Environmental Impact Assessment Report (EIAR)

Cunlaghfadda Green Energy Project, Co. Mayo

Chapter 3 – Consideration of Reasonable Alternatives

Table of Contents

3. SITE SELECTION AND REASONABLE ALTERNATIVES 3-1

3.1 Introduction 3-1
3.2 Consideration of Reasonable Alternatives 3-2
3.2.1 Methodology 3-2
3.2.2 'Do Nothing' Alternative 3-3
3.2.3 Alternative Renewable Energy Technologies 3-7
3.2.3.1 Solar Energy 3-7
3.2.4 Constraints and Facilitators Mapping 3-12
3.2.5 Alternative Site Locations 3-15
3.2.5.1 Strategic Site Selection 3-15
3.2.6 Alternative Project Design Options 3-20
3.2.6.1 Alternative Turbine Numbers and Model 3-20
3.2.6.2 Alternative Turbine Layout and Development Design 3-24
3.2.6.3 Alternative Access Track Layout 3-37
3.2.6.4 Alternative Borrow Pit Option 3-38
3.2.6.5 Alternative Biodiversity Management and Enhancement Proposals 3-40
3.2.6.6 Alternative Turbine Component Delivery Option 3-42
3.2.6.7 Alternative Design of Ancillary Structures 3-45
3.2.7 Alternative Grid Connection Design Options 3-46
3.2.7.1 Proposed Grid Connection Iteration No. 1 3-46
3.2.7.2 Proposed Grid Connection Iteration No. 2 – Final Design 3-48
3.2.7.3 Alternative Substation Location 3-54
3.2.8 Alternative Mitigation Measures 3-54

TABLE OF TABLES

Table 3-1 Comparison of environmental effects when compared against the chosen option of developing a renewable energy project. 3-3

Table 3-2 Comparison of environmental effects when compared against the chosen option (wind turbines) 3-8

Table 3-3 Comparison of environmental effects when compared to the chosen option (7 wind turbines, higher MW output) 3-20

Table 3-4 Comparison of environmental effects of the Proposed Project layout when compared to the chosen option. 3-32

Table 3-5 Comparison of environmental effects of sourcing all materials off site when compared against the chosen option – onsite borrow pit and offsite quarries. 3-39

Table 3-6 Comparison of environmental effects when compared against the chosen option (Grid Connection) 3-50

TABLE OF FIGURES

Figure 3-1 Constraints and Facilitators 3-14

Figure 3-2 Renewable Energy Strategy 3-17

Figure 3-3 Proposed Project Layout Iteration No. 1 3-26

Figure 3-4 Proposed Project Layout Iteration No. 2- including grid connection route 3-27

Figure 3-5 Proposed Project Layout Iteration 2- wind farm elements only 3-27

Figure 3-6 Proposed Project Layout Iteration No. 3 3-28

Figure 3-7 Proposed Project Layout Iteration No. 4 - Final Proposed Project Layout 3-31

Figure 3-8 Proposed Enhancement Site Iteration No. 1- Viable Areas for Natural Woodland Planting.. 3-41

Figure 3-9 Alternative Turbine Delivery Route Options..... 3-44

Figure 3-10 Proposed Grid Connection Iteration 2 – Final Design..... 3-49

3. SITE SELECTION AND REASONABLE ALTERNATIVES

3.1 Introduction

Article 5(1)(d) of Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment (codification) as amended by Directive 2014/52/EU (the EIA Directive) requires that the Environmental Impact Assessment Report (EIAR) prepared by the developer contains *"a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment."*

Article 5(1)(f) of the EIA Directive requires that the EIAR contains *"any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected."*

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

For the purposes of this EIAR, the various project components are described and assessed using the following references: 'Proposed Project', 'Proposed Wind Farm', 'Proposed Grid Connection' and 'Site'. Please see Section 1.1.1 of Chapter 1 of this EIAR for further details. A detailed description of the Proposed Project is provided in Chapter 4 Description of the Proposed Project of this EIAR.

This section of the EIAR contains a description of the reasonable alternatives that were studied by the Applicant, which are relevant to the Proposed Project and its specific characteristics, in terms of site location and other renewable energy technologies as well as site layout incorporating size and scale of the Proposed Project, connection to the national grid and transport route options to the Site. This section also outlines the design considerations in relation to the Proposed Wind Farm and Proposed Grid Connection. It provides an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects. The consideration of alternatives is an effective means of avoiding environmental impacts. As set out in the Environmental Protection Agency (EPA) '*Guidelines on The Information to be Contained in Environmental Impact Assessment Reports, 2022*' (EPA, 2022), the presentation and consideration of reasonable alternatives investigated is an important part of the overall EIA process.

Hierarchy

EIA is concerned with projects. EPA, 2022 states that in some instances neither the applicant nor the competent authority can be realistically expected to examine options that have already been previously determined by a higher authority, such as a national plan or regional programme for infrastructure.

Non-environmental Factors

EIA is confined to the environmental effects that influence consideration of alternatives. However, other non-environmental factors may have equal or overriding importance to the developer of a project, for example project economics, land availability, engineering feasibility or planning policy.

Site-specific Issues

EPA, 2022 states that the consideration of alternatives also needs to be set within the parameters of the availability of the land, i.e., the site may be the only suitable land available to the developer, or the need for the project to accommodate demands or opportunities that are site-specific. Such considerations should be on the basis of alternatives within a site, for example design and layout.

3.2 Consideration of Reasonable Alternatives

3.2.1 Methodology

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

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

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

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

EPA, 2022 states that "*It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account is deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required."*

Consequently, taking consideration of the legislative and guidance requirements into account, this chapter addresses alternatives under the following headings:

- 'Do Nothing' Alternative
- Alternative Renewable Energy Technologies
- Constraints and Facilitators Mapping
- Alternative Site Locations
- Alternative Proposed Project Design Options:
    - Alternative Turbine Numbers and Model
    - Alternative Turbine Layout and Development Design
    - Alternative Access Track Layout
    - Alternative Borrow Pit Option
    - Alternative Biodiversity Management and Enhancement Proposals
    - Alternative Turbine Component Delivery Option
        - Alternative Port of Entry
        - Alternative Component Delivery Route
        - Alternative Site Access Points
    - Alternative Design of Ancillary Structures
        - Alternative Internal Site Cabling Route
        - Alternative Meteorological Mast Location
        - Alternative Temporary Construction Compound Locations
- Alternative Proposed Grid Connection Design Options

› Alternative Mitigation Measures

Each of these is addressed in the following sections. When considering the Proposed Project, given the intrinsic link between layout and design, the two will be considered together in this chapter.

3.2.2 'Do Nothing' Alternative

Annex IV, Part 3 of the EIA Directive states that the description of reasonable alternatives studied by the developer should include *"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. EU, 2017 states that this should involve the assessment of *"an outline of what is likely to happen to the environment should the project not be implemented – the so-called 'do-nothing' scenario."*

An alternative land-use option to developing a renewable energy project at the Site would be to leave the Site as it is, with no changes made to the current land-use practices of pastoral agriculture and peat cutting activities on the Site. In doing so, the environmental effects in terms of emissions are likely to be neutral.

By implementing this 'Do-Nothing' alternative, however, the opportunity to capture the available 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 and the reduction of greenhouse gas emissions. The opportunity to generate local employment, local authority development contributions, rates and investment in the local area would also be lost. Furthermore, the opportunity to implement the measures outlined in the Biodiversity Management and Enhancement Plan (BMEP) would also be lost. Please see Appendix 6-4 BMEP for details.

