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INTRODUCTION

- 3.1 The following chapter sets out the need for the development with respect to national and regional policy as well as national renewable energy and climate change targets.
- 3.2 Careful consideration of alternative options throughout the design process provides one of the most effective means of reducing the environmental effects of a project. Following the establishment of the need for the development, the chapter details the reasonable alternatives studied by the developer. The main alternatives considered during the evolution of the design are set out in this chapter, along with an indication of the main reasons for selecting the chosen option and a comparison of the environmental effects.

Statement of Authority

- 3.3 This chapter has been prepared by Lynn Hassett, Associate EIA Co-ordinator from SLR Consulting.
- 3.4 Lynn holds an MSc in Environmental Impact Assessment (2001) and a BSc (Hons) in Applied Ecology (2000). She has over 14 years' experience in the preparation, contribution to and review of site selection EIAR chapters, as well as in the EIA co-ordination process as a whole. She has worked in the UK and Ireland on a range of urban and rural projects including in the mixed-use development, mining and quarrying sectors.

Need for the Development

- 3.5 Current national Government policy is becoming increasingly focussed on the need to reduce the use of fossil fuels and anthropogenic greenhouse gas emissions by promoting the generation of renewable electricity, including wind energy generation.
- 3.6 The Irish Government, through the Climate & Low Carbon Development (Amendment) Act 2021, commits to achieving 'net-zero' emissions by 2050. The latest Climate Action Plan published on 21st December 2022 (CAP 23) has set a target to up to 80% renewable electricity for the country by 2030. This figure represents approximately a doubling of current efforts.
- 3.7 CAP 23 commits to 22GW of new renewable capacity by 2030, a very significant rise from 15GW in the previous iteration of the Plan (CAP 21). Within this figure, the 2030 target for onshore wind is stated to be 9GW (up from 8GW in CAP 21).
- 3.8 The Climate Action Plan 2024 (CAP24) is the third annual update to Ireland's Climate Action Plan. The Plan was approved by Government on 20 December 2023, subject to Strategic Environmental Assessment, Appropriate Assessment and public consultation.
- 3.9 CAP24 reiterates the European Green Deal commitment to delivering net-zero GHG emissions at EU level by 2050; with Ireland committed to achieving a 51% reduction in emissions from 2021 to 2030, and the need for action to reduce emissions to be significantly accelerated in the period to 2030. The Proposed Development supports the delivery of targets within CAP23 and CAP24 and the unprecedented need for effective onshore wind projects with associated infrastructure.
- 3.10 The Government's Wind Energy Development Guidelines for Planning Authorities 2006 (DoEHLG, 2006) establishes a land-use planning framework whereby planning authorities can proactively support the development of wind energy projects at appropriate locations. The Eastern and Midland Regional Assembly Regional Spatial and Economic Strategy

2019-2031 recognises the need for decarbonising the energy sector and supports an increase in facilitating wind energy projects on a larger scale in appropriate sites within the region. It recognises the role of wind energy infrastructure in improving our climate resilience and cites the reliance of wind energy production through events such as Storm Ophelia during which other access to other energy sources was challenged. It recognises the requirement for this type of development to be located in rural areas.

- 3.11 In accordance with these land-use policies, the Meath County Development Plan 2021-2027 and the Westmeath County Development Plan 2021-2027 are both supportive of wind energy development at suitable locations and in accordance with specified development management criteria within their administrative areas.

Requirements of the EIA Directive

- 3.12 The requirement in relation to alternatives in the EIA process is set out in Directive 2011/92/EU, amended by Directive 2014/52/EU “the EIA Directive”, in Article 5 (1)(d), which states that an EIAR should include:

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

- 3.13 Article 5(1)(f) of the EIA Directive requires that the EIAR contains:

“any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.”

- 3.14 Annex IV of the EIA Directive states that the information provided in an Environmental Impact Assessment Report (EIAR) should include a:

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

- 3.15 This EIA process has been undertaken for the development of a wind farm and associated infrastructure. There are many factors that drive proposals for such development, such as national need, availability of land, geographical issues and availability of infrastructure. Part of the selection process is the proximity of the wind farm to a suitable grid connection point to connect a renewable project to the National Grid. Once the wind farm location has been identified, the location of ancillary infrastructure can be considered in the context of a number of factors such as length, population centres and terrain before the design is finalised.

- 3.16 Implementation of the EIA process, complete with continuous input from a range of technical environmental experts has influenced the consideration of alternatives for the Proposed Development.

- 3.17 The alternatives considered have been described in line with the EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (May, 2022). The Guidelines state that:

“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."

- 3.18 Furthermore, the Guidelines note the following regarding high level plans and strategies that may influence or pre-determine decisions in the development process:

"Higher level alternatives may already have been addressed during the strategic environmental assessment of relevant strategies or plans. Assessment at that tier is likely to have taken account of environmental considerations associated, for example, with the cumulative impact of an area zoned for industry on a sensitive landscape. Note also that plan level/higher-level assessments may have set out project-level objectives or other mitigation that the project and its EIAR should be cognisant of. Thus, these prior assessments of strategic alternatives may be taken into account and referred to in the EIAR."

- 3.19 It is important to note that there are non-environmental factors may have equal or overriding importance to the developer of a project, such as engineering feasibility or planning considerations. These other factors are also set out in this section where they were appropriate to the ultimate selection of the Proposed Development.

Alternatives Considered

- 3.20 Given the legislation and guidance background set out above, the reasonable alternatives considered in undertaking this EIAR were as follows:

- 'Do Nothing' alternative;
- Alternative locations;
- Alternative technologies;
- Alternative design and layouts; and
- Alternative cable routes & haul routes..

- 3.21 Each of these alternatives were considered relevant to the Proposed Development and its specific characteristics and are discussed in further detail below, including an assessment and comparison of likely significant environmental effects, and indicating the main reasons for choosing the development, as proposed.

'Do Nothing' Alternative

- 3.22 In the 'Do Nothing' alternative, the status quo in terms of the local environment would continue, as gradually evolving managed farmland, woodland and maturing commercial forestry. It is also possible that in the 'Do-Nothing' scenario, there will likely be some further commercial clear-felling and afforestation.

- 3.23 The Proposed Development Site would not fulfil its potential to contribute to renewable energy production which has been clearly stated as a need by Irish Government. According to EirGrid Group's All-island Generation Capacity Statement 2021 – 2030 (EirGrid, 2021), the growth in energy demand for the next ten years on the Island of Ireland will be between 18% and 43%. In the 'Do-nothing' scenario, importation of fossil fuels to maintain growing energy supply will continue and Ireland's energy security will remain vulnerable. A "Do-nothing" scenario would contribute to strain on existing energy production and may impact on economic growth if energy demand cannot be met. The delay in closing Tarbert and

Moneypoint means we continue to rely on imported fossil-fuels with unpredictable pricing, a vulnerable supply chain and higher carbon emissions.

- 3.24 Given the importance of onshore wind energy as a contributor to the renewable energy targets, the 'Do Nothing' alternative was not considered a viable option.
- 3.25 It was further considered that there is significant potential within Counties Meath and Westmeath to deliver further wind energy generation capacity. At present, there is no commercial scale wind energy project operating in County Westmeath. A 50MW wind farm has been permitted at Coole Wind Farm but is the subject of a judicial review and has no certainty of being delivered. A 54MW development was granted planning permission at Bracklyn by An Bord Pleanála in July 2022. There is one small-scale (10MW) installation operating in County Meath at Teevurcher. It is clear, therefore, that the counties have very significant untapped potential to contribute to national targets.
- 3.26 The 'Do-Nothing' option would result in a failure to capitalise upon and exploit the significant renewable wind energy resource available within Counties Meath and Westmeath, resulting in a lost opportunity to meet ambitious national targets for the production of renewable electricity.

