

Ballyfeeny Green Energy Project



Environmental Impact Assessment Report Volume II

Chapter 3 – Consideration of Reasonable Alternatives

September 2025



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Acronyms

Term	Meaning
EIAR	Environmental Impact Assessment Report
GCR	Grid Connection Route
TDR	Turbine Delivery Route
CEMP	Construction Environmental Management Plan
DMP	Decommissioning Management Plan
EIA	Environmental Impact Assessment
EU	European Union
PDR	Planning and Development Regulations
EPA	Environmental Protection Agency
WTG	Wind Turbine Generator
MW	Megawatts
CAP25	Climate Action Plan 2025
ITM	Irish Transverse Mercator
ESB	Electricity Supply Board
SEAI	Sustainable Energy Authority of Ireland
WEDG 2006	Wind Energy Development Guidelines 2006
Draft WEDG 2019	Draft Wind Energy Development Guidelines 2019
SAC	Special Area of Conservation
SPA	Special Protection Area
NHA	Natural Heritage Area
kV	Kilovolt
GIS	Geographical Information System
ECoW	Environmental Clerk of Works
EcoCoW	Ecological Clerk of Works
CFRAMs	Coastal Flood Risk Assessment Management
CDP	County Development Plan
NWPS	National Parks and Wildlife Services
NGOs	Non-Governmental Organisations
RCDP	Roscommon County Development Plan
BnM	Bord na Móna
T01	Turbine 1
T02	Turbine 2
T03	Turbine 3
T04	Turbine 4
T05	Turbine 5
T06	Turbine 6
IWEA	Irish Wind Energy Association
SE1	Site Entrance 1
SE2	Site Entrance 2
SE3	Site Entrance 3
SE4	Site Entrance 4
SE5	Site Entrance 5
SE6	Site Entrance 6
TSO	Transmission System Operator
ECP	Enduring Connection Policy

CRU	Commission of Regulations for Utilities
HDD	Horizontal Directional Drilling
MVA	Megavolt-amperes
O/H	Overhead
CO₂	Carbon dioxide
GW	Gigawatts
GHG	Greenhouse gases

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3 Consideration of Reasonable Alternatives

3.1 Introduction

This Chapter assesses the preferred options during the construction, operational and decommissioning phases. The Alternatives considered are outlined in terms of the development design of the proposed Project.

The proposed Project includes six no. turbines and all associated infrastructure including Turbine Foundations, Turbine Hardstands, Site Access Tracks, Wind Farm Internal Cabling, Grid Connection Route (GCR), Relay Mast, Onsite Substation and works required along the public road network for the two Turbine Delivery Route (TDR) options to facilitate the delivery of turbine components. A full description of the proposed Project is provided in **Chapter 2 - Project Description**

The Applicant is in receipt of a notification of opinion by the Local Authority on design flexibility. The notification is provided in **Appendix 1.5 – DFR-25-1 Notification of Opinion by LA**. This opinion from the Local Authority confirmed that it was *'appropriate that the proposed application be made and decided before the prospective applicant has confirmed certain details of the application'*.

Chapter 1 – Introduction, Section 1.6 Approach to Design Flexibility, outlines with respect to the notification of opinion by the Local Authority, the Applicant in this EIAR, proposes to assess three distinct Technology Options within the range outlined by the Local Authority and in accordance with the design flexibility parameters sought. **Chapter 1 – Introduction Table 1-3**, outlines the options and associated parameters that are used in the EIAR, comprising three potential turbines classified as Technology Option 1, 2 and 3. Further detail on the assessment of the Technology Options in this assessment are described in each respective Chapter. However, for the purposes of this Chapter, the Technology Options are not considered as Alternatives. full description of the proposed Project and the three Technology Options is provided in **Chapter 2 - Project Description**.

This Chapter is supported by the following:

Volume 4 – EIAR Figures;

Appendix 2.1 – Construction Environmental Management Plan (CEMP); and

Appendix 2.1.4 – Decommissioning Management Plan (DMP).

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The assessment should be read in conjunction with:

Chapter 2 – Project Description;

Chapter 7 – Land, Soils and Geology;

Chapter 8 – Water, Hydrology (Flood Risk Assessment) and Hydrogeology

Chapter 9 – Air Quality and Climate;

Chapter 10 – Noise and Vibration;

Chapter 11 – Landscape and Visual;

Chapter 12 – Traffic and Transport;

Chapter 15 – Shadow Flicker;

Chapter 16 – Cumulative Effects, which considers other plans and projects that may act cumulatively with the proposed Project; and

Chapter 17 - Interrelated Effects, which address the interactions between effects on different environmental aspects.

3.2 Statement of Authority

This section of the EIAR has been prepared by Rowan Engineering Consultants Ltd., (Rowan). Rowan has been providing environmental, ecological and planning services since the company was founded in 1998 to a broad range of clients.

This Chapter of the EIAR has been written by Dr James Massey – James is a Senior environmental consultant and ecologist with over 25 years' experience, specifically on environmental assessment of renewable projects, onshore and offshore in Ireland and worldwide. James is a Fellow of the Institute of Environmental Sciences and a member of several professional organisations. James is a Chartered Environmentalist and Chartered Scientist and holds a PhD, DSc, BSc in Applied Marine Biology and a number of professional and industry qualifications.

Denise Meade has reviewed this Chapter. Denise has over 20 years' experience working on both public and private sector developments. Her experience lies in the environmental co-ordination of large infrastructure projects across a range of industries including renewable energy, roads, water and wastewater. She has managed all aspects of planning applications, with a focus on the technical review and delivery of EIARs. She is a Chartered Environmentalist (CEnv) and Chartered Water and Environmental

Manager (C.WEM) and hold an MSc in Applied Environmental Science and AdvDip in Planning & Environmental Law.

3.3 Definition of Alternative

Article 5 of the EIA 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) states the following information regarding alternatives must be included in an EIAR:

“a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment” (Article 5(1)(d)).

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

“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”.

Schedule 6 of the Planning and Development Regulations (PDR) 2001, as amended, sets out the information which must be contained in an EIAR. Article 2 (b) states that:

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

This chapter will examine the alternatives as required above.

3.4 Methodology

3.4.1 Approach

There is limited European and national guidance on what constitutes a ‘reasonable alternative’. It is noteworthy that the document *Environmental Impact Assessment of Projects - Guidance on the Preparation of the Environmental Impact Assessment Report* (European Commission, 2017) states that reasonable alternatives,

“must be relevant to the proposed project and its specific characteristics, and resources should only be spent assessing these alternatives”.

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

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

“The objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with ‘an indication of the main reasons for selecting the chosen option’. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or ‘mini-EIA’) of each alternative is not required”.

3.4.2 Structure of the Chapter

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

- ‘Do Nothing’ Alternative;
- Alternative Locations;
- Alternative Layouts;
- Alternative Design;
- Alternative Processes;
- Alternative Mitigation Measures; and

- Consultation about the consideration of the alternatives.

Each of these is addressed in the following sections.

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

3.5 “Do-Nothing” Alternative

Annex IV, Part 3 of the EIA Directive, as amended, 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.

If the proposed Project were not to proceed the existing agricultural land use at the proposed wind farm Site would continue including the ongoing forestry and farming practices. Negatives associated with the “Do-Nothing” alternative include:

- Failing to work towards Ireland’s and Roscommon’s sustainability and renewable energy goals;
- No contribution to Ireland’s and Roscommon’s 2030 targets and the 2050 target of net zero emissions and the Climate Action Plan targets;
- No contribution to Roscommon’s target for wind energy production / renewable energy targets of potential 262MW of renewable energy;
- Importation of fossil fuels to maintain an increasing energy supply will continue and Ireland’s energy security will remain vulnerable;
- Adverse impacts on existing energy production which in turn may impact economic growth if energy demand cannot be met; and
- No project contribution to local employment, power generation and loss of community benefits through the proposed community benefit fund.

The significant positive environmental and societal benefits which would arise from implementing the proposed Ballyfeeny Green Energy Project would not be realised in the ‘Do-Nothing’ scenario. When faced with the real threat of climate change, and to meet Ireland’s ambitious targets for renewable energy generation and reduction of carbon emissions the do-nothing scenario was not the chosen option.

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

The Climate Action Plan 2025 (CAP25) sets out the government's ongoing and urgent response to the climate crisis. The Plan implements carbon budgets and sectoral emission ceilings, first introduced in 2022 and builds on previous climate action plans, which set a roadmap to halve Ireland's emissions by 2030 and reach net zero no later than 2050. The Plan sets out how Ireland can accelerate the actions that are required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development.

The opportunity to generate local employment, a development contribution, annual rates and investment would also be lost. The chosen option of a wind farm development is the most viable energy generation solution for the area, with the potential to contribute to regional and national renewable targets.

On the basis that the Do-Nothing alternative would represent a missed opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources coupled with a consequent reduction of greenhouse gas emissions, including those commitments set out in CAP25 and also a missed opportunity to increase the security of Ireland's energy supply, the Do Nothing alternative is not favoured. The environmental effects of the Do-Nothing Scenario are assessed in each of the supporting EIAR **Chapters 5 to 15**.

3.6 Alternative Locations

As part of the initial development phase, the Developer and Project team has considered a number of sites nationally. A shortlist of suitable development sites has been determined by the developer based on a series of site feasibility studies evaluating the environmental and planning considerations of sites, their suitability for power generation, potential for development and the availability of a suitable land bank etc. The shortlisting and identification of suitable development sites on the basis of the aforementioned criteria was conducted prior to the EIAR Scoping and Screening for the proposed Project.

An outline of the site selection criteria and the selection of the proposed Project at Ballyfeeny as the most suitable for development is outlined in this section.

The site selection process for the proposed Project site has been informed through consultation of national, regional and local policy to address factors which influence the turbine layout and project design. The primary policy, planning and environmental considerations for site selection are outlined in **Table 3-1** and **Table 3-2**, which also details reasons for the proposed project site being considered suitable for a wind farm.

The following sections outlines the principal considerations in evaluating the site suitability and comparing it to alternative locations.

Site location: Site location was selected in relation to Roscommon County Development Plan 2022-2028. The site area and its environs are designated as 'Most Favoured' for wind energy development.

Population Density: The proposed wind farm Site is located within an area which is entirely rural in nature with a low population density. The Roscommon County Development Plan 2022-2028 outlines that the population of Strokestown was 825 persons in 2016, and population growth from 2022-2028 is expected to increase by 19% (155 persons), thus confirming a low population density for the area. The population of Strokestown was selected as representative for the proposed Project site as this settlement is most proximal to the proposed wind farm Site and had population projections outlined within the Roscommon County Development Plan. The EIAR requires a detailed assessment of the population which is examined in **Chapter 5 - Population and Human Health**.

Wind Speeds: Wind speed data was used to evaluate the potential wind resource of each potential site. The Sustainable Energy Authority of Ireland (SEAI) have prepared a digital map of Ireland's wind energy resource called the Wind Atlas. The Wind Atlas was used to evaluate the current wind resource environment at each potential location and to refine potential target areas within the wider area where wind resource was sufficient to consider development. **Figure 3-1** shows the Wind Atlas output for the wider area of consideration overlaid with housing setback constraints derived from Geo-directory data to help narrow areas. This was done in accordance with the Wind Energy Development Guidelines 2006 (WEDG 2006) and with due regard to the Draft Wind Energy Development Guidelines 2019 (Draft WEDG 2019).

Protection of Visual Amenity: Upon reviewing the Roscommon County Development Plan 2022-2028 Landscape Character Assessment, the assessment value was used to inform the suitability of potential sites. The Project requires a detailed Landscape & Visual Impact Assessment (**Chapter 11 - Landscape and Visual**) however, which has been prepared as part of this report to minimise any potential significant effects on landscape and visual amenity to the site and its environs.

Protection of designated National and European sites: There are no sites of significance (i.e., Special Areas of Conservation (SAC's), Special Protection Areas (SPA's) and/or Natural Heritage Areas (NHA's), within or bounding the proposed Site. Moreover, there are no sites of significance located proximal to the wind farm Site. This identified the Site as potentially suitable for development. The EIAR requires a detailed assessment of the ecology of the site and potential pathway connectivity to the Natura site network. **Chapter 6 - Biodiversity**, assesses these elements in detail.

Feasible access to the national electricity grid possible within a viable distance: Alternative options of connecting a project to the national electricity grid were assessed as part of the proposed Project. Potential grid connection options for the Project would be subject to the node assignment rules by Eirgrid, as such it was determined that a project with a maximum export capacity of 20 – 40MW, would be assigned to the nearest 110kV busbar. Substations in close proximity to the Project were evaluated based on their suitability for connection to the national Grid.

Feasibility for suitable ports of entry and turbine delivery routes: Wind Turbine components (Blades, Towers, Nacelles etc.) are not manufactured in Ireland and therefore must be imported from overseas and transported via the public road network to a wind farm site. Galway Port and Killybegs Port are established ports of entry to Ireland serving wind farms across the western region and were considered as alternatives for TDR in the Scoping stages of the impact assessment, along with Dublin Port.

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

'Harnessing the potential of the region in renewable energy terms in accordance with the capacity allocation targets set out in Chapter 9: Climate Transition and Our Environment, across the technological spectrum from wind and solar, in addition to biomass and wave energy.'

Feasible supplies of materials within a viable distance: The proximity of materials required for construction (quarries and concrete production) in close proximity to the proposed wind farm Site (as highlighted in **Chapter 12 – Traffic and Transport** and **Planning Drawing 23604-900**), including the suitable public road network between these potential sources of materials is a further positive consideration of a wind farm site at this location.

In light of the above, when considering suitable locations for the proposed Project, the assessment has considered a number of sites in a regional context as being suitable for this type of development.

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

From the broad regional assessment (Stage 1) to identify potential suitable areas, the suitable areas identified were then further refined to outline potential site. The potential sites were the shortlisted (Stage 2) for the development of a potential wind farm. A number of comparative features of the sites were considered to select the optimal location from the potential land parcels available. Access and landowner agreements as well as sufficient space to construct Wind Turbine Generators (WTG) without impact or interference with local residences or businesses is a key consideration undertaken by the Project.

