FEHILY TIMONEY

DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED SHANCLOON WIND FARM, CO. GALWAY

VOLUME 2 – MAIN EIAR

CHAPTER 3 – SITE SELECTION AND CONSIDERATION OF REASONABLE ALTERNATIVES

Prepared for:

RWE Renewables Ireland Ltd

RWE

Date: **August 2025**

Core House, Pouladuff Road, Cork, T12 D773, Ireland

T: +353 21 496 4133 | E: info@ftco.ie

CORK | DUBLIN | CARLOW

www.fehilytimoney.ie

TABLE OF CONTENTS

LIST OF TABLES

3. SITE SELECTION AND CONSIDERATION OF REASONABLE ALTERNATIVES

3.1 Introduction

The following chapter, in accordance with EIA guidance document: '*Guidance on the preparation of the Environmental Impact Assessment Report'* (EU, 2017), sets out the reasonable alternatives which were studied by the Applicant for the Proposed Development and provides an indication of the main reasons for selecting the chosen option taking into account the environmental effects of the Proposed Development. It describes the site selection process, alternative design philosophies, alternative layouts and the do-nothing alternative.

3.2 Statement of Authority

This chapter has been prepared by Mr Anthony Ryan with the assistance of Ms Rita Mansfield of Fehily Timoney and Company.

Mr. Anthony Ryan is a Project Planner with Fehily Timoney and Company and holds a Masters' in Planning and Sustainable Development (M.Plan) from University College Cork. He has worked in planning consultancy for over three years and has prepared planning policy, population and human health impact assessments, and assessment of reasonable alternatives to proposed developments for environmental reports and wind farm EIARs. Anthony's key capabilities are planning policy, environmental constraints assessment, report writing, assisting Senior Consultants and planning research.

Ms. Rita Mansfield holds a Bachelor (Hons) Degree in Applied Ecology from University College Cork and a Higher Diploma in Environmental Protection and Pollution Control from the Sligo Institute of Technology. She has worked in environmental consultancy for 20 years and has prepared Environmental Reports and EIARs, including the consideration of alternatives, for large-scale infrastructure development throughout Ireland including for wind farms.

3.3 Alternative Assessment

The requirement in relation to alternatives in the EIA process is set out in the *European Union Directive 2011/92/EU, as amended by Directive 2014/52/EU on assessment of the effects of certain public and private Projects on the environment.* Article 5 (1)(d) states that an EIAR should include:

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

Annex IV of the EIA Directive states that the information provided in an EIAR should include a:

> *"description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects."*

This chapter has particular regard to the environmental considerations which influenced the selection of alternatives and details the evolution of the Proposed Development through alternatives considered, indicating the main reasons for selecting the chosen option taking into account the effects on the receiving environment and considering the comparison of environmental effects of each alternative.

The alternatives considered have been described in line with the EPA 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (2022). The Guidelines state that:

> *"It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required."*

The chapter also details non-environmental factors of the design process where they are relevant to the evolution of the Proposed Development.

Consequently, taking account of the legislation and guidance requirements, this chapter of the EIAR addresses alternatives under the following main headings:

- 'Do Nothing' Alternative;
- Strategic Site Selection;
- Alternative Renewable Energy Technologies;
- Alternative Turbine Numbers, Layout and Design;
- Alternative Transport Routes and Site Access;
- Alternative Substation and Associated Grid Infrastructure.

3.3.1 Do-Nothing Alternative

The EPA 2022 guidance prescribes that th*e 'do-nothing' alternative is a general description of the evolution of the key environmental factors of the site and environs if the proposed project did not proceed."* The do-nothing alternative is described in this chapter, and the likely evolution of the baseline is a more detailed assessment described in the baseline environment section of each individual technical chapter of this EIAR.

Ireland, through its commitments under CAP 24, is obliged to ensure that 80% of the total energy consumed in heating, electricity and transport is generated from renewable resources by 2030. This is in order to help reduce the nation's CO2 emissions and to promote the use of indigenous renewable sources of energy. These targets have been incorporated into national policy, most recently in the Climate Action Plan (2024). Of note is the European Commission Guidance (EU, 2017)[1] which acknowledges that the do-nothing scenario may not be a reasonable alternative where there is a pressing need for the project supported by policy.

Under the "Do-Nothing" scenario, the Proposed Development would not go ahead i.e. the development of a renewable energy project is not pursued, and the Site remains in use as agriculture, peatland and minor forestry with no anticipated changes made to the current land-use practices.

[1] European Commission (2017), Guidance on the preparation of the environmental impact assessment report (Directive 2011/92/EU as amended by 2014/52/EU)

In the "Do-Nothing" scenario, the prospect of creating sustainable energy through Galway's wind energy resource would be lost at this location.

In the 'Do- nothing' scenario, importation of fossil fuels to maintain growing energy supply will continue and Ireland's energy security will remain vulnerable. A "Do-nothing" scenario would contribute to strain on existing energy infrastructure and may affect economic growth if energy demand cannot be met. According to EirGrid's 'Generation Capacity Statement 2023-2032' (Eirgrid, 2024), the energy demand in Ireland is forecasted to increase 43% by 2032 (median scenario). This is a marked increase on previously predicted forecasts with the 2020-2029 Generation Capacity Statement predicting only 33% (median scenario) increase in demand. Much of this revised forecasting is attributable to the predicted demand by data centres, with the CSO statistical publication, 23 July 2024 noting that energy demand by data centres increased by 20% between 2022 and 2023. EirGrid's publication predicts that 30% of all electricity demand is expected to come from data centres by 2032.

Under the "Do-Nothing" scenario, the socio-economic benefits associated with the Proposed Development will be lost. These benefits include between 103 and 124 no. jobs during the construction phase of the Proposed Development (and a similar number during decommissioning), and between 73.8 to 87.2 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 Proposed Development which could be used to improve physical and social infrastructure in the locality.

In the "Do-Nothing" scenario, the potential environmental effects of the Proposed Development as set out throughout this EIAR will not occur. Table 3-1, below, sets out the potential effects of the 'do-nothing scenario' compared to the residual effects associated with the Shancloon Wind Farm in relation to the various environmental topics covered in the individual chapters of this EIAR.

