3 ALTERNATIVES CONSIDERED

3.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) provides a description of the reasonable alternatives assessed by the Developer, which are relevant to the Proposed Development and its specific characteristics. This Chapter sets out the site selection process, the reasonable alternatives considered and assessed for the Wind Farm Site and the Proposed Development, the design iterations and refinements of the design to achieve the preferred layout, taking into account the effects of the Proposed Development on the EIAR Study Area/ surrounding environment.

3.2 STATEMENT OF AUTHORITY

This chapter has been prepared by Mr. Darren Timlin and reviewed by Mr. David Kiely of Jennings O'Donovan & Partners Limited (JOD).

Mr. Darren Timlin is a Graduate Environmental Scientist and holds a Bachelor (Hons.) Degree in Environmental Science from the Atlantic Technological University. Darren has 3 years' experience drafting EIARs and Screening Reports, Appropriate Assessments for Wind Farms, Hydrogen Plants and Power Generation Plants. He forms part of the Environmental team responsible for preparing the EIAR Chapters. Darren has experience drafting EIARs and Screening Reports, Appropriate Assessments for Wind Farms, Hydrogen Plants and Power Generation Plants. He has experience in the use of Arc GIS Pro and Auto CAD 2D.

The Chapter has been reviewed by Mr. David Kiely, Director of JOD. Mr. Kiely has 43 years' experience in the civil engineering and environmental sector. He has obtained a Bachelor's Degree in civil engineering and a Master's in Environmental Protection, has overseen the construction of over 50 wind farms and has carried out numerous soils and geology assessments for EIAR's. He has been responsible in the overall preparation of in excess of 60 EIA Reports (EIARs).

3.3 METHODOLOGY

3.3.1 Requirements for Alternatives Assessment

Article 5(1)(d) of Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU (the EIA Directive) requires that the Environmental Impact Assessment Report (EIAR) prepared by the Developer contains *"a description of the reasonable alternatives studied by the*

developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment." Article 5(1)(f) of the EIA Directive requires that the EIAR contains *"any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected."*

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

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

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

There is limited European or National guidance on what constitutes a 'reasonable alternative' however the EU Guidance Document (EU, 2017) states that reasonable alternatives *"must be relevant to the proposed project and its specific characteristics, and resources should only be spent assessing these alternatives".*

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

The *'Guidelines on the information to be contained in Environmental Impact Assessment reports'* (EPA 2022) published by the Environmental Protection Agency (EPA) in May (2022) states that *"It is generally sufficient to provide a broad description of each main*

alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option".

The EPA guidance documents on EIAR preparation[1], stipulates the following:
"The presentation and consideration of the various alternatives investigated by the applicant is an important requirement of the EIA process."
The alternatives can include:

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

As stated in the EPA Guidelines 2022 on:
'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''

In an effective EIA process, different types of alternatives may be considered at several key stages during the process. As environmental considerations emerge during the preparation of the EIAR, alternative designs may need to be considered early in the process or alternative mitigation options may need to be considered towards the end of the process. These various levels of alternatives are set out in this chapter of the EIAR.

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

- 'Do-Nothing' Option
- Strategic Site Selection
- Alternative Wind Farm Design and Layout
- Alternative Turbine Numbers and Specifications

1 EPA. (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports.

- Alternative Transport Route and Site Access
- Alternative Grid Connection Location
- Alternative Grid Connection Routes
- Alternative Mitigation Measures

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[2]) 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.

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 as detailed in **Chapter 4: Planning Policy**. The binding EU targets have been transposed into Irish National Policy in the 2024 and 2025 Climate Action Plan which focuses up to 9 GW future electricity production on the onshore wind energy sector accounting for 80% of the share of electricity demand by 2030 together with offshore wind (5 GW), solar (8 GW) and new flexible gas plant (2

[2] European Union (2017). Environmental Impact Assessment of Projects. Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014-52/EU.

GW). This demonstrates the significance of wind energy in the Irish energy context and highlights the need for the Proposed Development in reaching both EU and national renewable energy targets.

As outlined in the revised Directive EU/2023/2413[3] Ireland is obliged to ensure that 42.5% 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 (2025) which aims to:

- Reduce CO_2 eq. (carbon dioxide equivalent) 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 (620 MW) was scheduled to close by 2023, and Moneypoint Power Station (915 MW) was scheduled to close by 2025. These are now delayed arising from concerns about security of electricity supply. This delay means 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 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 Proposed Development will not be constructed. The land upon which development will occur would remain unchanged. The main land use of the Wind Farm Site would remain as commercial forestry and agriculture. Consequently,

[3] Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652 http://data.europa.eu/eli/dir/2023/2413/oj [Accessed: 19th March 2026]

the environmental effects, identified in the EIAR, positive and negative, would not occur. However, in the "Do-Nothing" scenario, the prospect of creating sustainable energy through County Mayo's wind energy resource would be lost at this Wind Farm Site. The environmental effects of the 'Do-Nothing' scenario compared to proceeding with the Proposed Development is detailed in **Table 3.1**.

In the 'Do-Nothing' scenario, the proposed 68.8 MW of wind generation capacity and 150 MW of Battery Energy Storage (BESS) would be lost. This would hinder the achievement of renewable energy targets outlined in the Mayo County Development Plan (MCDP), which aims to increase the County's wind energy capacity to a minimum of 600 MW by the end of the plan period[4]. The nation's ability to produce sustainable energy and reduce greenhouse gas emissions to me 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 recently published EPA report 'Ireland's Greenhouse Gas Emissions Projects 2024-2055 (May 2025) highlighted that Ireland is not on track to meet the national target of 51% emissions reduction target by 2030 compared to 2018 under the Climate Action and Low Carbon Development 2015 (as amended), nor is it projected to meet its EU target of 42% emissions reductions compared to 2005 under the Effort Sharing Regulations.

The Proposed Development has the potential displace approximately 49,719 tonnes of CO_2 emissions per annum, or 1,740,156 tonnes over the proposed 35-year lifetime of the wind farm, see **Chapter 10: Air 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

[4] Mayo County Council (2022), Mayo County Development Plan 2022 – 2028, Volume I. Available at: https://www.mayo.ie/planning/county-development-plans/2022-2028 [Accessed 26/03/2026]

remain vulnerable. A "Do-Nothing" scenario would contribute to 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 Proposed Development will be lost. These benefits include between 45 to 63 No. jobs during the construction phase of the Project, and between 2 and 3 long-term jobs once operational. Furthermore, under the "Do-Nothing" scenario the local community will not benefit economically from the community benefit fund associated with the project which could be used to improve physical and social infrastructure within the vicinity of the Proposed Development.

The potential environmental effects of the 'Do-Nothing' Alternative when compared against the chosen option of developing a renewable energy project at this site are presented in **Table 3.1**. Refer to each respective chapter for full details of residual impacts.

Table 3.1: Environmental Effects of 'Do-Nothing' compared with a Wind Farm Development

Criteria	Residual Impact of the Proposed Development	Do-Nothing Alternative
Population & Human Health (incl. Shadow Flicker)	Positive effect on recreation and health gain due to the upgrade of roads. 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 via the community benefit fund. No upgrading of local tracks used for walking and cycling. No potential for shadow flicker or noise to affect sensitive receptors.
Biodiversity	As potential effects on European designated sites as a result of the Proposed Development would arise from	Without the proposed Wind Farm proceeding, it is expected that the present main land-uses within the area of the Wind Farm Site, namely

Criteria	Residual Impact of the Proposed Development	Do-Nothing Alternative
	contaminants carried within watercourses, it follows that there will be no likely significant effects on identified designated sites with hydrological connectivity with the Proposed Development site. While the Proposed Development will result in the loss of approximately 0.68 ha of relatively intact blanket bog, an adverse effect rated as of Significance in a Local context, the loss of bog will be off-set by the implementation of the Biodiversity Enhancement and Management Plan which will preserve and enhance an area of 3.9 ha of blanket bog for the lifetime of the Proposed Development. With mitigation measures implemented in full to minimise disturbance to high bog adjoining the work area at the wind turbine AT13 location, the significance of the disturbance effect can be reduced from a Moderate effect of medium-term duration to a Slight effect of medium-term duration. With mitigation measures as	agriculture and forestry, will continue. As the conifer plantations mature, they will be harvested and replanted. Further forestry may also be planted. The small area of blanket bog at the wind turbine AT13 location is likely to remain as it is, though it is possible that the bog could be planted with commercial forestry or subject to future turbary. The future use of the abandoned quarry at Lackan Hill will be at the discretion of the owners. However, in the absence of any future development, scrub is likely to spread, as well as grassland vegetation on gravel surfaces and spoil heaps. Overall, in the absence of the Proposed Development, the ecology of the Wind Farm Site would be expected to remain fairly similar as at present. to remain fairly similar as at present.

Criteria	Residual Impact of the Proposed Development	Do-Nothing Alternative
	presented implemented in full, it is considered that the significance of the predicted effect on terrestrial mammal species and amphibian and reptile species as a result of the Proposed Development will be Not Significant. Following extensive surveys within and surrounding the site for the Wind Farm, it is considered that the landscape in which the proposed Wind Farm is situated is of moderate risk for soprano pipistrelle, Leisler's bat and common pipistrelle. With the implementation of the mitigation outlined above the potential risk of fatality from collision and/or barotrauma events to foraging and/or commuting high risk species such as pipistrelle and Leisler's have been significantly reduced, and it is concluded that the Proposed Development will not have any long-term adverse effects on the local bat populations. Impacts on other bat species have also been assessed. While these species are not at high risk from collision they can be affected by loss of connectivity features and loss of	

Criteria	Residual Impact of the Proposed Development	Do-Nothing Alternative
	roosting sites. The Proposed Development will see hedgerows and woodland replanted within the vicinity of the site. The newly planted areas will be connected to existing habitats creating, which will be beneficial for local bat populations.	
Ornithology	With mitigation measures as presented in this report implemented in full, including the BEMP, it is considered that the significance of the predicted adverse effects on birds as a result of the Project will range from Imperceptible to, at most, Slight. In particular, the localised loss of peatland habitat at AT13 location will be offset by the BEMP and over time the effect on birds will be reduced to a level of Slight Significance. Similarly, the effect on birds by the loss of hedgerows and trees will be offset by a rigorous planting programme and over a medium-term period (up to 15 years) it is	Without the Proposed Development proceeding, it is expected that the existing main land uses within the site of the proposed Wind Farm, namely agriculture (pastoral) and commercial forestry, will continue. The value of the Wind Farm Site for birds would be expected to remain fairly similar as at present, though any increase in the extent of forestry in areas of bog could have adverse effects on species such as meadow pipit and snipe.