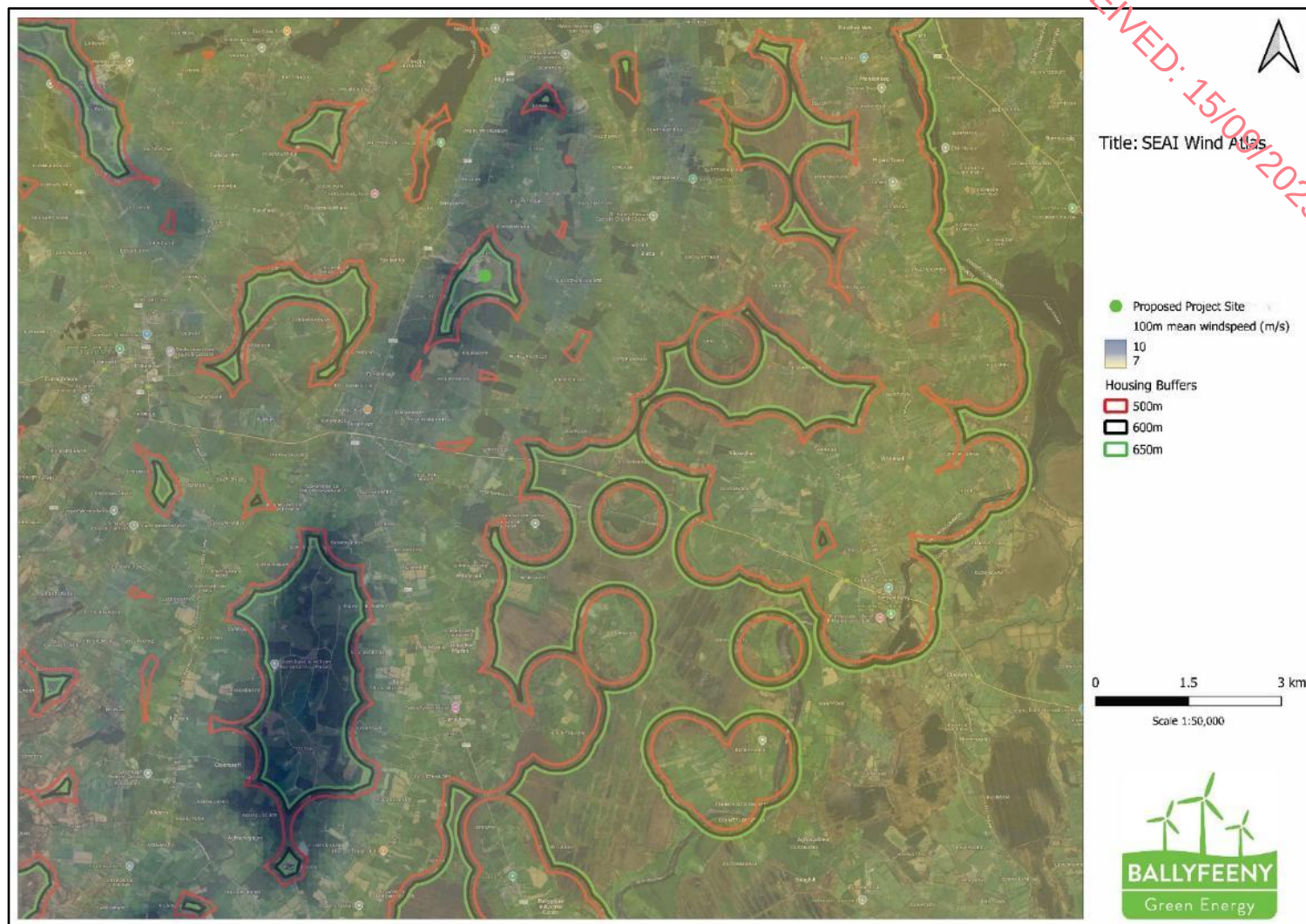


Figure 3-1: SEAI Wind Atlas across region considered. Potential sites identified by high potential and buffering residences for the Wind Energy Guidelines 2006 500m buffer and 2019 buffers.

3.6.1 Stage 1 – Identification of potential candidate sites

There are several factors that must be considered when selecting a site for wind energy development to achieve an economically viable project and some potential sites may have inherently different environmental sensitivities than others. The Wind Energy Strategy in the Roscommon County Development Plan 2022 – 2028, was considered to create a shortlist of areas based on, site zoning, wind resource and visual amenity setback distances, the Developer conducted a technical review of potential candidate sites for wind energy projects in Northeast Roscommon. This exercise reviewed a list of potential project sites, to align with the objective, to provide a typical regional target capacity of between 20MW and 40MW and with the best potential to deliver successful future wind farm projects.

As part of this site selection process, Geographical Information Spatial software (GIS) was utilised along with open data sources to map known constraints, and these were applied in the region to determine areas suitable for potential wind farm development. The constraints included the following:

- Planning Policy Context;
- Proximity to sensitive receptors;
- Proximity to Designated sites/Environmental Sensitivities;
- Soil Mapping;
- Consistent suitable wind speeds;
- Proximity to the national electricity grid;
- Archaeological and Cultural Heritage Features; and
- Supporting Infrastructure (including local road network and proximity to shipping ports).

This methodology was used to generate a shortlist of potential sites for further consideration, whereby additional factors that may affect development such as archaeology records, Coastal Flood Risk Assessment Management (CFRAMs) flood zones, watercourses, land use, site access, setback distances, and designated zoning were included in the assessment. Once a preferred site was identified from this assessment process, a further detailed site-specific assessment was undertaken to confirm the site's feasibility.

3.6.2 Stage 2 - Site Specific Assessments

Once the potential sites have been refined to a short list of windfarm candidate sites, a site-specific comparative assessment of each potential candidate site was conducted guided by the 2013 'Methodology for Local Authority Renewable Energy Strategies' that was prepared by the Sustainable Energy Authority of Ireland (SEAI) to assist Local Authorities in identifying areas that are suitable for renewable energy. A key element of this methodology is the identification of facilitators and constraints that influence the siting of this type of development. This general approach was adopted in the Developer's site selection process, but the process took account of the zoning provisions for wind energy in the Roscommon County Council Development Plan 2022-2028 - Renewable Energy Strategy. For the assessment of candidate sites, criteria (both facilitators and constraints) were chosen which not only covered the broad range of issues which can arise in wind farm development but also allowed for direct comparison of the candidate sites to each other to determine their relative suitability for wind farm development. The site-specific selection criteria and an outline of the basis for assessment for each criterion and the associated potential environmental effects are listed in **Table 3.1**.

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Table 3.1: Site-Specific Selection Criteria

Criterion	Basis for Assessment	Potential Environmental Interactions
Grid Capacity	Grid Access/Capacity means the potential of the national electricity grid to accommodate future projects on the network. The proximity of the project to suitable grid nodes (i.e., those with spare capacity) should facilitate the selection of a project for a viable grid connection offer.	Direct: Land, Soil and Geology, Hydrology and Hydrogeology, Biodiversity. Indirect: Noise and Vibration, Population and Human Health.
Grid Connection	Assessment of potential connection proximity to a point of connection (substation) to the electrical grid and the means of connection. A specialist electrical engineer was engaged to review the potential grid connection options for the proposed wind farm and to advise on the availability of grid capacity at surrounding grid connection nodes including at Sliabh Bawn 110kV, Lanesborough 110kV substation & Richmond 38kV, to identify a viable means of connection to the national electricity grid whether overhead or underground, and potential grid connection routes.	Direct: Land, Soil and Geology, Hydrology and Hydrogeology, Biodiversity. Indirect: Noise and Vibration, Population and Human Health.
Wind Resource Assessment	The available wind resource (i.e., wind speed) directly translates into how much electrical output is available from the site. Accurate wind resource assessments are crucial to the successful development of wind farms. The Irish Wind Atlas, published by the SEAI, uses long term weather model data to predict the long-term average wind speeds in Ireland, and is used by wind developers and local authorities to determine the best locations for future wind farm development	Direct: Project description and design, Air Quality and Climate. Indirect: Climate, Material Assets
County Development Plans	County Development Plans (CDP) typically indicate the areas of a county which are deemed preferred, open to consideration and not suitable for wind farm development. Review of the relevant County planning policy documents, including the Wind/Renewable	Direct: Landscape and Visual, Cultural Heritage, Biodiversity.

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Criterion	Basis for Assessment	Potential Environmental Interactions
(CDP) and Zoning	Energy Strategy.	
Proximity to Sensitive Receptors	Proximity to residential dwellings and other sensitive receptors refers to how close the wind turbines are to residences. The setbacks are compliant with the 2006 WEDG (500m setback) and follow the Draft WEDG 2019 which advise a minimum amenity setback of 4 times the blade tip height from the nearest dwellings.	Direct: Population and Human Health, Noise and Vibration, Shadow Flicker. Indirect: Landscape and Visual.
Environmental Sensitivity	Environmental sensitivity is the ecological sensitivity of the site based on proximity to sensitive areas within or around the site.	Direct: Biodiversity and Ornithology Indirect: Hydrology and Hydrogeology.
Archaeology and Cultural Heritage or amenity	Historical and cultural preservation are another key factor in site selection. Sites with recorded archaeological features or proximity to heritage sites may require extensive impact assessments and preservation measures. Avoiding areas with known archaeological significance can prevent delays in project approval and additional costs associated with mitigation efforts.	Direct: Archaeology and Cultural heritage, Population and Human Health Indirect: Landscape and Visual.
Ecological importance	The presence of protected habitats, wildlife reserves, or species of conservation concern, as identified by the National Parks & Wildlife Service (NPWS), CDP or local Non-Governmental Organisations (NGOs), can significantly affect site selection. Sites that overlap with designated conservation areas may face stringent environmental regulations, requiring mitigation measures or, in some cases, rendering the site unsuitable for wind farm	Direct: Biodiversity and Ornithology Indirect: Hydrology and Hydrogeology. Appropriate Assessment process.

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Criterion	Basis for Assessment	Potential Environmental Interactions
	development. Avoiding high-biodiversity areas helps streamline the permitting process and reduces environmental impact.	
Landscape Capacity/Cumulative Impact	This refers to the landscape's capacity to absorb wind farm developments, or the presence of receptors or other industries which a wind farm would contribute	Direct: Landscape and Visual. Indirect: Cultural Heritage.
Aviation and Communications	Airspace control and use to be considered. For the assessment, the criterion examines proximity of the site to local and regional airports, proximity to National Motorway network, parachute zone, Military Operating Areas, etc.	Direct: Telecommunications, Aviation and Electromagnetic Frequency.
Land Use and planning history	Assessment of land use (agricultural, arable, industrial forestry etc.) past land use and land value. Factors such as topography, soil stability, and land use compatibility must be considered to optimize turbine placement and minimize environmental impact. Agricultural/Commercial Forestry/Quarry. Not Lands already developed or owned by renewable energy developers Planning history of the site and other wind farm projects in the vicinity and wider area.	Direct: Cultural Heritage, Land, Soils and Geology, Hydrology and Hydrogeology, Biodiversity. Indirect: Population & Human Health
Flood Risk Analysis and watercourses, surface water etc.	Flood Plain Analysis assesses the wind farm's location in terms of historical flooding data. It also considers if the site is pumped, or gravity drained. Flood risk assessments are essential to ensure site stability and infrastructure resilience. Areas prone to flooding may require additional engineering solutions, such as elevated turbine foundations or drainage	Direct: Hydrology and Hydrogeology. Indirect: Traffic and Transportation.

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Criterion	Basis for Assessment	Potential Environmental Interactions
	systems, which can increase project costs. Sites with low or no flood risk offer a more secure and cost-effective option for development The presence of watercourses, such as rivers, streams, and wetlands, must be carefully evaluated to prevent ecological disruption and regulatory challenges. Sites with mapped watercourses require buffer zones to protect water quality and aquatic habitats. Additionally, wind farm infrastructure, including roads and turbine foundations, must be designed to minimize hydrological disturbances and comply with environmental protection regulations.	
Supporting Infrastructure	Sites with better road access require less modifications or upgrade to the local infrastructure to facilitate construction or delivery of turbine components to site. Adequate road infrastructure is essential for transporting turbine components, construction materials, and maintenance equipment. Sites with existing road networks that can accommodate heavy transport vehicles offer a logistical advantage, reducing the need for costly infrastructure upgrades. Additionally, proximity to grid connections is crucial for efficiently integrating generated electricity into the power network.	Direct: Traffic and Transportation. Indirect: Noise and Vibration, Air Quality and Climate.

These site-specific assessments were conducted by the Developer with input from the EIAR Consultants and relevant subject experts where required. Detail was recorded for each site under each criterion and a weighted score was awarded for each. A shortlist of sites deemed suitable for a wind energy development was compiled.

The proposed wind farm Site was one of a number of sites to make the final shortlist. Of these sites, the proposed Ballyfeeny Green Energy Project area was selected as a site with low potential for likely significant environmental effects and with a strong potential for wind energy generation in order to support the local and national renewable energy targets under the RCDP 2022 – 2028 and CAP25.

3.6.3 Site Specific Assessment Results

A summary of the findings of the short-listed sites is provided in **Table 3.2**. The selected Ballyfeeny Green Energy Project is compared to two other sites that exhibited high potential for wind energy development from the criteria outlined in **Table 3.1**. Site B was scoped out from further assessment as it is the existing Sliabh Bawn wind farm.

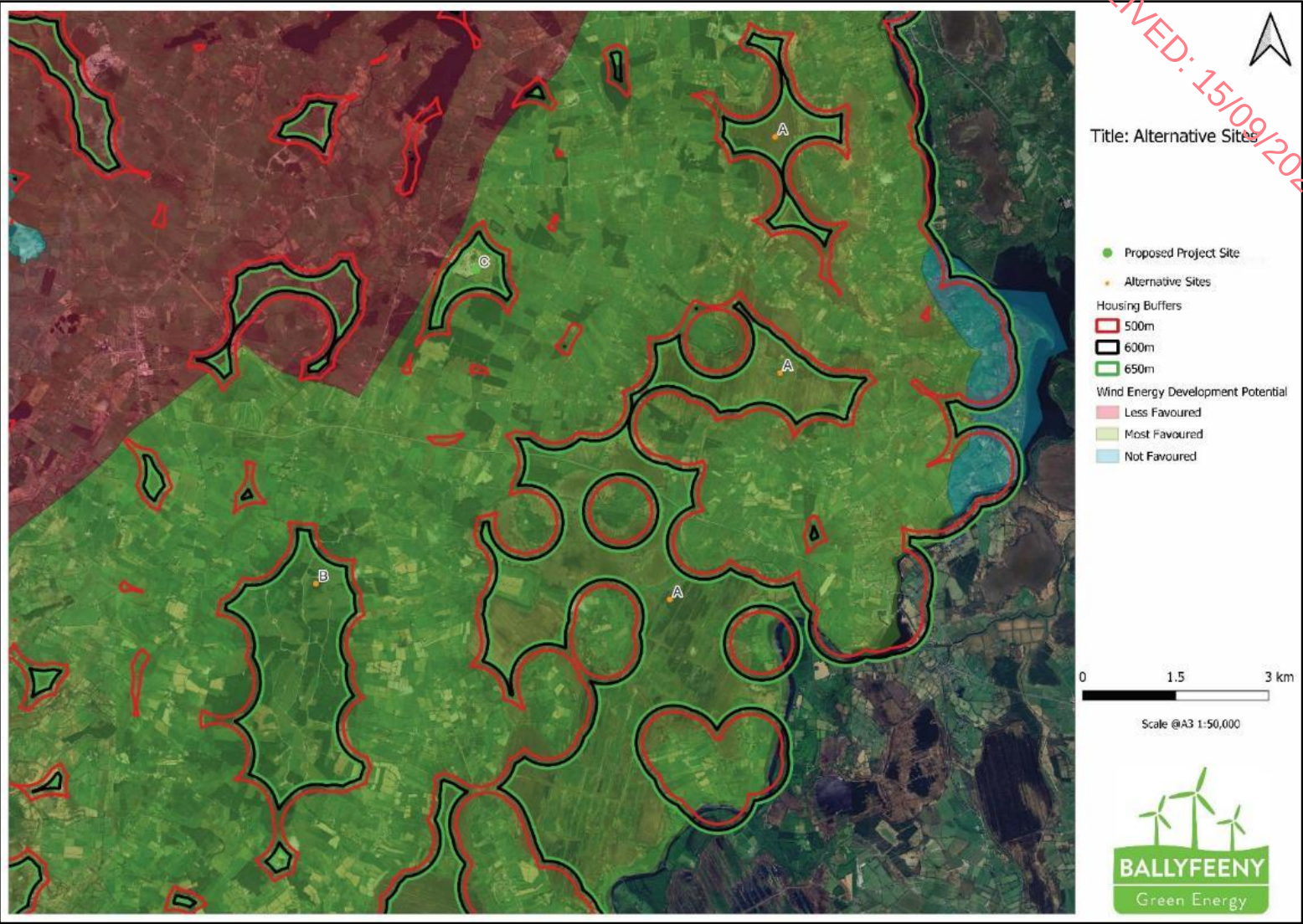


Figure 3-2: Regional assessment to identify sites by wind potential, housing buffer the CDP designated zoning