Refer to each respective EAIR chapter for full details of residual effects.

Table 3-1: Potential Residual Environmental Effects vs. 'Do-nothing'

Environmental Consideration	Residual Effect of the Proposed Development	'Do-noting' Alternative
Air & Climate	The Proposed Development will be contributary in meeting Ireland's future energy demands using renewable energies thereby offsetting the need to meet the demand by burning fossil fuels. It is estimated that an annual average output of 188,866 MWhr – 222,592 MWhr for the Proposed Development will result in the net displacement of 81,590 to 96,160 tonnes of CO2 per annum that would otherwise be generated by fossil fuel consumption. This will be a long term positive effect.	No benefit in terms of achieving emission reduction targets to address air quality and climate change effects.
Noise & Vibration	The operational wind farm noise levels will meet the daytime and night-time	The background daytime and nighttime noise levels in the locality

Environmental Consideration	Residual Effect of the Proposed Development	'Do-noting' Alternative
	noise limits derived using the Wind Energy Development Guidelines 2006, with quiet mode of operation under certain prescribed wind conditions at turbine T5 and T8 (as set out in the noise chapter). The effects are determined as not significant.	of the Proposed Development are low and representative of the rural context of the site. It is expected that the existing land uses at the site will continue in the absence of the Proposed Development, with prevailing noise levels unchanged.
Biodiversity	The Proposed Development is located in lands under agricultural use which comprise managed grassland and areas of wet grasslands and peatlands which include recolonising cutover bog and raised bog, and their associated extensive drainage network. The development lands also includes a watercourse crossing and small areas of conifer plantation. There will be a long term loss of these habitats relative to the footprint of the Proposed Development. Three summer bat roosts are present in the locality of the Proposed Development which support Brown long-eared bat, common pipistrelle, soprano pipistrelle and Leisler's bat. Activity for these species in the general area ranges from moderate to high. Other species present at lower levels of activity include myotis spp., lesser horseshoe bat and Nathusius' pipistrelle. While the turbine array is such that turbines are setback from the habitats which were observed as having moderate to high bat activity levels, there will be a requirement to remove hedgerows as part of the Proposed Development. Planting is proposed to offset this potential loss of bat commuting and foraging habitat, however it will take a number of growing seasons to fully establish. One active outlier badger sett (one entrance) will be removed as part of the Proposed Development. There will be no associated impact on badger population in the area. The Proposed Development includes biodiversity enhancement measures,	Under the Do-Nothing scenario the agricultural, peat cutting and forestry practices at the Site are anticipated to continue.

Environmental Consideration	Residual Effect of the Proposed Development	'Do-noting' Alternative
	including those for marsh fritillary (which are known to occur in the wider area). Having regard to mitigation proposed as part of the Proposed Development, residual effects are determined as not significant.	
Ornithology	Ornithology survey undertaken for the Proposed Development and its environs determined that the main bird usage areas are associated with the raised bog habitats that surround the Proposed Development. The Proposed Development will likely cause temporary displacement of birds during construction. The output of the Collision Risk Model for the Proposed Development was and determined that effects on bird populations due to the operation of the Proposed Development will be negligible.	Ornithological assemblages are likely to undergo some level of change because of climate change. The Climate Atlas of European Breeding Birds (CAEBB) highlights likely effects of climate change on bird species in Ireland as follows: Range Shifts; Changes in Species Composition; and Potential Loss of Diversity. In relation to birds that have been recorded as part of ornithology survey for the Proposed Development, the CAEBB notes the following: Meadow Pipit (*Anthus pratensis*): Although widespread, the Meadow Pipit may see its range shift, potentially moving out of some lowland areas as temperatures rise. Curlew (Numenius arquata): The loss of suitable wetland and upland breeding habitats, coupled with changing land use, could exacerbate the decline of this already threatened species.
Land, Soils, Geology	The Proposed Development will not contribute to any significant negative effects given that the design is sympathetic to the Site topography and will include provision for on-site peat and spoil management. The Proposed Development has been designed having regard to prevailing ground conditions. However, excavation of soils for turbine foundations has the potential to negatively impact soils through removal and compaction. A small number of dolines will be removed from the Site. Such effects will not be significant.	In the Do-Nothing scenario, it is likely that the current land uses will continue for the foreseeable future. The effect on the land, soils and geology would remain largely unaltered as a result.
Hydrology & Water Quality	Potential effects on hydrology and water quality will be mitigated in design and by	It is anticipated that programmes of measures under the WFD will

Environmental Consideration	Residual Effect of the Proposed Development	'Do-noting' Alternative
	application of SuDS such that the objectives of the Water Framework Directive (WFD) are not affected. Culverts and bridge crossing will be designed in accordance with OPW Section 50 requirements. Existing catchment flow patterns will be retained. Standard construction stage environmental control measures will be adopted to ensure the protection of drains and watercourses.	continue to result in gradual improvement in catchment quality.
Population & Human Health	Long-term slight to positive economic benefit to local area due to job creation and community benefit fund. The Proposed Development will have a non-significant neutral impact on recreation and tourism in the area due to the distance of the proposed turbines from significant recreation features. The results of the shadow flicker assessment predict that Shancloon Wind Farm has the potential to introduce shadow flicker at up to 103 receptors surrounding the site. The implementation of a scheme of mitigation to cease operation of the turbines during periods of potential shadow flicker events will ensure that the potential for shadow flicker effects to occur is effectively eliminated for all residential dwellings within 10 rotor diameters of a turbine.	No economic benefit for the local area due to no provision of a community benefit fund. No employment opportunities as a result of the construction, operation and decommissioning of the Proposed Development.
Material Assets	Long term slight positive effect due to renewable energy supply during the operational phase. Long term slight positive effect for the continued operation of grid and electrical infrastructure. Slight negative effect to capacity of licensed waste facilities.	No offset to fossil fuel use.
Traffic & Transport	Temporary short-term slight to moderate effect due to increase in road traffic associated with construction activities.	If the Proposed Development is not constructed, there will be no change to the existing traffic patterns.

