**) and in various chapters of this Environmental Impact Assessment Report (EIAR).
Option 2 was thoroughly assessed in the Background and Feasibility Analysis (BFA) report (**Appendix 2.2**) and in **Appendix 3.1** Alternative Grid Route Connection EIAR**.**

Option 1, connecting Tullabrack Substation to Moanmore Lower Wind Farm, was ultimately selected as the preferred choice due to its shorter distance of 2.76km and lower potential environmental impacts hence, only **Option 1**, is assessed further in this EIAR. However, there are only small differences between Option 1 and Option 2, therefore effects of Option 2 has been considered, as summarised in **Appendix 3.1**.

Table 3.6: Environmental Effects the preferred GCR Option 1 chosen compared with GCR Option 2

Criteria	Comparison of preferred Option 1 with Option 2
Population & Human Health (incl. Shadow Flicker)	**Option 1** (i.e., from Tullabrack Substation) likely to have less vehicular movements and road closures so less disruptions. **Options 2** is a longer route with more potential to impact on nearby residents due to road closures and vehicular movements.
Biodiversity	**Options 2** has more potential effects due to the longer distance from the proposed development Site, and more watercourse crossings (7 crossing) compared to one water crossings required for **Option 1**
Ornithology	Neutral

Criteria	Comparison of preferred Option 1 with Option 2
Soils & Geology	**Options 2** would have more effects on soils and geology due to distance, and more watercourse crossings than that of **Option 1.**
Hydrology & Hydrogeology	**Options 2** have more potential effects due to the longer distance from the proposed development Site, and more watercourse crossings (7 crossing) compared to one water crossings required for **Option 1.**
Air & Climate	**Option 1** originating from Tullabrack Substation, is expected to involve fewer vehicular movements and road closures, leading to less disruption. This also means reduced trench excavation and traffic, resulting in less dust and a lower impact on air quality in the area. In contrast. **Option 2** has a longer route with more potential to affect nearby residents due to increased road works and vehicular activity.
Noise	**Options 2** would result in greater noise generated on/near the proposed development Site from increased road opening and backfilling activities compared to **Option 1.**
Material Assets	More naturals materials and back filling required for longer GCR impacting natural resource
Landscape & Visual	Neutral
Cultural Heritage	Neutral
Traffic and Transport	**Option 1** (i.e., from Tullabrack Substation) likely to have less vehicular movements and road closures so less disruptions. **Options 2** has a longer route with more potential to impact on nearby residents due to road closures and vehicular movements.

3.8.3.4 Alternative Spoil Storage Sites

Spoil material will be generated from excavations to construct the infrastructure on Site. This will be mostly in the form of peat and subsoils, that will be stored on-Site as it is excavated. Generally, it is preferred to store spoil as close as possible to the Site from where it was excavated. It is proposed to store spoil in one area, a designated area to the east of the Site entrance. Spoil will be temporarily stored until it is being reinstated and the

spoil that cannot be reused will then be transferred to a permanent storage area. An alternative option would be to dispose of spoil at an off-site licenced waste facility.

A comparison of the potential environmental effects of storing spoil on-site in comparison to using an off-Site storage is presented in **Table 3.8**.

On-site storage was selected as the preferred as there will be less disturbance to the local residents with less vehicle movements, less noise and less vehicle emissions.

Table 3.8: Environmental Effects from Utilising On-Site Storage Compared to Off-Site disposal.

Criteria	On-Site spoil storage	Off-Site Disposal
Population & Human Health (incl. Shadow Flicker)	Less vehicular movements and potential health benefits.	Increased vehicular movements.
Biodiversity	The Project will result in a larger area of habitat being impacted. However, this is a temporary loss as the material that cannot be reused will be allowed revegetate naturally.	Less habitat affected.
Ornithology	Increased amount of habitat affected.	Less habitat affected.
Soils & Geology	Large volumes of spoil require significant on-site storage areas, which can lead to habitat loss or reduced available land for other activities. If not properly managed, spoil storage can increase sediment-laden runoff into nearby watercourses and pose risks to soil stability.	Less likely to have an impact on peat stability if spoil is stored off Site. Eliminates the need for large, designated storage areas, preserving on-site land for operational or ecological purposes. By removing spoil from the site, risks such as sediment-laden runoff, watercourse contamination, and peat

Criteria	On-Site spoil storage	Off-Site Disposal
	Storing peat on-site can create load pressure, potentially destabilising adjacent areas.	instability within the project area are minimised.
Hydrology & Hydrogeology	Increased risk of sediment laden runoff to watercourses. Increased risk of peat instability.	Lower risk of sediment runoff to watercourses. Lower risk of peat instability.
Air & Climate	Less vehicular movements and decrease in air quality effects.	Increased vehicular movements and increase in air quality effects.
Noise	Less noise generated from vehicular movements.	Increased noise generated from vehicular movements.
Material Assets	Neutral	Licenced off-site waste facility with capacity required.
Landscape & Visual	No landscape screening of infrastructure from spoil bunds.	No impact on the landscape of the Site.
Cultural Heritage	Neutral	Neutral
Traffic and Transport	Less vehicular movement on local roads.	Increased vehicular movement on local roads.