Table 3.2: Summary of the key Findings on the site chosen for the proposed Project

Site Section	Ballyfeeny (Proposed Site)	Site A
ITM Co-ordinates	598683.6, 782100.3	603470, 784280
Grid Connection	Grid Connection to Sliabh bawn (approx. 4.6-5km)	110KV Loop in Station connecting to Sliabh Bawn
Wind speeds @ 100m (m)	8.3-8.4	7.5-7.6
CDP Designated zoning	Most Favoured	Most Favoured
Sensitive receptor: 500m setback achievable (WEDG 2006 and min distance WEDG 2019)	Achievable 500m setback buffer using GSI source data.	Achievable 500m setback buffer using GSI source data.
Sensitive receptor: Setback consistent with 4 times tip height meter housing buffer	640m housing setback buffer achievable when using GSI source data. Planning check confirmed one house within the 640m setback buffer	650m housing setback buffer achievable when using Geodirectory GSI source data
Ecology sensitivity: Designated Sites (SAC, SPA etc.)	No designated sites in area. No immediate connectivity to nearby designates sites.	Direct hydrological connectivity to the River Shannon and the Lough Forbes SAC
Ecology Sensitivity	Anthropogenic usage (farm, forest quarry) limited natural habitats	Bog and predominantly cutover bog
Archaeology	No mapped archaeology on site or surrounding site	No mapped archaeology on site or surrounding site to the North, many mapped features on site to the South
Existing Land Use	Agricultural/Commercial Forestry/Quarry	Lands predominately within an area of cutover bog. Potential for future development by owner/wind farm developer (Bord Na Mona)
Communications and aviation	Communications Relay Mast adjacent to site No aviation centre nearby	Communication Relay Mast at distance from site No aviation centre nearby
Watercourses	No mapped EPA Watercourses present within the site. 2 watercourses present outside the site boundary	Mapped EPA Watercourses north of site and surrounding site, Watercourse present to south of site and surrounds site
Flood Risk	Initial assessment of OPW maps indicate no fluvial flood risk, Pluvial Flood Risk associated with the unnamed stream to the east of the site. FRA to be completed to understand full extent.	Initial assessment of OPW maps indicate no fluvial flood risk on site however, flood risk is present around the site on local rivers potential flood zone interaction for the

Site Section	Ballyfeeny (Proposed Site)	Site A
		TDR and GCR, Medium to high flood risk on a portion of South Site 'As lands on the west of site
Supporting Infrastructure Site Access	Access from R371, Good Road infrastructure from Galway port including Motorway and National and regional roads. Regional road is currently used as main route for the local quarry adjacent to the Site.	Site access via the N5 and upgrading of disused tram lines to access the site.
Supporting Infrastructure	Quarry adjacent to site	Cut over bog, Bord na Móna (BnM) infrastructure near site
Constraints and layouts	Layout options. Communications tower located adjacent to the proposed site that could constrain turbine layouts	Site located predominately on peat lands, mainly cutover bog. Peat depths are unknown as is any potential sensitive ecological receptors associated with peat lands.
Feasibility assessment	Conducted	Not selected for detailed assessment

The criteria outlined in **Table 3.2** can be regarded as either a constraint to the proposed Project or a facilitator for the proposed Project. For example, the level of flooding at the site may reduce the available 'buildable' area or the lack of flooding may highlight the suitability of the site. The environmental effect of significant flooding may arise due to a requirement for deeper and more extensive drainage leading to potential downstream surface water impacts. Flood risk was evaluated initially using CFRAMS and national data for site suitability and selection. Based on the results of the initial screening a Flood Risk Assessment would be required at design stage where any potential interaction was identified.

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

The proposed Site for the Ballyfeeny Green Energy Project was selected as suitable for potential wind energy development. The site is zoned as most favoured within the Wind Energy Strategy in the Roscommon County Development Plan, the Site has favourable wind speeds for wind energy development, potential for a grid connection, no evidence of sensitive ecological receptors or immediate connectivity to designated sites from a desk study and a suitable land bank for the construction of wind turbines in accordance with local and national policy and guidance. The comparative assessment confirmed that Site A was a feasible site for a wind farm, but it was considered to have greater environmental sensitivity than the proposed Site for Ballyfeeny, relating to its hydrological connection to a designated European site and the presence of peat and sensitive watercourses on site.

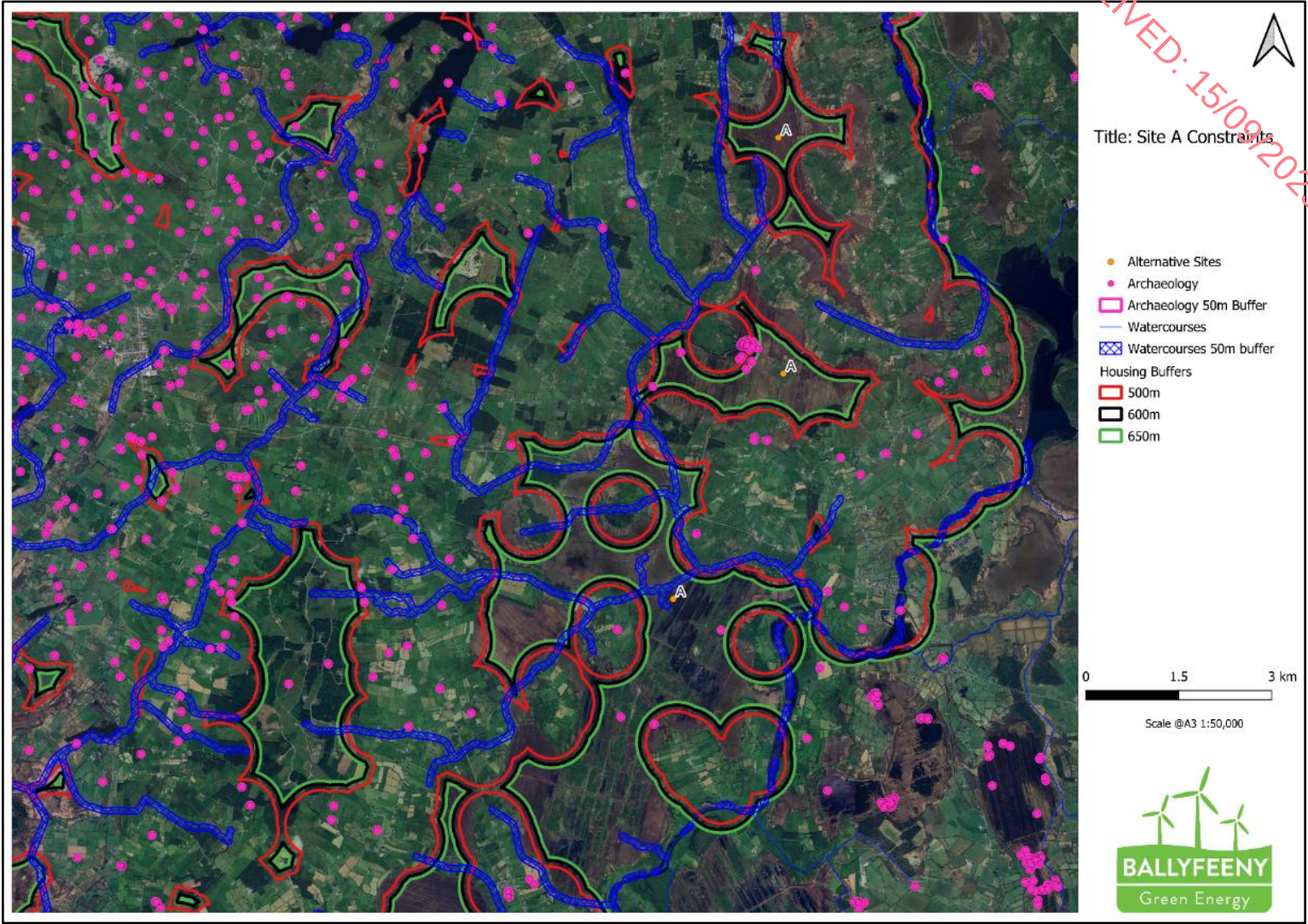


Figure 3-3: Alternative Siting – Site A and potential constraints

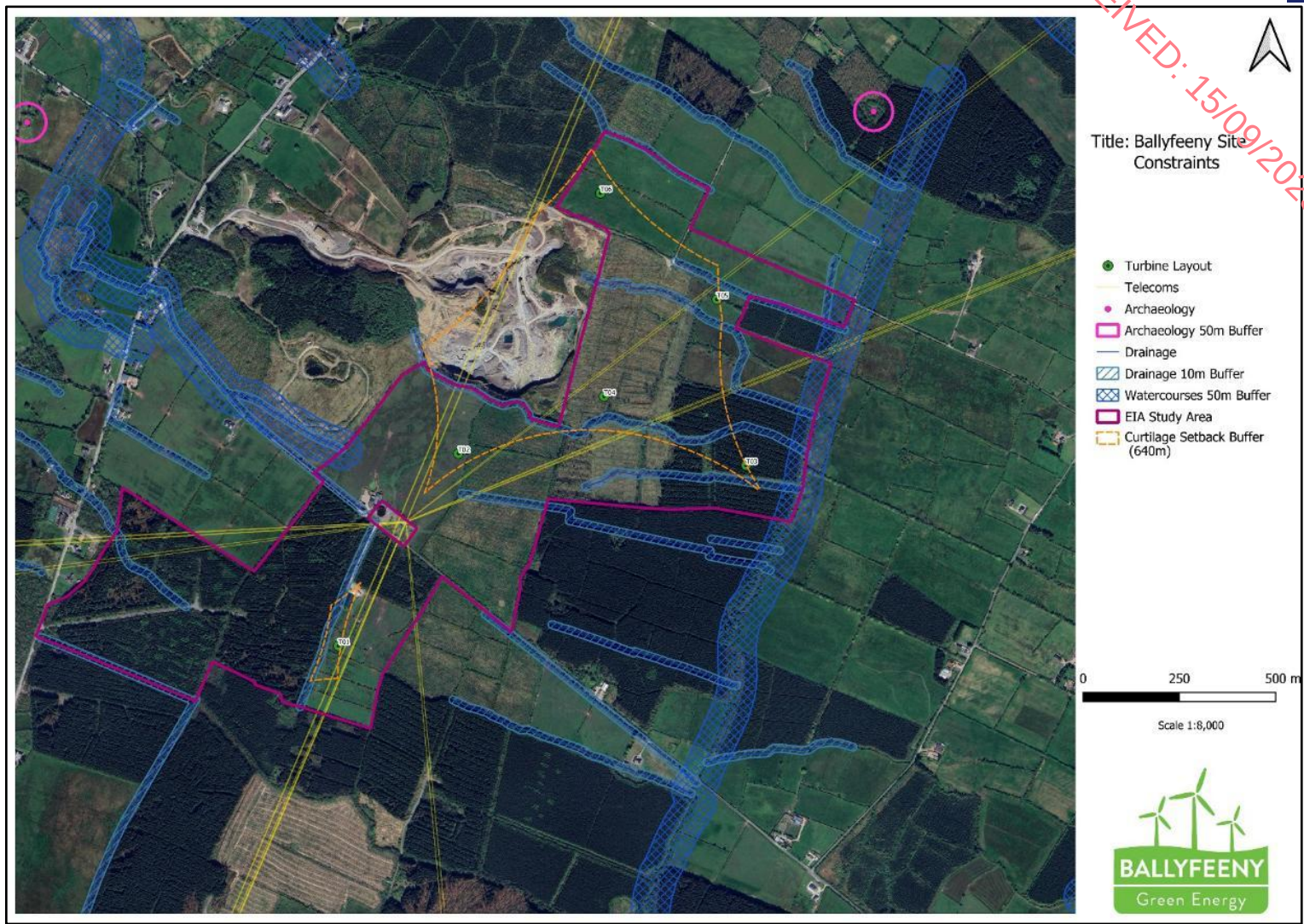


Figure 3-4: Alternative Siting – Proposed Ballyfeeny Site potential constraints

3.7 Alternative Layouts / Design

In the context of alternative design (incorporating scale and size), this section of the EIAR will set out the processes and assessments that were followed to arrive at the proposed turbine layout, turbine technologies and infrastructure layout. This section was informed initially from published information and confirmed by the site surveys and ground investigations, proximity of environmental aspects (e.g. ecology, population, material assets) and the optimisation of the selected layout and design in consideration of these aspects and meeting the project objective for the provision of renewable energy.

As part of an iterative design strategy within the Environmental Impact Assessment (EIA) process, alternative layouts have been assessed for the proposed Project. This process has been refined by the ecological, environmental, physical and socio-economic conditions and data from the site to optimise the layout in terms of the best practicable environmental and engineering options. Included in the process of refinement has been input and responses from planning authority and statutory bodies to the Scoping Report and feedback from the public consultation process.

The assessment included evaluation of alternate turbine size, orientation and numbers. The selected design minimises where possible the environmental impact whilst maximising renewable energy generation potential of the proposed wind farm Site. The assessment process of selecting the appropriate wind turbine size, type and layout is summarised in this Alternatives selection.

The Alternatives have been evaluated and the selected options refined to a likely size, type and technology. However, as outlined in **Chapter 2 – Project Description** the exact technology is not confirmed at the time of this application and the selection of the final technology will be based on future market availability of turbine options. Roscommon County Council confirmed in their Opinion on Unconfirmed Details dated 9th June 2024 that they were satisfied that it was appropriate that the proposed application be made and decided before the applicant has confirmed these details. Three turbine technology options (Technology Options 1, 2 and 3) have been proposed and assessed in full in the EIAR and are outlined in **Chapter 2 – Project Description** and **Planning Drawing No. 23604-500 – Part 1**. The option to seek consent for one technology option was discounted due to the need for design flexibility for the proposed Project. The three Technology Options do not constitute Alternatives to each other as consent is sought for all three, and the applicant will confirm the selected Technology Option prior to the commencement of that part of the development.

The proposed wind farm Project at Ballyfeeny and Tully, Co. Roscommon, will support European and National policy in decarbonising electricity generation and contribute to Ireland's target to generate 80% of the country's electricity from renewable sources by 2030, as well as the local objectives and policies of the RCDP 2022 – 2028 and Renewable Energy Strategy and targets. In supporting the national policy and objectives. Given these goals and objectives, the 'Do Nothing' alternative is not a favourable option.

There is a myriad of renewable energy technologies available on the market, however not all will be viable at the proposed Site. This section considers technology variables or solutions for wind generation and any innovations or mitigations (during construction, operation and decommissioning) which can be selected to reduce the potential for likely significant environmental effects from the proposed Project.

Baseline surveys were completed for the proposed Project as part of the EIAR process. Each environmental consultant completed a site walkover in order to determine any site-specific constraints that were to be factored into the site design. All site constraints were identified and updated as further detailed assessment was undertaken. The locations of county roads, watercourses and land drains, residential receptors, landowner boundaries, telecommunication links, ecologically sensitive receptors, areas of deep subsoil and peat depositions, archaeological sites and visually sensitive areas were noted. Appropriate separation distances and buffers around identified constraints were determined based on published guidance or professional judgement and mapped using a GIS model.