Criteria	Residual Impact of the Proposed Development	Do-Nothing Alternative
	considered that the effect will be reduced to the level of Not Significant. In the absence of mitigation, the construction phase of the Wind Farm may result in disturbance to breeding birds within a distance of up to 500 m of the work area – this is rated as an Adverse Significant Effect of Short-term duration for sparrowhawk, buzzard, kestrel and snipe. With mitigation in place, comprising the use of work restrictive zones around identified nests areas (as determined by survey at the time), the disturbance effect will be avoided completely or, at most, reduced to level of Not Significant. All construction works associated with the Proposed Development have potential to result in direct effects on breeding birds. However, as surface clearance works will be carried out largely outside of the breeding season (in compliance with the Wildlife	

Criteria	Residual Impact of the Proposed Development	Do-Nothing Alternative
	Acts), this impact will be avoided. Should removal of any vegetation be required during the breeding season, this would be subject to survey for presence of breeding birds by an experienced ornithologist and appropriate mitigation implemented to avoid or minimise adverse effects. During the operational phase of the Proposed Development, predicted collision rates for target species have been shown to range from Not Significant (hen harrier, buzzard, sparrowhawk & peregrine) to a Slight Adverse Effect (kestrel, lesser black-backed gull). For kestrel in particular, mitigation will be implemented to discourage birds from hunting close to turbines. During the operational phase of the Proposed Development, birds may show some avoidance of suitable habitat as a result of the presence of turbines. This is rated as a	

Criteria	Residual Impact of the Proposed Development	Do-Nothing Alternative
	Slight Adverse effect for hen harrier and buzzard. However, will time and a degree of habituation, this effect is likely to be reduced. The baseline surveys did not identify any regular migration routes or local movements of wetland bird species or birds of prey through the Wind Farm Site. The Proposed Development is not expected to have any residual effect on migrating species or local wetland bird populations. With appropriate mitigation in place to prevent effects on the quality of habitats within the Killala Bay/Moy Estuary SPA, significant residual adverse effects on the Special Conservation Interests, as well as Wetlands and Waterbirds, are not predicted (full details in accompanying AA Screening Report and NIS).	
Soils & Geology	Providing the mitigation measures outlined in this report are fully implemented and best practice is followed onsite, it is expected that	Should the Proposed Development not be constructed it is envisaged that the current land use would remain as it is now, with continued forestry and low

Criteria	Residual Impact of the Proposed Development	Do-Nothing Alternative
	effects associated with the development of the Wind Farm Site will not be significant. It is recommended that suitable monitoring programmes are implemented in order to ensure that there is rigid adherence both to the CEMP and to the mitigation measures outlined here during construction, operation and decommissioning of the Wind Farm.	intensity grazing for cattle and sheep.
Hydrology & Hydrogeology	No significant effects on the water environmental will occur during the construction, operation or decommissioning of the Proposed Development.	If the Proposed Development were not to proceed, the opportunity to generate renewable energy and electrical supply to the national grid would be lost, as would the opportunity to further contribute to meeting Government and EU targets for the production and consumption of electricity from renewable sources and the reduction of greenhouse gas emissions. Should the Proposed Development not proceed, the existing land-use practices of commercial forestry, agricultural and small-scale peat harvesting activities will continue at the Wind Farm Site.

Criteria	Residual Impact of the Proposed Development	Do-Nothing Alternative
		The forested areas of the Wind Farm Site would continue to function and may be extended to occupy a larger portion of the land. Coniferous forestry will be felled as forestry compartments reach maturity. Re-planting of these areas felled areas is likely. All forestry operations would conform with the best practice Forest Service regulations, policies and guidance documents. The existing surface water drainage regime in the forested and agricultural lands will continue to function and may be extended in some areas. In the 'Do Nothing Scenario', there may be a slight decrease in average annual rainfall at the Wind Farm Site as a result of climate change.
Air & Climate	The Proposed Development has been assessed as having the potential to result in a short-term imperceptible, negative effect on Climate and vulnerability during construction. There will be long-term significant, positive effect on climate as a result of	There will be no increase in air quality or a reduction of greenhouse gas emissions. By the Proposed Development not proceeding it will not assist in achieving the renewable energy targets set out in the Climate Action Plan 2025, the EU and National renewable energy and

Criteria	Residual Impact of the Proposed Development	Do-Nothing Alternative
	reduced GHG emission during the operational phase. Potential cumulative effects of the Proposed Development and other developments within 20 km on air and climate was assessed as having a long-term, significant, positive effect on the Climate.	greenhouse gas reduction targets. 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	No significant construction noise effects have been identified. Therefore, no specific mitigation measures are required. However, general guidance for controlling construction noise through the use of good practice given in BS 5228 will be followed. Construction and decommissioning of the Proposed Development shall be limited to working times given and any controls incorporated in any planning permission. During the decommissioning phase of the Proposed Development, noise levels are likely be no more than predicted in **Table 11.14, Chapter 11: Noise** however, it is envisaged that decommissioning will be of	Neutral

Criteria	Residual Impact of the Proposed Development	Do-Nothing Alternative
	shorter duration. Any legislation, guidance or best practice relevant at the time of decommissioning will be complied with. Construction and decommissioning is a temporary day time activity. The residual effects are the same as the construction and decommissioning effects identified in this assessment. The predicted noise levels exceed the night-time noise limit of 43 dB at six receptors, at various wind speeds – H3, H4, H6, H10. H11 and H13. Therefore, mitigation measures are required for exceedances at these receptors. These mitigation measures have been detailed in **Section 11.5.4**., **Chapter 11: Noise** In addition, all turbines will have STE fitted as standard to reduce noise emission levels.	
Landscape & Visual	Outside of those landscape and visual mitigation measures that formed part of the iterative design process of this Proposed Development over a number of years, and which	In this instance, the do-nothing effect would be that the receiving landscape stays in the same or similar condition as it currently is, managed for a combination of pastoral farmland and/ or forestry

Criteria	Residual Impact of the Proposed Development	Do-Nothing Alternative
	are embedded in the assessed project, other specific landscape and visual mitigation measures are not considered necessary / likely to be effective. Thus, the impacts assessed in **Section 12.4** are the equivalent of residual impacts in this instance. The decommissioning phase will see a similar nature of effects to the construction stage due to the movement of heavy machinery within the Wind Farm Site and to and from the Wind Farm Site removing turbine components. However, such effects will be temporary in duration and decreasing in scale as turbines are removed from view and the landscape is substantially reinstated to former uses. As with construction stage impacts, decommissioning stage effects are not considered to be significant. It is not considered that there will be any significant effects on landscape and visual amenity arising from the Proposed Development.	or left as semi-naturalistic moorland. Applications for Wind energy development would likely still occur throughout the study area due to the positive wind energy policy areas located throughout, whilst the construction of existing wind farm permissions would likely take place.

Criteria	Residual Impact of the Proposed Development	Do-Nothing Alternative
Material Assets	Positive effect by offsetting use of fossil fuel. Positive impact due to provision of electricity infrastructure.	No offset to fossil fuel use. No provision of additional electricity infrastructure in the local area.
Cultural Heritage	Following the successful implementation of the mitigation measures presented in **Chapter 14, Cultural Heritage, Section** Error! Reference source not found. at construction stage, the operational phase of the Proposed Development will result in no predicted direct effects on the known and potential Cultural Heritage resource. As such, no mitigation measures are required. As detailed in **Chapter 14, Cultural Heritage, Section** Error! Reference source not found., the Proposed Development will result in a range of long term, indirect negative effects on the wider setting of archaeological monuments and designated architectural heritage structures within the landscape surrounding the Wind Farm Site. These indirect operational stage effects range from moderate to significant in terms of significance of effect	In this instance, the do-nothing effect would be that the Carn House and Carn archaeological complex, Lacken Gazebo and at Rathfran Abbey stays in the same or similar condition as it. Applications for Wind energy development would likely still occur throughout the study area due to the positive wind energy policy areas located throughout, whilst the construction of existing wind farm permissions would likely take place.

Criteria	Residual Impact of the Proposed Development	Do-Nothing Alternative
	(**Chapter 14, Cultural Heritage,** Error! Reference source not found.). Given the structural nature of the Turbine installations, there are no mitigation measures that can effectively address the indirect effects on heritage landscape setting. It is noted that these effects will be reversible at the decommissioning phase.	
Traffic and Transportation	Moderate localised short-term effect due to construction and decommissioning activities.	Neutral

3.5 STRATEGIC SITE SELECTION

3.5.1 Strategic Site Screening

The cost of building each megawatt of electricity-generating capacity in a wind farm is in the region of €1.5 million to €2.0 million. It is therefore critical that the most suitable the Wind Farm Site for the Proposed Development was chosen. The site selection process for the Proposed Development has been fully informed by national, regional and local policy at a macro level (see **Chapter 4: Planning**), as well as site-specific factors that influence the turbine layout and project design on the Wind Farm Site at a micro level (see **Section 3.6** below).

The Developer, Constant Energy Limited, carried out an initial mapping exercise to identify candidate sites for wind energy development. The purpose of the site identification exercise was to identify an area that would be capable of accommodating wind farm development while minimising the potential for adverse effects 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 Proposed Development was required.

The Applicant considered suitable sites in numerous areas within County Mayo based on designations in the County Development Plan. Various other sites are being considered within the county and being taken forward for planning.

The area near the Wind Farm Site in the barony of Tirawley of north Mayo was considered suitable for a wind farm due to its wind resource, proximity to grid connection option accessibility.

The Wind Farm Site was further considered suitable for a wind farm due to its location partially within areas designated by Mayo County Council for renewable wind energy developments. Other areas of the subject Wind Farm Site are undesignated but nonetheless are located adjoining or in close proximity to these designated areas, and share the same physical, ecological and environmental characteristics as the designated areas.

The initial constraints assessment considerably reduced the area available Proposed Development. The area to the west of the Wind Farm Site, south of Ballycastle was considered as a location for a large portion of the turbines as it was within land designated as Tier 1 Preferred (Large Windfarms) by the Mayo County Council Renewable Energy Strategy 2011 – 2020. However, on further assessment, this area was not considered suitable due to the presence of Annex 1 bog, areas of deep peat, proximity to archaeological features and the high probability of finding artefacts of cultural significance, visual impact and the potential for peat slippage to occur.

The wind energy designations map of the Mayo County Development plan, Volume 4: Renewable Energy Strategy (RES) 2011 - 2020[6] was used as the basis for the screening. The RES for County Mayo sets out guidance designed to allow County Mayo to both contribute to meeting national legally binding targets while also capitalising on those opportunities associated with the generation and harnessing of renewable energy in a sustainable manner. The RES was not revised as part of the Mayo County Development Plan 2022 – 2028, however, Objective REO 7 clearly indicates that the review of the RES will commence within one year of adoption of the County Development Plan.