Alternative Locations

- 3.27 Strategic site selection, which avoids areas of environmental sensitivity is the principal mitigation option for onshore wind energy projects. At the outset of developing a wind energy project an assessment of alternative locations can avoid sensitive locations in favour of locations which have fewer constraints.
- 3.28 There are various sources of guidance with regards to the assessment and management of shadow flicker impacts caused by wind turbines. However, in alignment with its corporate policy objectives, the client has committed to zero shadow flicker.
- 3.29 A rigorous strategic national site selection process was undertaken to identify the optimum site to accommodate the Proposed Development. The developer is highly experienced and is developing other wind farms at the following locations, Cloghan, Cushaling, Moanvane and Pinewoods that employ a screening process for site selection – wind speeds, proximity to grid, housing buffers.
- 3.30 The site selection process also took account of relevant International, National and Regional policies, as well as the principal environmental, planning and technical criteria that determine the feasibility and suitability of the existing environment to absorb wind farm developments.
- 3.31 The primary macro level considerations in the identification of a broad area for wind energy development included the following considerations:
- Identification of environmental designations on a National Scale,
 - Identification of areas of built Wind Farms in Ireland,
 - Identification of Grid Capacity and Electricity Infrastructure,
 - Transmission Uses of System Charges,
 - Population Density,
 - Wind Speed, and
 - Relevant International, National and Regional Policies.

Environmental Designations

- 3.32 An assessment of environmental designations (SAC's, SPA's, pNHAs) identified the western and eastern seaboard of the Country as having dense levels of European and National environmental designations. **Figure 3-1** shows the environmental designated sites surrounding the Proposed Development Site within a 25km radius. The majority of the site is not designated for environmental conservation.

Built Wind Farms

- 3.33 According to the latest statistics from Wind Energy Ireland (Wind Energy Ireland) there are over 300 operational wind farms across Ireland. SEAI provides an online interactive map¹ which indicates a number of connected and up and coming / contracted projects.
- 3.34 **Figure 3-2** shows the currently connected/ contracted wind farms within a 25km radius of the Proposed Development. The only such project is the Liffey Autoproduction Project, which is a small capacity development (3 MEC) located approximately 23km northwest of the Proposed Development Site in Co. Cavan.

Capacity on the Electrical Grid

- 3.35 Electrical grid capacity has become a critical issue for site selection. At the time of site selection in 2020, a desktop review of the capacity assessment of the grid (Eirgrid, 2021) was undertaken to ascertain where capacity might be available for the provision of a new wind energy project at a national scale to determine at a regional scale, areas suitable for wind energy development with capacity. The Midlands Region and parts of the Greater Dublin area were identified as most likely.
- 3.36 The EirGrid All Island 10 Year Transmission Forecast Statement 2021 notes that,
“Some capacity for additional generation is available within the 110 kV network at some nodes in the South-East and Midlands of Ireland. This is due to the presence of large demand centres, the lower penetration of renewable generation, as well as the strength of the transmission network in this region.”

National Transmission

- 3.37 Transmission Use of System (TuOS) charges are applied to electricity generators and suppliers to reflect the transmission cost of connecting at different locations and to recover the total allowed revenues of the onshore and offshore transmission owners and their levels within an area are an important factor in determining the suitability of it for locating infrastructure.
- 3.38 Changes to generation dispatch patterns and the geographical location of generation can have an impact on all-island transmission network power flows, which can impact on TuOS charges. The EirGrid All Ireland 10 year Transmission Forecast sets out the TUoS changes over 2020-2021. As can be seen in **Figure 3-3**, EirGrid would apply one of its lowest TuOS values to a project connecting in this area which is primarily due to the existing capacity that exists in the network which means that fewer network reinforcements are required in the area to facilitate the power from the Proposed Development. At the time of the site selection for the Proposed Development, two areas were identified with the area of highest

¹ <https://gis.seai.ie/wind/> [Accessed January 2024].

infrastructure capacity- these include Munster and Connacht followed by the midlands areas, including County Westmeath. These areas of the grid network are particularly suitable for the connection of wind generation from a grid system operator’s perspective.

- 3.39 Potential grid connectivity and constraints were also considered during the strategic site selection process as detailed in the strategic screening exercise. The Proposed Development Site was found to be in proximity to a 110 KV overhead line at Clonmellon which provides onwards links with the national grid.

Population Density

- 3.40 An analysis of 2022 Census data provides information on population density by county as set out in **Table 3-1**. Population is denser within the urban centres of Dublin and Cork, spreading through their wider catchment area.
- 3.41 The midland counties show a moderate to lower population density, being removed from urban centres. County Meath has a lower population density (94 persons per square kilometre) than Dublin (1,573 persons per square kilometre), but a comparatively high population density than other counties as can be seen below on **Table 3-1**. This reflects the location of Meath within the Greater Dublin area, and its major towns being located within commuter belts. A small proportion of the Proposed Development is located on the western side of Meath, further from Dublin. A lower average population density is found in County Westmeath (52 persons per square kilometre) within which the vast majority of the Proposed Development is located. Lower population densities can be found in Counties Clare, Donegal and Kerry, however as demonstrated in **Figure 3-3**, these areas have higher GTUoS values with a lower capacity for grid transmission. When all factors, such as proximity to environmental designations, quantum of constructed wind farms, grid capacity and population density, the midlands area was considered the most feasible overall.

Table 3-1 CSO 2022 Population Density by County

CensusYear	County	Population by Area	County by Size km ²	Pop Density
2022	Co. Carlow	61,931	897	69.04
2022	Co. Cavan	81,201	1,932	42.03
2022	Co. Clare	127,419	3,450	36.93
2022	Co. Cork	581,231	7,500	77.50
2022	Co. Donegal	166,321	4,860	34.22
2022	Co. Dublin	1,450,701	922	1573.43
2022	Co. Galway	276,451	6,151	44.94
2022	Co. Kerry	155,258	4,807	32.30
2022	Co. Kildare	246,977	1,695	145.71
2022	Co. Kilkeny	103,685	2,073	50.02
2022	Co. Laois	91,657	1,720	53.29
2022	Co. Leitrim	35,087	1,589	22.08
2022	Co. Limerick	205,444	2,756	74.54
2022	Co. Longford	46,634	1,091	42.74

CensusYear	County	Population by Area	County by Size km ²	Pop Density
2022	Co. Louth	139,100	826	168.40
2022	Co. Mayo	137,231	5,588	24.56
2022	Co. Meath	220,296	2,342	94.06
2022	Co. Monaghan	64,832	1,295	50.06
2022	Co. Offaly	82,668	2,001	41.31
2022	Co. Roscommon	69,995	2,548	27.47
2022	Co. Sligo	69,819	1,837	38.01
2022	Co. Tipperary	167,661	4,305	38.95
2022	Co. Waterford	127,085	1,857	68.44
2022	Co. Westmeath	95,840	1,840	52.09
2022	Co. Wexford	163,527	2,367	69.09
2022	Co. Wicklow	155,485	2,027	76.71
2022	Ireland	5,123,536	70,273	72.91

Wind Speed

3.42 Sustained wind speeds are required in order for a wind development to make a substantial and viable contribution to the national grid. An examination of the Wind Atlas² over the study area indicates that wind speeds average between 5.2 and 5.4 m/s at 20m to up to approximately 8.8m/s at 150m (as shown on **Figure 3-4**). Wind speeds were a consideration in the final site selection of the Proposed Development.

Relevant Policies

National Level

3.43 A comprehensive assessment of policy is set out within the relevant chapters to which they relate in this EIAR, as well as in the Planning Statement accompanying the planning applications. With regard to wind energy development, page 122 of the National Planning Framework (NPF) states:

'Ireland's national energy policy is focused on three pillars: (1) sustainability, (2) security of supply and (3) competitiveness. The Government recognise that Ireland must reduce greenhouse gas emissions from the energy sector by at least 80% by 2050, compared to 1990 levels, while at the same time ensuring security of supply of competitive energy sources to our citizens and businesses.'

3.44 In relation to the siting of wind farm developments, the NPF states:

'Increases in population, economic growth, higher levels of food demand, transitioning to a more sustainable energy market and conservation goals will ultimately result in increased competition for suitable land to facilitate these

² <https://www.seai.ie/technologies/seai-maps/wind-atlas-map/> [Accessed January 2024].

accumulating pressures. Some parts of Ireland are more suitable than others for facilitating particular national sectoral aims by reason of physical factors, environmental sensitivities, land capacity and existing settlement patterns.'