The site layout design stage considered the size, number and positioning of turbines and layout of associated site infrastructure i.e. internal roads, temporary construction compounds, met masts, substations, potential for borrow pits etc. Alternatives considered for each of these elements are documented in the following sections. It was an iterative process comprising input from the design team, environmental specialists, and internal and external stakeholders. These constraints and measures have been adopted as part of the evolution of the design to avoid or reduce adverse impacts on the environment. These measures are referred to as 'embedded mitigation' and will be discussed in each EIAR Chapter. The final layout of the proposed Project is shown in **Volume 4 Figure 2-2**.

Table 3.3: Design considerations and alternate layout considerations

Design Iteration 1	Design Iteration 2	Design Iteration 3
Figure 3-5	Figure 3-6	Figure 3-7
First turbine layout with no input from environmental or design specialists in order to determine the potential development area of the project. Sensitive Receptor setback distances were determined based on geo-directory data with a 600m setback buffer (based on 150m turbine tip height), to determine the potential for wind farm development prior to detailed site investigations.	Turbine layout refined with ground-based receptor survey and Local Authority planning register to verify the geo-directory data set and refine the visual amenity setback buffer with due regard to the Draft WEDG 2019 (4 x turbine tip height).	Turbine layout with some site constraints (Verified sensitive receptor setback based on house survey, the increase of watercourse crossing and telecoms links)
Changes Made		
	T02 was located near a house not represented on the open source Geodirectory data. Following the house survey and ground truthing of the nearby receptors, T02 was repositioned in consultation with the landowner and homeowner (35). T01 was relocated closer to T2 based to consolidate the layout and improve access for construction and maintenance. T04 was repositioned to maintain optimal spacing and overall site performance following T02's repositioning.	T03 & T05 were repositioned to allow greater clearance to the mapped onsite drainage. T01, T02, T04 and T05 were micrositied to minimise impacts on the Telecoms network, that also included the positioning of the proposed Relay Mast that is included as part of the telecom's mitigation proposals.

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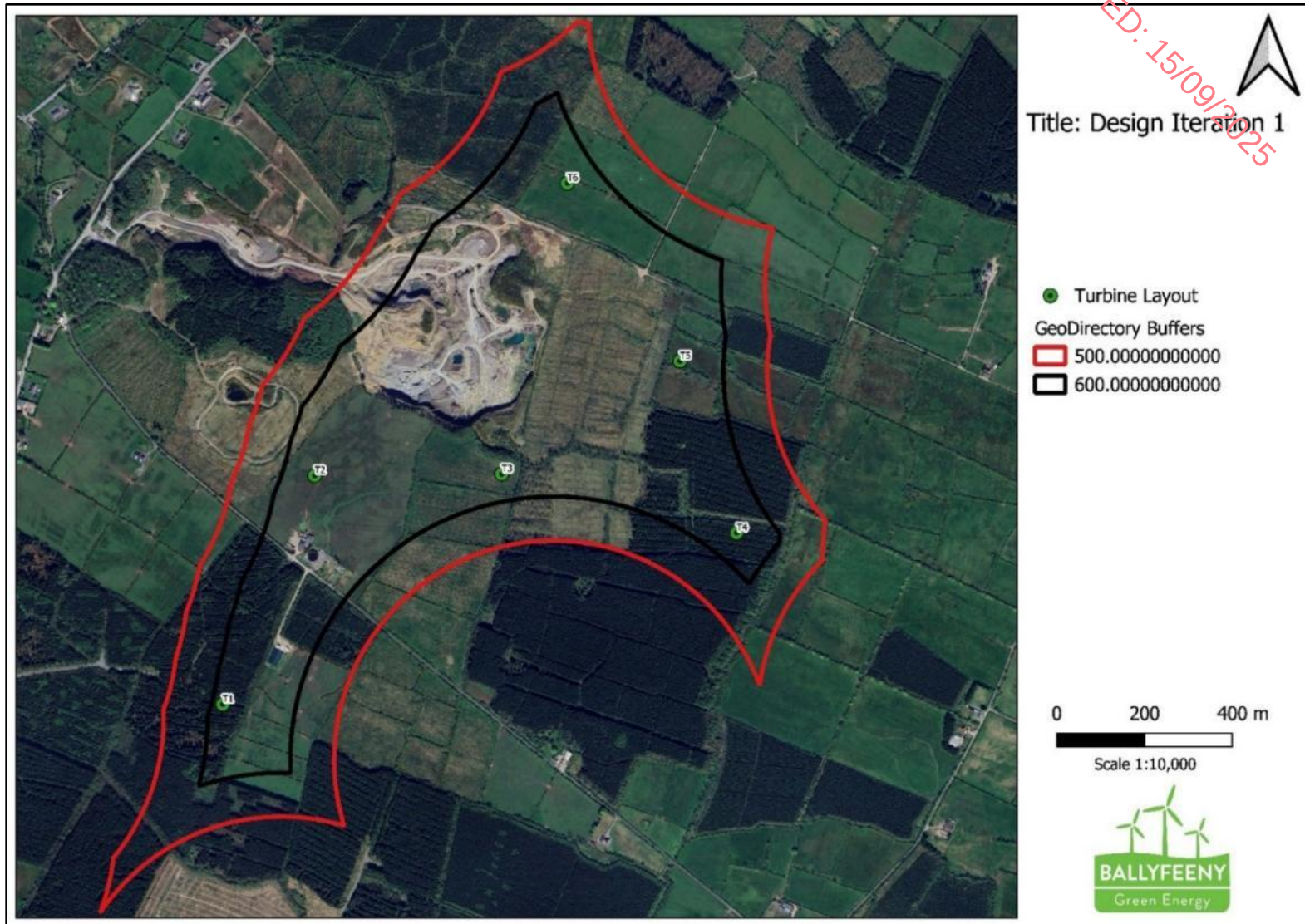


Figure 3-5: Alternate site layouts under consideration- Ballyfeeny Layout Option 1

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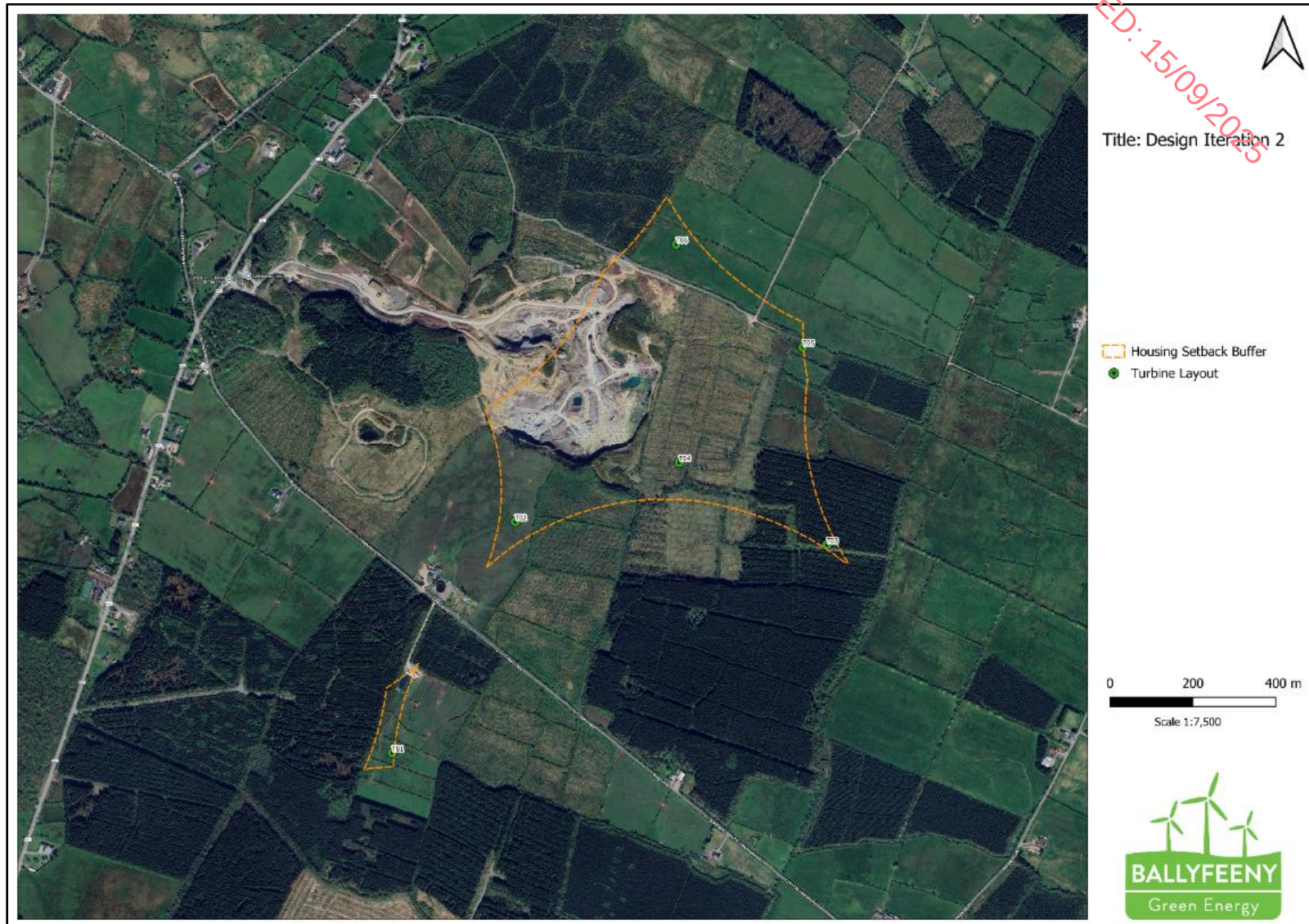


Figure 3-6: Alternate site layouts under consideration -Ballyfeeny Layout Option 2

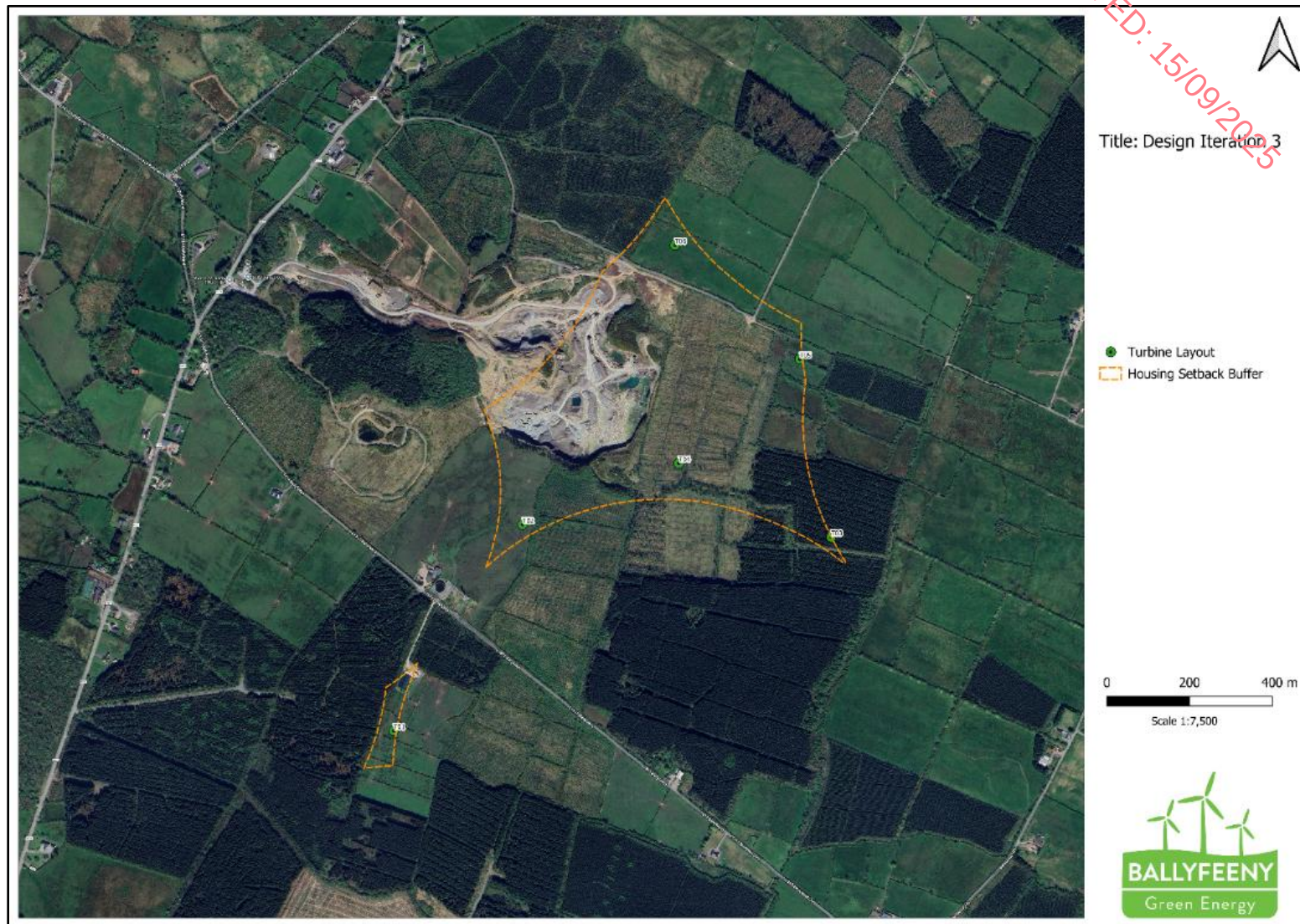


Figure 3-7: Alternative Site Layouts under consideration for Ballyfeeny

3.7.1 Optimising Selected Turbine Layouts

Based on the findings of the initial feasibility, and subsequent site investigations, the site-specific studies, including ecological constraints and evaluation of proximity of sensitive receptors; an iterative process commenced to determine the optimum turbine layout, taking into account of all significant site constraints. The layout designs were also optimised based on the distances to be maintained between turbines and dwellings (based on the WEDG 2006 and with regard to the draft WEDG 2019 guidance), as well as from other constraints such as roads, etc.

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

The selection of turbine number, size and layout has also had regard to wind-take, noise, landscape and visual, communications and shadow flicker impacts and the separation distance to be maintained between turbines. The EIAR and wind farm design process was an iterative process, where findings at each stage of the assessment were used to further refine the design, always with the intention of minimising the potential for environmental impacts. The development of the final proposed wind farm layout has resulted from feedback from the assessments carried out during preparation of this EIAR, statutory consultation, site walkovers by competent experts and information supplied from consultation with residents and landowners in the vicinity of the proposed Site.

The various considerations that were taken into account include:

- Turbine proximity to sensitive receptors;
- Turbine size;
- Noise and shadow flicker guidelines;
- Distance from archaeological sites;
- Distance from sensitive habitats;
- Distance and layout of local drainage networks and watercourses;
- Distance from water bodies to turbine locations and other site infrastructure;

- Soil stability;
- Turbine spacing;
- Avoidance of any interference with telecommunications systems and transmission;
- Visibility of the proposed development in the landscape;
- Site characteristics;
- Internal road layout;
- Distance from the site boundary to turbine locations; and
- Proximity of met masts to dwellings.

Evaluation of the relevant guidance was also undertaken, to ensure compliance with Wind Energy Development Guidelines (WEDG 2006), and consideration of the Best Practice Guidelines for the Irish Wind Energy Industry (IWEA, 2012); *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022) and guidelines and recommendations from the relevant local authority's County Development Plans and wind energy strategies. Due regard was given to the draft 2019 Wind Energy Development Guidelines (Draft WEDG 2019), especially with regards to, shadow flicker, residential amenity and community benefits.

The initial constraints study identified a significant viable area within the proposed Site, in which a potential turbine layout was developed. This turbine layout was then refined a number of times following feedback from the project team during detailed site investigations and from consultees.