As such, on the basis of the positive environmental effects arising from the Proposed Project when compared to the 'Do-Nothing' scenario, the 'Do-Nothing' scenario was not the chosen option. The existing land uses can and will continue in conjunction with the Proposed Project. A comparison of the potential environmental effects of the 'Do-Nothing' Alternative when compared against the chosen option of developing a renewable energy project at the Site are presented in Table 3-1 below.

Table 3-1 Comparison of environmental effects when compared against the chosen option of developing a renewable energy project.

Environmental Consideration	Do-Nothing Alternative	Chosen Option of developing a renewable energy project
Population & Human Health	No increase in local employment and no long-term financial contributions towards the local community. No potential for shadow flicker and noise to affect sensitive receptors. No potential for positive effects on air quality and climate change targets.	Approximately 100 jobs could be created during the construction, operation, and maintenance phases of the Proposed Project. Based on the assessment and mitigation proposals detailed in Chapter 5 Population & Human Health, there will be no significant effects related to shadow flicker during the operational phase. As detailed in the assessment in Chapter 10 Air Quality, the Proposed Project will have a Long-term Moderate Positive Impact on air quality.

Environmental Consideration	Do-Nothing Alternative	Chosen Option of developing a renewable energy project
	No potential to supply an estimated 19,542 homes with clean renewable electricity. No potential for effects on visual amenity due to the construction and operation of turbines.	As detailed in the assessment in Chapter 11 Climate, the Proposed Project will have a long-term Moderate Positive Impact on climate. As detailed in Chapter 12 Noise and Vibration, residual effects from Noise and Vibration are predominantly short-term, negative and slight for the short-term construction and decommissioning phases. For the Operational Phase, the residual effects range from not significant to imperceptible on sensitive receptors. As detailed in Chapter 13 Landscape and Visual, the landscape type and character of the area where the proposed turbines are sited comprises modified working landscape types of low sensitivity and can effectively accommodate wind energy development. Of the 19 no. viewpoints (VPs) assessed, none were identified to cause significant visual effects. Visual effects will decrease with distance from the proposed turbines. The proposed turbine locations adhere to the recommended 500m set back distance in the 'Wind Energy Development Guidelines for Planning Authorities' (DoEHLG, 2006) (hereafter referred to as 'the Guidelines (DoEHLG, 2006)') for the purpose of protecting residential visual amenity. The proposed turbine locations also adhere to the recommended set back of 4 x tip height as recommended by the draft Wind Energy Development Guidelines for Planning Authorities' (DoHPLG, 2019) (hereafter referred to as 'the Draft Guidelines (DoHPLG, 2019)' of 640m.
Biodiversity (including Birds)	No habitat loss. No potential for collision risk for birds and bats. No potential biodiversity enhancement measures would be put in place.	As detailed in Chapter 6 Biodiversity, the Proposed Project has been designed to avoid or mitigate impacts on biodiversity including bats and downstream aquatic receptors. The Proposed Project includes for a BMEP, providing a local boost to biodiversity and water quality. Please see Appendix 6-4 for details. As detailed in the Collision Risk Assessment (CRA) in Appendix 7-6, the impact of the

Environmental Consideration	Do-Nothing Alternative	Chosen Option of developing a renewable energy project
		proposed turbines on birds corresponds to a Low - Very Low effect significance.
Land, Soils & Geology	No excavation of large volumes of peat and spoil	As detailed in the assessment in Chapter 8 Land Soils and Geology, peat, topsoil and subsoil excavation volumes will be managed within the Site, and the residual effects on peat, topsoil and subsoil are not significant. Geotechnical investigations followed by careful design will lead to no significant environmental impacts. The peat and spoil management proposals discussed in Appendix 4-3 sets out the optimal treatment for peat and spoil excavated/generated on site without creating significant impacts for biodiversity, hydrology, land use etc.
Water	Neutral	As detailed in the assessment in Chapter 9 Water, no significant effects on surface water or groundwater quality will occur.
Air Quality	Will not provide the opportunity for an overall increase in air quality or reduction of greenhouse gasses.	As detailed in Chapter 10, there will be no significant effects on air quality during the construction, and decommissioning phases. There will be a Long-term Moderate Positive Impact on air quality during the operational phase.
Climate	Will not provide the opportunity for a contribution to the reduction of greenhouse gases. No potential to assist in achieving the renewable energy targets set out in the Climate Action Plan 2025.	As detailed in the assessment in Chapter 11 Climate, over the proposed 35-year lifetime of the Proposed Wind Farm, 690,588 tonnes of carbon dioxide per annum will be displaced from traditional carbon-based electricity generation. The addition of an estimated 31.5MW clean energy to the national grid will be a positive contribution to Ireland's renewable energy targets set out in the Climate Action Plan 2025 (CAP25).
Noise & Vibration	No potential for noise impacts on nearby sensitive receptors.	Based on the assessment detailed in Chapter 12 and the mitigation measures proposed, there will be no significant effects on sensitive receptors due to an increase in noise levels from the Proposed Project during the construction and operational phase.
Landscape & Visual	No potential for effects on visual amenity due to the construction and operation of turbines.	As detailed in Chapter 13 Landscape and Visual, the landscape type and character of the area where the proposed turbines are sited comprises modified working landscape types of low sensitivity and can effectively accommodate

Environmental Consideration	Do-Nothing Alternative	Chosen Option of developing a renewable energy project
		wind energy development. Of the 19 no. viewpoints (VPs) assessed, none were deemed significant.
Archaeology, Architectural and Cultural Heritage	No potential for impacts on unrecorded, subsurface archaeology.	As detailed in the assessment in Chapter 14 (Archaeological, Architectural and Cultural Heritage), there will be no significant direct or indirect effects on known or unknown archaeology and cultural heritage during the construction, operational and decommissioning phases.
Material Assets	Neutral	As detailed in Chapter 15 Material Assets, there will be no significant effects on material assets during the construction, operational and decommissioning phases of the Proposed Project. A detailed Traffic Management Plan incorporating all the mitigation measures will be agreed with the roads authority prior to construction works commencing on Site.
Vulnerability of the Project to Major Accidents and Natural Disaster	No potential to be affected by or to cause major accidents or natural disasters.	As detailed in Chapter 16 Major Accidents and Natural Disasters, the risk of a major accident and/or disaster during the construction of the Proposed Project is considered 'low' in accordance with the '*Guide to Risk Assessment in Major Emergency Management*' (DoEHLG, 2010). The highest risk scenarios to the Proposed Project (i.e., contamination and fire/explosion) are considered to be unlikely to occur at any phase of the Proposed Project. The Proposed Project will be designed and built in accordance with current best practice and, as such, mitigation against the risk of major accidents and/or disasters will be embedded through the design. With the implementation of all mitigation and monitoring measures detailed in the EIAR, there will not be significant residual effects associated with the construction, operation and decommissioning of the Proposed Project.

For the reasons set out above, the proposal for a wind energy development at the Site was progressed over a Do-Nothing Scenario despite the potential environmental effects. By progressing the Proposed Project there is an opportunity to enhance employment and investment in the local area and to capture the available renewable energy resource within County Mayo, thus contributing to meeting national and international climate targets. Please refer to Chapter 5 through to Chapter 16 of this EIAR for further details on the impact associated with the progression of the Proposed Project.

3.2.3 Alternative Renewable Energy Technologies

The Proposed Project will be located in a site where peat cutting activities and pastoral agriculture will continue to be carried out around the footprint of the Proposed Project.