- 3.45 In addition to the NPF, the Climate Action Plan is the foremost national climate change document within the Republic of Ireland and provides the guidance for development targeting climate mitigation accordingly.
- 3.46 Ireland's second Climate Action Plan (CAP 23) implements the carbon budgets and sectoral emissions ceilings and sets a roadmap for taking decisive action to halve Ireland's emissions by 2030 and reach net zero no later than 2050, as committed to in the Programme for Government (as set out earlier in the section addressing the need for the development).

Regional Level

- 3.47 During design of the Proposed Development, the Regional Spatial and Economic Strategy for the Eastern and Midland Region was the foremost regional planning document within the Republic of Ireland. Page 181 of the RSES notes that:

'Incorporating renewable energy within Ireland's energy supply may improve the resilience of energy infrastructure as reliance on energy imports and the associated concentrated infrastructure is reduced. Distributed renewable energy sources can contribute to local energy system resilience. For example, during both Storm Ophelia and Storm Emma, when the operation of many of Ireland's infrastructures was challenged, wind energy maintained output throughout the adverse conditions and contributed to maintaining local supply and post event recovery to normal operation. The Region should promote best practice in resilience in critical infrastructure, including implementation of emerging European best practice in this regard.'

Local Level

- 3.48 In assessing alternative locations, reference was made to the policies and objectives of the Westmeath County Development Plan 2021-2027 and the Meath County Development Plan 2021-2027, including the Strategic Environmental Assessment (SEA) prepared for each plan in accordance with Directive 2001/42/EC. SEA is a form of environmental assessment carried out at a plan level, and adopted by the Planning Authority.
- 3.49 Section 10.23 of the Westmeath County Development Plan 2021-2027 states that "*The Council will have regard to the Wind Energy Development Guidelines for Planning Authorities, prepared by the Department of Environment, Heritage and Local Government, or any update made thereto. Further, regard should be taken of the Landscape Character Assessment of the County which is contained in the accompanying Volume 2 of this Plan*".
- 3.50 Section 10.23 sets out the policy context for wind energy development in the county, which is generally supportive as long as such proposals would not have an adverse effect on residential or tourism amenities, special landscape character, views or prospects, Natura 2000 sites, protected structures, aircraft flight paths or by reason of noise or visual impact. According to Policy CPO 10.145, the Proposed Development can be categorised as an industrial scale / large-scale energy production project given proposed turbine height as being over 100m, number of turbines being greater than five and output being greater than 5MW.

- 3.51 Overall, the entire county is deemed to be of 'Low Capacity' or 'No Capacity' for the delivery of wind energy developments. Similarly, the Meath County Development Plan does not identify specific locations for wind development. Therefore, given that no strategic areas for the provision of wind energy developments have been formally identified, a further assessment of possible reasonable alternative locations was undertaken. This assessment was based on the abovementioned criteria together with the general criteria included in the Wind Energy Guidelines for Planning Authorities 2006, the Draft Revised Wind Energy Development Guidelines 2019 and the SEAI'S Methodology for Local Authority Renewable Energy Strategies 2013.

Alternative Technologies

- 3.52 There are a number of renewable energy technologies available for use in Ireland, most notably bio energy, wind, solar PV, hydrogen, offshore wind, tidal and wave energies. However, in comparison, the majority of these technologies (with the exception of Solar PV) are in their infancy in terms of commercial application and are not considered to be viable for this site or for the applicant.

Bioenergy

- 3.53 Bioenergy presents an alternative to wind in assisting Ireland to meet its renewable energy targets. Bioenergy refers to the production of renewable energy from a variety of materials of biodegradable nature and is generally considered under the headings: solid biomass, biogas and biofuels. However, the technical and economic challenges for the production of biofuel are high.
- 3.54 Biomass is not always a reliable energy source due to its dependence on the availability of raw materials, such as crops or wood, and there can be lifecycle implications in terms of the energy required through the whole cycle. When these resources are scarce, it can be difficult to sustainably generate energy from biomass. Biomass from waste is considered more advantageous in terms of carbon emissions savings, although again a steady stream of supply can be difficult to source. Biomass energy production can also be inefficient and converting it into a useful form of energy often involves burning, which generates emissions. Biomass energy production can also take up a lot of land, especially if crops are being grown specifically for the production of energy, which can lead to deforestation and other environmental impacts. Additionally, biomass energy production is often more expensive than other renewable energy sources, such as wind and solar power. For these reasons, biomass was not an alternative technology viable for the Proposed Development Site.

Solar Energy

- 3.55 The Site is located in a predominantly agricultural area, which is generally flat with some gently undulating terrain. There is a substantial commercial forestry and agricultural presence in the area.
- 3.56 Solar energy requires a southerly aspect for optimum viability as well as significant direct land-take and substantial changes to existing agricultural practices. Given the terrain of the site in tandem with the existing land uses of the area, it was considered that there would not have been enough landholding suitable for solar PV production.

Hydrogen

- 3.57 Hydrogen energy is an emerging technology in the move to net zero. It is currently, however, a less viable alternative given the high costs, safety considerations large quantities of water required and lack of adequate storage infrastructure. While hydrogen can be facilitated in tandem with a wind or solar development, it requires other important considerations for viability, including safety and infrastructure, such as pipelines to transport the hydrogen to where it is needed or local storage, such as tanks and underground storage facilities, for safely storing the hydrogen until it is needed.

Wind

- 3.58 Wind energy is recognised in Government policy as a proven and cost-effective renewable energy generation technology in the context of Ireland's abundant wind resource.
- 3.59 The optimum ground conditions for producing onshore wind energy include: Sufficient wind speeds of at least 8 m/s, good accessibility for construction and maintenance, a favourable local terrain, such as a high ridge or hilltop, Proximity to existing transmission lines and roads; a low population; flat and open terrain to help reduce turbulence and a large land availability to accommodate large-scale projects. Nearly all of these conditions can be met across the application site. Though it is recognised that wind speeds are higher in elevated terrain, in general wind energy production at lower altitudes in Ireland is very effective due to the large available wind resource and mature cost-effective technologies.
- 3.60 Wind energy projects do not require a large direct land take and can co-exist with agricultural activities, with only minor disturbance during the construction phase.
- 3.61 Of the options available for the site, it is considered that wind energy has the most potential to provide efficient renewable electricity with less impact on existing land uses. According to the SEAI, wind energy is currently the largest contributing resource of renewable energy in Ireland. It is both Ireland's largest and cheapest renewable electricity resource. In the first quarter of 2023, for example, 34% of Ireland's electricity came from wind, and while solar continues to increase, on a sunny day in early May 2023, 10% of the country's energy was produced by solar power³.

Alternative Design and Layouts

- 3.62 Following the identification of the Site as the preferred location, an iterative process was undertaken to determine the precise siting, design and layout of the proposed turbines and associated infrastructure. Several alternative layouts were evaluated to consider how different elements of the Proposed Development could be arranged such that there would be no likely significant effects on the environment.
- 3.63 The aim was to adopt the combination of design and layout options that presents the best balance between the avoidance of likely significant environmental effects and the achievement of the objectives of the Project. The process involved an ongoing dialogue between technical designers and competent environmental experts throughout the design process, with the designers adjusting the design in response to continued environmental

³ <https://www.seai.ie/news-and-media/seai-wind-and-solar-farms/> [Accessed 27 January 2024].

evaluation. Feedback from the scoping process, including public and stakeholder consultation discussed in **Chapter 1**, also informed this process.