The number of turbine layouts were refined, with due regard for the potential power generation and proximity to any local residences.

Positioning and internal track layouts considered the best engineering solution considering the minimisation of excavation works and cut and fill requirements, length and volume of internal access roads and hardstands to reduce imported material requirements and environmental considerations for material movement and groundworks within the site to select the preferred engineering solution.

3.7.2 Iterative Design through the EIAR Process (Embedded Mitigation)

Through the development of the proposed Project, measures have been adopted as part of the evolution of the design to avoid or reduce adverse effects on the environment. This has included an iterative process where a constraints-led design was employed, whereby ecological information was incorporated into the design process to avoid impacting potentially important ecological features where possible. These measures are referred to as 'embedded mitigation' and are effectively built into the impact assessment.

This iterative approach is recommended as Best Practice in the design of wind farms (IWEA, 2012). Each environmental chapter of the EIAR (Chapters 5 – 15) outlines the embedded mitigation measures that have been adopted as part of the proposed Project.

Bat Ecology

For low-risk sites, such as the proposed Project, Best Practice Guidance (SNH, 2021) recommends a buffer distance of 50m between a turbine blade tip and the nearest woodland, including hedgerows. This buffer creates a clearance setback of 50m between the arc of the blade's sweep and the woodland/hedgerow which could be used by bats without risk of collision with the turbine blades. Based on the SNH buffer formula and proposed turbine dimensions, with sufficient curtilage proposed in line with the turbine blade length assessments, where possible this has been accounted for in the turbine placement rather than vegetation clearance. Further details in relation to the calculation and buffers is provided in **Chapter 6 - Biodiversity**.

Ornithology

As advised by the Ornithologist survey team and in line with best practice, surveys of any protected species present or recorded breeding within the given distances of the works area, would entail the application of species-specific buffer zones to be established around the expected location of the nest. The baseline avifaunal surveys commenced before the final design process, as two years of baseline data was collected in line with current guidelines. **Chapter 6 - Biodiversity** confirmed that a seasonal restriction and buffer zone is required during the construction phase for a potential peregrine nesting site in the nearby quarry. Data on habitats and species were available early in the design phase allowing consideration where required and supporting the consideration of alternatives and selection of final design.

Habitats, Trees and Hedgerows

The layouts considered not only land use but also the potential habitats of the Site both in terms of the turbine layouts but also the consideration of Access Tracks and Turbine hardstand, spoil storage areas etc. Site Access tracks were designed to offset from existing hedgerow and treelines to protect the root structures where possible, in line with the NRA (2006) Guidelines for the protection and preservation of tree, hedgerows and scrub and BS 5837 (2005) and the Objectives of Roscommon CDP 2022 - 2028, particularly in relation to the protection of hedgerows (Objective NH10.13).

Hydrology

Apart from works required to facilitate water crossings and some other minor works, a 50m buffer was applied to watercourses shown on the 1:50,000 OSI maps at the design phase in accordance with the Irish Wind Energy Industry Best Practice Guidelines (IWEA, 2012). The guidelines state construction works should be kept 50m from watercourses where reasonably possible, with the exception of crossings which should be minimised. Further details on the assessment of the Project on site watercourses are provided in **Chapter 8 - Hydrology and Hydrogeology**.

The general design approach to wind farm layouts in existing forestry is to utilise, and integrate with, the existing agricultural and forestry infrastructure where possible, whether it be existing access tracks or the existing agricultural/forestry drainage network. Although manmade land drains are not typically considered a hydrological constraint due to their low hydrological or ecological value, a 10m drain buffer has been applied where possible as further embedded mitigation for the protection of watercourses.

Telecommunications

The orientation of the turbines and their layout was influenced by the existing communication infrastructure at the Site. An assessment of the existing communications array determined the optimal positioning of turbines minimise interference with the communication links, where possible. Where this was unavoidable, a telecommunication Relay Mast was included within the Project's design to mitigate any likely adverse impacts on the communication network in the area. Further information is outlined in **Chapter 14 - Material Assets, Appendix 14.1 – Telecommunications Impact Assessment** and **Appendix 14.2 Aviation Review Statement**.

As part of the consideration of telecommunications on Site, a number of alternative solutions including the diversion and removal of the tower at the Site were considered. This alternative was determined to have a greater likelihood of local disruption to communications and was not considered further. The height, nature and requirements of the telecommunication relay equipment were also considered along with the turbine layouts to determine an optimised solution for the Project.

3.7.3 Alternative Technologies

Typically, each turbine manufacturer has a platform or portfolio of turbine technologies available on the market to suit a range of wind farm site characteristics. The technology platforms can be broken up into a number of ranges. Due to the high average wind speeds expected at the proposed Site, rotor diameters of between 117m and 150m were considered for the proposed Project. Rotor diameters larger than 150m were considered not suitable for the Site based on the high average wind speeds expected. The wind energy sector is constantly evolving, through technological innovations leading to bigger, more powerful and more efficient wind turbines. One of the most significant advancements has been the development of larger turbine rotor diameters. The length of the blade increases the amount of energy that can be generated from the wind resource increasing the overall efficiency, power output and lowering the cost to produce electricity. The typical expected rated output for onshore wind turbines in the 117m to 150m rotor ranges are expected to be between 4MW and 7MW.

The assessment of alternative turbine technologies (larger and smaller rotor diameters) is outlined in **Table 3-4**. **Figures 3-7, 3-8 and 3-9** present the alternative turbine layouts based on smaller and larger turbine technologies.

Table 3.4: Consideration of larger and smaller turbine technology alternatives

	Alternative Turbine Technology (Larger or smaller Rotor Diameters)		
Turbine Rotor Diameter	117m Rotor Diameter Range	136m Rotor Diameter Range	150m Rotor Diameter Range
Potential Capacity	7 turbines	6 turbines	2 Turbines

	Alternative Turbine Technology (Larger or smaller Rotor Diameters)		
within the Site			
Commentary	The proposed Site has the capacity to accommodate up to 7 wind turbines in the 117m rotor diameter range. However, recently, the turbine manufactures have advised that there is a limited number of factories manufacturing this turbine technology. The future production is focusing on the larger more efficient rotor diameters. There is no guarantee from the turbine manufacturers at the moment that this rotor diameter technology option will be in production beyond 2026.	The proposed Site has the capacity to accommodate up to 6 wind turbines in the 136m rotor diameter range. The turbine technologies within this rotor diameter range (133m, 136m, 138m) are all proven technologies, with turbines within this range in operation in Ireland and throughout the world. The 136m rotor diameter range provides an appropriate balance between power generation and environmental considerations with respect to the relevant legislation and guidance such as the WEDG 2006 and the Draft WEDG 2019.	Future production from the manufacturers is looking towards larger more efficient rotor diameters. Two of the main turbine manufacturers have turbine technologies with a rotor diameter in the range of 150m. However, due to the increased rotor diameter, an increase in hub height would be required and ultimately an increase in the turbine tip height to approximately 170m. Having regard to the Draft WEDG 2019 this increase in tip height would require a residential amenity setback to sensitive receptors of 700m (4 * 170m). As a result of this the maximum number of turbines that the site could accommodate would be 2 with an expected maximum installed capacity for the project would likely to be c. 12MW.

The selection of smaller turbines would be a less efficient use of the wind resource available having regard to the nature of the Site and the wind height. A larger number of smaller turbines would result in the wind farm occupying a greater footprint within the Site, with a larger amount of supporting infrastructure being required (i.e. access tracks, internal collector

cables etc.) and increasing the potential for adverse environmental effects to occur. This coupled with the uncertainty of the likely availability of the turbines within this rotor range beyond 2026, resulted in the 117m rotor diameter range of turbines, being excluded from further assessment.

Larger turbines in the 150m rotor diameter range, would potentially maximise the wind resource of the site due to the increased efficiency relating to the longer turbine blades. However, their larger size and inter spacing between turbines, coupled with the increased setback to sensitive receptors mean that the proposed site only has the capacity to potentially accommodate up to 2 wind turbines, limiting the potential export capacity of the wind farm and the environmental benefits associated with clean energy generation. As such the 150m rotor diameter range of turbines was excluded from further assessment.

Turbines within the 136m rotor diameter range (133m, 136m and 138m rotor diameters) were considered appropriated for the proposed Site due to the long-term market availability of the technologies, the turbine size and generation potential for the proposed Project.

The precise Technology Option however cannot be confirmed at the time of assessment due to the market forces and time to procure the units from the assessment and planning process.

As a result, the Design Flexibility Opinion has been availed of for the project in relation to the Three Technology Options. All three options are fully considered in the EIAR and are not Alternatives as defined under this Chapter (see **Chapter 2 – Project Description** and the **Planning Statement** (TPA, 2025) for additional details on Design Flexibility).

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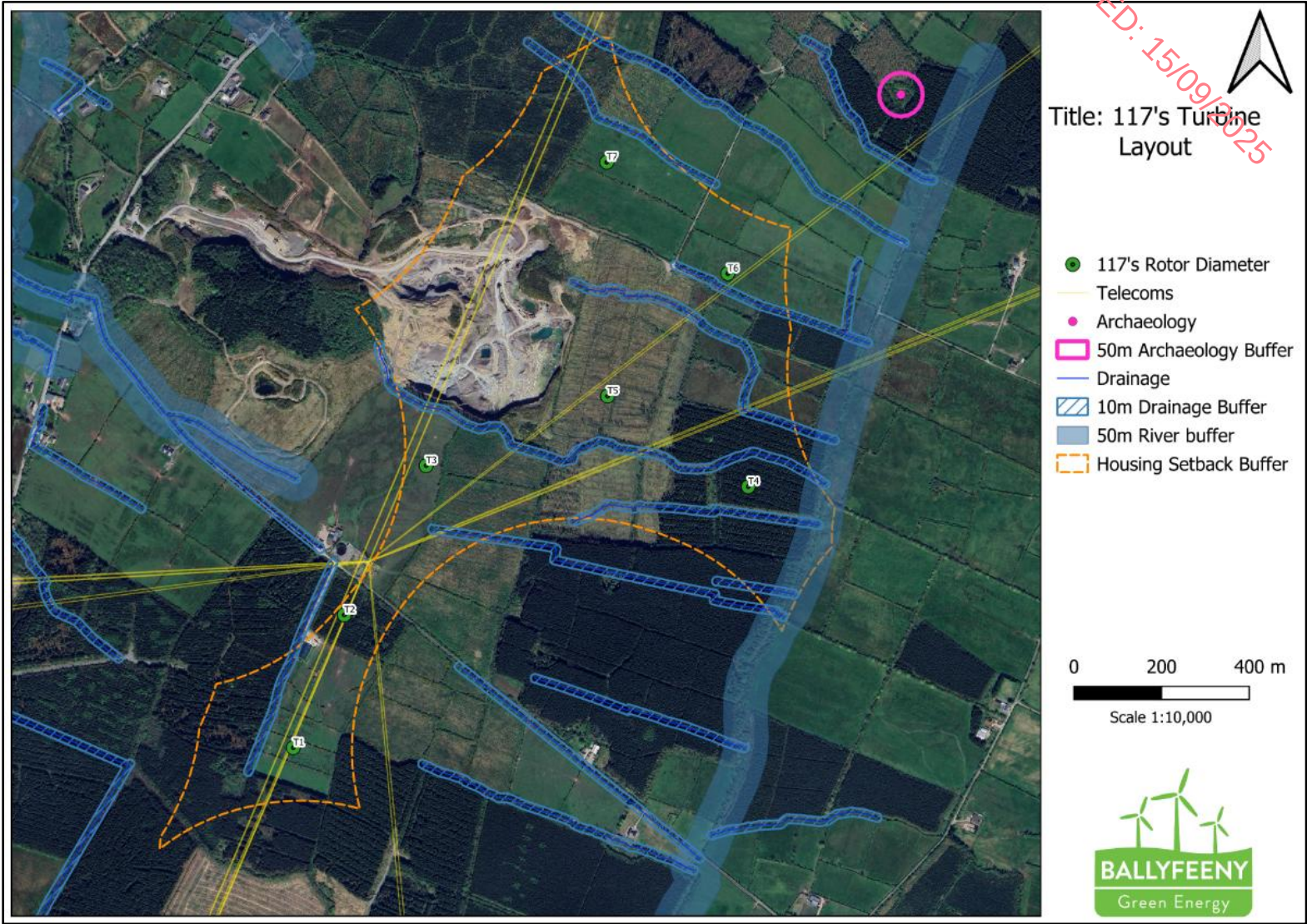


Figure 3-8: Alternate 7 turbine layout considered with 117m rotor diameter turbine model

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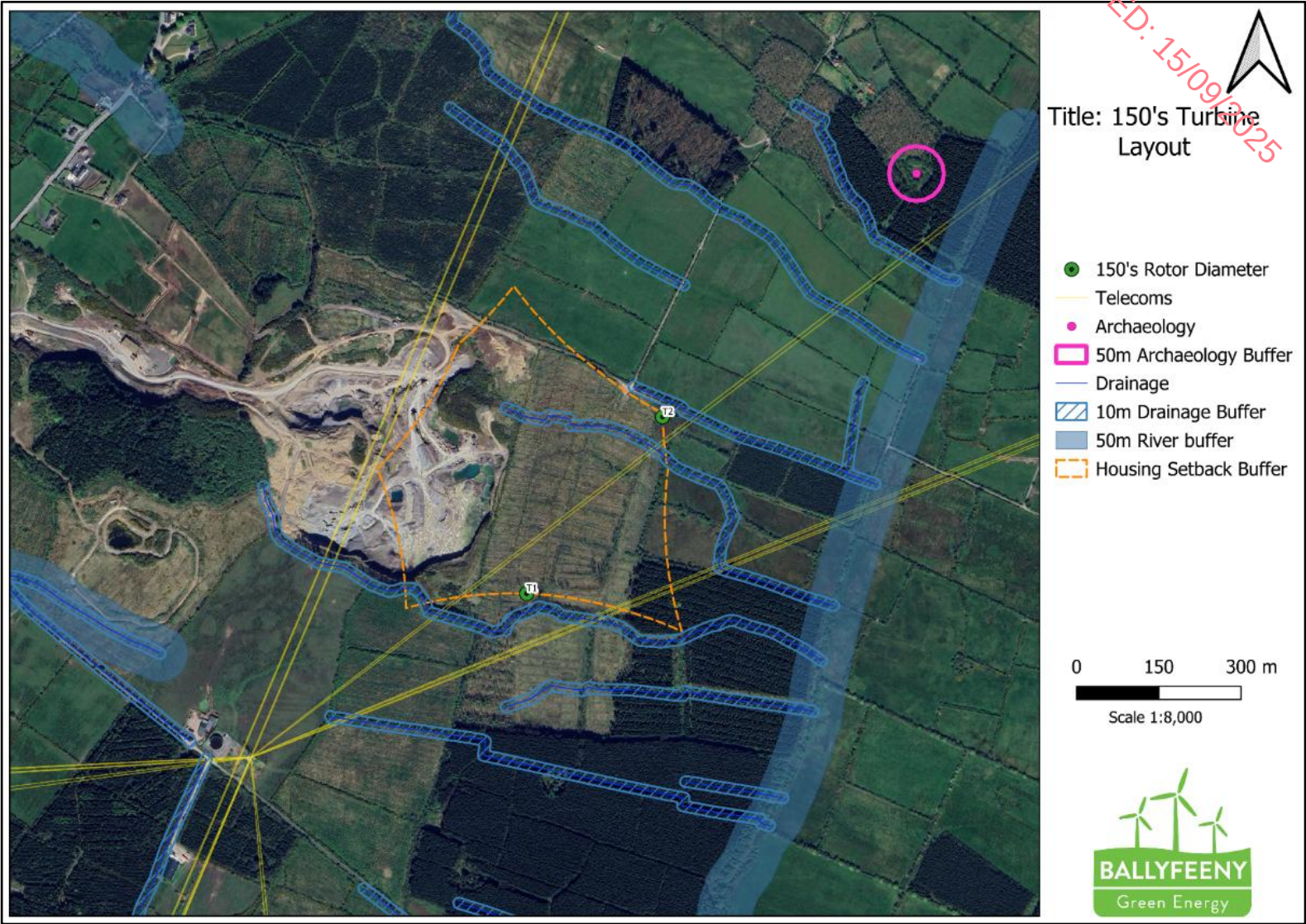