6 https://www.mayo.ie/getmedia/f9cf9cb0-7134-476b-b00f-a535c81e999f/Vol-4-Mayo-Renewable-Energy-Strategy.pdf

Lands classified under the RES's tiered strategic wind energy strategy are considered *'the most appropriate for renewable energy developments'.* The definitions of the on-shore wind energy classifications, as per the Mayo Renewable Energy Strategy 2011 – 2022 are outlined below –

- **Priorities Areas** are areas which have secured planning permission and where on-shore wind farms can be developed immediately.
- **Tier 1 – Preferred (Large Wind Farms)** are areas in which the potential for large wind farms is the greatest.
- **Tier 1 – Preferred (Cluster of Turbines)** are areas identified as being most suitable for smaller clusters of wind turbines (clusters of up to three to five turbines depending on site conditions and visual amenities.
- **Tier 2 – Open for Consideration identifies** areas which may be considered for wind farms or small clusters of wind turbines but where the visual impact on sensitive or vulnerable landscapes, listed highly scenic routes, scenic routes, scenic viewing points and scenic routes will be the principal considerations. The Tier 2 classification will be reviewed by the Council following a determination by EirGrid of grid infrastructure for the County.

Having considered the constraints stated in this chapter, the Developer searched for areas within or adjacent to lands designated for wind farm development and which would not affect environmentally sensitive areas. Land use associated with agricultural grasslands and commercial forestry were preferred. The Wind Farm Site was initially examined using a Geographic Information System (GIS) exercise applying a 500 m setback from individual properties derived from the Draft Revised Wind Energy Development Guidelines (Department of Housing, Local Government and Heritage, 2019) (4 times blade tip height setback (4x 125 m)) and the 2006 Wind Energy Development Guidelines (500 m setback distance). This setback distance from individual properties was reassessed to allow for a siting of a slightly larger turbine the Vestas V117 with a 135 m blade tip height. The setback distance of 540 m from individual properties derived from the Draft Revised Wind Energy Development Guidelines (Department of Housing, Local Government and Heritage, 2019) (4 times blade tip height setback (4 x 135 m)). This setback criteria was applied both to existing residences and to sites with planning permission granted by Mayo County Council but not yet constructed. The exercise was then extended using a wide array of key spatial datasets such as ordnance survey land data, house location data, transport, forestry data, existing wind energy and grid infrastructure data and environmental data such as ecological designations and landscape

designations. Having considered all the constraints identified within the study exercise, the final site selection was determined by those sites with a significant landholding capable of accommodating a feasible wind farm development while minimising the potential for adverse effects to the surrounding environment.

Study Areas not selected for further study were largely excluded because of some or all of the following:

- County Development Plan Zone
- Wind Resource
- Designated European Sites
- Tourism
- Ornithology
- Planning Precedent
- Terrain / Land Use
- Housing Density
- Archaeology

The initial screening exercise as outlined above identified only one potential viable area in the Tirawley barony. This site was deemed suitable due to the proximity to a substation from which any proposed wind farm could connect to the national grid i.e. the existing Tawnaghmore 110 kV substation approximately 7.2 km (as the crow flies) southeast of the Proposed Development Site. The overall length of the grid connection between the substation and existing Tawnaghmore 110 kV substation is approximately 13.55 km).

The Wind Farm Site is not located in, or close to any European designations such as Special Protection Areas (SPA) or Special Area of Conservation (SAC) or significant hydrological or geotechnical considerations. The Developer also plans to develop various other sites within the county of Mayo as separate planning applications to Mayo County Council and/or An Bord Pleanála. These other wind farm sites include 5 no. potential wind farms located between c. 11.7 km and c. 43 km southwest of the Proposed Development. No other viable sites were found during the assessment and all five sites are being developed by the Developer.

Residential and commercial building locations were attained from Eircode's database of address points in Ireland. As potential Study Area assessments progressed this dwelling

setback distance was further refined to comply with the Proposed Development and area specific details.

During the EIA process outlined in **Section 3.6** the location of the turbines was influenced by inputs from the hydrologist, ecologist, geologist, archaeologist, landscape and visual specialist. These included proximity to heritage sites (cairns & passage tombs), visual impacts to the surrounding area (Downpatrick Head), the proximity to dwellings, impacts on local ecology (Annex 1 bogs) and areas prone to peat slippage.

The Tirawley Wind Farm Study Area is located approximately 5.2 km northwest of Killala Village. The final Wind Farm Site layout comprises of a mix of areas classed as Tier 1, Tier 2 and non-designated area. Of the 16 no. turbines, 3 no. turbines are in a 'Tier 1 Preferred Large Windfarms' area, 8 no. turbines are within an area 'Open for Consideration' and 5 no. turbines are on a non-designated area. However, these 5 no. turbines are within 820 m of a designated area, as shown on **Figure 4.1**.

The Mayo Renewable Energy Strategy (RES) allows for renewable developments on unclassified lands, stating they will be assessed on their individual merits under the principles of proper planning and sustainable development. Siting these specific turbines outside the designated tiers was a deliberate outcome of a constraints-led process that prioritised the avoidance of deeper peat, active Annex 1 bogs, and complex archaeological buffers found within parts of the nearby Tier 1 areas. This site-specific approach aligns with the successful precedent set by the nearby Killala Community Wind Farm, which effectively integrated renewable infrastructure into the local environment through similar localised assessments and proven delivery routes.

Furthermore, the Project supports National Policy Objective 70 of the National Planning Framework by promoting renewable energy at appropriate locations to meet a climate-neutral economy by 2050. With an anticipated output of 68.8 MW, the development qualifies as a Strategic Infrastructure Development (SID) that directly addresses the 4.2 GW national shortfall in wind capacity required to meet 2030 targets. This site-specific approach is further justified by the amended EU Renewable Energy Directive (RED III), which collectively obliges Member States to reach at least a 42.5% share of renewable energy by 2030. Critically, RED III places the presumption of overriding public interest for renewable energy plants, grid connections, and storage assets.

This Environmental Impact Assessment (EIA) confirms the study area can accommodate the development without significant adverse effects on local amenities, ensuring full compliance with national, regional, and local planning policies. Further justification for selecting this area outside the preferred tiers is detailed in **Chapter 4, Section 4.7**.

3.5.2 Preliminary Constraints Mapping and Landscape Study

Constraints mapping was carried out at the preliminary stage of the Proposed Development (Q2-Q3 2022) for the selected Wind Farm Site. The constraints mapping process involved the placing of buffers around different types of constraints, clearly identifying the areas within which no development works could take place. A description of the constraints and buffers applied are outlined in **Section 3.6.1**. This has resulted in a 16 turbine layout on the Wind Farm Site.

3.5.3 Suitability of the Candidate Site

It is critical for the Developer and their project team to ensure that the most suitable site for development of a proposed wind farm is identified and progressed through planning due to the financial commitments involved i.e., the cost of building each megawatt (MW) of electricity-generating capacity in a wind farm is in the region of €1.5 million to €2.0 million.

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

- Policy Alignment: Site location relative to the Mayo County Renewable Energy Strategy's classification of areas preferred, open to consideration or lands adjacent for wind farm developments from a planning perspective. The final 16 turbine layout includes 3 turbines in 'Tier 1 Preferred' areas and 8 within areas 'Open for Consideration,' while the 5 turbines on unclassified lands share the same physical, ecological, and environmental characteristics as the designated portions.
- Grid Connectivity and Synergy: Located in an area within a viable distance to the national electricity grid via the Tawnaghmore 110 kV Substation.
- Technical Constraints: Application of a strict 540 m setback from residential dwellings (four times the 135 m blade tip height), ensuring compliance with the Draft Revised Wind Energy Development Guidelines (2019)

- Environmental and Geotechnical Protection: Located outside areas designated for protection of ecological species and habitats including European Designated Sites. The selection process prioritised the avoidance of sensitive Annex 1 bogs, deep peat, and ground slopes greater than 10–14% to mitigate risks of peat instability.
- Resource and Social Compatibility: Selection of a site with consistently high average annual wind speeds and a low population density of 16.72 persons per km², which is significantly lower than the rural average of 30 persons per km².
- Sustainable Infrastructure Reuse: Maximizing the use of existing forestry and farm access tracks to minimise additional land take and habitat destruction.

3.5.3.1 Mayo County Development Plan (CDP) 2022 – 2028

The CDP 2014 – 2020 has been replaced by the CDP 2022 – 2028, Volume 4 of the CDP remains unchanged and includes the Renewable Energy Strategy. The CDP 2022 – 2028 has been in effect as of the 10th of August 2022.

County Development Strategic Aims

The CDP has the following aims:

"*To create a sustainable and competitive county that supports that health and well-being of the people of Mayo, providing an attractive destination, as a place in which to live, work, invest, do business and visit, offering high quality employment and educational opportunities within strong and vibrant sustainable communities, whilst ensuring a transition to a low carbon and climate resilient county that supports high environmental quality".*

It is a strategic aim of Mayo County Council in regards infrastructure developments *"to facilitate the provisions of high-quality information and electricity network required to support and enhance the key aims of best place live, work, visit and invest"*.

It is a strategic aim of Mayo County Council in regards climate action and renewable energy *"to transition to a low carbon and climate resilient county, with an emphasis on reduction in energy demand and greenhouse gas emissions, through a combination of effective mitigation and adaption responses to climate change; in addition to maximise the opportunities to become a national leader in renewable energy generation, whilst increasing the resilience of our Natural and Cultural Capital to climate change by planning and implementing appropriate adaption measures"*

Strategic County Development Plan Objectives

S0 4 Strategic County Development Objective: Low Carbon and Climate Resilient County – "*It is an objective of the Development Plan: To transition to a low carbon and climate county by:*

A. Promoting sustainable patterns, the integration of land-use and sustainable development modes of transport, encourage walking, cycling and public transport, increasing reliance on green energy sources, encouraging urban and rural communities to facilitate effective change.

B. Building climate change resilience and climate action into all services and functions of Mayo County Council.

S0 9 Strategic County Development Objective: Ecological Impact Assessment, Strategic Environmental Assessment and Strategic Flood Risk Assessment

A. To ensure the assessment of planning applications in the plan area have regard to the information, data and requirements of the Appropriate Assessment Natura Impact Report, SEA Environmental Report and Strategic Flood Risk Assessment Report contained in Volume 5 of the Mayo CDP 2022-2028.