Environmental Consideration	Residual Effect of the Proposed Development	'Do-noting' Alternative
Archaeology & Cultural Heritage	Potential for unrecorded, sub-surface archaeological resource within the footprint of Proposed Development.	Neutral
Landscape & Visual	Impact to landscape and visual from turbines resulting in moderate to significant long term effects.	Neutral
Telecoms & Aviation	No significant residual effects on telecommunications and broadcasting and aviation as a result of the Proposed Development.	If the Proposed Development were not to proceed, there would be no change to the existing telecommunications, broadcasting and aviation operations in the area.

3.3.2 Strategic Site Selection

The following details the RWE Renewables Ireland Ltd. project screening and project selection process which illustrates in broad terms by which the Shancloon Farm site was identified for wind energy development.

The process of site screening and project selection is undertaken in house by RWE's team of developers. The development team is made up of planners, engineers, project managers and environmental scientists ensuring that a holistic approach is undertaken during the screening and project selection process. RWE recognises the complexities associated with the development of renewable energy sites and has developed a large database of information that allows the company to identify and screen potential sites.

RWE uses Geographical Information Spatial software (GIS), using a number of criteria and stages to assess the potential for wind energy development across the entire country of Ireland. This exercise utilises a large number of 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. This initial stage in the selection process discounted lands that were not available for development due to technical and/or environmental constraints.

The site screening assessment was guided by the 2013 'Methodology for Local Authority Renewable Energy Strategies' report from the Sustainable Energy Authority of Ireland (SEAI). For the assessment of candidate sites, a number of criteria were chosen which not only covered the broad range of considerations for wind farm development but also allowed for direct comparison of the candidate sites to each other to determine their relative suitability for wind farm development. The key policy, planning and environmental considerations for the selection of a potential wind farm site included:

- Site location relative to the County Council's Renewable Energy Strategy (RES) classification of areas considered suitable for wind farm development;

- Population density;
- Consistent wind speeds;
- Protection of visual amenity;
- Access route availability;
- Proximity to water bodies;
- Land Ownership title constraints,
- Low potential for impact on designated National and European sites;
- Located outside areas designated for protection of ecological species and habitats;
- Access to the national electricity grid possible within a viable distance;
- Suitable topography / ground conditions;
- Low potential for impact on Archaeological features;
- Sufficient area of unconstrained land that could potentially accommodate wind farm development and turbine spacing requirements

3.3.1 Shancloon Wind Farm – Proposed Development Suitability

The Shancloon Wind Farm was identified for potential development following a detailed desktop screening appraisal, firstly at national level and then at regional and county level of all available sites.

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

- Site location relative to the County Galway Local Authority Renewable Energy Strategy (LARES) classification of areas considered suitable for wind farm development from a planning policy perspective;
- Access to the national electricity grid possible within a viable distance;
- Located outside areas designated for protection of ecological species and habitats;
- Consistently high average annual wind speeds; medium housing density; and visual amenity classification is relatively favourable.

Of the sites assessed, Shancloon was selected as a site with relatively low potential for environmental effects. The proposed turbine array is located within an area identified as open to consideration for wind energy development, it is outside of any nationally or European protected area, is in a remote rural setting away from population centres, is proximal to potential grid connection and has a good available wind resource.

3.3.1.1 Policy

The most relevant planning policies which are applicable to the Proposed Development are discussed in Chapter 4 of this EIAR. Discussed hereunder is the County Galway Local Authority Renewable Energy Strategy.

The Galway County Development Plan 2022-2028, as adopted on 20th of June 2022, supports the development of Wind Energy projects in appropriate areas, and the LARES contained within 'Appendix 1: Renewable Energy Strategy' of the County Development Plan provides strategic direction to achieve the following within County Galway:

- Encourage renewable energy;
- Provide guidance regarding the siting and designing of wind energy developments;
- Promote the economic development of wind energy;
- Promote energy security and the establishment of a low carbon economy.

The proposed Shancloon Wind Farm turbine array is fully located within an area of unconstrained land in terms of wind energy development designation and a suitable available wind resource which is identified in the LARES as having a wind development potential designation of '*Open to Consideration'* i.e. as per the LARES, an '*Area where Wind Energy development is likely to be favourably considered - subject to the results of more detailed assessment of polices and potential effects'.*

3.3.1.2 Natura 2000 Sites

Galway's LARES identifies Special Area of Conservations (SAC/cSAC), Special Protected Areas (SPA/cSPA) or Natural Heritage Areas (NHA and pNHAs) as key policy considerations relating to renewable energy development. While these designations do not automatically preclude renewable energy development, any development in these areas is subject to the policies and obligations that pertain to these designations.

The Proposed Development is not located within the boundary of any European or nationally protected designated area.

The broader environment hosts several European sites which are associated with limestone geology and include turlough habitats e.g. Ardkill Turlough SAC and Shrule Turlough SAC, limestone pavement e.g. Cloughmoyne SAC and Calcareous fen e.g. Mocorha Lough SAC. The Proposed Development also drains to waterbodies associated with Lough Corrib SAC (also designated an SPA). There are no NHAs in close proximity to the Proposed Development, however there are several pNHAs in the area, all of which are associated with turlough habitats, and some of which overlap with SAC boundaries. The nearest designated site to the proposed turbine array is Lough Corrib SAC.

Further details on designated areas in the locality of the Proposed Development are provided in Chapter 9 – Biodiversity.

3.3.1.3 Population Density

The Proposed Development includes development of the turbine array within the Electroal Divisions (ED) of Beaghmore (2022 population of 394 persons and a population density of 21) and Kilshanvy (2022 population of 420 persons and a population density of 20), with the on-site substation to be located within Donaghpatrick (2022 population of 584 persons and a population density of 36) and minor temporary works proposed within the ED of Foxhall (2022 population of 675 persons and a population density of 21) for turbine delivery.

The population density of the Proposed Development lands is far below the State (2022 population density of 73.3) and County Galway (2022 population density of 45.2). The low population density allows for greater capacity for wind energy development at the Shancloon Wind Farm Site, allowing for appropriate setback distances from dwellings as set out in the 2006 Wind Energy Development Guidelines and 2019 draft Wind Energy Guidelines.