- 3.64 The assessment of alternative designs and layout was focused on achieving the best balance with regards to a wide range of environmental factors. This continuous assessment was intrinsic to the selection of the final design and layout of the Project.
- 3.65 The alternative layouts considered were highly dependent on the specific turbine technology to be installed, with larger turbines requiring increased inter-turbine spacing to minimise wake effects and maintain correct operational performance. A series of wind modelling analyses, using specialist software, examined a range of site layouts and turbine designs to establish turbine technology, including hub, rotor and overall height parameters.
- 3.66 The site layout was designed to minimise potential environmental impacts and to maximise the energy generation potential from wind on site. The design was carried out in accordance with industry guidelines and best practice, namely the Department of Environment, Heritage and Local Government (DoEHLG) Planning Guidelines (2006) / Draft Planning Guidelines (2019) and Irish Wind Energy Association Best Practice Guidelines (2012). The layout and design was developed through an iterative process which took account of such criteria as:
- Setback to existing/permitted residential dwellings,
 - Set back from village and town centres, designated sites,
 - Most suitable access to turbine locations and national grid,
 - Landscape and visual sensitivity,
 - Inter-visibility/visual clutter,
 - Avoidance of telecommunications links present at the general location,
 - Set back from other constraints such as watercourses and power lines,
 - Suitable wind speeds,
 - Ecology and Ornithology,
 - Soils and Geology,
 - Hydrology,
 - Noise, and
 - Cultural Heritage.
- 3.67 The overall project design has gone through three major iterations in 2018, 2021 and 2022, which have focused on variations in optimal turbine number and tip height which would deliver the desired 50MW power output for the project. Figure 3-5 shows a visual representation of the design evolution over this period. The final selection of eight turbines within two clusters was chosen as the best available option for refinement through the EIA process.
- 3.68 The most significant design changes that were made during the early stages of the EIA process are as follows:
1. A revised proposed substation location, relocated from the northern cluster of turbines to a location to the east of the village of Clonmellon

2. A revised access arrangement and construction compound location for the northern cluster, with access and grid route now provided via the L5542

3. A revised grid route, now combined with road access arrangements, which would be accommodated along the N52 and L5542

4. Further micro siting of T1 and its associated access.

- 3.69 An initial consultation meeting was carried out between the developer and An Bord Pleanála in October 2022, during which the evolution of the design of the project in its entirety was set out. An EIA Scoping Report was then issued to a range of statutory and non-statutory bodies between 9 November 2022 and 10 December 2022, which is discussed in further detail in **Chapter 1** of this EIAR. The consultation feedback obtained in relation to environmental issues was incorporated into the detailed design of the preferred option. A second consultation meeting was undertaken with An Bord Pleanála in March 2023 during which the design adjustments were discussed.
- 3.70 The main changes to detailed design as a result of EIA scoping and consultation are as follows:
- Amendments to grid connection and cable routing to safeguard N52 road improvement scheme (in response to Transport Infrastructure Ireland feedback)
 - Micro siting adjustment of T1 to avoid sensitive Annex 1 and Marsh Fritillary sensitive habitat (in response to Meath County Council feedback)
 - River crossings throughout the Proposed Development have been further avoided (in response to Inland Fisheries Ireland feedback)
- 3.71 In addition, further detailed mitigation measures were identified for all environmental topic areas, which are described within the respective EIA technical chapters.
- 3.72 Issues in relation to peat stability and flood risk surveys have been identified in the location of T1. Detailed investigations have been carried out and a suite of mitigation measures are set out within the Construction Environmental Management Plan (**Appendix 2.2**) and **Chapters 6 and 7** of this EIAR to ensure that the environmental effects are kept within acceptable limits.
- 3.73 In a further effort to reduce the environmental effects of the Proposed Development, the developer has also considered alternative options to include borrow pits within the Proposed Development Site from which fill material required for the construction of access roads and turbine bases may be obtained. The use of borrow pits represent an efficient use of existing onsite resources and would eliminate the need to transport large volumes of construction materials along the local public road network to the Site.
- 3.74 An alternative to using onsite borrow pits is option of sourcing all stone and hardcore materials from locally licensed quarries. The transport of such material to Site would result in an increase in construction traffic and heavy loads. This will be avoided should adequate resources be present on site.

Alternative Cable Routes & Haul Routes

- 3.75 Following the overarching site selection for the wind energy project, the most appropriate cable route option was explored within the Proposed Development Site. The acceptable

proximity of the proposed wind turbines to a suitable potential substation connection point for onward connection to the national grid was a key driver in the strategic site selection process, meaning that once that had been decided, the cable route and haul options could be refined based on local site requirements and constraints. Factors considered included length of the cable route, environmental and heritage constraints, population centres and suitability of terrain.

- 3.76 Underground electrical cables will transmit the electricity generated by each proposed wind turbine to the proposed substation via an underground 33kV cable of 3.85km length and onwards to the national grid connection point.
- 3.77 While it is considered that overhead cables are easier to repair and access and are less expensive, undergrounded cable connections will have no visual impact and will be located within the public roadway, therefore reducing potential impacts on underground archaeology, drainage, habitat loss and surface water.
- 3.78 The initial selection for cable routes followed consideration of criteria as follows:
- Proximity of a potential location for a suitable off-site substation to connect to the national grid connection point
 - Cable routes were shortened and optimised where possible to minimise impacts
 - Minimisation of watercourse crossing points
 - Avoidance of environmental and heritage features
 - Minimisation of traffic and transportation obstruction
- 3.79 A network of access tracks that provide access from the public road network to the site and to each turbine for construction, operational maintenance and decommissioning purposes has also been selected based on similar criteria. A network of internal connections between these access points has been identified to reduce the need for use of the local public roads for development traffic. This selection was based on the availability of existing track and suitable ground conditions, to rain, local road infrastructure and other considerations.
- 3.80 As set out above, feedback received from TII in relation to avoiding the area of N52 Cavestown to Kilrush minor alignment improvement works has been incorporated and design of the cable route has been amended accordingly. River / waterbody crossings have also been further avoided following feedback received from Inland Fisheries Ireland.

Substation Locations

- 3.81 **Figure 3-5**, which shows the design evolution of the Proposed Development, shows the original location for the proposed substation within the northern cluster of wind turbines, to the northeast of the existing quarry site.
- 3.82 The original proposed substation was within the main development site, and it was intended to access the existing 110 kV overhead line at Clonmellon via an underground cable along the public road. This would have required a typical 110kV cable trench of 4,600 metres.
- 3.83 On further assessment, that location was deemed to have ecological value as part of Newtown Lough, being in close proximity to European protected Annex I Annex I fen habitat. Scoping consultation feedback obtained from Meath County Council also highlighted the

elevated position of the proposed substation site in the landscape and a ringfort – rath feature adjoining this site.

- 3.84 A more environmentally acceptable alternative, off site substation location has since been identified to the west of Clonmellon. This substation site is advantageous given its proximity to existing visible transmission infrastructure. It is also proposed to be connected via an underground 33kV cable along the public road, which has a required trench of 950m, hence will have less impact on the N52 road during cable routing works. The revised location is also more readily screened from view, compared to the previously proposed elevated site.

Community Consultation

- 3.85 Community consultation was undertaken in the local area in March 2023 and then again in August/September 2023, consisting of a leaflet drop and creation of a project website. Comments received are summarised in Chapter 1 together with changes to design as a result of community consultation.

Conclusion

- 3.86 This chapter has provided a description of the reasonable alternatives that have been considered in the evolution of the design of the Proposed Development.
- 3.87 From the outset the developer has sought to select a location for the Proposed Development which does not have inherent environmental sensitivities.
- 3.88 Once the preferred location was identified, the design process was influenced by an iterative EIA process through which a series of alternative designs and layouts were evaluated and amended to avoid any likely significant environmental effects.
- 3.89 The iterative EIA process has resulted in the proposals that are finally assessed in this EIA Report. It is the final option that was selected through the EIA process that represents the most environmentally acceptable option whilst meeting the recognised need for the development.
- 3.90 The Proposed Development Site was assessed as the most suitable location for a number of reasons including high wind speeds, low population density and available grid capacity in the surrounding network.