Both onshore and offshore wind energy development will be required to ensure Ireland reaches the target set in the Climate Action Plan 2025 (CAP25) to source 80% of our electricity from renewable energy by 2030. It is not a case of 'either' 'or'. CAP25 has set out the following targets for electricity generation:

- Share of electricity demand generated from renewable sources to up to 80% where achievable and cost effective, without compromising security of electricity supply
- Onshore Wind Capacity: up to 9GW
- Offshore Wind Capacity: 5GW (minimum)
- Solar PV Capacity: 8GW

When considering other renewable energy technologies in the area, the Applicant considered commercial solar energy production as an alternative.

3.2.3.1 Solar Energy

Commercial solar energy production is the harnessing and conversion of sunlight into electricity using photovoltaic (PV) arrays (panels). To achieve the same maximum estimated electricity output from solar energy as is expected from the Proposed Wind Farm (c. 31.5MW), a larger development footprint would be required. As detailed in Section 1.1.1 in Chapter 1, the EIAR Site Boundary encompasses an area of approximately 165ha and the permanent footprint of the Proposed Project measures approximately 5.5ha, which represents approximately 3% of the Site.

Please note, the amount of electrical energy output from renewable generation is generally described in terms of capacity factor. The capacity factor relates to the amount of energy that may be achieved from a renewable technology over the period of one calendar year. Generally solar PV has a lower capacity factor than wind generation. One factor in the energy yield difference is that solar PV does not produce electrical energy at night, but the wind can blow at any time of the day or night. The Proposed Wind Farm is located within the B wind region for Ireland, as delineated by the EirGrid '*Enduring Connection Policy 2.3 Solar and Wind Constraints Report: Assumptions and Methodology'*.[1] The capacity factor for wind in this region is 35% (0.35). If solar PV was to be deployed on the Site, it would be located within the Solar Middle region of Ireland as delineated by the EirGrid report. The capacity factor for solar in this region is 14.6% (0.146).

Therefore, for a solar PV array of the scale necessary to provide the same electricity output as the Proposed Wind Farm, it would require a footprint of approx. 63 hectares[2] or 38% of the overall Site.

Taking into account the factors outlined above, and considering the farming practices in the area, it has been determined that wind energy is the most suitable renewable energy technology for the Site with the lesser potential for significant, adverse environmental effects.

[1] *EirGrid (2024) Enduring Connection Policy 2.3 Solar and Wind Constraints Report: Assumptions and Methodology* <https://cms.eirgrid.ie/sites/default/files/publications/ECP-2.3-Solar-and-Wind-Constraints-Report-Assumptions-and-Methodology-v1.1.pdf>

[2] *Approximately 1.6 - 2 ha are required for each MW of solar panels installed based on approximately 4000 panels per MW (taken from the Sustainable Energy Authority Solar Energy FAQ publication which can be accessed here: https://www.seai.ie/publications/FAQs_on_Solar_PV.pdf). For the purposes of comparison, a minimum value of 1.6 ha has been assumed.*

A comparison of the potential environmental effects of the development of a solar PV array when compared against the chosen option of developing the Proposed Project at this Site are presented in Table 3-2 below.

Table 3-2 Comparison of environmental effects when compared against the chosen option (wind turbines)

Environmental	Solar PV Array (with up to 31.5MW Output)	Chosen Option- Proposed Project
Population & Human Health (incl. Shadow Flicker)	Relatively lower long-term financial contributions towards the local community (i.e., community benefit fund) on a per MWh basis. No potential for shadow flicker to affect sensitive receptors. Lower potential for noise and vibration effects. Lower potential for visual obstructions in the skyline due to solar farms being low lying structures. Potential for glint and glare impacts on sensitive receptors. Based on the renewable energy outputs associated with solar PV, using solar PV at the Site would have a positive effect on human health due to the production of clean renewable energy and the offsetting of emissions (e.g., nitrogen, sulphur dioxide) which are produced from fossil fuel powered sources of electricity.	Higher long-term financial contributions towards the local community (i.e., community benefit fund) on a per MWh basis. Potential for shadow flicker to affect sensitive receptors. Based on the assessment detailed in Chapter 5 and the mitigation measures proposed, there will be no significant effects related to shadow flicker from the Proposed Project. Greater potential for noise and vibration during construction, operational and decommissioning phases. No potential for glint and glare impacts on sensitive receptors. Greater potential for visual effects during operational phase. No material difference between the two options during construction and decommissioning. No material difference between the two options, with wind energy also producing clean renewable energy which would have a positive effect on human health. Based on the assessment included in Chapter 10 and Chapter 11, the Proposed Project will have a long term moderate positive effect on human health due to the production of clean renewable energy and the offsetting of emissions (e.g., nitrogen, sulphur dioxide) which are produced from fossil fuel powered sources of electricity.
Biodiversity (including Birds)	Larger development footprint would result in greater potential habitat loss. No potential for collision risk for birds. Potential for glint and glare impacts on birds.	Smaller development footprint would result in a smaller habitat loss. As detailed in Chapter 6 Biodiversity and the BMEP, the development has been designed to avoid or mitigate impacts on biodiversity including bats and downstream aquatic receptors. Potential for collision risk for birds. With the implementation of the mitigation

		measures described in Chapter 7 Birds, the residual effects for collision risk are not significant. No potential for glint and glare impacts on birds.
Land, Soils & Geology	Shallower excavations involved in solar PV array developments would result in reduced volume of spoil to be excavated.	Potential for deeper excavations associated with a wind farm development may result in an increased volume of peat and spoil to be excavated. As detailed in the assessment in Chapter 8, there is no loss of peat, topsoil or subsoil as a result of the Proposed Project. Peat, topsoil, and subsoils will be relocated within the Site. No significant effects on peat, topsoil and subsoils will occur. The peat and spoil management proposals discussed in Chapter 4 sets out the optimal treatment for peat and spoil excavated/generated on site without creating significant impacts for biodiversity, hydrology, land use etc.
Water	Shallower excavations involved in solar PV array developments would result in reduced volume of spoil to be excavated, therefore reducing the potential for silt-laden runoff to enter receiving waterbodies.	Potential for deeper excavations associated with a wind farm development may result in an increased volume of peat and spoil to be excavated, which may increase the potential for silt-laden runoff to enter receiving waterbodies. Project specific drainage design removes the potential for significant environmental effects. As detailed in the assessment in Chapter 9, no significant effects on surface water or groundwater quality will occur.
Air Quality	Increased potential for dust and other noxious emissions due to larger volume of transport movements to and from the Site and larger volume of plant and ground works on site due to the larger footprint.	Reduced potential for dust and other noxious emissions due to smaller volume of plant and ground works on site due to a smaller footprint. As detailed in the assessment in Chapter 10, no significant effects on air quality will occur.
Climate	Reduced capacity factor of solar PV array technology would result in less carbon offset.	Greater capacity factor of wind will result in a higher carbon offset and a shorter carbon payback period. As detailed in the assessment in Chapter 11, over the proposed 35-year lifetime of the Proposed Wind Farm, 690,588 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The addition of an estimated