Figure 3-9 Alternate 2 turbine layout considered with 150m rotor diameter turbine model

3.7.4 Site Entrances

During the design phase of the proposed Project, significant consideration was given to potential impacts on the surrounding receptors including potential impacts on the local Ballyfeeny National School particularly during the construction phase of the proposed Project. It is during the construction phase of a wind farm project that, potential impacts relating to the increased number of heavy and light goods vehicles travelling to and from the wind farm Site, are possible. In addition to these construction impacts, potential impacts on the Ballyfeeny National School arising from the construction of the proposed Grid Connection were taken into consideration. Following this and in consultation with the environmental team tasked with the preparation of the EIAR report it was decided, if possible, to avoid any potential impacts on the national school during the construction phase. As a result, the Developer consulted with Coillte to secure their agreement to utilise an existing forestry track (SE1) off the R371 regional road south of the Ballyfeeny National School, during the construction phase in order to facilitate abnormal load and heavy goods vehicles accessing the proposed wind farm Site. Similarly for the Grid Connection Route it was deemed best practice to avoid passing the Ballyfeeny National School with the underground 38kV cable due to potential traffic disturbance during the school term. A similar agreement was reached with Coillte which facilitated the proposed Grid Connection Route following the existing forestry track and avoiding any potential impacts on the national school during the construction phase. SE1 is proposed to be a temporary site entrance that will be utilised during the construction and decommissioning phases and only if any abnormal load deliveries are required during the operational phase. Due to the limited number of heavy and light goods vehicles required during the operational phase it is deemed appropriate to utilise SE2 and SE3 for access to the wind farm Site during the operational phase.

SE6 is proposed for the construction phase only to accommodate a straight run through with turbine component deliveries to T06. A traffic management plan is proposed to control traffic movements at SE6 during the construction phase. SE6 is proposed to be a temporary entrance for the construction phase only and will not be utilised by construction or operational traffic. SE4 is an existing entrance to an unsealed public road currently utilised for forestry and agricultural purposes and will be upgraded to facilitate the movement of construction and operational traffic for the proposed project. A key consideration not to upgrade SE6 to a permanent site entrance that could be utilised during the construction and operational phases

was to avoid and minimise hedgerow loss where possible at this location. If a permanent site entrance was proposed at this location, it would require enhanced sightlines in accordance with best practice guidelines that would result in approximately 140m of additional hedgerow loss at this location. Following the mitigation hierarchy of avoid, minimise or offset, it was considered best practice at this entrance to utilise the existing SE4 entrance during the construction phase and to only remove the minimum amount of hedgerow required in order to deliver turbine components to T06.

The current design as shown in **Volume 4 EIAR Figure 2-2** will use a dedicated entranceway through the Coillte forestry access track to access the site. Internally minimal permanent changes to the road network for site entrances were planned.

3.7.5 Site Access Tracks and Turbine Hardstands

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

Access track layout and design is also an iterative process. The layout was designed to minimise construction of new tracks by following the existing access tracks where possible and linking turbine locations via the most direct route, avoiding environmental (higher value habitat), drainage and any archaeological constraints, where possible.

Design Iteration 1 as shown in **Figure 3-10**, was designed to accommodate an earlier turbine layout revision discussed in Section 3.7.1. The civil design was intended to minimise the length of Access Tracks where possible providing a direct route to the turbine locations. As the turbine layouts were optimised, the site Access Tracks and Turbine Hardstands were refined as a result. On site topographical surveys were undertaken in order to verify the contour maps available for the wind farm sites.

The initial design was further developed by layering the site constraints including watercourse and land drain buffers, adding the detailed topographical survey data and incorporating the

vehicle turning radii for abnormal length vehicles such as those used to transport wind turbine blades. The turbine location T01 and associated Turbine Hardstand were modified to align better with the existing Coillte forestry track in order to minimise the construction of new track directly adjacent to the existing track. This modification resulted in a reduction of approximately 400m of new track through the existing forestry.

The Access Track and Turbine Hardstand orientation between T02, T03, T04 and T05 were orientated along the existing contours of the site in order to reduce the cut and fill requirements and minimise the spoil arisings across the Site. Where Access Tracks were proposed to run alongside existing hedgerow and treelines, an offset of a minimum of 2.5m was implemented in order to maintain a root protection zone for the existing vegetation. A further hedgerow and tree survey will be completed prior to construction so as to ensure the Access Track alignment is designed such that no ground disturbance takes place within the root protection zone. The final design iteration is shown in **Figure 3-11**.

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Figure 3-10: Initial Internal Access Track Design Iteration 1

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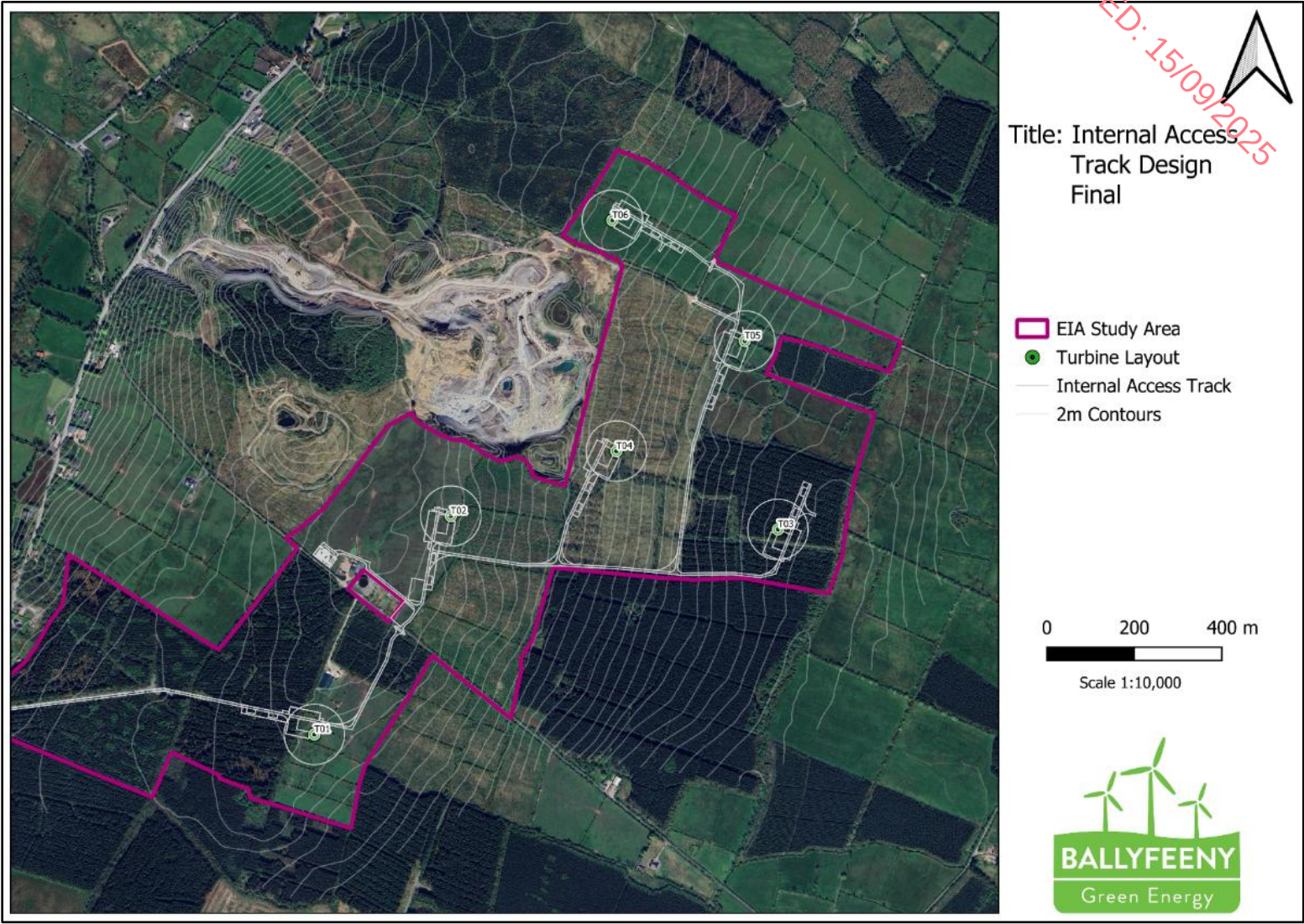


Figure 3-11: Final Internal Access Track Design

3.7.6 Substation Locations and Grid Connection

Four existing substations in the vicinity of the proposed Site were considered for connection of the proposed Project to the national electricity Grid. These include Sliabh Bawn 110kV Substation, Lanesborough 110kV Substation, Fischertown 38kV Substation and Richmond 110kV Substation. Each of the potential nodes of connection to the national grid are within 20km of the proposed Site. A comparative analysis of the four nearest and most suitable substation for connection was completed and is outlined **Table 3.5**.

The potential grid connection routes and location of the substations in relation to the proposed Site is shown in **Figure 3.12**.

Consultation with Eirgrid

As part of the selection process for the preferred grid connection route, a consultation clinic was held between Ballyfeeny Green Energy Limited and Eirgrid the Transmission System Operator (TSO) on the 29th of January 2025.

As part of the consultation clinic, the Developer's project management team discussed the four likely grid connection nodes with representatives from Eirgrid. On the call Eirgrid confirmed that the existing substations at Lanesborough and Richmond are close to full capacity and if the proposed Project was to consider connecting to either of these nodes it would trigger transformer uprates within the substations in order to connect the proposed Project. The Lanesborough substation due to its proximity to the River Shannon and the nearby town of Lanesborough is congested with limited potential for future expansion.

The Fischertown 38kV substation has available bays to connect the proposed project at 38kV. However, if the project were to connect to the Fischerstown 38kV substation it would not be in compliance with EirGrid's node assignment rules, whereby a project of this size would need to connect to the closest available 110kV bay. A connection to the 38kV network at Fischertown 38kV substation would also trigger a transformer uprate at Richmond 110kV substation, due to the limited available grid capacity at this substation.

Eirgrid confirmed that Sliabh Bawn 110kV substation would be the preferred connection method as the substation has an existing spare 110kV bay within the station that would be ideally suited for a new transformer bay within the existing substation compound.

Eirgrid, however, advised that the proposed Project would be subject to the Enduring Connection Policy (ECP), which is the current pathway for generators such as wind farms to apply to connection to the national electricity system, which is regulated by the Commission of Regulation for Utilities (CRU). Developers can only submit a grid connection application through the ECP process once the Planning Application has been acknowledged as completed by the Local Authority. As such full technical criteria relating to the grid connection cannot be finalised until the ECP process has been completed.

Table 3.5: Evaluation of Substation and grid connection alternatives

	Sliabh Bawn	Lanesborough	Fischerstown	Richmond
Substation kV	110KV	110KV	38KV	110KV
Proximity and suitability	By far the closest substation to site – approx. 5km cable route	~16km cable route	The 38kV substation at Fischerstown has insufficient capacity to connect a project of our size and would require a transformer uprate at Richmond.	~16km cable route
Obstructions to route	Avoids crossing the River Shannon and avoids having to install underground cables within the national road network.	Would require a substantial horizontal directional drill (HDD) under the River Shannon	Would require a substantial horizontal directional drill (HDD) under the River Shannon and would need to negotiate the settlement of Termonbarry	Would require a substantial horizontal directional drill (HDD) under the River Shannon and would need to negotiate the settlement of Termonbarry
Obstruction to substation access	Avoids cable within the N5 (HDD under the roadway at the Scramoge junction is possible to avoid impacts on the national road network	Additional complexity of station being located in the middle of town and close to the River Shannon.	11km cable route to Fisherstown	Involve HDD under the River Shannon
Capacity to connect	There is a spare 110kV bay in Sliabh Bawn 110kV substation that can facilitate the connection of the proposed project.	Potential for significant traffic disruption, and interactions with existing services in the roadway/streets.	Would need to negotiate the settlement of Termonbarry	Additional two EPA mapped watercourses to be crossed
Engagement and interactions	Engaged in official discussions with EirGrid about projects connection to this station	Engaged in official discussions with EirGrid about projects connection to this station	Engaged in official discussions with EirGrid about projects connection to this station	Engaged in official discussions with EirGrid about projects connection to this station
Grid Route Connection type	Underground conduits adjacent to main road possible HDD for N5 crossing	Underground conduits adjacent to main road possible HDD required for to cross the Shannon and grid cables within the N5 & N63. Potential overhead line solution connection to cross Shannon	Underground and overhead (O/H) sections maybe required. Major HDD under River Shannon – replacement of up to 4km of existing O/H lines to facilitate the additional capacity within the substation.	Underground and overhead sections maybe required 2km of the grid route would be required along the N4 to connect to the Richmond 110kV substation.

	Sliabh Bawn	Lanesborough	Fischerstown	Richmond
		and connect to the substation but would have more significant environmental constraints.		
EirGrid opinion	EirGrid are agreeable with the installation of a new distribution transformer (110/38kV) which would utilise this spare 110kV bay	The capacity of the proposed project would necessitate the upgrade (replacement) of the existing 31.5MVA transformer in Lanesborough station	The overhead line from Fisherstown to Richmond 110kv station is only rated for 15MW of power flow and would require an uprate along with the uprate of the existing transformer in Fischertown.	The capacity of the proposed project would necessitate the upgrade (replacement) of the two existing 31.5MVA transformers in Richmond station with larger transformers to facilitate the proposed project.
Capacity	This connection method would allow for not only the connection of the proposed Project but also providing spare capacity for subsequent connections at 38kV.	The capacity of the proposed project would necessitate the upgrade (replacement) of the existing 31.5MVA transformer in Lanesborough station	Our connection would necessitate the re-stringing of at least 4km of 38kV overhead line to facilitate the uprate of the substation.	The capacity of the proposed project would necessitate the upgrade (replacement) of the two existing 31.5MVA transformers in Richmond station with larger transformers to facilitate the proposed project.
Cost and infrastructure requirement	Would be the least cost technically acceptable and in line with the Eirgrid connection requirements.	Significant uprates would be required to the existing station along with complex grid connection route traversing a large settlement would deem this solution not to be the least cost technically acceptable and would be in contrast to the Eirgrid requirements.	Significant uprates would be required to the existing station and the overhead line between Richmond and Fischertown along with complex grid connection route crossing the River Shannon by HDD would deem this solution not to be the least cost technically acceptable and would be in contrast to the Eirgrid requirements.	Significant uprates would be required to the existing station including the uprate of the existing transformers along with complex grid connection route crossing the River Shannon by HDD would deem this solution not to be the least cost technically acceptable and would be in contrast to the Eirgrid requirements.