References

- EirGrid (2021). *All Island 10 Year Transmission Forecast Statement 2021*. Available at: <https://www.eirgridgroup.com/site-files/library/EirGrid/All-Island-Ten-Year-Transmission-Forecast-Statement-TYTFS-2021.pdf> [Accessed January 2024].
- Wind Energy Ireland: <https://windenergyireland.com/about-wind/the-basics/facts-stats> [last accessed January 2024].dated September 2023

Figures

Figure 3-1 Environmental Designations in Ireland

Figure 3-2 SEAI Connected and Contracted Wind Farms in Ireland

Figure 3-3 All Island 2021 Regional Average GTUoS Values

Figure 3-4 Wind Speeds within the Study Area

Figure 3-5 Design Evolution

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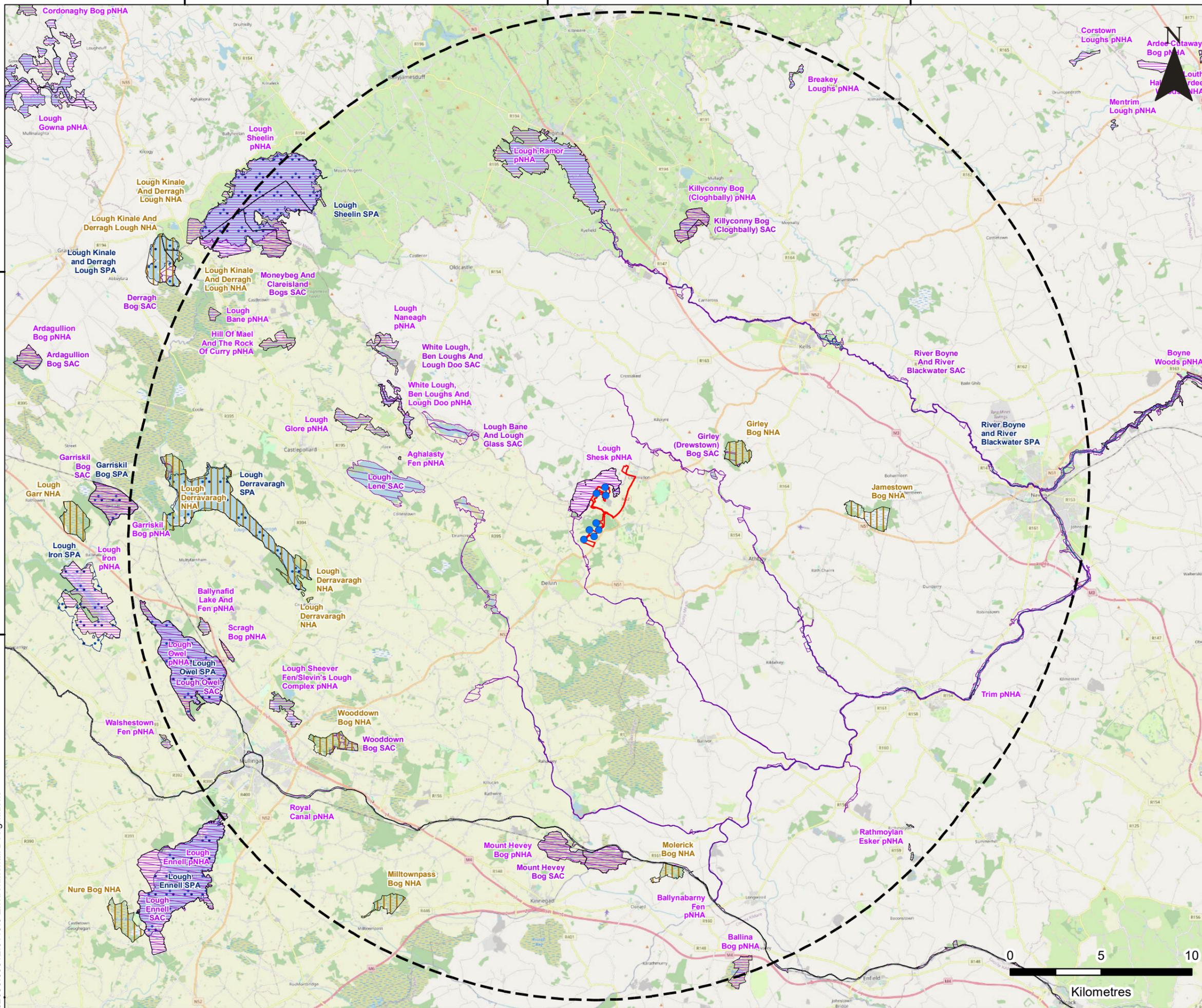
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02036_00812_0119_0 Environmental Designations



LEGEND

-  Proposed Development Site Boundary
-  Proposed Turbine Location
-  Proposed Development Site Boundary 25 km Buffer
-  Special Area of Conservation (SAC)
-  Special Protection Area (SPA)
-  Natural Heritage Area (NHA)
-  Proposed Natural Heritage Area (pNHA)



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KNOCKANARRAGH WIND FARM
ENVIRONMENTAL IMPACT
ASSESSMENT REPORT

REASONABLE ALTERNATIVES

ENVIRONMENTAL DESIGNATIONS

FIGURE 3-1

Scale 1:200,000 @ A3 Date OCTOBER 2023



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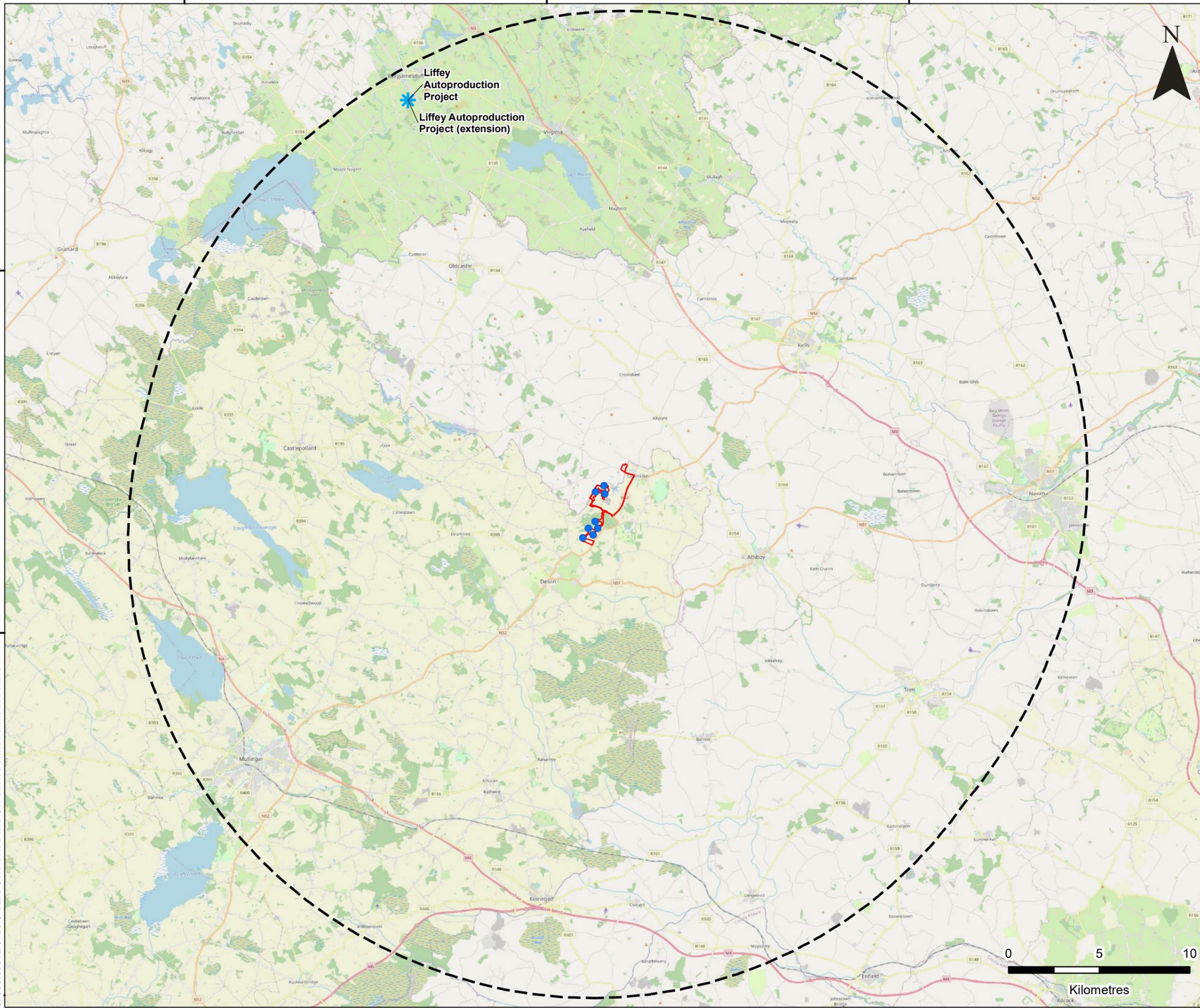
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02036.00812.0120.0 SEAI Connected and Contracted Wind Farms in Ireland