3.3.1.4 Other Considerations

Wind speed was assessed at the Site in order to determine if wind energy development would be feasible. Wind speed analysis from the Sustainable Energy Authority of Ireland (SEAI) identifies the Site as having an average wind speed of 8.5 m/s at 150 m above ground level. Meteorological monitoring carried out within the proposed development lands between February 2021 and June 2021 (using a lidar system located at ITM coordinates 531978.72,753818.92) recorded mean horizontal wind speeds at 183m height of 8.944 m/s and 8.689 m/s at 158m height. This correlates well with the SEAI historic data. The data indicates viable values for wind energy development at this location, considering values of 3-5 meters per second are required for turbines to start operating.

The subject site is well connected by local road infrastructure to primary transport routes: the M17 and R332.

Grid connection was also considered during the strategic site selection. The Proposed Development requires only a short section of 110 kV cable (c. 650m) to tie in to the existing Cashla-Dalton 110 kV overhead line.

The Site is not located in proximity to any local and regional airports, with Ireland West Airport being located 41.5km to the north (noting that obstacles of more than 100 meters above terrain for a distance of up to 45km from the airport will be registered in the IAA Air Navigation Obstacle Data Set).

The Site is not located near any restricted zone associated with military operating areas or exercise/training areas. Similarly, the Site and associated access, turbine delivery route and haul routes are not on roads identified by the Air Corps as critical low level flying routes in support of Air Corps operation requirements (Ref Chapter 17 for further details).

3.3.1.5 Summary

From the review of the criteria set out above, the Site was identified as a suitable location for the provision of a wind farm of the scale proposed. The Site is located predominantly within low intensity usage agricultural land which allows the current land use to continue in parallel with the Proposed Development. The Site is also located in an area with a relatively low population density with appropriate annual wind speeds, is in close proximity tot eh national electricity grid, and is located outside of any nationally or European designated area.

3.3.2 Alternative Renewable Energy Technologies

Alternative sources of energy generation form part of the renewable energy development portfolio of the Applicant, and a number of options were considered at a high level prior to initiation of this Proposed Development. The alternative renewable energy source considered for this Site was solar. Solar is an alternative source of renewable energy considered appropriate for the Site given existing land use. Commercial solar energy production is the harnessing and conversion of sunlight into electricity using photovoltaic arrays (panels).

In order to achieve the same energy output from solar energy, the Site would require a significantly larger development footprint due to the significant difference in capacity factors between solar and wind technologies and the footprint of the technology infrastructure. The capacity factor of solar energy is significantly lower than that of wind energy, requiring approximately three times the installed capacity of the Proposed Development to produce the same amount of energy. Solar farms require c. one hectare per MW, the land area required would be in the region of 80 hectares (including associated operating infrastructure). This compares to a footprint of 19.6 ha for the 11 no. proposed turbines and infrastructure.

A comparison of the potential environmental effects of the development of a solar PV array when compared against the chosen option of developing the proposed wind farm at this site (with both options having the same MW output) are presented hereunder.

Table 3-2: Comparison of environmental effects for an alternative solar technology

Environmental Considerations	Solar PV Array	Wind Farm
Air & Climate	Requires a larger installed capacity to achieve the same output however solar energy requires less steel and less concrete than wind energy and therefore has a lower embodied carbon value.	Despite requiring a lower installed capacity to achieve the same output, the volume of steel and concrete required and the related embodied carbon for wind turbines would be higher.
Noise & Vibration	Less potential for noise impacts on nearby sensitive receptors (generally in construction only).	Increased potential for noise impacts on sensitive receptors during construction given more intensive construction techniques and during operation of turbine components.
Biodiversity	Larger footprint would result in greater habitat loss and lower opportunity to avoid habitats of higher value and greater loss of bat foraging and commuting habitat. Solar panels have the capacity to reflect polarised light, which can attract aquatic insects, which has the potential to impact their reproductive biology.	Smaller footprint with associated lower potential for habitat loss.
Ornithology	Potentially larger area of habitat loss for birds, in particular ground nesting birds. Bird collision risk from solar panels is very low.	Bird collisions with wind turbines. Habitats for ground nesting birds retained.
Land, Soils, Geology	Shallower excavations with less requirement for spoil management. However, will have a larger footprint and as such greater potential to encounter dolines, requiring excavation for stabilisation.	Will require piled foundation solutions with greater potential for geological and hydrogeological interation.
Hydrology & Water Quality	Larger development footprint, likely requiring greater number of drain crossings / interactions with greater potential for sediment runoff.	Smaller development footprint requiring fewer drain crossings. Turbines are compatible with being constructed areas of flooding.

Environmental Considerations	Solar PV Array	Wind Farm
	Incompatible with areas of flooding.	
Population & Human Health	Potential for glint and glare impacts on local road users. Increased land take and associated loss of agricultural land use.	Potential for shadow flicker controlled in accordance with Wind Energy Guidelines. Existing agricultural land use can continue.
Material Assets	Higher risk from fire and electrical faults. Higher potential for interaction with local services e.g. the high pressure gas main in the area.	Socketed and piled foundations required due to dolines on site. However, this increases confidence in turbine stability.
Traffic & Transport	Potential for greater traffic volumes during construction phase due to the number of solar panels required to achieve the same output.	Fewer deliveries will be made however greater need for internal site management of spoil due to larger foundations.
Archaeology & Cultural Heritage	Larger footprint has higher potential to unearth undiscovered cultural artifacts, however foundations are relatively shallow.	Smaller footprint with lower potential to unearth undiscovered cultural artifacts.
Landscape & Visual	Potentially less visible from surrounding area due to screening from forestry and topography	More visible at a greater distance from the site.
Telecoms & Aviation	Larger land take requirements with greater potential for interface with telecommunications and aviation.	There are two radio network (listed below) in the vicinity of the of the proposed wind farm neither of which network would be impacted by the proposed turbine layout. Two private unlicensed airfields within 5km which will need to avoid the wind farm.

3.3.3 Alternative Turbine Numbers, Layout and Design

The design of the Proposed Development has been an informed and collaborative process of constraints assessment from the outset, involving engineers, environmental, hydrological, geotechnical, archaeological and transport specialists. The objective of which is the avoidance of significant environmental effects while designing a project which is technically feasible 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 and surveys, consultation and impact assessment, all of which have brought the design from its first initial layout to the current proposed layout.