B. To require project planning to be fully informed by ecological and environmental constraints at the earliest stage of project development and any necessary assessment to be undertaken, including Ecological Impact Assessments (EcIA) and assessments of disturbance to species protected under the Wildlife Act and/or the Flora Protection Act and of Habitat IV species protected under the Habitats Directive.

C. Ensure that proposals for developments located within identified or potential flood risk areas, or which may exacerbate the risk of flooding elsewhere, are assessed in accordance with the provisions of the Flood Risk Management Guidelines (DoEHLG/OPW 2009) and Circular PL2/2014 (or any updated/superseding document), the relevant policies, objectives and guidelines within this plan and shall also take account of the National CFRAM Programme Flood Hazard Mapping and Flood Risk Management Plans when they become available.

S0 10 Strategic County Development Objective: Implementation of National and Regional Objectives: *"Its an objection of the Development Plan":*

A. To contribute and progress, as practicable, towards achievement of the National Strategic Objectives of Project 2040, the Regional Growth Ambitions of the Northern and Western Regional Assembly's RSES, and the Sustainable Development Goals of the 2030 Agenda for Sustainable Development.

EDO 54 Rural Economic Objectives: *"It is an objective of the Development Plan":*

A. To facilitate rural enterprises, and resource development (such as agriculture, agri-food sector, agri-tourism, commercial fishing, aquaculture, rural tourism, forestry, bio-energy, the extractive industry, recreation, cultural heritage, marine enterprise sector, research and analysis) and renewable energy resources (such as wind/solar/ocean energy) that are dependent on their locality in rural locations, where it can be demonstrated that the development will not have significant adverse effects on the environment, including the integrity of the Natura 2000 network, residential amenity or visual amenity.

B. Where proposals demonstrate measures to promote environmental enhancement through improved ecological connectivity, such as measures in the Pollinator Plan, additional native species planting or blue and green infrastructure measures, these will be favourably considered.

Green Economy Objectives

EDO 66 Green Economy Objectives: *"It is an objective of the Development Plan":*

A. To support and facilitate the Green Economy in County Mayo

EDO 67 Green Economy Objectives: *"It is an objective of the Development Plan":*

A. To facilitate the development of industries that create and employ green technologies and take measures to accelerate the transition towards low carbon and circular economies.

EDO 69 Green Economy Objectives: *"It is an objective of the Development Plan":*

A. To support and facilitate renewable energy initiatives that facilitate a low carbon transition.

Electricity Policies

INP 21 Electricity Policies: *"It is a policy of the Development Plan":*

A. To support the provisions of high-quality, electricity infrastructure and development of an enhanced electricity supply, to serve the existing future needs of the county.

B. To facilitate new transmission infrastructure projects, including the delivery of renewable energy proposals to the electricity transmission grid in a sustainable and timely manner, whilst seeking to minimise any adverse impacts on local communities and protect and maintain biodiversity, wildlife habitats, scenic amenities, including protected views and nature conservation.

INP 22 Electricity Policies: *"It's a policy of the Development Plan":*

A. To co-operate and liaise with statutory and other energy providers in relation to power generation, in order to ensure adequate power capacity for the existing and future business and enterprise needs of the county.

Electricity Objectives

INO 37 Electricity Objectives: *"Its an objective of the Development Plan":*

A. To facilitate the progression of an implement improvements to the existing electricity networks and facilitate the development of new transmission infrastructure projects in accordance with EirGrid's Implementation Plan Strategy 2020 – 2025 (or any superseding strategy) that might be brought forward during the lifetime of this plan.

INO 38 Electricity Objectives: *"Its an objective of the Development Plan":*

A. To ensure the provisions, where feasible, of electricity cables located underground.

INO 39 Electricity Objectives: *"Its an objective of the Development Plan":*

A. To seek the delivery of the necessary integration of transmission network requirements to facilitate linkages of renewable energy proposals to the electricity transmission grid, in a suitable and timely manner.

Climate Action Policies

CAP 1 Climate Action Policies: "Its a policy of the Development Plan":

A. To support and enable the implementation and achievement of European and national objectives for climate adaption and mitigation as detailed in the following documents, taking into account other provisions of the Plan (including those relating to land use planning, energy, sustainable mobility, flood risk management and drainage.

B. Climate Action Plan (2019 and any subsequent versions);

- *National Climate Change Adaption Framework (2018 and any subsequent versions).*
- *Relevant provisions of any Sectoral Adaption Plans prepared to comly with requirements of the Climate Action and Low Carbon Development ACT 2015, including those seeking to contribute towards the National Transition Objective, to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally economy by the end of year 2050; and Mayo Council Climate Change Adaption Strategy (2019-2021 and any subsequent versions).*

CAP 2 Climate Action Policies: *"Its a policy of the Development Plan":*

A. To support the National Climate Change Strategy and methods of reducing anthropogenic greenhouse gases on an ongoing basis through implementation of supporting objectives in this Plan, particularly those supporting use of alternative and renewable energy sources, sustainable transport, air quality, coastal management,

flooding and soil erosion and promotion of the retention of, and planting of trees, hedgerows and afforestation, subject to no significant adverse effects on the environment including the integrity of the Natura 2000 network.

CAP 4 Climate Action Policies: *"Its a policy of the Development Plan":*

A. To support local regional, national and international initiatives for climate adaption and mitigation and to limit emissions of greenhouse gases through energy efficiency and the development of renewable energy source, which make use of all natural resources, including publicly owned lands, in an environmentally acceptable manner.

CAP 6 Climate Action Policies: *"It's a policy of the Development Plan":*

A. To support the transition to a competitive low carbon, climate-resilient and environmentally sustainable economy by 2050, by way of reducing greenhouse gases, increasing renewable energy, and improving energy efficiency and supporting natura-based solutions to climate adaption and mitigation that provides co benefits.

Climate Action Objectives

CAO 1 Climate Action Objectives: *"Its an objective of the Development Plan":*

A. To support and advance the provisions of renewable energy resources and programmes in line with the Government's National Renewable Energy Action Plan (NREAP), the Governments' Energy White Paper "Irelands Transition to a Low Carbon Energy Future" (2015-2030) and any other relevant policy adopted during the lifetime of this plan.

Renewable Energy Policies

REP 1 Renewable Energy Policies: *"It's a policy of the Development Plan":*

A. To support Ireland's renewable energy commitments outlined in national policy by facilitating the development and exploitation of a range of renewable energy sources at suitable locations within the county, where such development does not have a negative impact on the surrounding environment (including water quality), landscape, biodiversity or local amenities to ensure the long-term sustainable growth of the county.

REP 3 Renewable Energy Policies: *"It's a policy of the Development Plan":*

A. To actively encourage and support the sustainable development, renewal and maintenance of energy generation infrastructure in order to maintain a secure energy supply, while protecting the landscape, archaeological and built heritage and having regard to the provisions of the Habitats Directive.

REP 4 Renewable Energy Policies: *"It's a policy of the Development":*

A. To ensure that developers of proposed large-scale renewable energy projects carry out community consultation in accordance with best practice and commence the consultation at the initiation of project planning.

REP 7 Renewable Energy Policies: *"It's a policy of the Development":*

A. To promote the harnessing of wind energy to contribute toward decarbonising County Mayo, including new emerging by-product markets.

Renewable Energy Policies

REO 3 Renewable Energy Policies: *"It is an objective of the Development Plan":*

A. To encourage and facilitate, where possible, the production of energy from established and emerging renewable technologies.

REO 6 Renewable Energy Policies: *"It is an objective of the Development Plan":*

A. To ensure all renewable energy proposal comply with the provisions of the Mayo County Council Renewable Energy Strategy 2011-2022 (or as updated).

REO 8 Renewable Energy Policies: *"It is an objective of the Development Plan":*

A. To encourage the development of wind energy, in accordance with Government policy, and having regard to the Landscape Appraisal of County Mayo and the Wind Energy Development Guidelines (2006) and Mayo Renewable Energy Strategy, or any revisions there of or future guidelines, and ensure consistency with the provisions of RPO 4.16 and RPO 5.2(b) of the RSES (2020-2032).

REO 17 Renewable Energy Policies: *"It is an objective of the Development Plan":*

A. To promote on-site wind/solar energy developments or other emerging energy technologies, where energy generated is primarily required to meet the needs of households, communities, agriculture and other business to reduce their carbon emissions.

REO 23 Renewable Energy Policies: *"It is an objective of the Development Plan":*

A. To support and facilitate the achievement of the minimum renewable energy target of 600 MW for County Mayo over the plan, and to review/revise this target to ensure consistency with any future renewable energy strategies for the Northern and Western Region.

3.5.3.2 Designated Sites

It is preferable that wind energy development is not located in an area designated as a Natura 2000 site. The Proposed Development is not located within any area designated for ecological protection. The nearest Natura 2000 site, i.e., Special Area of Conservation (SAC) or Special Protection Area (SPA) to the Proposed Development is the Lacken

Saltmarsh and Kilcummen Head SAC and Killala Bay / Moy Estuary SPA which are located approximately 1.2 km to east of the Wind Farm Site.

The nearest nationally designated site, i.e. Natural Heritage Area (NHA) to the Wind Farm Site is the Ummerantarry Bog NHA, which is located approximately 8.5 km west-southwest of the the Wind Farm Site. Please note that there is no ecological or hydrological connectivity between the Ummerantarry NHA and the Proposed Development. The nearest proposed Natural Heritage Area (pNHA) to the Wind Farm Site is Lacken Saltmarsh and Kilcummin Head pNHA which is located 1.2 km to the east of the Wind Farm Site.

3.5.3.3 Wind Speeds

Wind speed was assessed at the Wind Farm Site in order to determine if wind energy development would be feasible. Wind speed analysis through the Irish Wind Atlas produced by Sustainable Energy Authority of Ireland (SEAI) was used to determine average wind speeds for the country. The Wind Atlas shows that wind speeds on the Wind Farm Site are consistent with a wind farm development. Wind speeds from the north to the south of the Wind Farm Site range between 8.2 m/sec to 7.2 m/sec at 75 m, 8.6 m/sec to 7.7 m/sec at 100 m and 9.3 m/sec to 8.6 m/sec at 150 m/s.

3.5.3.4 Population Density

Areas with low housing density are preferable for wind energy development so as to minimise potential disturbance to residential amenity. Having reviewed the settlement patterns in the vicinity of the Wind Farm Site, the study area has emerged as suitable to accommodate the proposal. The population density of Study Area 1 (District Electoral Divisions) Ballycastle, Killala, Lackan North and Lackan South (160.09 km^2), as described in the **Chapter 5: Population and Human Health**) is 16.72 persons per square kilometre[7]. This is significantly lower than the average rural population density of 30 persons per square kilometre in rural areas[8]. The low population density of the Wind Farm Site provides greater capacity for wind energy development, allowing for a greater number of turbines to be constructed while maintaining appropriate setback distances from dwellings as set out in the Wind Energy Development Guidelines.