Figure 3-12 Substation and grid connection alternatives considered

Based on the engineering assessment and consultation with Eirgrid, the preferential GCR was determined to be the Sliabh Bawn 110kV Substation. Advantages included a simple GCR utilising the utility corridor or existing road network and existing infrastructure with sufficient capacity for the export of power to the national electricity grid.

3.7.7 Borrow Pits, Excavation and Infilling

The use of onsite borrow pits, would represent a source of stone and aggregate materials for use in the construction of Site Access Tracks, Turbine Hardstands etc. The use of an on Site borrow pit would minimise the amount of material required to be imported by heavy goods vehicles during the construction phase.

During the design phase of the proposed project the potential for borrow pits was examined and found that suitable aggregates could be won from an on Site borrow pit if proposed. A borrow pit would require significant land take during the construction phase and with the underlying geology of greywacke and black argillite, it is considered likely that blasting would be required in order to win sufficient aggregates for the proposed Project.

However, given the proximity of nearby quarries and concrete batching facilities to the proposed Project, the most environmentally sensitive option was considered to utilise existing licenced quarry facilities to import aggregates to the proposed Project. By utilising existing local facilities, this would reduce potential adverse significant effects associated with noise and dust from quarrying activities including blasting at the proposed Site. It would also result in less land take requirements, habitat loss and the potential for fine sediment run off into the surrounding watercourses. The site investigation report completed for the proposed Project which informed this proposal can be found at (**Appendix 7.1 – Soils & Geology Technical Assessment** and **Chapter 7 – Land, Soils and Geology**).

3.7.8 Temporary Construction Requirements

Included in the consideration of impact areas within the Site is the size and location of temporary facilities required for construction. This consideration of the alternatives for the scale and siting of construction compounds included the appraisal of the temporary site entrances considered in **Section 3.8.1**. In order to facilitate construction, a construction compound or compounds will be required as well as areas for laydown and storage during construction. After consideration of the site and habitats and avoiding the drainage and watercourse buffers and forested areas, the establishment of two smaller, Temporary Construction Compounds during the enabling works for

the construction phase, and with installation completed at the commencement of the main construction works.

Temporary Construction Compound 1 will accommodate temporary containers for welfare facilities, site offices, meeting rooms, canteen area, a drying room and sanitary provisions near the roadway and in the area to be restored and remediated following the substation and communications Relay Mast construction and a second Construction Compound for storage of construction materials and plant.

Two smaller compounds instead of a larger compound, that are sited adjacent to the proposed works minimises the restoration requirements following construction and prevents the need for a larger area to be impacted. The compounds are temporary, and the **Appendix 2.1 – CEMP** outlines mitigation to minimise the impact of the site's operations during construction.

3.7.9 Turbine Delivery Route Alternatives

A number of turbine delivery routes were considered as alternative in the feasibility stages of the project.

Port of Entry

Routes from Dublin Port, Killybegs, Foynes and Galway as the port of embarkation were considered, however, these were discounted in the early stages due to increased distance, requirement for extended motorway journeys and the fact that Galway Port has the facilities to receive turbines and masts efficiently with a designated corridor out of the city.

Turbine Delivery Route

Once the preferred port of entry was selected, the Project design team undertook a desktop survey in order to determine potential routes from Galway Port to the proposed wind farm Site.

The preferred routes were narrowed down to two options.

- Option 1 – Leaves Galway Port and follows the N6, M6, M18, N17 and turns onto the N5 just before Charlestown. Where the route followed the N5, until the turn off North onto the R371 at Scramogue and continues to Site Entrance 1.
- Option 2 – Leaves Galway Port and follows the N6 and M6 until the turn off to the N61 at Athlone. Here the proposed route continued to Roscommon Town and followed the

N63 to Ballyleague where it turned North onto the R371. The proposed route then crossed the N5 at the Scramogue Junction and followed the R371 to Site Entrance 1.

A swept path analysis was undertaken for both turbine delivery route options, and based on the findings, Option 2 was evaluated as being more complex requiring significant land take at the Ballyleague junction where major road modifications would be required in order to facilitate the movement of abnormal length loads such as turbine blades. This coupled with additional works being required within the large settlement of Roscommon town deemed this route to be not preferred.

Option 1a & 1b

Following the results of the swept path along Option 1 and 2, a further detailed assessment was undertaken of Option 1 as the preferred Turbine Delivery Route. Further details were gathered on the proposed N5 Ballaghaderreen to Scramoge Realignment Scheme. The alignment commences at Ballaghaderreen, bypassing Strokestown before rejoining the N5 at the Scramogue Junction. During the assessment it was noted that the N5 upgrade route is scheduled to be completed prior to the proposed construction timeframe. Turbine Delivery Route Option 1a is proposed to follow the new N5 Ballaghaderreen to Scramoge Realignment Scheme bypassing Strokestown. This is why Option 1a has been determined the preferred route for turbine component delivery within the EIAR. However, in the unlikely scenario that the N5 Ballaghaderreen to Scramoge Realignment Scheme is not constructed prior to the construction phase of the proposed Project, consent is also sought for Option 1b which proposes deliveries through the town of Strokestown, and which has been fully assessed within the EIAR.

The alternative Turbine Delivery Routes assessed are shown in **Figure 3-13**.

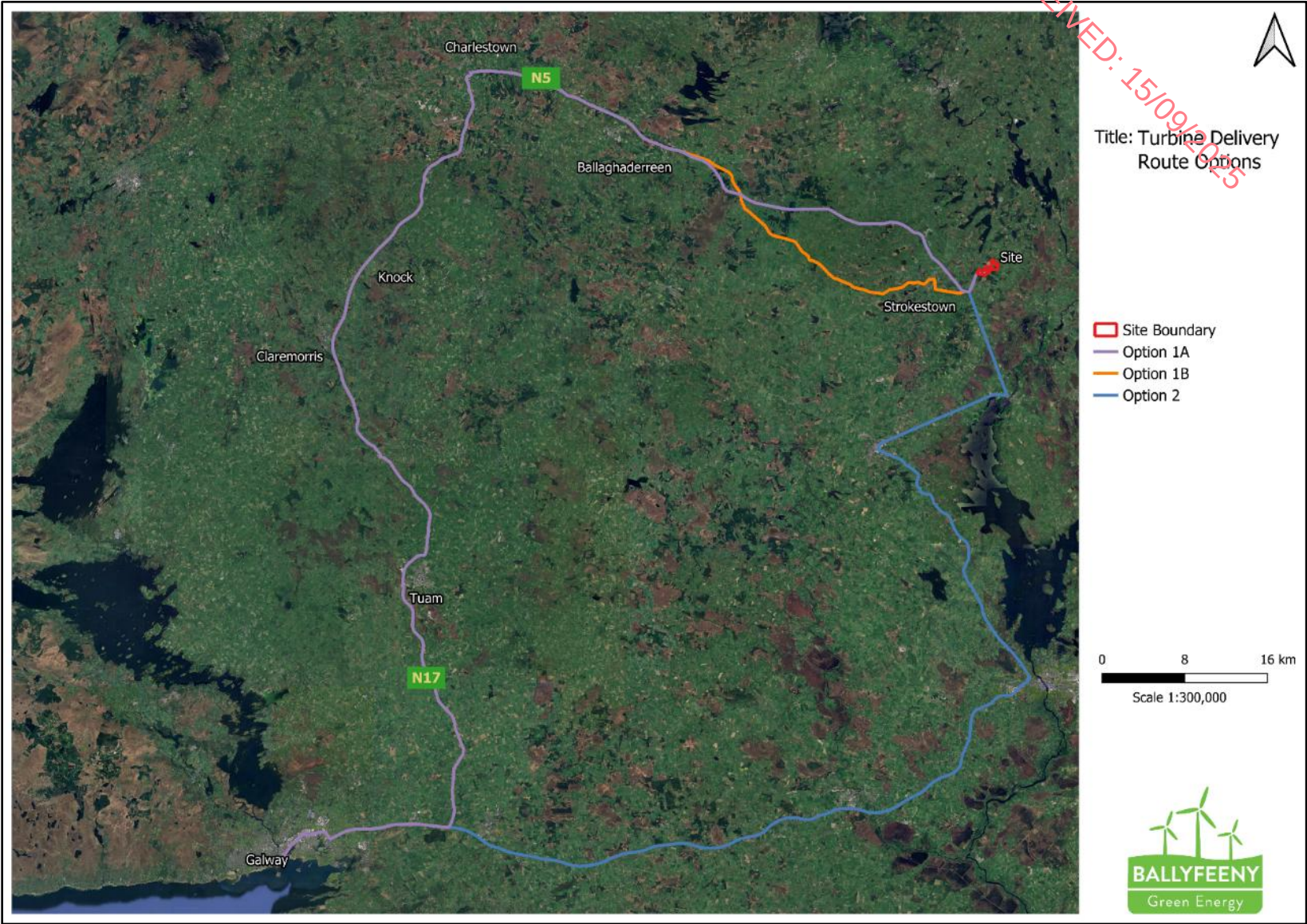


Figure 3-13 Turbine Delivery Route Options from Galway Port

3.8 Alternative Processes

3.8.1 Alternative Sources of Energy

Currently, most of Ireland's energy is produced using fossil fuels such as gas, oil, coal and peat. The large-scale use of carbon intensive fossil fuel releases large quantities of carbon dioxide (CO₂) and other pollutants into the atmosphere, which contribute to the process of climate change and other detrimental health and environmental effects. In the event the wind farm was not constructed, power generation would still be required in the region, and in line with the CAP25 and RCDP 2022 - 2028 targets, this generation should be considered from renewable sources.

Renewable energy resources include wind, solar, water (hydropower, wave and tidal), heat (geothermal) and biomass (wood, waste) energy. These sources are constantly replenished through the cycles of nature, unlike fossil fuels, which are finite resources that are becoming increasingly scarce and expensive to extract. Renewable energy resources offer sustainable alternatives to our dependency on fossil fuels as well as a means of reducing greenhouse gas emissions and opportunities to reduce our reliance on imported fuels. These resources are abundantly available in Ireland, yet only a fraction has been tapped so far (SEAI website, www.seai.ie). A gradual shift towards increasing our use of renewable energy resources would result in:

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

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

When considering wind energy as an energy source, it is important to place its development in an international, national and local policy context from the perspectives of environment, energy and planning. Numerous legislative mechanisms and requirements from a global to local level have been formulated to support the generation of energy from renewable sources and reduce the dependency on fossil fuels and these are discussed in further detail within **Chapter 4 – Policy and Planning**. At a national level, in December 2015 the Government published an Energy White Paper, entitled ‘Ireland's Transition to a Low Carbon Energy Future 2015 – 2030’. It is set firmly in the Global and European context, which has put energy security and climate change among the most urgent international challenges. This paper sets out the Government's Energy Policy from now until 2030. The three core objectives (the ‘three energy pillars’) are sustainability, security of supply and competitiveness. The target is that GHG emissions will be reduced by 80% to 95% below 1990 levels by 2050 and to zero or below by 2100. This will be achieved by a range of measures including changes of behaviour, greater efficiency, use of renewable indigenous resources etc.

A key target of the CAP25 is to increase the share of electricity demand generated from renewable sources to 80% where achievable and cost effective, without compromising security of electricity supply. A key element of this ambition is a target of 9GW of installed onshore wind energy by 2030. Large scale wind energy projects continue to be seen as providing a significant contribution to achieving this target. In order to achieve this target, the revised National Planning Framework states that “*each Region must plan for sufficient wind and solar energy development in order to achieve the targeted regional renewable electricity capacity allocations*” outlined in the framework. By 2030, the Northern and Western region's capacity allocation is to produce an additional 1,389 MW of energy from onshore wind compared with 2023 levels. Local authorities will be obliged to plan for the delivery of this energy through allocations set out in Regional Spatial and Economic Strategies prepared by regional assemblies. The proposed Project will help in the delivery of growth in the renewable energy sector, by delivering clean, green, energy to the national electricity grid.

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

With respect to the listed technologies for production of renewable energy, the reasons why

the use of wind energy technology on this particular site produces the lowest level of environmental effects are as follows:

- Large scale solar farms require a significantly higher footprint than wind farms to produce the equivalent level of electricity. Solar farms require 1.6 – 2 ha per MW, for a solar farm to have the same electricity output as the proposed project it would require land in the region of 43 – 60ha for a 27 – 30MW solar farm. This compared to the footprint of 12ha for the six proposed turbines and associated infrastructure within the site. As such the additional land take required for a solar farm at this Site, would result in greater habitat loss and increased potential for surface water run off due to the larger development footprint. The unfavourable topography and surrounding forestry would also result in a reduced capacity factor for solar compared to wind generation and as a result would limit the Site's potential to achieve the local and national climate targets.
- Co-firing of peat and biomass is an activity that is proposed to utilise the existing peat fired power stations and is dependent on the continuation of peat extraction. As the Lanesborough power station is no longer operational, the alternative for the region would be the construction of a new peat/biomass power station and recommence peat extraction. This would result in additional environmental effects above the activity of the existing power stations. In addition, commercial peat harvesting has ceased and therefore there is no potential for peat stocks to be generated for this activity.
- Landfill gas production is only possible through colocation with an existing municipal landfill. Therefore, this is not a feasible alternative to the proposed project.
- Biogas production facilities generally have a relatively small footprint and tend to be located adjacent to the national gas network to facilitate gas injection. There is no national gas network close to the proposed Project, and no renewable gas entry points proposed in the vicinity of the proposed Project. As such if a Biogas production facility was proposed for this Site, it would require the transport of renewable gas over long distances along the public road network. As such the proposed Site was considered not suitable for Biogas production facilities.

3.8.2 Alternative Land-uses

Commercial managed forestry plantations are evident within and surrounding the proposed Site. These plantations require large areas of land and therefore further plantations within the Site

would have a likely significant effect on the potential for rehabilitation or biodiversity enhancement. The land use at the site is predominately agricultural and forestry related (public and private). The other main feature adjacent to the proposed site is the active Ballyfeeny Rock Quarry.

In the event the wind farm was not constructed it would be safe to assume that these activities would continue in the area. The proposal is that the majority of these activities will continue with the wind farm in place, and the land will resume previous functions and activities post decommissioning. Due to the damage of forestry onsite from recent storms, parts of the forestry on Site and surrounding the Site is scheduled for thinning and felling from 2025 onwards. No alternative land uses are proposed for the Site or in the immediate vicinity. There are no previous planning applications for this Site that would indicate any alternative land use and as such have not been considered further.

3.9 Alternative Mitigation Measures

The mitigation measures proposed in relation to the elements of the Project are detailed in the chapters to follow and are also summarised in **Chapter 18 - Schedule of Mitigation and Monitoring Measures**. The mitigation measures proposed are considered to be proven and best practice. The level of mitigation proposed is determined to be proportionate to the likely impact. On this basis, the mitigation measures proposed within the EIAR chapters are considered to be the most environmentally conscious and preferred for the proposed Project.

3.10 Consultation about the Consideration of Alternatives

Details of the consultations held in respect of the proposed Project are listed in **Chapter 1 – Introduction** and in **Appendix 1.2 – Scoping Report**. All meetings, public consultations and matters raised received to date have been reviewed and incorporated into the design and layout process, as appropriate. Site Access alternatives have been discussed with relevant landowners as well as most suitable locations for site entrances and Internal Access Tracks.

In addition, Section 3.8.3 of this chapter outlines consultation with EirGrid the national TSO, on the options for substations, grid connection and network capacity for the proposed Project.

Future consultation is planned for operational phase and consultation with landowners will be undertaken on decommissioning options in the future.

3.11 Considerations of Alternatives for Decommissioning and end use

In accordance with EPA guidelines for EIAR, the decommissioning phase is considered not only for the impact assessment, but also under this Alternatives Chapter, at 'end of life' wind farm (**Chapter 2 – Project Description**).