		31.5MW clean energy to the national grid will be a positive contribution to the State's renewable energy targets set out in the National Climate Action Plan (CAP25).
Noise & Vibration	Potential for short term noise impacts on nearby sensitive receptors during the construction and decommissioning phase. Larger traffic movements and increased plant on site due to the larger footprint could lead to larger noise and vibration output during the construction phase.	Potential for long-term noise impacts on nearby sensitive receptors during the construction and decommissioning phase. Based on the assessment detailed in Chapter 12 and the mitigation measures proposed, there will be no significant effects on sensitive receptors due to an increase in noise levels from the Proposed Project during the construction and operational phase.
Landscape & Visual	Panelling potentially less visible from surrounding area due to the screening by vegetation and topography.	Greater visibility due to the vertical scale of the proposed turbines. As detailed in the assessment in Chapter 13, the landscape value of the Site is deemed to be of 'Low' value and sensitivity, and the strategic siting of infrastructure will mitigate any potential for landscape and visual effects. Of the 19 no. viewpoints (VPs) assessed, none were deemed significant.
Archaeology, Architectural and Cultural Heritage	Larger development footprint would increase the potential for impacts on unrecorded, subsurface archaeology.	Smaller development footprint would decrease the potential for impacts on unrecorded, subsurface archaeology. As detailed in the assessment in Chapter 14 (Archaeological, Architectural and Cultural Heritage), there will be no significant direct or indirect effects on known or unknown archaeology and cultural heritage during the construction, and decommissioning phases. During the operational phase, there will be some not significant to moderate residual indirect effects on monuments and protected structures. However, in reality the effect will be less severe since the ZTV model does not take natural screening and buildings into consideration which will alleviate if not remove the impact on setting altogether. Archaeological monitoring under licence of the smaller footprint will be implemented during the construction phase.
Material Assets	No material difference for impacts on gas, water, aviation.	No material difference for impacts on gas, water, aviation. Buffers implemented on

	Potential for greater traffic volumes during construction phase due to the number of solar panels required to achieve the same output. Greater potential for impacts on waste management due to increased plant on site giving rise to increase in hazardous waste materials. No potential for impacts on telecommunications.	telecommunication links, with no telecommunication links traversing the Site. Potential for reduced traffic volumes during construction phase due to the number of wind turbines required to achieve the same output. As detailed in Chapter 15 Material Assets, there will be no significant effects on traffic and transport during the construction, operational and decommissioning phases of the Proposed Project. A detailed Traffic Management Plan incorporating all the mitigation measures will be agreed with the roads authority prior to construction works commencing on site. Reduced potential for impacts on waste management due to less plant on site giving rise to increase in hazardous waste materials in comparison to solar. Potential for impacts on telecommunications.
Vulnerability of the Project to Major Accidents and Natural Disaster	Larger development footprint would result in a higher risk in relation to major accidents and natural disasters due to increased land disturbance. Lower potential risk in relation to bridge/structural collapse due to the lighter project components required.	A reduced development footprint would result in a lower risk in relation to major accidents and natural disasters due to reduced land disturbance. Increased potential risk in relation to bridge/structural collapse due to the heavier project components required. As detailed in Chapter 16 the risk of a major accident and/or disaster during the construction of the Proposed Project is considered 'low'. The highest risk scenarios to the Proposed Project (i.e., contamination and fire/explosion) are considered to be unlikely to occur at any phase of the Proposed Project. A detailed risk assessment on potential risks relating to major accidents and natural disasters is provided in Section 16.4.1.6 of Chapter 16 of this EIAR.

While there are positive and negative environmental aspects of both renewable energy development options, neither is likely to have significant adverse effects; however, given the particular suitability of the Site for wind energy development, the lesser area of land required and the greater positive impact of wind energy generation from a climate and air quality perspective, it was considered the more

suitable option and the most efficient method of electricity production with the lesser potential for significant environmental effects.

3.2.4 Constraints and Facilitators Mapping

The design and layout of the Proposed Project follows the recommendations and guidance set out in the Guidelines (DoEHLG, 2006) and the *'Best Practice Guidelines for the Irish Wind Energy Industry'* (Irish Wind Energy Association, 2012).

The Guidelines (DoEHLG, 2006) were the subject of a targeted review. The proposed changes to the assessment of impacts associated with onshore wind energy developments were outlined in the Draft Revised Wind Energy Development Guidelines (hereafter the Draft Guidelines (DoHPLG, 2019). The proposed changes presented in the Draft Guidelines (DoHPLG, 2019) give certain focus on the setback distance from residential properties, along with shadow flicker and noise requirements relative to sensitive receptors. The consultation on the Draft Guidelines (DoHPLG, 2019) closed on 19th February 2020, but at time of writing, they have not yet been adopted, and the Guidelines (DoEHLG, 2006) remain the relevant guidelines for the purposes of Section 28 of the Act. Please see Section 1.2.2 of Chapter 1 for further information on the wind energy development guidelines.

The constraints mapping process involves the placing of buffers around different types of constraints so as to clearly identify the areas within which no development works will take place. The size of the buffer zone for each constraint has been assigned using guidance presented in the Guidelines (DOEHLG 2006). Should the Draft Guidelines (DoHPLG, 2019) be adopted in advance of a decision being made on this planning application, the Proposed Project will be capable of achieving the requirements of the Draft Guidelines (DoHPLG, 2019) as currently proposed.

The constraints map for the Site, as shown in Figure 3-1, was produced following a desk study of all site constraints. Figure 3-1 encompasses the following constraints and associated buffers:

- **Sensitive Receptors:** a minimum 640m setback from all sensitive receptors (meeting the requirement of 4 x tip height separation distance as required by the Draft Guidelines (DoHPLG, 2019). Although not adopted, the Applicant has applied the setback in this instance as it is considered best practice.);
- **Designated sites:** Natura 2000 sites plus 100-metre buffer;
- **Telecommunications and gas pipelines:** Telecommunication Links plus operator specific buffer. There are no telecommunication link identified on site following a telecommunications scoping exercise being undertaken. There are 3 gas pipelines located adjacent to the Site. A 184m buffer (2 x hub height) was applied to each gas pipeline as is recommended by Gas Networks Ireland.
- **Hydrology:** Watercourses plus 50-metre buffer. Lakes plus 100-metre buffer. The closest watercourse is located c.372m from the closest turbine. The closest lake is located c.240m from the closest turbine.
- **Archaeology:** Archaeological Sites or Monuments: 30-metre buffer, plus 'Zone of Notification' as required by the National Monuments Service (ROI). There are no recorded monuments within the Site.
- **Habitats and Biodiversity:** Siting of infrastructure so as to minimise loss of habitats of Local Importance (higher value) and higher. Avoidance of Annex 1 habitats.

Facilitators at the Site build on the existing advantages and include the following:

1. Available lands for development;

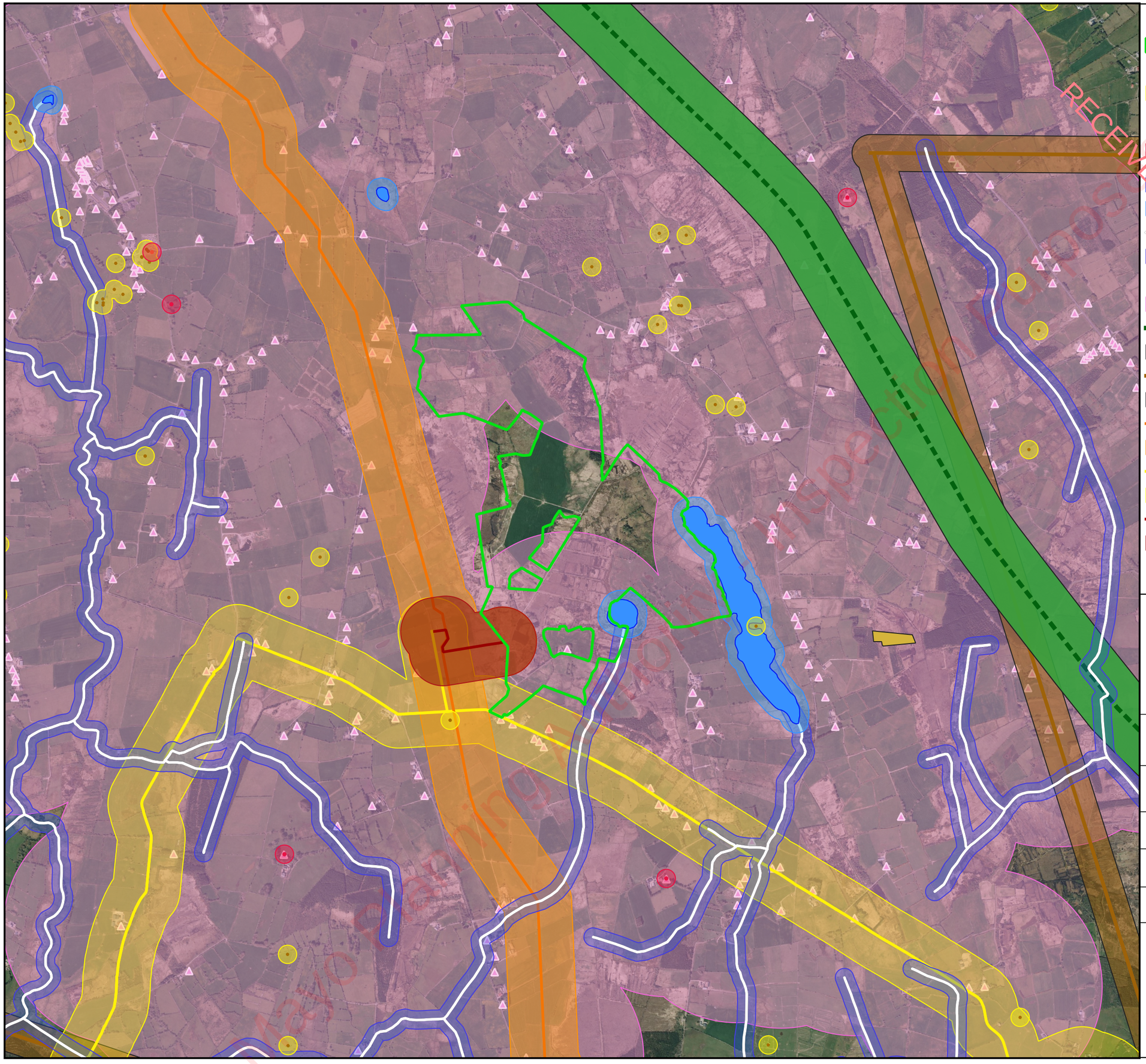
2. Acceptable wind resource;
3. General accessibility of all areas of the site due to existing track infrastructure; and
4. Limited extent of constraints.

The inclusion of the constraints on a map of the Site allows for a viable area to be identified. An initial turbine layout is then developed to take account of all the constraints mentioned above and their associated buffer zones and the separation distance required between the turbines. Following the mapping of all known constraints, detailed site investigations were carried out by the project team.

The ecological assessment of the Site encompassed habitat mapping and extensive surveying of birds and other fauna. This assessment, as described in Chapters 6 and 7 of this EIAR on Biodiversity and Birds, optimised the decision on the siting of turbines and the carrying out of any development works, such as the construction of tracks.

The hydrological and geotechnical investigations of the Site examined the proposed locations for turbines, tracks and other components of the Proposed Project, such as the temporary construction compound. Where specific areas were deemed as being unsuitable for the siting of turbines or tracks, etc., alternative locations were proposed and assessed, taking into account the areas that were already ruled out by constraints.

The turbine layout for the Site has also been informed by the results of noise assessments, landscape and visual and the separation distance to be maintained between turbines. Thus, the baseline environmental assessment of the Site and wind farm design 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.



Map Legend

- EIAR Site Boundary
- National Monutments
- National Monuments 50m Buffer
- National Inventory of Architectural Heritage Buildings
- National Inventory of Architectural Heritage 50m Buffer
- Lakes
- Lakes 50m Buffer
- EPA Mapped Watercourse
- EPA Watercourse 50m Buffer
- Sensitive Receptors
- Sensitive Receptors 640m Buffer
- Irish Rail Railway
- Irish Rail 180m Buffer
- Telecoms Links
- Telecoms 100m Buffer
- High Pressure GNI Centreline
- High Pressure GNI 184m Buffer
- Medium Pressure GNI Centreline
- Medium Pressure GNI 184m Buffer
- Cathodic Protection Centreline
- Cathodic Protection GNI 184m Buffer

Drawing Title

Constraints and Facilitators

Project Title

Cunlaghfadda Green Energy Project

Drawn By	Checked By
JA	NS
Project No.	Drawing No.
220825	Figure 3-1
Scale	Date
1:20,000	2026-05-18

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3.2.5 Alternative Site Locations

To ensure that the Levelised Costs of building each Megawatt of electricity-generating capacity on a wind farm is controlled efficiently, it is incumbent on the design team to ensure that the most suitable site for development of a wind farm development is chosen. The process of identifying a suitable location for a development such as the Proposed Project is influenced by a number of factors. While wind speeds, the area of suitable or available land, proximity to a grid connection point and planning policy are all very important, a wind farm project must be commercially viable/competitive, as otherwise it will never attract the necessary project finance required to see it built.

The Site has been identified as having potential for a wind energy development as a result of a nationwide search of suitable lands. The site selection process has been constraints and facilitators led. Facilitators are factors that give an advantage to a proposed project, while constraints are restrictions that inform the location and design of a project by highlighting sensitivities. A nationwide constraints analysis was undertaken and included avoidance of environmental designations (Natura 2000 sites), review of national, regional and local policies and objectives, adequate setbacks from sensitive receptors, proximity to national grid nodes, avoidance of direct impacts on known cultural heritage assets, access and constructability. Average wind speeds for the Site were also considered, with the Sustainable Energy Authority of Ireland (SEAI) Wind Atlas being consulted[3].

3.2.5.1 Strategic Site Selection

As the cost of building each megawatt of electricity generating capacity in a wind farm is in the region of €1.5 million, it is critical that the most suitable site for the Proposed Project is chosen.

As set out in Section 1.3 of this EIAR, the Applicant company, Cunlaghfadda Green Energy Ltd is a subsidiary of Greensource Sustainable Developments Limited (Greensource Ltd).

Greensource Ltd. is an innovative Irish renewable energy company based in Adare, Co. Limerick that specialises in the development of renewable energy projects, working with communities from pre-planning to operation, and creating long-lasting local partnerships. Greensource Ltd. has over ten years development and operational experience. Greensource Ltd. has a highly skilled and experienced team who are committed to developing projects with successful outcomes for all stakeholders. Working with integrity and care for the local environment, the team has a strong track record with over ten years' development and operational experience of renewable energy projects in Ireland.

Site selection for the development of a wind farm must be suitable for consideration under a number of criteria, such as:

5. ***Local Policy:*** *alignment with the wind energy strategy (i.e., in an area deemed 'open to consideration') of the relevant local authority;*
6. ***Environmental Sensitivities****: Located outside of EU Natura 2000 sites; locations outside of National designations; Annex I Habitats;*
7. ***Grid Connection****: Access to and capacity of the national electricity grid;;*
8. ***Sensitive Receptors****: Capable of complying with required setbacks from sensitive receptors; and*
9. ***Site Scale:*** *Sufficient area of unconstrained land that could potentially accommodate a wind farm development and turbine spacing requirements.*

The criteria above will be explained further below in so far as they influenced the site selection exercise undertaken.