7 https://www.cso.ie/en/census/census2016reports/census2016smallareapopulationstatistics/ [Accessed, 17/09/2025]
8 https://www.google.com/search?q=https://www.cso.ie/en/releasesandpublications/ep/p-cp2tc/censusofpopulation2022-profile2-populationdistributionandmovements/ [Accessed: 17/09/2025]

3.5.3.5 Summary

From the review of the criteria set out above, the Wind Farm Site was identified as a suitable candidate site for the provision of a wind farm of the scale proposed (16 turbine layout). The Wind Farm Site is largely located predominantly within agricultural land and existing commercial forestry with one turbine sited in blanket bog which allows the Wind Farm Site to take advantage of existing Site Access Tracks (which will be upgraded in specific locations). This combined with the proximity to the existing Tawnaghmore 110 kV substation further highlights the suitability of the Wind Farm Site as it can make further sustainable use of these established items of infrastructure.

The Wind Farm Site comprises of a mix of areas classed as Tier 1, Tier 2 and a non-designated area. Of the 16 no. turbines, 3 no. turbines are in a 'Tier 1 Preferred Large Windfarms' area, 8 no. turbines are within an area 'Open for Consideration' and 5 no. turbines are on a non-designated area. However, these 5 no. turbines are within 820 m of a designated area, as shown on **Figure 4.1**. The areas of the proposed site that are located outside the designated areas are 'unclassified' and share the same characteristics as the portion within the classified lands i.e. agricultural lands (grazing) and planted conifer forestry. It's important to emphasise that the RES does not specifically restrict applications for wind turbines within the unclassified areas, but rather, they are assessed on their merits 'on the principles of proper planning and sustainable development'. The Wind Farm Site does not overlap with any designated sites and is located in an area with a relatively low population density with appropriate annual wind speeds.

Section 3.5.3 provides the main reasons for selecting the chosen subject site and has demonstrated that the site can adequately accommodate the Proposed Development without significant adverse effects to environmental amenities and sensitivities, and therefore, is fully in accordance with National, Regional and Local planning policy.

The purpose of the site identification exercise was to identify an area 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 that would yield a sufficient viable area for the sitting of each element of the Proposed Development was required.

3.6 ALTERNATIVE LAYOUT AND DESIGN

The design of the Proposed Development has been informed by the designers, Developers, engineers, landowners, environmental, hydrological and geotechnical, archaeological specialists, telecommunication specialists, and traffic consultants. The aim is to reduce potential for environmental effects while designing a project capable of being constructed and viable and maximising wind resource. Throughout the preparation of the EIAR, the layout of the Proposed Development has been revised and refined to take account of the findings of all site investigations, which have brought the design from its first initial layout to the current proposed layout. The design process has also taken account of the recommendations and comments of the relevant statutory and non-statutory organisations, the local community and local authorities and as detailed in **Section 1.11** of **Chapter 1: Introduction** and in **Appendix 1.3** of this EIAR.

3.6.1 Constraints Led Approach

The design and layout of the Proposed Development follows the recommendations and industry guidelines set out in the 'Wind Energy Development Guidelines' (Department of the Environment, Heritage and Local Government, 2006), 'Best Practice Guidelines for the Irish Wind Energy Industry' (Irish Wind Energy Association, 2012) and the Draft Revised Wind Energy Development Guidelines, December 2019. The layout and design were an iterative process which followed the constraints-led design approach.

The constraints-led design approach consists of the identification of environmental sensitivities within the Wind Farm 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'.

Constraints mapping was carried out at the preliminary stage of the project (Q1-Q2 2024) for the selected Site. The constraints mapping process involved the placing of buffers around different types of constraints to identify the areas within which no development works could take place. The constraints map for the Wind Farm Site, as shown in **Figure 3.1** encompasses the following constraints and associated buffers:

- Wind Turbine's: 4 x Blade Tip Height (4 x 135 m = 540 m) buffer of residential dwellings curtilage
- Operator specific buffer of Telecommunication Links
- 50 m buffer of Watercourses
- 10 m buffer of manmade drains

- 50 m – 100 m buffer of Archaeological Sites or Monuments

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

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

- Available lands for development
- Distance from designated sites
- Good wind resource
- Existing access points and generated accessibility of all areas of the Site due to the existing road infrastructure
- Avoidance of environmental constraints identified from desk studies

The inclusion of the constraints on a map of the Study area allowed for a viable developable area to be identified. An initial turbine layout was then developed to take account of all the constraints mentioned above and their associated buffer zones and the separation distance required between the turbines.

Following the mapping of all known constraints, detailed site investigations were carried out by the project team. The ecological assessments of the Wind Farm Site encompassed habitat mapping and extensive surveying of birds and other fauna. These assessments, as described in **Chapter 6: Biodiversity** and **Chapter 7: Ornithology**, optimised the decision on the siting of turbines as explained in **Section 3.6.2**.

Similarly, the hydrological and geotechnical investigations of the Wind Farm Site informed the proposed locations for turbines, Site Access Tracks and other components of the Proposed Development, such as the substation and the construction compound. This included peat depth and peat stability analysis (**Chapter 8: Soils and Geology**) and the identification of watercourses, groundwater constraints, flood risk and wells (**Chapter 9: Hydrology and Hydrogeology**). Where specific areas were deemed as being unsuitable (e.g., unstable peat giving high risk for slippage) for the siting of turbines or Site Access Tracks, etc., alternative locations were proposed and assessed, taking into account the areas that were already ruled out of consideration.

Telecommunication operators were contacted as part of the constraints mapping process to determine whether or not any telecommunication links traversed the Wind Farm Site.

Where links were identified, the siting of turbines was adjusted to avoid interference with the links and to comply with the telecommunication operators required set back distances.

3.6.2 Alternative Turbine Numbers, Layout and Specifications

The wind farm design was an iterative process, with findings from each stage of the EIAR used to refine the layout and minimise environmental effects. The final proposed layout resulted from feedback from various studies, assessments, and discussions with landowners.

The selection of the turbine number and layout was refined to noise and shadow flicker by maintaining a 540 m buffer from residential buildings. This process reduced the turbine count from an initial 42 turbine concept to the final 16-turbine layout. The design iterations are summarised in **Table 3.2**.

Table 3.2: Summary of Wind Farm Layout Iterations

Layout Iteration	No. of Turbines	Turbine Specifications (Example)	Total Potential Output (MW)
Layout 1	42	(Not specified)	(Not specified)
Layout 2	31	28 x 3.45 MW (125 m blade tip) & 3x 6.0 MW (180 m blade tip height)	114.6 MW
Layout 3	25	21 x 3.45 MW (125 m blade tip height) & 4 x 6.0 MW (180 m tip blade tip height)	96.45 MW
Layout 4	21	21x 3.45 MW (125 m blade tip height)	72.45 MW
Layout 5	18	18 x c. 4.3 MW (135 m tip)	77.40 MW
Final Layout	16	16 x c. 4.3 MW (135 m tip)	68.8 MW

Note on Turbine Numbering

The text refers to turbines by their final numbering (e.g., AT01), as shown on **Figure 3.1**. Where earlier layout figures are referenced, the turbine labels shown on those drawings are provided in parentheses for clarity (e.g., "AT06 (labelled as AT15 in **Figure 3.4**)").

Layout 1

The initial constraints study identified three viable areas (Sites A, B, and C) suitable for approximately 42 turbines. The initial turbine layout and constraints (Layout 1), shown in **Figure 3.2** occupied separate viable areas within the wider Study Area. The initial turbine layout without constraints is shown in **Figure 3.3**. Further investigations were carried out on the determined viable areas of the Proposed Development. Further investigation of

Site C identified constraints including peat slippage potential, archaeology, visual effects, and proximity to the regional road the R314. Consequently, Site C was excluded, and the layout was refined to Sites A and B.

Layout 2

The second layout identified a reduced area in Sites A and B suitable for 31 turbines (**Figures 3.4** and **3.5**), with a total potential output of 114.6 MW. A mixed-technology approach was proposed:

- **Site A** proposed 28 turbines with a power output of up to 3.45 MW and a maximum tip height of 125 m (e.g., Vestas V105-3.45 MW). This turbine height was selected due to more restrictive housing buffers and to reduce visual effect. The 125 m tip height is consistent with the existing Killala Community Wind Farm visible to the south. The output for this site was projected at 96.60 MW.
- **Site B** proposed three larger turbines with a power output of up to 6 MW and a 180 m tip height (e.g., Vestas V150-6.0 MW). The larger turbines would allow for greater power output (up to 18 MW) within a smaller physical footprint compared to the approximately six smaller turbines required for a similar output. It was noted that turbines at this location had the potential to cause a visual impact on scenic routes to the north.

This 31 turbine layout was further refined. Several turbine locations were removed from the layout, while others were microsited to new positions to avoid constraints:

Micrositing: Four turbines were microsited to new positions for technical reasons, with no change to the turbine count.

- One Turbine (labelled as AT12 in **Figure 3.4**) and AT13 (labelled as AT01 in **Figure 3.4**) were repositioned to avoid interference with telecommunication links.
- The position of one turbine (labelled as AT24 in **Figure 3.4**) was altered to reduce the required length of access tracks.
- One turbine (labelled as AT22 in **Figure 3.4**) was repositioned to provide an appropriate buffer from an identified archaeological feature.

Deletions: Eight turbines were removed from the layout entirely.

- One turbine (labelled as AT17 in **Figure 3.4**) was removed due to its proximity to overhead power lines.
- Seven turbines were removed due to failure to reach an agreement with associated landowners (six in Site A and one in Site B).

Layout 3

The third layout consisted of 25 turbines across Sites A and B (**Figures 3.6** and **3.7**), with a total potential output of 96.45 MW. This layout comprised 21 turbines with a 125 m tip height (e.g., Vestas V105, c. 3.45 MW) and four larger turbines in Site B with a 180 m tip height (e.g., Vestas V150, c. 6.0 MW). A fourth 6 MW turbine was added to Site B in this iteration. The projected output was c. 72.45 MW from the 21 smaller turbines and 24 MW from the four larger turbines, totalling a maximum 96.45 MW. The use of four larger turbines in Site B was justified as it provided the same potential power output as approximately seven smaller turbines. A larger number of smaller turbines would have resulted in the wind farm occupying a greater footprint, requiring more supporting infrastructure (e.g., hardstands, access tracks) and thereby increasing the potential for environmental impacts.