LEGEND

-  Proposed Development Site Boundary
-  Proposed Turbine Location
-  Proposed Development Site Boundary 25 km Buffer
-  Connected or Contracted Wind Farm



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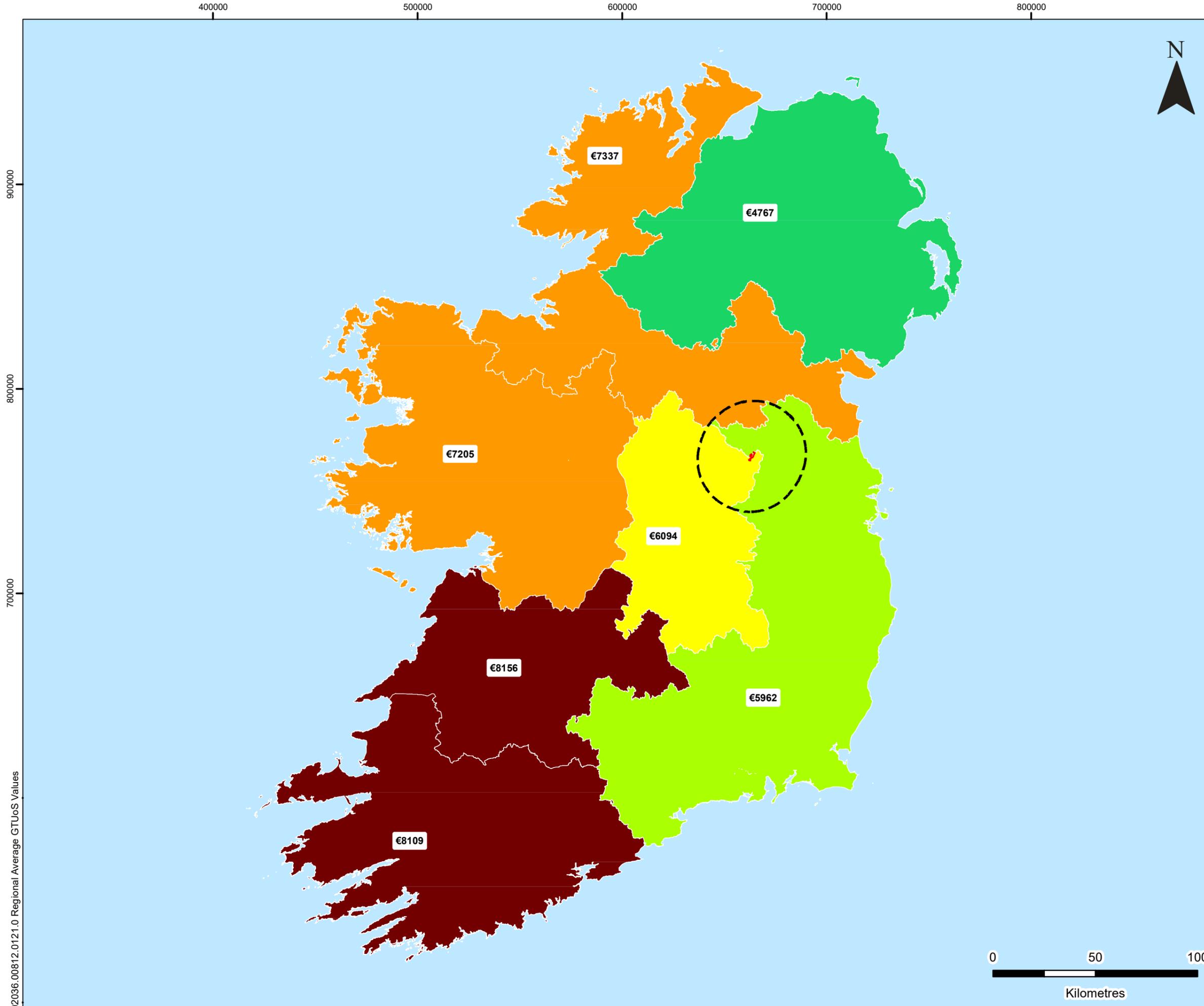
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REASONABLE ALTERNATIVES
SEAI CONNECTED AND CONTRACTED WIND FARMS IN IRELAND

FIGURE 3-2

Scale 1:200,000 @ A3 Date OCTOBER 2023





LEGEND

- Proposed Development Site Boundary
- Proposed Development Site Boundary 25 km Buffer

Regional Average Generator Use of System Charges (GTUoS) Tarriff (€)

- < 5000
- 5000 - 6000
- 6000 - 7000
- 7000 - 8000
- > 8000



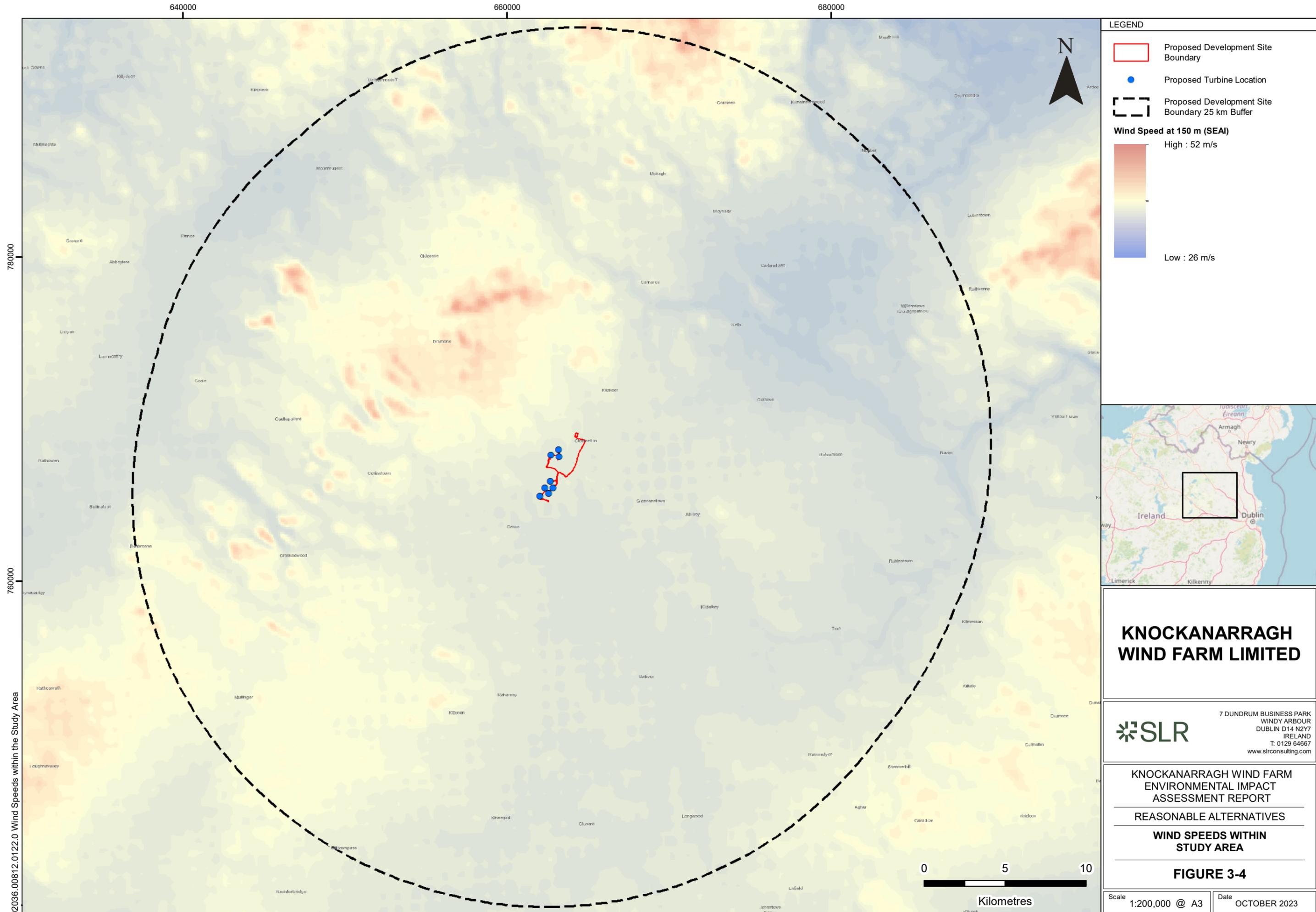
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 REASONABLE ALTERNATIVES
REGIONAL AVERAGE GTUoS VALUES
FIGURE 3-3