[3] *SEA Wind Atlas: https://maps.seai.ie/apps/WindAtlas/*

3.2.5.1.1 Local Policy

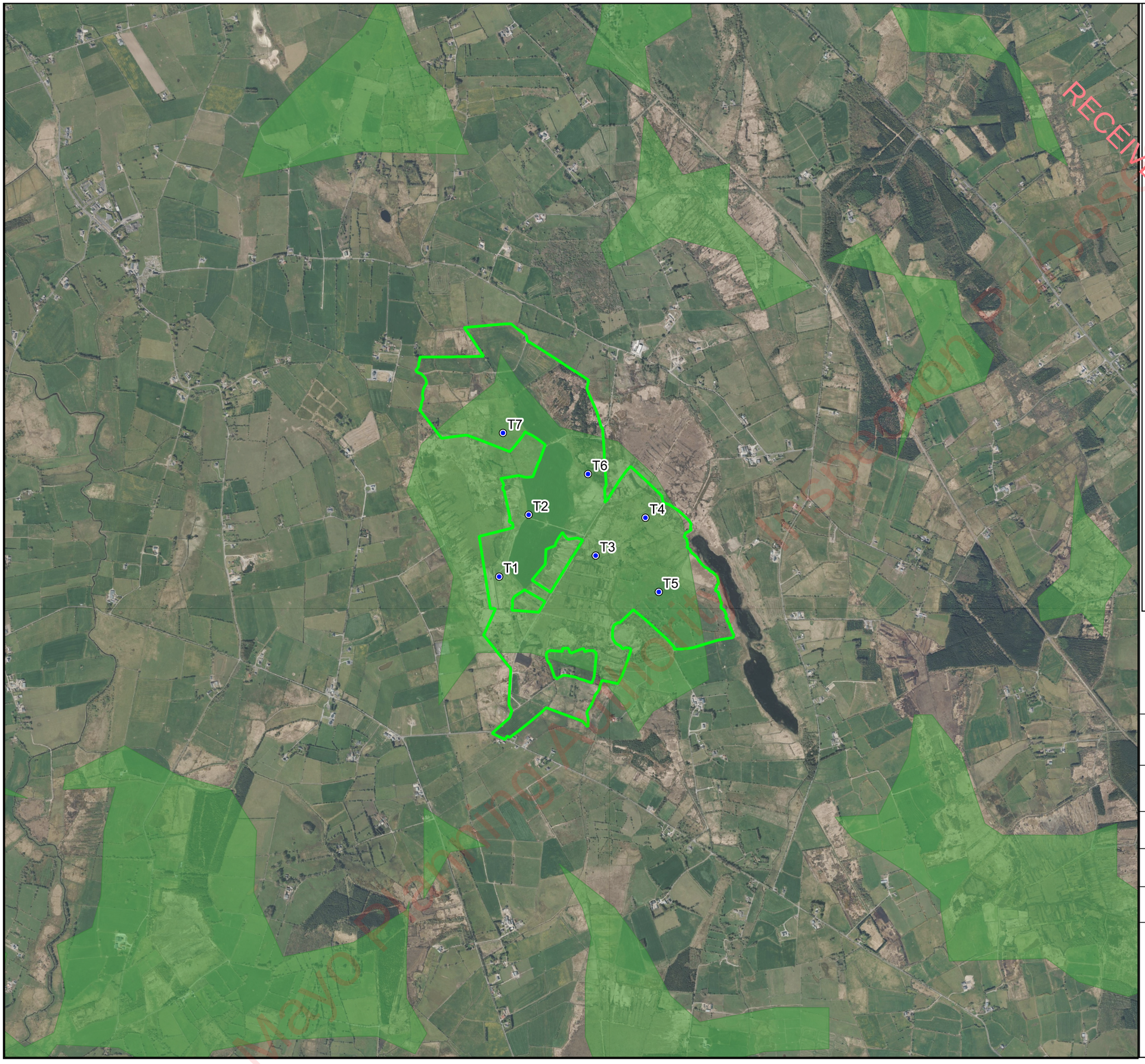
The Site falls across the administrative area of Mayo County Council and therefore, is subject to the planning policies and objectives set out in the Mayo County Development Plan 2022-2028 (MCDP).

County Mayo's Renewable Energy Strategy (RES) is included in Volume 4 of the MCDP. The RES identifies areas within the County within the following categories:

- Priority Areas
- Tier 1 - Preferred (Cluster of Turbines)
- Tier 1 - Preferred (Large Wind Farms)
- Tier 2 - Open for Consideration

The proposed turbines are wholly located within an area designated as 'Preferred for Cluster of Turbines'. Please see Figure 3-2 for further detail. As outlined in the RES classification, Preferred for Cluster of Turbines are *"areas identified as being most suitable for smaller clusters of wind turbines (clusters of up to three to five turbines depending on site conditions and visual amenity)."*

Wind turbines located in these areas are therefore open to development, subject to conformance with the RES and the proper planning and sustainable development of the area. While there are 7 turbines proposed at the Site within this designation which exceeds the range of three to five turbines as suggested by the RES, the turbine layout considered was considered to be appropriate for the Site following consideration of site conditions and visual amenity. Please see Section 2.5.4 of Chapter 2 for further information on the Mayo Renewable Energy Strategy.



Map Legend

- EIAR Study Boundary
- Proposed Turbines

Mayo Renewable Energy Strategy 2022-2028

- Tier 1 - Preferred (Cluster of Turbines)
- Tier 1 - Preferred (Large Wind Farms)
- Tier 2 - Open for Consideration

Drawing Title

Renewable Energy Strategy

Project Title

Proposed Cunlaghfadda Green Energy Project

Drawn By	Checked By
NS	RK
Project No. 220825	Drawing No. Figure 3-2
Scale 1:20,000	Date 2025-11-27

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3.2.5.1.2 Environmental Sensitivities

Designated Sites

The Site is not located within any Nationally Designated or Internationally Designated Natura 2000 site.

The nearest Natura 2000 site to the Site, i.e. Special Area of Conservation (SAC) or Special Protection Area (SPA) is the River Moy SAC (Site Code: 002298), which is located approximately 2.2km to the west of the Site at its closest point (i.e., T01). The River Moy SAC' qualifying interests include lowland hay meadows, active and degraded raised bogs, alkaline fens and white- clawed crayfish.

The nearest national designated site, i.e. Natural Heritage Area (NHA) or proposed Natural Heritage Area (pNHA) to the Site is the Mountpleasant School Turlough pNHA which is located approximately 4.9km west of the Site at its closest point (i.e., T01).

Annex I Habitat

Within the Site, Annex I Transition mires and quaking bogs [7140] and Annex I Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae) [6410] habitats have been identified through comprehensive multi-season site surveys. The Proposed Project has been designed to avoid and/or mitigate any potential effects and therefore there is no Proposed Project infrastructure sited within this area.

A small section of the Annex 1 Molinia Meadows is encompassed in 1 no. of the biodiversity management and enhancement proposals for the Proposed Wind Farm, please refer to Appendix 6-4 BMEP and Chapter 6 Biodiversity for further details regarding habitats and proposed enhancement/management measures within the Site.

3.2.5.1.3 Grid Connection

It is intended to connect the Proposed Wind Farm to the national grid via a new onsite 'loop-in' 110kV substation connected to the nearby Cloon to Castlebar 110kV overhead transmission line via approximately 982 metres (m) of underground cabling route which will run in a north-eastward direction from the proposed onsite 110kV substation through agricultural land to the existing overhead line. The existing overhead line will be broken by 2 no. end masts (lattice type towers) to facilitate the connection to the Proposed Wind Farm.