This layout was further refined following feedback from the project team, the applicant, and Mayo County Council. A decision was made to remove Site B from the Project for the following reasons:

- **Visual Effect**: Concerns were raised regarding the visual effect of the larger 180 m turbines, specifically sited on Knockboha Hill, on protected scenic views including the Wild Atlantic Way and the Céide Fields. It was determined that a reduction in turbine height at this location would not be sufficient to mitigate the visual impacts.
- **Ground Conditions:** The removal of Site B was further justified by concerns regarding peat depths, the presence of intact blanket bog, and the potential for the generation of a large volume of spoil material from construction.

Following the removal of Site B, the proposed on-site borrow pit was also excluded from the project. Its location was re-designated for the purpose of spoil deposition only, with stone for construction to be imported from local quarries.

Layout 4

Following the removal of Site B, the fourth layout (**Figure 3.8** and **Figure 3.9**) consisted of 21 turbines located entirely within the remaining viable area of the Wind Farm Site. The layout was based on a single turbine model with a 125 m tip height and a power output of

c. 3.45 MW. This design stage involved detailed micrositing of the individual turbine locations.

Each position was refined based on the assessment of local ground conditions, including ecological, geotechnical, archaeological, and hydrological constraints, to finalise the turbine arrangement. Through this iterative process, the proposed layout had systematically designed-out major constraints identified in earlier stages. The resulting 21 turbine layout represented the most refined design possible based on environmental, planning, and landowner constraints.

Layout 5

The fifth iteration of the design was driven by a manufacturing change. The candidate turbine with a 125 m blade tip height was discontinued and was no longer available on the market. The next available candidate turbine had a maximum tip height of 135 m. This 10 m increase in height required the setback distance from residential properties to be increased from 500 m to 540 m. This change reduced the remaining viable area.

The fifth layout (**Figure 3.10**) consists of 18 turbines with a maximum potential output of 77.40 MW. The composition is as follows:

- **18 turbines** will have a maximum tip height of 135 m and a potential power output of up to c. 4.3 MW each.

The transition from the 21 turbine Layout 4 to this 18 turbine layout involved the following specific changes:

- **Deletions:** Three turbine locations from the Layout 4 plan were removed due to their proximity to individual dwellings under the new 540 m setback distance.
- **Relocations:** One turbine location was relocated c. 688 m southeast due to a failure to acquire the originally intended lands. Further minor micrositing of other turbine locations was also carried out.

Final Layout

The final iteration of the design was driven by landowner agreements. Two further turbines (labelled as AT07 and AT08 in **Figure 3.9**) where dropped after failure to reach a mutual agreement with the associated landowners.

The final layout (**Figure 3.1** and **3.11**) consists of 16 turbines with a maximum potential output of 68.8 MW. The composition is as follows:

- **16 turbines** will have a maximum tip height of 135 m and a potential power output of up to c. 4.3 MW each.

The final turbine model will be subject to a competitive tendering process. Compared to a layout of smaller turbines, the chosen 16 turbine design has a smaller development footprint and requires less supporting infrastructure. For example, producing the same amount of energy would require approximately 28 smaller (2.5 MW) turbines.

The final layout incorporates all site constraints and includes embedded mitigation. The setback distances of 540 m ensure compliance with the Draft Revised Wind Energy Development Guidelines (Department of Housing, Local Government and Heritage, 2019). The turbine control system will also feature an automatic shutdown module to prevent shadow flicker at sensitive properties.

It was at this point that the boundary of the Wind Farm Site for the purposes of the EIAR was defined, focusing on the final 16 turbine layout and its associated infrastructure.

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 3.3**.

Table 3.3: Environmental Effects from Initial to Final Layout

Criteria	Initial Layout (Figure 3.2)	Final Iteration (Figure 3.1)
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.	No significant environmental effects.
Ornithology	No significant environmental constraints.	No significant environmental constraints.
Soils & Geology	Slight increase in the volume of peat and spoil to be managed.	This layout was amended following initial geotechnical investigations to avoid areas of deep peat where possible and reduce the volume of peat and spoil to be managed.
Hydrology & Hydrogeology	An increase in the volume of peat and spoil to be managed	Neutral.

Criteria	Initial Layout (Figure 3.2)	Final Iteration (Figure 3.1)
	on site would increase the potential for silty runoff to enter receiving watercourses.	
Air & Climate	Slight increase in the carbon payback time.	Neutral.
Noise	Neutral.	Neutral.
Material Assets	Potential for effect to existing telecoms link traversing the Wind Farm Site.	Neutral as the location of two turbines were moved to avoid interference with the telecoms link.
Landscape & Visual	Significant effect to viewpoints along the Wild Atlantic Way, Céide Fields and Downpatrick Head.	Reduced effect to viewpoints along the Wild Atlantic Way, Céide Fields and Downpatrick Head.
Cultural Heritage	Neutral	Neutral
Traffic and Transport	Greater land take on Turbine Delivery Route to facilitate transport of larger turbine blades.	Neutral

3.6.3 Site Access Track Layout

Site Access Tracks are required onsite to enable transport of infrastructure and construction materials within the Wind Farm Site. Tracks must be of a gradient and width sufficient to allow safe movement of equipment and vehicles. It was decided during the initial design of the Proposed Development that existing roads would be utilised where possible to minimise the potential for effects by constructing new roads as an alternative.

As the overall Wind Farm Site layout was finalised, the most suitable routes between each component of the Proposed Development were identified, taking into account the existing roads and the physical constraints of the Wind Farm Site. Locations were identified where upgrading of the existing road would be required. This included where sections of new roads would need to be constructed, in order to ensure suitable access to and linkages between the various project elements, and efficient movement around the Wind Farm Site.

An alternative option to utilising the existing road network within the Wind Farm Site would be to construct a new road network, having no regard to existing roads. This approach was considered unfavourable, as it would require unnecessary disturbance to the Wind Farm Site and create the potential for additional environmental effects to occur. It would

also result in an unnecessary requirement for additional cut and fill material to be used in the construction of these new roads. A comparison of the potential environmental effects of constructing an entirely new road network when compared with maximising the use of the existing road network is presented in **Table 3.4**.

Table 3.4: Environmental effects from constructing a new Site Access Track network compared to utilising existing Tracks and creating new Site Access Tracks where required

Criteria	Comment
Population & Human Health (incl. Shadow Flicker)	Increase in noise, disruption of the road network and reduction of air quality as a result of the associated increase in construction activities required onsite and vehicular movements on the local road network.
Biodiversity	Larger development footprint will result in greater habitat loss.
Ornithology	Larger development footprint will result in greater habitat loss which could effect birds.
Soils & Geology	Larger development footprint would result in greater volumes of peat and spoil to be excavated and stored. Larger volume of stone imported for road construction.
Hydrology & Hydrogeology	Larger development footprint and increased number of new watercourse crossings, therefore, increasing the potential for silty runoff to enter receiving watercourses.
Air & Climate	Potential for greater dust emissions due to the requirement of an increased volume of stone. Potential for greater vehicular emissions due to increased volume of construction traffic. However, these will not be significant.
Noise	Increase in noise resulting from an increase in construction activities required onsite and vehicular movement on local road network
Material Assets	Larger development footprint will result in greater land-take and a change in land use.
Landscape & Visual	Potential for visual and landscape effects due to the

Criteria	Comment
	construction of new Site Access Tracks. However, this will not be significant following revegetation after construction.
Cultural Heritage	Larger development footprint would increase the potential for effects on unrecorded, subsurface archaeology.
Traffic and Transport	Increase in vehicular movements on the local road network.

3.6.4 Location of Ancillary Structures

The ancillary infrastructure required for the Proposed Development include a Temporary Construction Compound, Electrical Substation, BESS, Grid Connection, Meteorological Mast and Borrow Pit.

3.6.4.1 Temporary Construction Compounds

The Temporary Construction Compounds (TCC) will be used as a secure storage area for construction materials and to contain temporary site units for sealed staff welfare facilities. The TCC will contain cabins for offices space, meeting rooms, canteen area, a drying room, parking facilities, and similar personnel type facilities. Details of the TCC's can be seen in **Planning Drawing No: 6289-PL-400** and **6289-PL-401**. The first TCC is located in the south of the Wind Farm Site near the entrance to the proposed onsite Electrical Substation, the BESS compound and wind turbine AT01 (**Figure 2.21**). The second TCC is located at an existing farmyard south of wind turbine AT12. The farmyard will be repurposed as a TCC during the construction phase of the Proposed Development (**Figure 2.21**). The use of two TCC's as opposed to one compound will reduce the distance construction traffic has to travel within the Wind Farm Site. A number of locations were assessed for the location of the TCC. The current proposed locations are considered the most suitable due to its location to the Onsite Substation and wind turbine AT01 entrance and at an existing farmyard south of wind turbine AT12. The current positions are further considered the most suitable as one is located on an improved agricultural grassland area and the second on an existing farmyard which will reduce the effects on more valuable peatland on other parts of the Wind Farm Site.

A comparison of the potential environmental effects of constructing two smaller compounds when compared against constructing a single, large construction compound 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)	Neutral
Biodiversity	Decrease in biodiversity loss within the Wind Farm Site with the repurposing of an existing farmyard versus the construction of one large construction compound on agricultural pasture.
Ornithology	Decrease in potential Ornithological effects within the Wind Farm Site with the repurposing of an existing farmyard versus the construction of one large construction compound on agricultural pasture.
Soils & Geology	Decrease on soil and geology effects within the Wind Farm Site with the repurposing of an existing farmyard versus the construction of one large construction compound on agricultural pasture.
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	Neutral.
Noise	Potential for increased noise effects on nearby sensitive receptors.
Material Assets	Neutral
Landscape & Visual	Neutral
Cultural Heritage	Neutral
Traffic and Transport	More efficient movement and management of material across the Wind Farm Site.

3.6.4.2 Alternative Spoil Storage Areas

Spoil material will be generated from excavations to construct the infrastructure onsite. This will be mostly in the form of peat, topsoil and subsoils, that will be stored onsite as it is excavated. Generally, it is preferred to store spoil as close as possible to the site from where it was excavated to avoid sedimentation and habitat loss. Therefore, it is proposed to permanently store spoil in 17 no. areas across the Wind Farm Site, particularly close to the turbine locations and the Onsite Substation and BESS compound. These areas are shown on **Figure 2.5**. All spoil storage areas will be permanent spoil storage areas but can also be used temporarily where necessary and then used for landscaping around the edges of Turbine Hardstands and the Access Tracks and Onsite Substation. All spoil will be repurposed where appropriate and will comply with the Directive (2008/98/EC) and waste hierarchy.

A comparison of the potential environmental effects of storing spoil onsite in comparison to using an offsite storage is presented in **Table 3.6**.