The Applicant is seeking consent for a period of 35 years for the operation of the proposed Project from the date of commissioning. Following the end of the operation phase, the Applicant may wish to extend the life of the proposed turbines, replace the turbines with a new set of turbines subject to fulfilling any planning requirements at the time, or the proposed Project may be decommissioned fully. The Onsite Substation and grid connection will remain in place as it will be in the ownership of ESB Networks and will form part of the National Grid. The Relay Mast will remain in place as it will form part of the telecommunication network in the area.

For the removal of the wind turbines, cranes of similar size to those used for construction will be used to disassemble each turbine using the same Turbine Hardstands. The wind turbines will be disassembled in reverse order to how they were erected starting with the turbine blades and finishing with the turbine towers. The towers, blades and all components will then be removed from Site and reused, recycled, or disposed of in a suitably licensed waste facility in accordance with the waste hierarchy. The turbine transformers will also be removed from Site. There is potential to reuse turbine components in the second-hand market, while others can be recycled at a licensed facility.

Repowering involves upgrading or replacing components to extend the lifespan and/or increase power output. Life extension focuses on maintaining existing turbines by refurbishing or repairing components. Repowering requires further planning permission at the time of decommissioning and as such, whilst considered as a valid alternative is subject to future environmental impact assessment. The Repowering alternative considers the current guidelines IWEA (2019) A Guide to Repowering in Ireland. It is considered as an alternative but would be subject to future environmental impact assessment and planning permission for evaluation of any proposed repowering project.

Partial removal options leave some structures in place, to reduce environmental effects from decommissioning works and where the features have direct or alternate uses onsite. Substations and cables are often left in situ for continued usage or as nodes for future alternate grid reinforcement.

Some elements may have ecological enhancement function that would be detrimental by removal.

Full removal involves dismantling and restoring the site. Where possible components are removed for recycling or repurposing offsite and the site is restored to as near to pre-development status as possible.

3.11.1 Decommissioning Alternative 1 - Repowering

Repowering can include total repowering of a wind farm, or partial upgrade / replacement of existing wind turbines. This represents the most advantageous and preferred option for the windfarm as it allows for updating of the technology and continuing to contribute to renewable energy generation. Repowering is most via one of the two alternatives below namely:

Partial Repowering: Replacing components like blades, gearboxes, or nacelles with newer, more efficient models.

Full Repowering: Replacing entire turbines with larger or more efficient models. This may require new foundations and increased land area.

Advantages:

Increased energy production, extended lifespan, potential for increased carbon offsetting and commitment to renewable energy goals in future climate action plans.

Disadvantages:

Subject to future planning/permitting approvals, therefore can only be considered at a high level at this time. If the wind farm operates for the full 35-year lifespan before repowering, it is considered reasonable to assume that the technology will have significantly advanced or altered over this period as well as the requirements for energy demand and generation.

3.11.2 Decommissioning Alternative 2 - Life Extension

Extending the operational life of existing turbines through upgrades, repairs, and maintenance. This can be done by refurbishing components like generators, blades, or towers, but does not include the replacement of units. Life extension is considered under the current industry guidelines IWEA (2021) Wind Energy Ireland Guide to Wind Turbine

Lifetime Extension.

Advantages:

Maximizes investment in existing infrastructure, reduces costs compared to repowering or decommissioning, and can improve reliability.

Disadvantages:

Wind farm life is extended beyond the current assessment timelines and would be subject to extensions of planning permission.

3.11.3 Decommissioning Alternative 3 - Decommissioning (Partial or Full Removal)

Decommissioning and removal of the wind farm can be complete removal, partial removal and retaining some areas and infrastructure for future use, or to leave certain elements in situ where complete removal would lead to significant engineering challenges and environmental disturbance.

Partial Removal: Leaving parts of the structures in place, such as foundations, substation and conduits and tracks.

Advantages of Partial Removal:

Returns the majority of the site to its predevelopment state, potentially reducing the cost and complexity of full removal, allows reuse of usable infrastructure such as Access Tracks, the Onsite Substation and Relay mast. It is proposed that at the decommissioning phase the Turbine Foundations, excluding the above ground section of the turbine foundation called the 'plinth' and ducting for the Internal Wind Farm Cabling, will be left in situ. The foundation plinth is proposed to be removed during the decommissioning phase. By only removing the above the ground turbine infrastructure such as the plinth, it minimises the potential for environmental effects in relation to noise, dust and spoil management.

Full Removal: Dismantling all components, including breaking out the entire concrete foundation and removing them from the site to a licensed waste facility, restoring the land to its original state.

Advantages of Full Removal:

Removes the project entirely and reverts to the current baseline of the proposed project, by including the removal of all underground infrastructure.

Disadvantages of Full Removal:

Can require extensive groundworks and excavation as well as demolition and may require significant civil engineering work to remove foundations, tracks and other infrastructure. Full removal deconstruction activity can be equal to or more than the construction assessment. No reuse and beneficial reuse for any of the facilities and infrastructure developed for the project. Full removal of turbine foundations could result in increased environmental effects such as noise, dust and surface water runoff from breaking out the concrete foundations.

Decommissioning options have been evaluated to determine the best environmental and engineering practical options. Repowering may provide the best reuse of the site at end of life and would be appraised at that time including an evaluation of the potential for environmental impacts and taking into account any changes in national objectives policies and local County Development Plans.

In the case of decommissioning, partial removal is proposed which will comprise restoring the site to near predevelopment conditions and land use, whilst limiting the extent of works required. The decommissioning works includes the following:

- Removal of turbine nacelles and towers. These works will be undertaken essentially in the reverse of construction and will remove the wind turbine to ground level;
- Removal of foundation to -0.5m and restoration of the areas to either agricultural land or land suitable for forestry replanting as preferred by the landowner;
- Removal of onsite cabling but leaving the buried ducting in place to prevent the need for excessive groundworks;
- Removal and reduction of hardstands and access tracks by excavation and grubbing. Areas of access track useful for access and field access will be retained with the agreement of the landowner;
- Restoration of hedgerows and field boundaries where access tracks have been

removed and the return of topsoil to hardstand areas;

- It is anticipated that the substation and communication Relay Mast will be utilised beyond the lifetime of the project; and
- All hedgerow restoration and other biodiversity related mitigation will be retained post project. Where temporary site entrances need to be reopened to remove infrastructure during decommissioning, these will be restored after use.

A **Decommissioning Management Plan** and an indicative site layout following the decommissioning of the Project are provided in **Appendix 2.1.4**. The layout presents the most likely scenario of removed and retained access tracks and areas. However, the exact area of track to be retained post development will be confirmed with the landowners who will receive the site at end of life.

3.11.4 Post Decommissioning Wind Turbine End Use

With many of the earliest wind turbines in Ireland and around the world reaching the decommissioning phase Reuse, Recycling and Recovery solutions are a high priority for the wind industry. Where possible turbine components will be considered for Reuse, Recycling or Recovery to prevent the need for disposal. The reuse potential for both turbine blades, towers and associated materials is rapidly developing with a strong second-hand market developing globally for wind turbine components.

It's anticipated that by the end of life of the proposed Project, techniques and options for the Reuse, Recycling and material Recovery for wind farm infrastructure will be well developed and established. There is a growing range of potential options for the reuse of wind turbine components such as turbine blades, towers and nacelles in community projects as demonstrated in the images in **Figure 3-14**.

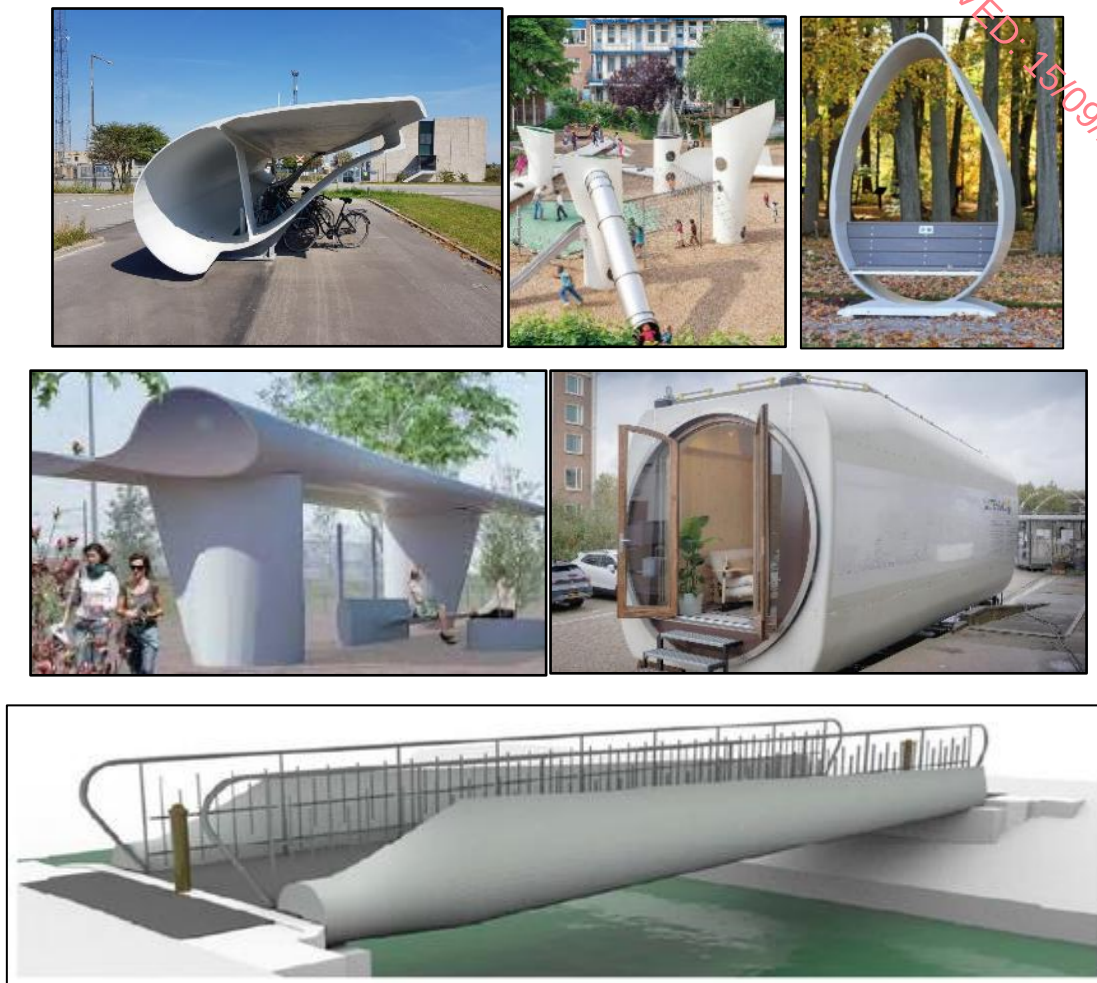


Figure 3-14:Current examples of wind farm material reuse for community purposes (Examples from the WIND Exchange website (<https://windexchange.energy.gov/end-of-service-guide>) All designs and image rights reserved by original authors and contributors.

Further details on the considerations for end of life are outlined in **Appendix 2.1.4 – Decommissioning Management Plan**

3.12 Summary

Table 3-6 below summarises the alternatives considered and compares these alternatives on the basis of key considerations.

Table 3-6 - Summary of Alternatives Considered

Alternative	Summary
'Do-Nothing' Alternative	The Do-Nothing alternative would represent a missed opportunity in terms of Roscommon, the Northern and Western region and Ireland meeting their obligations under the Climate Action Plans and revised National Planning Framework, and also in terms of energy security.
Alternative Locations	All suitable sites within the BGE considered area were assessed for their potential for renewable energy developments. The proposed wind farm Site was one of a number of sites to make the final shortlist of feasible sites. Of these sites, the proposed Ballyfeeny site was selected on the basis of its low potential for environmental effects, its siting in a preferential wind development area, its good wind resource and the low population density and number of sensitive receptors in the area.
Alternative Layouts	A number of turbine layouts were assessed as part of an iterative process that took into consideration the size, number and positioning of turbines and the layout of associated site infrastructure. The final layout chosen represents the optimum layout in terms of the impact on receptors, constructability and delivery of the required output from the wind farm.

Alternative	Summary
Alternative Design	<u>Turbine Configurations</u> The optimum design envisages 6 No. turbines in the 4 – 7 MW range. Smaller turbines could also achieve the same site output, but the use of smaller turbines would be a less efficient use of the available wind resource and having regard to the nature of the site would have a greater environmental footprint. <u>Site Entrances</u> Three additional possible site entrances were examined. The existing entrance off the local road can be used for operations but was considered likely to be too small and too disruptive for use as a construction delivery route and TDR. Utilisation of the temporary site entrance along the existing Coillte access track minimizes disruption and provides a preferred construction entrance for the site. <u>Internal Access Tracks</u> A number of Internal Access Track layouts were examined as part of the iterative process for selection of the optimum turbine configuration. The final layout was chosen to minimise construction of new access tracks by following the existing access tracks where possible and linking turbine locations via the most direct route. In addition, three of the entrances and access areas are temporary and are only needed for construction purposes and can be restored after use. <u>Substation Locations</u> Two potential substation locations were examined, both located within 100m of each other, as well as a number of other configurations onsite. Based on the assessment of the need for easy operational access, and minimizing the environmental footprint, in conjunction with the requirements of the Draft WEDG, 2019 and those of Eirgrid and ESB Networks, it was concluded that the location selected was optimum in terms of access options, the provision of supporting infrastructure for the preferred location of the communication relay mast, and the potential for the connection of welfare facilities as required by

Alternative	Summary
	ESB.
Alternative Processes	<u>Alternative renewable energy generation</u> Early feasibility considered other forms of renewable generation on the site, but given its location and wind resource, and the minimization of footprint associated with a windfarm, this was selected as the best environmental option and maximize the area of continuing land use predevelopment. <u>Land Uses</u> The alternative land use for the site consists of either the continuation of the existing land uses or for the lands to be repurposed for other uses.
Decommissioning Alternatives	Repowering or reconditioning of the windfarm to extend its operational period would provide the most advantageous reuse of the site. These would be subject to future planning and assessment and is based on the current relevant policies and objectives that could change over the 35-year operational lifespan. <u>Decommissioning</u> Decommissioning options were evaluated and the option for the partial removal of wind farm infrastructure was identified as the preferred option. This option was considered to maximise the removal of hardstands and foundations in order to prepare and reinstate areas that are suitable for landowners to return areas to predevelopment land use but at the same time minimizing the level of groundworks and excavations and the associated potential for environmental impacts. The partial

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Alternative	Summary
	removal of supporting infrastructure with likely maintaining of substation and communication assets that will be under the management of the respective operators is considered. The preferred solution is outlined in a Decommissioning Management Plan accompanying the EIAR and summarized in Chapter 2 – Project Description.
Alternative Mitigation Measures	
	The chosen mitigation measures are those that are considered to have the least environmental effects. Alternative mitigations are discussed within the relevant sections of the Chapters of the EIAR.

The site selection and final design have been selected based on the iterative design process of the EIA process, informed by the considerations of the site and minimising impact to the environmental aspects. Reasonable Alternatives have been considered at all stages of this process and the proposed Project as presented represents the best practical environmental and engineering option for the development of the Site.

3.13 References

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- Planning Inspectorate for England (PINS) (2019). Advice Note 17: Cumulative Effects Assessment;
- Department of the Environment, Heritage and Local Government, 2006 Wind Energy Development Guidelines
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