Constraints and environmental sensitivities were identified, and buffers applied in order to determine appropriate areas within the site to accommodate turbine development. This constraints exercise resulted in a developable area being defined. Once the viable area was established, the siting requirements of the wind turbines in terms of separation distances etc. were considered and a preliminary layout was developed for the site. Constraints assessment included the following buffers:

- Residential dwellings plus a minimum 720-metre buffer (4 x tip height achieved from non-participating properties houses) (as per draft WEGS);
- European (Natura 2000) Designated Sites plus 200-metre buffer (based on expert judgement);
- Telecommunication Links plus operator specific buffer;
- Overhead transmission lines plus 3.5 times proposed rotor diameter buffer (as required by EirGrid);
- Electrical infrastructure outside of 1in 100 year flood extents (as per EirGrid and OPW);
- Turbine foundation works setback a minimum 50 metre buffer from bank rivers, streams and lakes (as per IFI guidance);
- Archaeological Sites or Monuments - 'Zone of Notification' plus 50m buffer as per recommendations of National Monuments Service;

Additionally, ground conditions were established through geotechnical investigations, the results of which were considered in turbine design and layout.

Constraints analysis allows for a viable developable area for wind turbines to be identified, from which an initial wind farm layout is developed. This initial layout is then further informed by detailed site investigations and studies including hydrological, ecological, archaeological and geotechnical, along with social assessment (e.g. noise and shadow flicker) and engineering (e.g. wind analysis, civil and drainage layout). As such, the environmental assessment of the Site was an iterative process used to further refine the design, always with the intention of minimising the potential for environmental effects.

3.3.3.1 Turbine Number and Model

The Proposed Development is for an 11-turbine layout with a ground to blade tip height range of 178 m to 180 m. The wind turbines will have a rotor diameter ranging from 149.1 0 m to 155 m and a hub height ranging from 102.5m to 105m. The proposed wind turbines will have a rated electrical power output of between 5.6 MW and 6.6 MW. Based on the 11-turbine layout the Proposed Development has the potential to achieve an Export Capacity (MEC) of approximately 61.6 MW to 72.6 MW. Consideration was given to achieving a similar MEC using smaller turbines: c.150m in height with a 4.2 MW rating. In such a case between 14 and 17 turbines would be required and would have an associated increased land take and associated environmental effects. Furthermore, the use of smaller turbines would not make as efficient use of the wind resource available at higher elevations above ground level.

The 11-turbine layout selected for the site has the smallest development footprint of the alternatives considered, while still achieving the optimum output at a more consistent level than would be achievable using different turbines.

A comparison of the potential environmental effects of the installation of a larger number of smaller wind turbines when compared against Proposed Development is presented hereunder.

Table 3-3: Comparison of environmental effects for an alternative solar technology

Environmental Considerations	Larger number of smaller turbine models (14-17 turbines 150m tip height)	Proposed Development (11 turbines 178m - 180m tip height)
Air & Climate	Lower output increases carbon payback period relative to embodied carbon value and lowers contribution to climate targets.	Higher output means faster carbon payback period relative to embodied carbon and higher contribution to climate targets.
Noise & Vibration	Larger footprint and associated increase in proximity to sensitive receptors with potential for noise effects.	All turbines set back a minimum of 720m from sensitive residential receptors and potential noise effects mitigated through turbine operating mode. Larger turbines have a greater sound power level and as such greater potential for noise effects.
Biodiversity	Greater potential for effects on bats due to greater number of turbines. Larger footprint with associated potential removal of higher value habitats.	Lower number of turbines reduces area of habitat removal and allow more strategic placement of turbines away from higher value habitats and designated areas.
Ornithology	Larger number of turbines increase collision risk area for birds. Larger footprint has an associated greater habitat removal with greater potential for displacement of birds.	Fewer wind turbines reduce potential collision risk for birds. Has allowed the positioning the turbines within more open areas away from busier flight paths associated with the bog habitats and river habitats in the locality. Larger wind turbines have a slower blade rotation thereby reducing potential collision risk for birds.
Land, Soils, Geology	Larger footprint would require greater peat and spoil management and make it more difficult to avoid areas of deeper peat or locations of dolines. Given ground conditions, smaller turbines would not negate the need for pilled foundations.	Smaller development footprint would result in smaller volumes of peat and spoil to be excavated and managed. Location and alignment of hardstands and roads can be more sympathetic to the natural topography allowing optimization of cut/fill.
Hydrology & Water Quality	Larger number of turbines might necessitate a greater number of drain and watercourse crossings and may require siting of turbines closer to rivers.	Lower number of turbine allow for greater setback distances from rivers.
Population & Human Health	Increased potential for shadow flicker due to the increased number of turbines.	Lower potential for shadow flicker due to setback from receptors.
Material Assets	Higher potential for interaction with local services e.g. the high pressure gas main in the area.	Site designed to avoid significant interaction with gas main or other utilities.
Traffic & Transport	Greater number of turbine component deliveries to site.	Lower number of component deliveries to Site.

Environmental Considerations	Larger number of smaller turbine models (14-17 turbines 150m tip height)	Proposed Development (11 turbines 178m - 180m tip height)
	Larger footprint requiring greater haulage.	
Archaeology & Cultural Heritage	Larger footprint has higher potential to unearth undiscovered cultural artifacts, however foundations are relatively shallow.	Smaller footprint with lower potential to unearth undiscovered cultural artifacts. Design takes cognisance of nearby recorded monuments and avoids them and their zone of influence where possible.
Landscape & Visual	Increased visual effect due to cluttered / stacked effect caused by increased number of turbines.	Larger turbines viewed as more significantly imposing infrastructure by closer sensitive receptors. Can achieve greater setback from properties with fewer turbines.
Telecoms & Aviation	Greater potential for interference with telecoms due to larger number of turbines.	No effects on telecoms or aviation.

Fewer, but taller turbines were selected for the final design due to the lower overall footprint and associated reduced environmental effects.