Details regarding potential alternative grid connection options are considered and presented in Section 3.2.6.

3.2.5.1.4 Sensitive Receptors

The Applicant sought to identify an area with a relatively low population density. Having reviewed the settlement patterns in the vicinity, the study area has emerged as suitable to accommodate the Proposed Project. The population density of the Population Study Area in 2022 as described in the Population and Human Health section of this EIAR is 14.87 persons per square kilometre, as described in Chapter 5 of this EIAR. This is considerably lower than the national population densities of 71.47 persons per square kilometre and lower than the population density of County Mayo, recorded at 24.69 persons per square kilometre. The proposed turbine positions achieve the recommended setbacks in the Guidelines (DoEHLG, 2006) and the Draft Guidelines (DoHPLG, 2019), with the closest sensitive receptor being located 643m from the closest turbine, i.e. achieving the 4 x tip height setback.

The nearest settlement to the proposed turbines is Mayo Abbey, located approximately 2.4km northwest of the nearest proposed turbine (T07) and is classified as a rural village in the settlement hierarchy of the Mayo County Development Plan (MCDP)[4].

3.2.5.1.5 *Site Scale*

The Site, covering a total of 165 hectares, comprises a mix of pastoral agriculture, peatlands and small-scale private forestry and has an elevation range of approximately 60mOD (metres above Ordnance Datum) to 70mOD. The adjacent land use predominantly comprises the same. The Proposed Wind Farm benefits from existing farm tracks (approx. 1km). Once operational, the Proposed Wind Farm will be accessible via a new proposed site entrance in the townland of Cloonbaul, approximately 800m north of the L15053. The Site comprises habitats of varying ecological value; please note, all proposed infrastructure maintains appropriate setback distances from sensitive ecological receptors.

As such, with its proximity to grid, accessibility, and achievable setbacks from sensitive receptors, the Site affords a largescale area that is sufficiently unconstrained to accommodate a 7-turbine wind farm development. The constraints and facilitators mapping process is outlined in Section 3.2.5.2.1.

3.2.5.1.6 *Summary*

From the review of the criteria set out above, the Site was identified as a suitable location for the provision of a renewable energy development of the scale proposed. The Site is located on a mix of agriculture-pastoral lands and peatland which allows the Proposed Wind Farm to take advantage of the existing access tracks (some of which will be upgraded) and highlights the suitability of the Site as it can make sustainable use of established items of infrastructure. Please note, all required setbacks from sensitive receptors, as set out above, are achievable.

The Site is not located within or adjacent to EU or National protected areas, but please note that Annex I Transition mires and quaking bogs and Annex I Molinia meadows are present within the Site. No infrastructure is proposed within these areas, however as identified above, proposed biodiversity enhancement and management proposals do encompass a portion of this area. These measures include enhancement of 1.16ha of Molinia meadow which will provide dual benefits for both the Annex I habitat and marsh fritillary butterflies, planting of 2.5km of treeline/ hedgerow planting and enhancement and planting of 3.5ha of native woodland within the Site.

From the review of the criteria set out above, the Proposed Grid Connection was identified for the provision of a connection of the Proposed Wind Farm to the national grid. The 110kV underground electrical cabling route is located within the Site landholding and does not cross any public road sections.

Factoring all required environmental constraints into the project design, a site of considerable scale, with an estimated installed capacity of 31.5MW, and potential to power approximately 19,542 Irish households with renewable energy and displace 19,731 tonnes of carbon dioxide per annum (690,588 tonnes over the 35-year operational life) was established. The Site is considered appropriate for wind energy development and represents a positive contribution to National and EU climate action targets.

Once the current Site emerged as a suitable location for the provision of the Proposed Project, the applicants approached the relevant landowners in order to assemble the land necessary for the Proposed Project. Arising from site assembly discussions, the current Site was identified and brought forward as being capable of accommodating a cohesive viable area of sufficient size to cater for the Proposed Project. While the outcome of the site selection process has identified the Site as a suitable

[4] *Mayo County Development Plan 2022-2028 Volume 1 Written Statement- https://www.mayo.ie/getmedia/db6f18d0-73c2-463f-a6cc-5b1186762a48/Vol-1-Written-Variation-No-1.pdf*

location for a renewable energy development of the nature proposed, it does not preclude other sites within the vicinity being brought forward for consideration in the future.

Throughout the design process, the layout of the Proposed Project has been revised and refined to take account of the findings of all desk-based assessments, site surveys/ investigations and baseline assessments which have brought the design from its first initial layout to the current proposed layout; please see Section 3.2.5 below for further details.

3.2.6 Alternative Project Design Options

3.2.6.1 Alternative Turbine Numbers and Model

Modern wind turbines have a potential power output in the 4 – 7-megawatt (MW) range. It is proposed to install 7 no. 4.5MW turbines at the Site which will have an estimated installed capacity of 31.5MW. Such a wind farm could also be achieved on the Site by using smaller turbines (for example 2.5 MW machines). However, this would necessitate the installation of over 12 turbines to achieve a similar output. A larger number of smaller turbines would result in the wind farm occupying a greater footprint, with a larger amount of supporting infrastructure being required (i.e., tracks etc.) and increasing the potential for environmental impacts to occur. The proposed number of turbines takes account of all site constraints and the distances to be maintained between turbines and features such as public roads and houses, while maximising the wind energy generating potential of the Proposed Wind Farm. The 7-turbine layout selected for the Proposed Project has the smallest development footprint of the other alternatives considered, while still achieving the optimum output at a more consistent level than would be achievable using different turbines.

The turbine model to be installed on the Site will have an overall ground-to-blade tip height of 160m, a rotor diameter of 136m and a hub height of 92m. The EIAR therefore provides a robust assessment of the turbines that could be considered within the overall development description. The capacity and performance of wind turbines is related to their scale. The 160m tip height of the proposed turbines is considered appropriate for the Site to ensure the most efficient use of the wind resource is achieved whilst having due regard to the character of the Site.

The use of alternative smaller turbines at the Site would not be appropriate as they would fail to make the most efficient use of the wind resource passing over the Site and would potentially require a larger development footprint. This alternative would potentially lead to additional environmental effects.

A comparison of the potential environmental effects of the installation of a larger number of smaller wind turbines when compared against the chosen option of installing a smaller number of larger wind turbines on the Site is presented in Table 3-3 below.

Table 3-3 Comparison of environmental effects when compared to the chosen option (7 wind turbines, higher MW output)

Environmental Considerations	Larger number of smaller turbines	Chosen option of a 7 turbine layout
Population & Human Health (incl. Shadow Flicker)	Greater potential for shadow flicker and noise impacts on nearby sensitive receptors due to the increased number of turbines. However, these can be curtailed to meet threshold criteria. Smaller turbines would be less visually obstructive in the	Reduced potential for shadow flicker and noise impacts on nearby sensitive receptors due to the reduced number of turbines. As per the assessment carried out in Chapter 5 Population and Human Health, there is no potential for significant shadow flicker effects from the proposed turbines. Shadow flicker effects can be mitigated to meet threshold criteria.