Table 3.6: Environmental Effects from Utilising Onsite Storage Compared to Offsite storage

Criteria	Onsite spoil storage	Offsite spoil storage
Population & Human Health (incl. Shadow Flicker)	Less vehicular movements and potential health benefits.	Increased vehicular movements.
Biodiversity	Increased amount of habitat affected. Potential for habitat enhancement	Less habitat affected. No potential for habitat enhancement
Soils & Geology	Neutral	Neutral
Hydrology & Hydrogeology	Increased risk of sediment laden runoff to watercourses.	Lower risk of sediment runoff to watercourses.
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	Neutral
Landscape & Visual	No landscape screening of infrastructure from spoil bunds and/or reinstatement of borrow pit.	No effect on the landscape of the Wind Farm Site.
Cultural Heritage	Neutral	Neutral

Criteria	Onsite spoil storage	Offsite spoil storage
Traffic and Transport	Less vehicular movement on local roads.	Increased vehicular movement on local roads.

3.6.4.3 Onsite Substation and Battery Energy Storage System (BESS)

The north and south of the Wind Farm Site were assessed for locating the onsite substation. Having regard for the Wind Farm Site constraints, the grid connection to Tawnaghmore 110 kV substation and the EirGrid requirement for the minimum clearance between the substation and a wind turbine (Minimum Clearance in air)[9] of 2 times the turbine fall over distance (270 m), the proposed location for the onsite substation was selected.

While the Proposed Development has a projected 35-year lifespan, the substation and related infrastructure will become a permanent ESBN asset, remaining part of the area's electrical network even if the rest of the site is decommissioned. BESS allows wind farms to deliver electricity to the grid more consistently, even when wind speeds fluctuate. This reduces the intermittency of wind power and makes it easier to integrate into existing grid systems.

BESS provide essential ancillary services such as frequency regulation and voltage support, which enhance overall grid stability. By capturing excess generation during peak wind production periods and discharging it during times of low output, these systems effectively mitigate curtailment risks and optimize the economic value of wind assets. Ultimately, the deployment of BESS transforms variable wind energy into a reliable, dispatchable power source capable of meeting real-time demand fluctuations.

3.6.5 Alternative Substation Design Technologies

Following the determination that connection to the Tawnaghmore 110 kV substation at the Killala Business Park represents the preferred option for connecting the Tirawley Wind Farm to the national grid, the Developer undertook an analysis of technological design options, including electrical equipment and plant, which could be provided for as part of the proposed substation. Depending on the alternative design technologies deployed,

9 EIRGrid (2019) Functional Specification 110/220/400 kV Substation General Requirements, Revision 4 (XDS-GFS-00-001-R4) Available at: https://www.eirgridgroup.com/site-files/library/EirGrid/6-110-220-400-kV-Substation-General-Requirements.pdf

there will be minor variations in terms of internal substation layout and footprint. It is important to note that the design of such substations must accord with Eirgrid specifications and as such, the scope for installing alternative electrical design technologies is very limited. Within Eirgrid specifications for 110 kV substations, there are currently two approved designs, the 110 kV Air Insulated Switchgear (AIS) Substation and the 110 kV Gas Insulated Substation (GIS) described below.

3.6.5.1 Air Insulated Switchgear Substation

An AIS substation uses atmospheric air as the main insulation for the exposed electrical conductors. The switchgear is normally connected together by bare metallic conductors mounted on support structures overhead in the station called gantries or post insulators. As a poorer insulation, but cheaper and constantly available medium, air in an AIS substation requires larger electrical and safety clearance distances than those required for a GIS station. This is due to the comparatively low dielectric strength of atmospheric air. This requirement drives the need for greater substation footprint. This is one of the main disadvantages of AIS switchgear.

AIS switchgear and transformers are usually installed outdoors. A separate control building is also required which houses protection and control equipment associated with the switchgear and other High Voltage (HV) equipment and which also houses the auxiliary power supplies for the station.

An important advantage of the AIS substation over the alternative GIS technology is the relative ease of future expansion and refurbishment with minimum impact on operation. For this reason and because of historical cost differences, AIS substations have tended to be the most generally used. AIS substation compatible switchgear will continue to be available in future which means provisions for future upgrading and equipment supply does not need to be built in at the outset, unlike GIS where it must be considered at the initial stage.

A well-designed AIS substation is more advantageous for expansion as the electrical connections between items of equipment are exposed to the air, facilitating future connection or modification.

The only provision that must be assured for possible future extension of an AIS substation is that the site must be of sufficient size and that the equipment can be suitably located within it[10].

3.6.5.2 Gas Insulated Switchgear Substation

A GIS substation uses pressurised Sulphur Hexafluoride gas (SF6 gas), which has a higher dielectric strength than air, to provide insulation for the switchgear. The conductors and switchgear contacts are insulated by pressurised SF6 gas requiring much smaller clearances than those of AIS substation and hence the footprint of a typical GIS substation compound would be smaller than its AIS substation equivalent. Although the switchgear is smaller, the same space is required for the transformers, terminal towers and site screening. As a rule, GIS switchgear is installed indoors but often with outdoor transformers. The building height for a GIS substation would be typically in the range of 15 m to 17 m high.

It is normal to locate the switchgear in a building, which needs to be large enough to accommodate the switchgear and provides adequate space for access to replace components if necessary. The same transformers are used for GIS as for AIS requiring the same space for these large items of equipment regardless of whether a substation is GIS or AIS.

There are several manufacturers of GIS switchgear and their design evolves so that at each stage the design can be superseded over a number of years. New designs are rarely compatible with earlier versions. Therefore, it is often necessary to install additional equipment that is actually required for the initial installation to cater for future extensions. This is a disadvantage of the technology[11].

3.6.5.3 Application of AIS and GIS Technology for the Proposed Development

With respect to technology both AIS and GIS are well proven technologies and have been implemented successfully in Ireland and elsewhere in the world. Given the lack of footprint area on Wind Farm Site and the reduced footprint required for a GIS substation in comparison to the AIS substation, the GIS substation is considered acceptable for the

10 EirGrid (2013) The Grid Link Project Lead Consultant's Stage 1 Report. Available at: https://www.eirgrid.ie/site-files/library/EirGrid/Stage%201%20Report.pdf [Accessed: 01/04/2026]

11 EirGrid (2013) The Grid Link Project Lead Consultant's Stage 1 Report. Available at: https://www.eirgrid.ie/site-files/library/EirGrid/Stage%201%20Report.pdf [Accessed: 01/04/2026]

requirements of the Tirawley Wind Farm development. The larger footprint required for an AIS substation, the availability of land on Wind Farm Site and the setback distance required from the neighbouring wind turbine AT01 turbine, means the AIS substation is not considered acceptable for the requirements of the Tirawley Wind Farm development.

The decision to use the GIS substation has been based on the space restrictions of the Wind Farm Site, setback distance required from turbine wind turbine AT01 and the reduced visual impact associated with GIS substation versus the AIS substation.

3.6.6 Grid Connection Routes

A key consideration in determining the Grid Connection technology 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 little or no visual effect. A comparison of the potential environmental effects of constructing overhead lines when compared against constructing underground lines is presented in **Table 3.7**.

Table 3.7: Environmental effects from overhead lines compared to underground lines

Criteria	Comment
Population & Human Health (incl. Shadow Flicker)	Potential to effect property prices due to visual effect.
Biodiversity	Neutral.
Ornithology	Neutral.
Soils & Geology	Neutral.
Hydrology & Hydrogeology	Neutral.
Air & Climate	Neutral.
Noise	Neutral.
Material Assets	Neutral.
Landscape & Visual	Potential for greater visual effect due to overground poles and cables.
Cultural Heritage	Neutral.
Traffic and Transport	Neutral.

Only one underground cabling route option to Tawnaghmore substation was considered and assessed as part of a civil and structural due diligence and would be brought forward as part of the planning application. The route as shown in **Figure 2.2**. The first route considered was determined to be the optimal route as it is the shortest distance, via the road network and would ensure minimal disruption to the road network. Other potential routes would encompass either longer distances or going through the Killala Village where high levels of disruption would be anticipated along with minimal space available within the road for new cabling.

3.6.6.1 Borrow Pits

It is not proposed to use any onsite borrow pit for the Proposed Development. The rock formations underlying the development have some limited potential for use as an aggregate resource the lack of any existing commercial quarry enterprise in the immediate vicinity indicates that either the rock quality is too variable or of insufficient strength / durability to be exploitable as a commercial economic resource. Fill material required for the construction of Site Access Tracks and Turbine Foundations will be obtained from areas of cut onsite and sourced from local quarries offsite.

A comparison of the potential environmental effects of using local quarries in comparison to using an onsite borrow pit is presented in **Table 3.8**.

Table 3.8: Environmental effects from Utilising Local Quarries Compared to an onsite Borrow Pit

Criteria	Comment
Population & Human Health (incl. Shadow Flicker)	More vehicular movement and an increase in potential negative health effects. Potential negative effects are short term during the construction phase of the Proposed Development.
Biodiversity	Beneficial, no new land take required vs the land take required for the construction of an onsite borrow pit.
Ornithology	Neutral
Soils & Geology	Beneficial, no new land take required vs the land take required for the construction of an onsite borrow pit.
Hydrology & Hydrogeology	Neutral

Criteria	Comment
Air & Climate	More vehicular movements and increase in negative air quality effects. Potential negative effects are short term during the construction phase of the Proposed Development.
Noise	Reduction in noise generated onsite, with no rock breaking activities occurring onsite.
Material Assets	Neutral
Landscape & Visual	Beneficial, no new borrow pits constructed onsite.
Cultural Heritage	Neutral
Traffic and Transport	Increase in vehicular movement on local roads. Potential negative effects are short term during the construction phase of the Proposed Development.

3.7 ALTERNATIVE RENEWABLE ENERGY TECHNOLOGIES

Forestry and agriculture will continue to be carried out on the Wind Farm Site around the footprint of the Proposed Development. An alternative source of renewable energy considered for Wind Farm 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 3 times the capacity of the Proposed Development (i.e. c. 68.8 MW) 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 110.08 to 137.6 hectares. This compares to the total permanent land take of the Proposed Development, including the Site Access Tracks, Turbine Hardstands, Turbine Foundations, GCR, BESS and Onsite Substation of approximately 9.21 ha. **Table 3.9** outlines the potential effect from then development of a solar photovoltaic array when compared to a wind farm energy development. The selected wind farm energy development is the most efficient method of energy production with the lesser potential for significant, adverse environmental effects.