3.9 ALTERNATIVE TURBINE DELIVERY ROUTE AND SITE ACCESS

Wind turbine components (blades, nacelles and towers) are not manufactured in Ireland and therefore must be imported from overseas and transported overland to the Site. Alternative transport routes to the Site were considered in relation to turbine components, general construction-related traffic, and Site access locations.

3.9.1 Port of Entry

The alternatives considered for the port of entry of wind turbines into Ireland for the proposed Development include Galway Port and Foynes Port. Both Ports offer a lift-on lift-off procedure to facilitate importation of wind turbines. Foynes Port was selected as the port of entry for this project because it is located closer to the Site and a number of the existing wind farms in the vicinity of the Site have used this route and therefore less requirements for works to facilitate turbine deliveries on the route. Other ports were not considered as

these two options are the closest to the Site and are proven to have the required capabilities for turbine deliveries.

A comparison of the potential environmental effects of using Foynes Port in comparison to Galway Port is presented in **Table 3.9**. Foynes Port was selected at the preferred port of delivery due to the shorter route and less works required on third party lands.

Table 3.9: Environmental Effects from Utilising Foynes Port v Galway Port

Criteria	Foynes Port	Galway Port
Population & Human Health (incl. Shadow Flicker)	Shorter, proven route to site with lower population density, minimal shadow flicker, and reduced human health impacts.	Longer, unproven route to site with higher population exposure, greater shadow flicker, and increased health risks.
Biodiversity	Less works in third party lands off the road network.	More work in third party lands off the road network.
Ornithology	Fewer sensitive bird habitats, lower disturbance risk.	Greater bird habitat disruption, higher disturbance potential.
Soils & Geology	Less works in third party lands off the road network.	More works in third party lands.
Hydrology & Hydrogeology	Increased watercourse crossings with a higher potential for surface water contamination and groundwater disruption, leading to greater hydrological and hydrogeological concerns.	Fewer watercourse crossings, reduced risk of surface water contamination, and minimal disruption to groundwater recharge areas, resulting in lower overall hydrological impact.
Air & Climate	Minimal emissions due to shorter transport distance	Longer route may increase emissions and congestion
Noise	Less noise generated from vehicular movements.	Higher number of sensitive receptors.

Criteria	Foynes Port	Galway Port
Material Assets	Neutral	Neutral
Landscape & Visual	Neutral	Neutral
Cultural Heritage	Neutral	Neutral
Traffic and Transport	Shorter vehicular movement on local roads.	Longer vehicular movement on public roads.

3.9.2 Delivery to Site

In assessing the most suitable route for turbine transport, cognisance was taken of the Turbine Delivery Route (TDR) used for the proposed Ballykett wind farm, which is located directly to the east of the Site. The proposed Ballykett wind farm proposes to use the N68 to reach the Site. The route will undergo a confirmatory route survey and confirmatory swept path analysis as part of the preparation for construction. The alternative is to use the N68 to Kilrush and then the R483 to the Site. However, this was found be a less favourable route because it would require the turbine deliveries going through Kilrush Town. This route would have a greater impact on residents due to the higher population density of the town and additional accommodation requirements due to numerous pinch points.

The transport analysis for the Project (as presented in **Chapter 16: Traffic and Transportation**) shows that only relatively minor temporary accommodation requirements will be required, at two locations in lands under public control on the TDR, to accommodate the proposed development at Moanmore. The TDR proposed as outlined in the bullet points below will utilise the national and primary roads available which have been designed to carry larger loads and Heavy Goods Vehicles (HGVs).

The Turbine Delivery Route is shown in **Figure 16.3** and the Haul Route as shown in **Figure 16.4**.

It is proposed that the turbine components will be delivered via Foynes Port. The following route is proposed (Detailed analysis of the proposed Turbine Delivery Route between the N68 / L6132 and the Site entrance have been carried out by Jennings O'Donovan and are included in **Appendix 16.1**. The Turbine Delivery:

- Loads would exit the harbour and join the N69 southbound and follow the N69 to Limerick City;
- West of Limerick City loads (except for nacelles and lower tower sections) would continue on the N18/M18 northbound before turning left to join the N85 westbound;

- Loads for nacelles and lower tower sections will continue on the R510 and onto the R527 and continue to the R445 at the Coonagh Roundabout and then onto the N18. This is due to height restrictions in the Limerick Tunnel under the River Shannon.
- Loads would turn onto the N68 at the Rocky Road Roundabout and travel on the N68 south-west; and
- Loads would turn right onto the L6132 westbound to the site access junction.
- Loads would turn left onto L2032 southbound to then turn right at the Site access point.

3.10 CONCLUSION

A description of the reasonable alternatives in terms of project design, technology, location, size and scale which are relevant to the proposed Project and its specific characteristics [maximum 15MW output, 3 no. turbine with a tip height of 150m, a hub height of 82m and a rotor diameter of 136m], has been provided. An indication of the main reasons for selecting the chosen options, including a comparison of the environmental effects has also been provided. Through appropriate assessment of the reasonable alternatives, as outlined in this chapter, and the nature of the Development, the Site has been shown to be suitable given consideration of the main criteria of distances from dwellings, wind speeds, potential environmental effects and a relatively short Grid Route Connection.