The consideration to provide fewer, larger turbines with greater power output is in line with industry trends. This option increases energy efficiency, improving the energy output to the national grid per turbine, thus reducing the cost of energy for the consumer while also providing more positive impacts in terms of climate change mitigation and energy security. The use of less turbines also reduces the effect on the receiving environment with less land-take required to accommodate the wind farm and less associated construction works as detailed above. Recent permitted wind farm applications in Ireland tend towards larger/taller turbines (i.e. the larger turbine tip heights that are available on the market in Ireland). Examples of recent consented wind farms which include larger/taller turbines are the Ardderroo Wind Farm, Co. Galway (ABP ref. PL07 .303086) which consists of 25 no. turbines at 178.5m tip height, the Coole Wind Farm, Co. Westmeath (ABP ref. PL25M.300686) which consists of 13 no. wind turbines of 175m tip height and Barnesmore Windfarm, Co Donegal (ABP ref. PL14 .306303) which consists of 13 turbines with tip height up to 180m.

Fáilte Ireland (2012) in their assessment of 'Visitor Attitudes on the Environment' concluded that in relation to the perceived impact of wind farms on natural beauty, "*the majority of visitors also still favour large turbines (47%) over small turbines (28%), and in smaller numbers, with the option of 5 turbines proving the most popular, followed by two clusters of 10 and finally wind farms of 25 turbines".*

There is a balance to be struck between the visual and spatial dominance of turbines and the clutter and the frequency of turbines within a view as both of these effects contribute towards the magnitude of visual effect.

3.3.3.2 Alternative Turbine Layouts

Alternative layouts for the Proposed Development were developed in an iterative design process which aimed to avoid environmental sensitivities, minimise potential environmental effects both on and off site and to maximise the wind potential on site. The design has been carried out in accordance with industry guidelines and best practice, namely the Department of Environment, Heritage and Local Government's (DoEHLG) Wind Energy Development Guidelines (2006), The Department of Housing, Planning and Local Government's (DoHPLG), and the Irish Wind Energy Association Best Practice Guidelines (2012). The design process of the Proposed Development has complied with the Draft Revised Wind Energy Development Guidelines (2019) in the aesthetic considerations in the siting and design of the wind farm and in terms of mitigation by design including increased setback from nearby dwellings and the policy regarding zero shadow flicker.

Initially, following the establishment of the developable area for the Shancloon Wind Farm, and as part of the design iteration process, an early stage layout (Design Iteration 1 as shown in Figure 3.1), was established which comprised 13 turbines. This initial layout focussed on achieving optimal performance and as such focussed on limiting wind take. As such turbine separation distances were based on wind ellipses of three times the rotor diameter (3d) in the crosswind direction and seven times the rotor diameter (7d) in the prevailing downwind. This allowed for a 13-turbine layout.

The proposed wind turbine layout was refined (Design Iteration 2 as shown in Figure 3.2), following feedback from the project team and the Developer and was informed by ongoing desk-based and environmental surveys, noise and shadow flicker modelling, engagement with local residents, service providers, environmental stakeholders and landowners. As a result the turbines were moved away from environmental sensitivities.

Following feedback project geotechnical and civil engineers, ecologists and hydrologists the 13-turbine layout was optimised through minor movements of selected turbines in order to achieve best separation distances between wind turbines and to increase inter wind turbine spacing. This included the removal of more constrained turbines in order to arrive at the final 11-turbine layout (Design Iteration 3 as shown in Figure 3.3). The final proposed option was developed to present the least potential environmental effect through the project philosophy of mitigation by avoidance in design.

A comparison of all design iterations is presented on Figure 3.4.

The construction methods for any wind farm are not unique in the context of ground preparation, foundation installation and turbine erection. When considering the construction methodology for the Proposed Development (and alternative layouts) consideration was given to the site investigative surveys undertaken on site and the most appropriate means of constructing the onsite infrastructure without allowing for significant environmental effects. Foundations for wind turbines will be piled due to the presence of dolines on site and roads in peat will be floated roads. The construction methods that will be employed are not unique potential sources of contamination and so the various layouts are considered neutral in this regard.

The final design iteration was chosen to take forward for the Proposed Development as an 11 - turbine array and a 178m - 180 m turbine tip height as it strikes a balance between energy production capacity and reduction of environmental effects. This layout is clear and simple incorporating a degree of symmetry and order. The layout thus represents the most visually sympathetic arrangement possible for a viable wind energy development. The chosen option provides for the greatest amount of energy production while avoiding potential significant effects on the receiving environment and achieving appropriate setback from dwellings (see the shadow flicker and noise chapters for further details on the financially involved dwelling) and sensitive environmental receptors.

A comparison of potential environmental effects of the wind farm design iteration options and the final design iteration for the Proposed Development is detailed hereunder.

Table 3-4: Environmental Considerations Through Turbine Layout Evolution

Environmental Considerations	Considerations at initial layout (DI1) through to Second Layout (DI2)	Considerations at Second Layout (DI2) through to Final layout (DI3)
Air & Climate	Several of the turbines located in areas of raised bog at DI1 were relocated in DI2 in order to reduce the requirements for removal of deep peat which sequesters carbon. 13 turbines with most optimised wind capture layout capitalises on the potential to maximise the use of the site wind resource.	Reducing the turbine array from 13 to 11 lowered the potential to maximise the use of the site's wind resource. T12 and T13 would require the removal of areas of raised bog in order to accommodate the turbine hardstanding. These turbines were removed from the development thereby lowering the effect on deep peat, which reduces carbon losses and improves carbon payback time for the Proposed Development. Removing T13 and T12 lends itself to a more compact site layout requiring less construction material.
Noise & Vibration	Turbine array located closer to sensitive noise receptors and increase number of turbines has greater potential for noise effects. T2 relocated due to provide for greater separation distance from properties to the west of the Site.	Relocation of T3 away from high value bat habitat also provides for greater separation distance from properties to the west of the Site. Fewer turbines provides for greater separation distances between sensitive receptors and the Proposed Development.
Biodiversity	Larger number of turbines with a more spread out layout has a greater potential to locate turbines in or close to sensitive habitats / species. Several turbines identified in DI1 were relocated away from sensitive bat habitat[2] as part of DI2 iteration: • T5 – moved out of the zone of influence of confirmed bat roost in farm building, however moved close to raised bog. • T6 – moved away from hedgerow with high bat activity. • T8 – moved away from scrubby habitat on arterial drainage channel CH4/13/5/1 which has high bat activity. • T9 – moved away from hedgerow with high bat activity.	Reduced number of turbines and relocation of turbines away from sensitive habitats: • T3 – moved away from forestry edge which is location with high bat static detector activity. • T5 – moved 100m away from area of raised bog into area of dry-humid acid grassland • T6 – moved slightly (c. 40m) to avoid dolines and to move further from high activity bat habitat • T12 – removed due to conflict of civil layout with raised bog habitat and bat habitat • T13 – removed due to civil design conflict with raised bog and location within flood extents.