Scale 1:1,750,000 @ A3 Date OCTOBER 2023

02036.00812.0121.0 Regional Average GTUoS Values



LEGEND

- Proposed Development Site Boundary
- Proposed Turbine Location
- Proposed Development Site Boundary 25 km Buffer

Wind Speed at 150 m (SEAI)

High : 52 m/s

Low : 26 m/s



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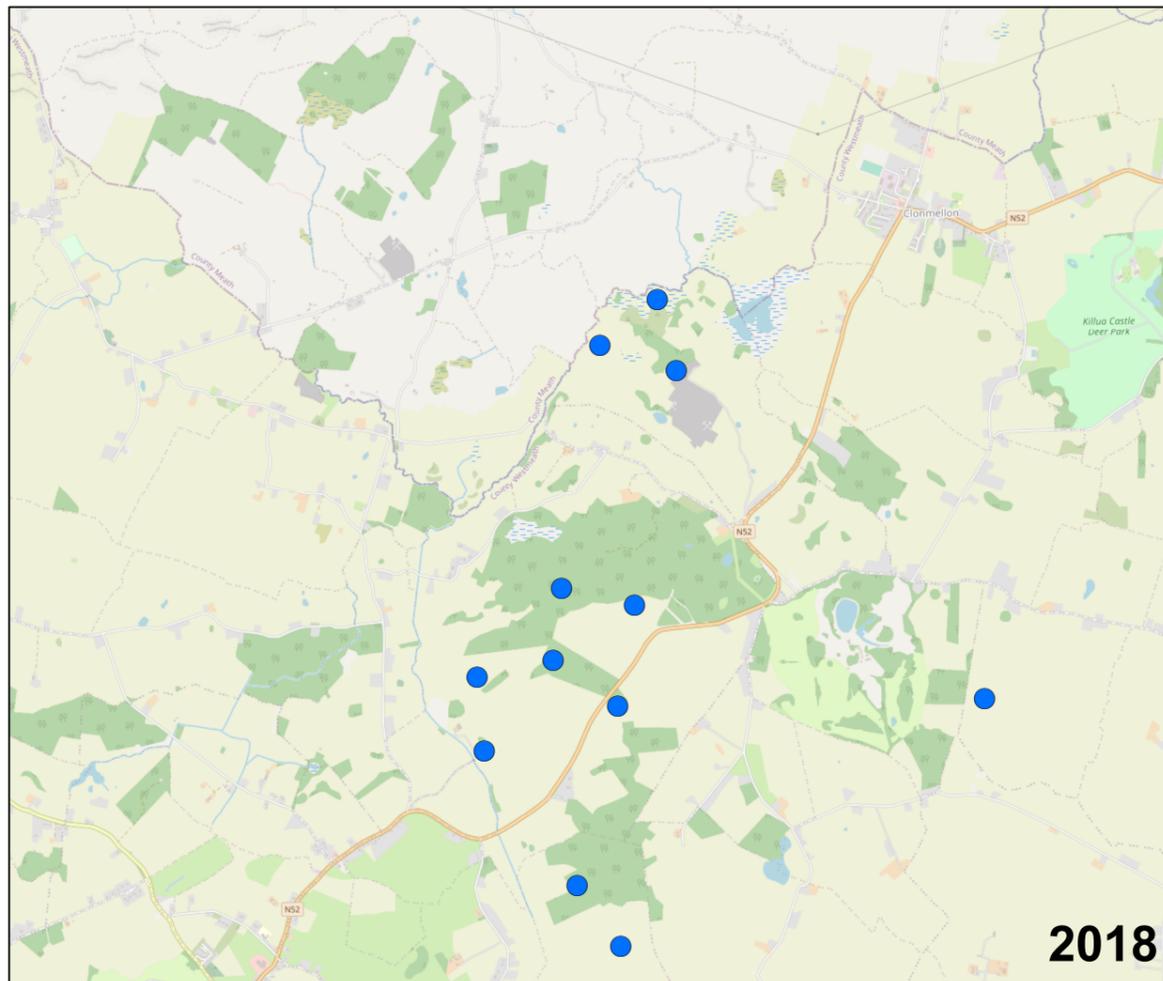
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REASONABLE ALTERNATIVES