Table 3.9: Environmental Effects from a Solar Photovoltaic Array Compared to a Wind Farm Development

Criteria	Comment

Criteria	Comment
Population & Human Health (incl. Shadow Flicker)	No potential for shadow flicker to affect sensitive receptors. Potential for glint and glare effects on local road users and at dwellings.
Biodiversity	Larger development footprint would result in greater habitat loss.
Ornithology	Potential for mimicry of sensory cues i.e., glint and glare similar to water leading to bird fatalities caused by collision. This can be mitigated.
Soils & Geology	Larger development footprint would result in greater volumes of peat and spoil to be excavated.
Hydrology & Hydrogeology	A solar PV array development would require a larger development footprint therefore increasing the potential for silty laden runoff to enter receiving watercourses.
Air & Climate	Reduced capacity factor of solar PV array technology would result in a longer carbon payback period.
Noise	Potential for transformers to cause noise effects on nearby sensitive receptors.
Material Assets	The larger development footprint would have a greater effect on the land use (Forestry and Agriculture) of the Wind Farm Site.
Landscape & Visual	Potentially less visible from surrounding area due to screening from existing forestry and topography. More of a visual effect due to their land take and slope of the land.
Cultural Heritage	Larger development footprint would increase the potential for effects on unrecorded, subsurface archaeology.
Traffic & Transport	Potential for greater traffic volumes during construction phase due to the number of solar panels required to achieve the same output.

3.8 ALTERNATIVE TURBINE HAUL ROUTE

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

3.8.1 Port of Entry

The alternatives considered for the port of entry of wind turbines into Ireland for the Proposed Development include Killybegs Harbour, Co. Donegal, Galway Port, Co. Galway and Foynes Port, Co. Limerick. Each Port offers a roll-on roll-off procedure to facilitate import of wind turbines. Killybegs Port was selected as the port of entry for this project because it is located closer to the Wind Farm Site and a number of the existing wind farms in the locality have successfully utilised this port. This reduces the work required on the TDR.

3.8.2 Turbine Component Delivery to Site

There are 3 TDR options considered for the Wind Farm Site. Option 1 will be from Killybegs Harbour to Wind Farm Site, Option 2 will be from Galway Port to Site and Option 3 will be from Foynes to Site. The primary route considered is Option 1 Killybegs Harbour to Site. The Haul Route Assessment report (**Appendix 17.1**) details these routes.

The TDR options were assessed for the delivery of turbine components from Killybegs Harbour, Galway Port and Foynes Port taking the relevant national roads towards the Wind Farm Site. These TDR options have been previously used and assessed for other windfarm developments (constructed and pre-planning stage) in the Northwest Mayo area. As port (Killybegs Harbour, Galway Port and Foynes Port) to Ballina Town Co. Mayo are proven TDR options thus they have not been assessed or included in this report. A swept path analysis has been completed by JOD from the Ballina N59 (Killybegs) or N26 (Galway/ Foynes) exit to the Wind Farm Site (**Appendix 17.1**). It's recommended that a blade lifter is used to navigate areas where oversail is required i.e. towns, tight corners or where infrastructure cannot be temporarily removed. This would require further analysis and site investigations. The transport analysis (as presented in **Chapter 17: Traffic and Transportation** and **Appendix 17.1**) shows that only minor additional accommodation works will be required to accommodate the proposed turbines.

The below highlights the route from each of the TDR Option 1 (Killybegs Harbour) to the Wind Farm Site.

Killybegs Harbour TDR

Turbine component delivery routes from Killybegs Harbour includes the R263, N56, N15, N4, N59, L-1141, R294, L-1119, N59, L-1108, R315, L-51722, L-51732 and the R314 shown on **Figure 2.7**. In terms of the haul route cognisance was taken of the haul route used for the Killala Community Wind Farm which utilised the R263, N56, N15, N4, N17, R294, N59, R314 which is located c. 5.2 km southeast of the Wind Farm Site. That route had been subject to a full route survey and sweep path analysis survey prior to the construction of the Killala Community Wind Farm. A swept path analysis has been completed by JOD from the Ballina N59 exit to the Site (**Appendix 17.1**). Road widening will occur at 22 pinch points from the Ballina N59 exit to the Wind Farm Site to facilitate the delivery of turbine components. Therefore, by utilising this route less works are required compared with alternative roads that have not been previously used for turbine delivery.

A section of this route is proven suitable for the transport of turbine components for the Proposed Development. The Turbine Delivery Route Report (as presented in **Appendix 17.1**) shows that only minor additional accommodation works will be required to accommodate the proposed turbines.

3.8.2.1 Civil Construction Haul Route (CHR)

The local road network was assessed for the Civil CHR. All sub-base, base course and final running layer materials for the Site Access Tracks and Turbine Hardstand construction will require importation. Specific grades of rock fill may be required as fill under Turbine Foundations. The crushed stone as well as rock fill and concrete for Turbine Foundations, concrete blocks for the construction of substation buildings and precast chambers for site cabling will be sourced from one of the local quarries in the area. Concrete, crushed stone and concrete blocks for construction of the Proposed Development will come from licensed quarries (**Figure 17.8**) in the locality such as:

- Killala Rock Quarry, Killala
- Coolturk Quarries Ltd., Crossmolina
- Mullafarry Quarry, Killala
- Lacken Stone, Ballina
- Molloy Concrete Ltd, Ballina

These quarries will also be the source of crushed stone and concrete for widening works to the TDR (widening along the L-5187-47, L-31142-0, L5187-22-0, L-5187-47, L21147-0, L-31142-0 and roads to a width of 4.5m and the widening of junctions at the crossroads R314 and L-51731 crossroads in the townland of Billoos), Construction Haul Routes (R314), Grid Connection works (the L-31143, L-1114, R314, L-5177, L-5176, L-1107, L-1111, L-5147 and the Killala Business Park).
For all quarries, trucks will approach the study area using the R314 before turning on to the Wind Farm Site entrances as shown in **Figure 2.1**.

No upgrade works are necessary to the R314 to facilitate the delivery of materials. There will be no need for passing bays, as the R314 is wide enough to facilitate HGV deliveries and will allow traffic to flow at all times.

A condition survey of the road will be carried out prior to commencement of construction and another post-construction. The Developer will lodge a bond with Mayo County Council prior to commencement of construction in the amount to be agreed with the Council for the possible repair/upkeep of the road. During the construction period, the road will be inspected weekly by the Developer's Resident Engineer. The Contractor will be instructed to repair any defects within the following two weeks. At the end of the construction period, any further defects will be remedied to the satisfaction of relevant County Councils.

For the grid connection, general material excavated from trenches in public roads will be disposed of to a licensed facility while excavated road surfacing material will be recycled. General soil waste will be transported to one or more of the following licensed facilities:

- McGrath Industrial Waste Ltd., Castlebar, Co. Mayo
- Coolturk Quarry Ltd., Crossmolina, Co. Mayo
- Mullafarry Quarry Ltd., Killala, Co. Mayo
- Loftus Skip Hire, Ballina Co. Mayo
- Michael O'Malley Tarmacadam Contractors Ltd. Turlough Rd, Castlebar, Co. Mayo
- Pat King, Castlebar, Co. Mayo
- Eoghan Cunningham, Westport, Co. Mayo

Soil and stone spoil from road widening on the Turbine Haul Route will be disposed of to the same facilities.

Excavated road surfacing materials will be recycled and used for temporary reinstatement of trenches. Bitumen and supplementary road surfacing for trench reinstatement can be sourced from:

- McGraths Cong, Co. Mayo,
- McTighe Group, Co. Galway,
- Moran Tarmacadam, Trista Co. Mayo
- Northwest Tarmac, Ballina, Co. Mayo

Grid construction traffic will use the grid route and link with the R314 at Killala Business Park or will be serviced from the Wind Farm Site.

3.9 ALTERNATIVE MITIGATION MEASURES

Mitigation by avoidance has been central to the Proposed Developments evolution. By avoiding the ecologically sensitive areas of the Wind Farm Site the potential for environmental effects is limited. As noted above, the site layout aims to avoid any environmentally sensitive areas through the application of site-specific constraints.

The alternative to this approach is to encroach on the environmentally sensitive areas of the site and accept the potential environmental effects and risk associated with this. The best practice design and mitigation measures set out in this EIAR will contribute to reducing any risks and have been designed to break the pathway between the Wind Farm Site and any identified sensitive receptors.

3.10 CONCLUSION

A description of the reasonable alternatives in terms of project design, technology, location, size, and scale, studied by the Developer, which are relevant to the Proposed Development and its specific characteristics has been provided.

Alternative Locations

Following a strategic site screening exercise in County Mayo, the Tirawley Wind Farm Site was considered the most appropriate location for the Proposed Development due to its strong wind resource, low population density, and proximity to viable grid connection options. As a result of examining the site constraints through an iterative design process, the site can accommodate the proposed 18 wind turbines.

Alternative Technologies

Wind energy was chosen over solar energy due to solar's lower capacity factor and the significantly larger development footprint required to produce an equivalent amount of energy. The smaller footprint of the wind farm allows for the continuation of existing agricultural and forestry land use on the site.

Alternative Layout and Design

The final 16 turbine layout is considered the most appropriate option. It is the result of an iterative process that removed turbines from the most visually sensitive locations to protect views from areas like the Wild Atlantic Way and the Céide Fields. Furthermore, the design process involved micrositing individual turbines to avoid other key constraints, including telecommunication links, archaeological features, overhead power lines, and areas with deep peat or a high risk of peat slippage. The submitted layout adheres to the setback distances from dwellings as set out in the Draft Revised Wind Energy Development Guidelines (2019).

Alternative Turbine Numbers and Specifications

The proposed turbine layout underwent several design iterations, which systematically reduced the number of turbines from an initial concept of 42 down to the final 16 turbine layout. This reduction was the result of a constraints-led process, where feedback from detailed environmental and technical studies was used to refine the design. The final 16 turbine layout is considered the optimal balance between maximising the renewable energy output of the site while minimising the overall development footprint

Alternative Grid Connection Route Options

The chosen underground GCR to the Tawnaghmore 110 kV substation is the preferred option. It was determined to be the optimal route as it primarily uses the public road network for the shortest distance, ensuring minimal disruption.

Alternative Turbine Delivery Route Options

Killybegs Port was selected as the port of entry for this Proposed Development because it is located closer to the Wind Farm Site and the delivery route has been successfully utilised by other wind farms in the locality, such as the Killala Community Wind Farm. This makes it a proven route that requires less modification work compared to other options

Concluding Statement

An indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects, has been provided. Through appropriate assessment of the reasonable alternatives, as outlined in this chapter, the site has been shown to be suitable, given consideration of the main criteria of distances from dwellings, neighbouring land uses, wind speeds, potential environmental effects, and grid connection options. The Proposed Development is a commercially viable wind energy development that will make a meaningful contribution to Ireland's climate targets.