[2] Guidance on Bat Surveys, Assessment & Mitigation for Onshore Wind Turbine Developments – Version 1.1 NIEA, Natural Environment Division, March 2024 prescribes a ZoI of within 200m plus rotor radius of the proposed turbine(s) from roost features and that a minimum 50m buffer to all habitat features used by bats (e.g. hedgerows, tree lines) should be applied to the siting of all wind turbines.

Environmental Considerations	Considerations at initial layout (DI1) through to Second Layout (DI2)	Considerations at Second Layout (DI2) through to Final layout (DI3)
	• T10 – moved out of raised bog habitat into area of cutover bog • T12 – moved away from area of scrubby habitat with high bat activity into area of cutover adjacent to Cloonbar bog. T11 was moved out of the area of raised bog in Cloonbar bog and T1 was moved out of Shancloon bog in order to reduce effects on higher ecological value intact bog.	
Ornithology	Larger number of turbines has greater potential for bird collision and displacement from supporting habitat. As part of DI2 evolution T2 was moved out of Shancloon bog which supports several raptor species (with kestrel possibly breeding in adjacent conifer) and waders/waterbirds (potential breeding snipe).	Reduced number of turbines and more compact layout has an associated reduced potential for bird collision risk. T13 removed from Beagh More bog which reduces collision risk for the associated bird assemblage.
Land, Soils, Geology	Larger development footprint would result in greater volumes of peat/soil and subsoil to be excavated and removed to dedicated onsite spoil management areas. Negligible risk of peat slippage at the site given site topography. As part of DI2 T3 moved away from larger doline feature to reduce potential need for excavation. Turbines moved out of areas of raised bog to reduce potential foe effects on peat.	T12 and T13 would require the removal of areas of raised bog in order to accommodate the turbine hardstanding. These turbines were removed from the development thereby lowering the effect on peat and requirement for peat/spoil management.
Hydrology & Water Quality	Turbines located within modelled flood extents. As part of DI2, T7 was moved away from the confluence of the arterial drainage channel ref. F.280A and CH4/13 Sect. 3 (the Black (Shrule) river). Note this area is within the 1 in 100 year flood extents (with a flood depth of 0.2m) The turbine location was moved c. 40m up-topography from an elevation of 30m	Removing T13 lends itself to a more compact site layout requiring fewer drainage measures and includes the removal of the need to construct two additional bridge crossings of the Black (Shrule) river, with an associated reduced potential for effects on hydrology and water quality and reduced associated riparian landtake.

Environmental Considerations	Considerations at initial layout (DI1) through to Second Layout (DI2)	Considerations at Second Layout (DI2) through to Final layout (DI3)
	above OD to 31m above OD and is located on the boundary of the modelled 1 in 100 flood extents. T13 was moved away from Black (Shrule) river into area of cutover bog. However this is proximal to Beagh More bog raised bog and remains within 1 in 100m flood extents (with flood depths of c. 0.5m) Larger development requiring higher number of watercourse crossings, drain crossings and cross drains.	
Population & Human Health	Potential for shadow flicker impacts on nearby sensitive receptors is greater due to location and number of turbines.	More compact layout with fewer turbines allow the location of the turbine array further away from sensitive receptors and reduced potential for shadow flicker.
Material Assets	Will require crossing of gas main.	Will require crossing of gas main.
Traffic & Transport	Potential for greater traffic volumes during construction phase due to greater materials requirements.	T1 – moved c. 60m north to accommodate tie into local access to turbary. Remains outside of 1 in 100 flood extents. T2 – moved slightly to accommodate tie into local access to turbary and to provide further set-back from bat foraging habitat. T8 – minor relocation to accommodate turning head.
Archaeology & Cultural Heritage	Greater potential for encountering unrecorded, subsurface archaeology in areas of undisturbed peat. Turbines were removed for areas of raised bog.	Access to T13 would directly impact boundary mound. T13 has been removed from the final layout.
Landscape & Visual	Higher potential impacts to inhabited houses to the west of the Wind Farm Site due to initial layout and potential for greater impact due to the wider visual extent of the proposed turbines. Movement of T2 reduces visual effects somewhat.	Slightly lower overall visual impact due to lower number of turbines and compaction of the layout.
Telecoms & Aviation	T1 is located within the zone of impact of the Three Kilmaine tecoms and T4 within the Three Shrule telecoms. Turbines were relocated as part of DI2.	No effects determined.

3.3.4 Alternative Transport Routes and Construction/Operation Access

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

The alternatives considered for the port of entry of wind turbines into Ireland for the Proposed Development include the Port of Foynes, Dublin Port and Galway Port. It is not feasible to approach the site from the north due to constraints through a number of towns.

The Port of Dublin has an embargo on turbine loads and won't currently permit their import through the port and as such was not considered further.

Each Port offers a roll-on roll-off procedure to facilitate import of wind turbines. Galway Port was selected as the port of entry for the Proposed Development because it is located closer to the Site and road connections between the Port and the Proposed Development are dominated by motorway and national road infrastructure and as such reduce the requirement for third party land take and / or remediation work on the turbine delivery route.

The road network along the turbine delivery route has the capacity to manage the large/abnormal loads proposed. Once the route leaves the national road it will use the R332 to access the Site. The route chosen was such to reduce potential for interaction with third party lands while finding the most direct route to Site. In this regard, alternative entrance points to the Site were also considered:

1. Access from the south via the L-6225 - this approach would require a new bridge crossing / upgrade of the existing bridge crossing of the Black (Shrule) river. The lands adjacent are within the modelled 1 in 100 flood extents, with flood depths of c. 0.9m. As such the required bridge crossing would need to be substantial. Significant third party landtake would be necessary for this route option. As such the route was deemed to have a greater potential for significant environmental effects than the selected route for turbine delivery and for site access.
2. Access from the L-6483 at T10 – constraints relating to access to private lands to allow adequate turning radius and the presence of Marsh Fritillary (protected butterfly species) habitat along the western extent of the L-6483 made this route less preferable.