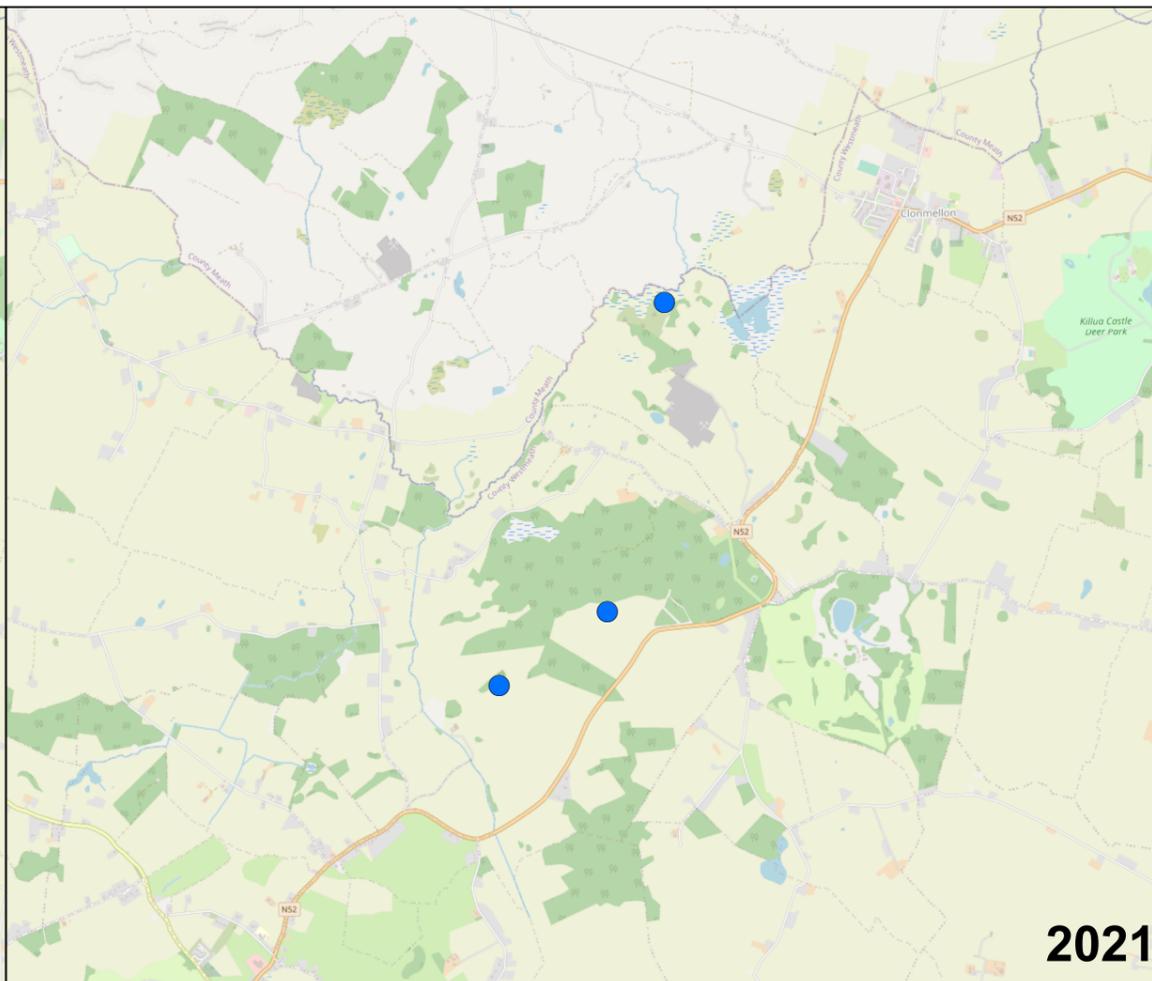
**WIND SPEEDS WITHIN
STUDY AREA**

FIGURE 3-4

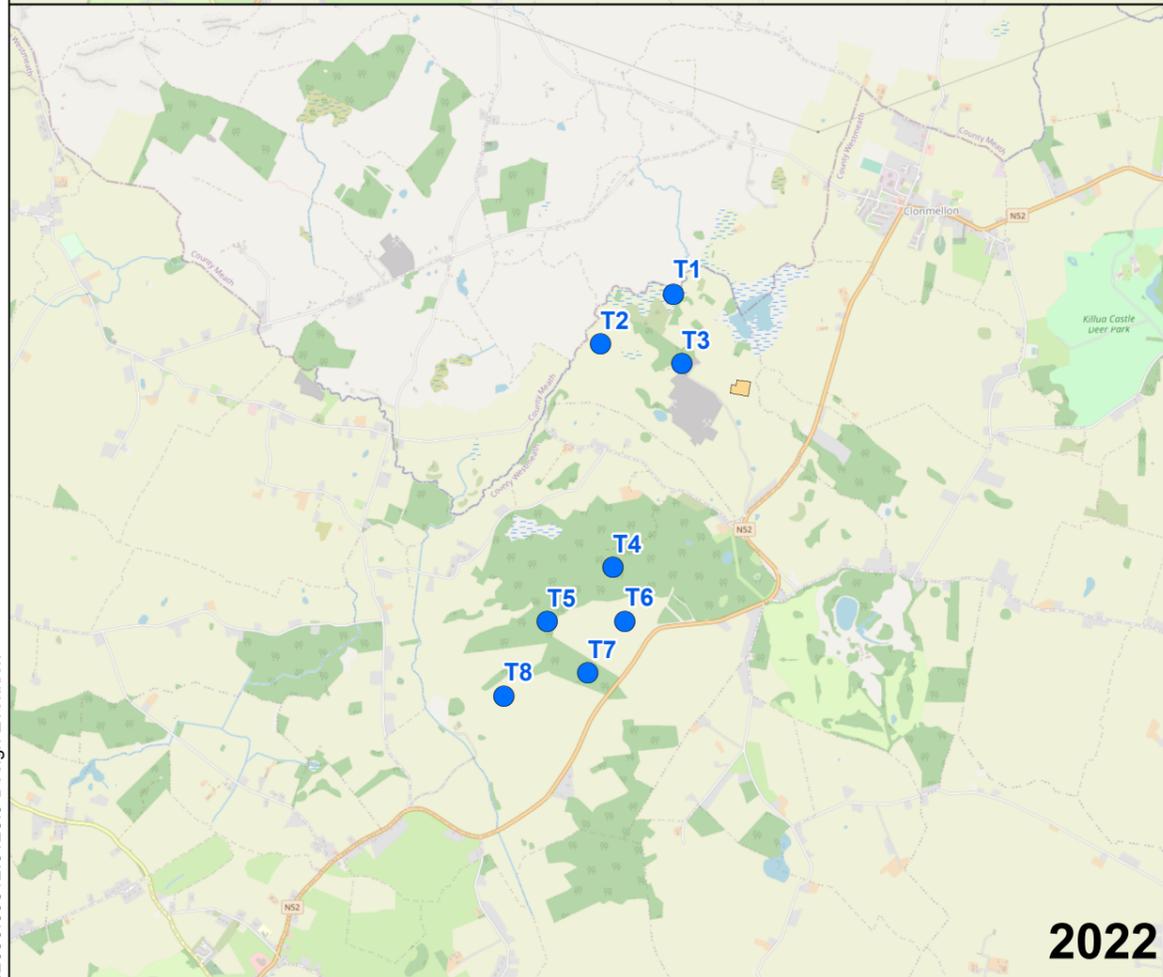
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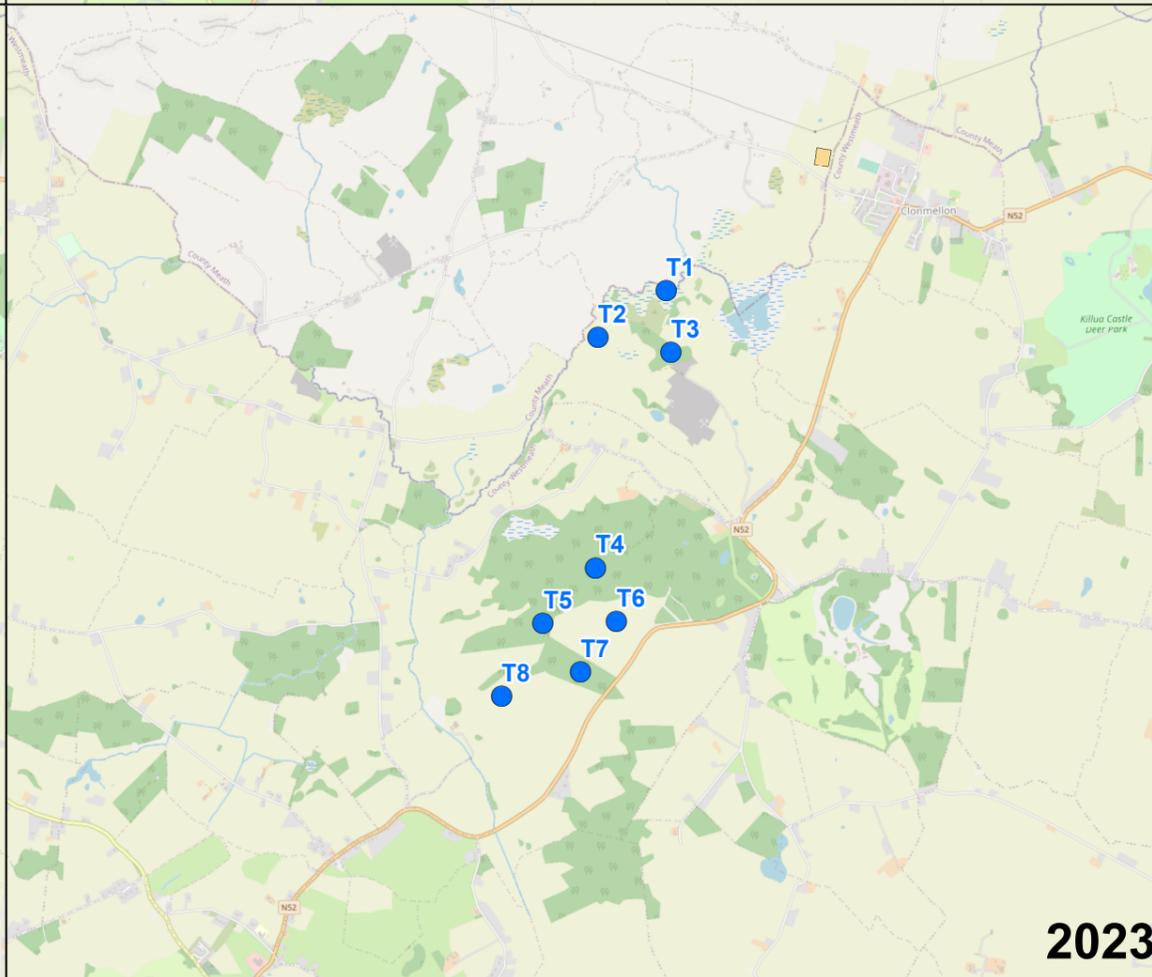
2018



2021



2022



2023

LEGEND

- Proposed Turbine Location
- Proposed Substation Location

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DESIGN EVOLUTION

FIGURE 3-5

Scale 1:50,000 @ A3 Date NOVEMBER 2023