Ultimately the most viable turbine delivery / abnormal load route to Site was determined as follows (Figure 2.3):

- Loads will exit the docks and head northeast on Lough Atalia Road;
- Loads will take a slight right onto College Road / R339. They will then continue to follow R339;
- Loads will turn left at Connolly Avenue;
- Loads will then turn right onto Tuam Road / R336;
- Loads will turn right at the R386 / N6 junction and will proceed eastbound on the N6;
- Loads will continue on the N6 and the M6 eastbound;
- At Junction 18 loads would turn left onto the M17 northbound;

- Loads would follow the Tuam bypass onto the N17;
- Loads will turn left onto the R332;
- Loads will turn left onto the L6483 and continue west to the proposed site entrance on the L-2234.

The objective will be to maintain the strategic capacity and safety of the N17, M17, M6 and N6 carriageways at all times, cognisant of the National Development Plan, 2021 – 2030, with key sectoral priorities for maintaining the national road network to a robust and safe standard for users.

As presented in Chapter 14 - Traffic and Transportation of this EIAR and shown on planning drawings, only minor accommodation works will be required to allow for abnormal load delivery at the junction between the R332 and L-6483 and at the junction between the L-6483 and the L-2234 whereby vegetation clearance and a running surface will be required at both locations.

The proposed access roads on the Site are to enable transport of infrastructure and construction materials. As the overall site layout was finalised, the most suitable routes between each component of the Proposed Development were identified, capitalising on the use of existing tracks and roads and taking into account the physical constraints of the Site.

The location of the main on-site construction compound was selected relative to the location of the access into the Site. A secondary smaller compound will be provided within the western extent of the turbine array and various compound locations were examined within this land parcel. However, site topography dictated the ultimate location of the compound, located between T2 and T3 (given that other locations within this land parcel would have dictated a significantly greater need for earthworks and fill). A location in proximity to the on-site farm buildings was considered, however this is a confirmed bat roost and as such the construction compound would need to be located away from these buildings in order to limit potential for disturbance which would have had the potential for a significant effect on bat population.

An additional compound will be provided at the 110 kV substation, the location of which is dictated by the access to the substation site.

3.3.5 Alternative Substation Locations and Associated Grid Infrastructure

As the 110kV overhead line is located in close proximity to the Site, it was decided from the outset, that the proposed 110kV substation would be sited at the west of the Site in order to connect into the existing grid infrastructure and thereby negating the need to utilise the public road network for grid connection works. Three location options for the proposed substation were selected (see Figure 3.5, Volume IV):

Option 1: Located within third party agricultural lands located c. 750m from the nearest turbine (T3) and 1.9km from the existing overhead line. This option is located north of the Togher River and would require c. 2.5 km of 110 kV underground cable in order to connect to the existing overhead line. This route would necessitate a cable bridge / horizontal directional drilling (HDD) crossing of the Togher River. Much of the 110kV cable route would be located within the 1 in 100 year flood extents of the watercourse. This is contrary to EirGrid's 110 kV Underground Cable Functional Specification[3] which requires that "Cables shall not be routed through any area likely to flood (areas classified in 1 in 100 year fluvial and pluvial events)". As such this substation location and cable options is not viable from a technical perspective.

[3] Document Reference: CDS-GFS-00-001-R0 110 kV, 220 kV and 400 kV Underground Cable Functional Specification General Requirements (EirGrid, 2020)

Option2: Option 2 is located in third party agricultural lands immediately adjacent to the existing overhead line. A portion of these lands are within the modelled 1 in 100 year flood extents and as such extensive earthworks would be required to raise the substation lands above the flood depths. Additionally, Marsh Fritillary larval webs were identified within these lands. Development would therefore result in loss of suitable breeding habitat for this species. Marsh fritillary is listed in the IUCN Red List of Threatened Species as vulnerable and is listed in Appendix II of the Bern Convention. As such the damage or destruction of the breeding habitat of this species is prohibited. Site investigation at this location (borehole reference number PBH-18 – see Chapter 11 for further details) indicated a possible karst zone between 8.50m to 14.80m BGL. The reduced recovery and brown clay infill are indicative of karst bedrock. Calcite veins and the bleaching of rock along fractures are indicative of faulting and associated hydrothermal activity. Given ecological, hydrological and geotechnical constraints, this location was deemed non-viable.

Option 3: This option is located within third party agricultural lands south of the Togher River and is located c. 2km from the nearest turbine (T4) and would require the installation of c. 650m of 110 kV cable. The site is located outside of the 1 in 100 year flood extents of the Togher River. The cable route and loop in towers will be located c. 50m from a record for a cashel (incl. potential external burials - GA028-046).

A comparison of the potential environmental constraints and effects for the substation location options concluded Option 3 as the most appropriate location for the proposed substation.

3.4 Conclusion

This chapter of the EIAR has described the reasonable alternatives considered throughout the development process for the proposed Shancloon Wind Farm in terms of project design philosophies, technology, size and scale for the development. This Chapter sets out the evolution of the Proposed Development and the alternatives considered. The section details the strategic site screening process i.e. the high-level considerations in finding a suitable site for a renewable energy project. Alternative renewable energy technologies were considered and a comparison of potential environmental effects of the alternatives was provided.

The alternative layouts of the Proposed Development were established through the project philosophy of mitigation by design. Alternative density and scales were considered, and the potential environmental effects of various alternative turbine scales and numbers were compared. The alternative 110kV infrastructure options were examined, and the optimal option was chosen as a result of environmental assessment.

Alternatives were also considered for other individual elements of the Proposed Development including the turbine delivery route. All project elements were arrived at through the avoidance of potential environmental effects as detailed in the comparisons provided throughout this Chapter.

The final proposed layout of the Proposed Development as assessed throughout this EIAR is assessed to be the optimal design which minimises effects on the receiving environment, while providing significant renewable electricity to the national grid, in line with national energy and climate policy.

FEHILY TIMONEY

DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

www.fehilytimoney.ie