Environmental Considerations	Larger number of smaller turbines	Chosen option of a 7 turbine layout
	skyline; however, the larger development footprint would spread further across the landscape potentially occupying a larger portion of a viewpoint.	There is no potential for significant noise and vibration effects from the proposed turbines. Furthermore, noise emissions can be curtailed to meet threshold criteria. Larger turbines would be more visually obstructive in the skyline. As detailed in Chapter 13, the landscape type and character of the area where the proposed turbines are sited comprises modified working landscape types of low sensitivity and can effectively accommodate wind energy development. Of the 19 no. viewpoints (VPs) assessed, none were deemed significant.
Biodiversity (including Birds)	Larger development footprint would result in greater potential for habitat loss. Increased potential for collision risk for birds and bats due to increased number of turbines.	Smaller development footprint would result in reduced potential for habitat loss. As detailed in Chapter 6 Biodiversity, the development has been designed to avoid or mitigate impacts on biodiversity including bats and downstream aquatic receptors. As per Chapter 6 of this EIAR, there are no significant long-term negative effects expected on biodiversity receptors. Decreased potential for collision risk for birds and bats due to decreased number of turbines. With the implementation of the mitigation measures described in Chapter 7 Birds, the residual effects for collision risk are not significant.
Land, Soils, & Geology	Larger development footprint would result in greater volume of spoil to be generated, excavated and sorted. Geotechnical investigations followed by careful design would lead to no significant environmental impacts.	Smaller development footprint would result in reduced volume of spoil to be generated, excavated and sorted. As detailed in Chapter 4 and 8, the Proposed Wind Farm has been designed to utilise the existing tracks to minimise ground disturbance where possible. Geotechnical investigations followed by careful design would lead to no significant environmental impacts. The peat and spoil management proposals discussed in Chapter 4 sets out the optimal treatment for peat and spoil

Environmental Considerations	Larger number of smaller turbines	Chosen option of a 7 turbine layout
		excavated/generated on site without creating significant impacts for biodiversity, hydrology, land use etc. As detailed in the assessment in Chapter 8, no significant effects on peat, topsoil and subsoils will occur.
Water	Project specific drainage design removes the potential for significant environmental effects. Larger development footprint, therefore, increasing the potential for silt-laden runoff to enter receiving waterbodies.	Project specific drainage design removes the potential for significant environmental effects. Smaller footprint would result in less potential for silt laden run-off to enter a waterbody. As detailed in the assessment in Chapter 9, no significant effects on surface water or groundwater quality will occur.
Air Quality	Increased potential for vehicle and construction dust emissions due to an increased volume of construction material and turbine component deliveries to the site, giving rise to a reduced air quality locally for the construction phase.	Decreased potential for vehicle emissions and dust emissions due to a decreased volume of construction material and turbine component deliveries to the Site. As detailed in Chapter 10, there will be no significant effects on air quality during the construction, and decommissioning phases. There will be a Long-term Moderate Positive Impact on air quality during the operational phase.
Climate	Increased potential for vehicle emissions and dust emissions due to an increased volume of construction material and turbine component deliveries to the Site.	Decreased potential for vehicle emissions and dust emissions due to a decreased volume of construction material and turbine component deliveries to the Site. As detailed in the assessment in Chapter 11 Climate, over the proposed 35-year lifetime of the Proposed Wind Farm, 690,588 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The addition of an estimated 31.5MW clean energy to the national grid will be a positive contribution to the State's renewable energy targets set out in the CAP25.
Noise & Vibration	Potential for increased noise impacts on nearby sensitive receptors due to reduced separation distance between sensitive receptors and turbine	Potential for decreased noise levels at nearby sensitive receptors due to increased separation distance between sensitive receptors and turbine locations.

Environmental Considerations	Larger number of smaller turbines	Chosen option of a 7 turbine layout
	locations and additional turbine generators.	Based on the assessment detailed in Chapter 12, there will be no significant effects on sensitive receptors during the construction, operational and decommissioning phases from the Proposed Project.
Landscape & Visual	Smaller turbines may be less visually intrusive on the landscape. Equally, a larger number of smaller turbines would be spread over a wider area, taking up a greater portion of a viewpoint	Larger turbines may be more visually intrusive on the landscape. Equally, a smaller number of larger turbines would be spread over a smaller area, taking up a smaller portion of a viewpoint. The Proposed Wind Farm is an appropriately designed and suitably scaled project. As detailed in Chapter 13, the landscape type and character of the area where the proposed turbines are sited comprises modified working landscape types of low sensitivity and can effectively accommodate wind energy development. Of the 19 no. viewpoints (VPs) assessed, none were deemed significant.
Archaeology, Architectural and Cultural Heritage	Larger development footprint would increase the potential for impacts on unrecorded, subsurface archaeology. No material difference between the two options for indirect effects on monuments.	Smaller development footprint would decrease the potential for impacts on unrecorded, subsurface archaeology. No material difference between the two options for indirect effects on monuments. As detailed in the assessment in Chapter 14 (Archaeological, Architectural and Cultural Heritage), there will be no significant direct or indirect effects on known or unknown archaeology and cultural heritage during the construction, and decommissioning phases. During the operational phase, there will be some not significant to moderate residual indirect effects on monuments and protected structures. However, in reality the effect will be less severe since the ZTV model does not take natural screening and buildings into consideration which will alleviate if not remove the impact on setting altogether. Archaeological monitoring under licence will be implemented during the construction phase.

Environmental Considerations	Larger number of smaller turbines	Chosen option of a 7 turbine layout
Material Assets – Traffic and Transport	Potential for greater traffic volumes during construction phase due to larger development footprint and requirement for more construction materials and turbine components.	Potential for reduced traffic volumes during construction phase due to smaller development footprint and requirement for less construction materials and turbine components. As detailed in Chapter 15 Material Assets, there will be no significant effects on traffic and transport during the construction, operational and decommissioning phases of the Proposed Project. A detailed Traffic Management Plan incorporating all the mitigation measures will be agreed with the roads authority prior to construction works commencing on at the Site.
Material Assets- Utilities, Waste Management, Telecommunications and Aviation	No material difference between the two options for gas, water, waste management, telecommunications and aviation.	No material difference between the two options for gas, water, waste management, telecommunications and aviation.
Vulnerability to Major Accidents Natural Disasters	Larger development footprint would result in a higher risk in relation to major accidents and natural disasters due to increased land disturbance and a larger excavation footprint.	Smaller development footprint would result in a lower risk in relation to major accidents and natural disasters due to reduced land disturbance and a smaller excavation footprint. As detailed in Chapter 16 the risk of a major accident and/or disaster during the construction of the Proposed Project is considered 'low'. The highest risk scenarios to the Proposed Project (i.e., contamination and fire/explosion) are considered to be unlikely to occur at any phase of the Proposed Project. A detailed risk assessment on potential risks relating to major accidents and natural disasters is provided in Section 16.4.1.6 of Chapter 16 of this EIAR.

For the reasons set out above, the proposal for a 7 no. turbine layout with larger turbines was considered to have the least amount of environmental effects when compared to a larger number of smaller turbines.

3.2.6.2 Alternative Turbine Layout and Development Design

The design of the Proposed Project has been an informed and collaborative process from the outset, involving the designers, developers, engineers, landowners, environmental, hydrological and

geotechnical, landscape and archaeological specialists and traffic consultants. The aim being to reduce potential for environmental effects while designing a project capable of being constructed and viable.

Throughout the preparation of this EIAR, the layout of the Proposed Project has been revised and refined to take account of the findings of all site investigations and baseline assessments, which have brought the design from its first initial layout iteration to the final Proposed Project layout. The design process has also taken account of the recommendations and comments of the relevant statutory and non-statutory consultees, and local authorities as detailed in Chapter 2 of the EIAR, while still seeking to ensure that a viable project can ultimately be constructed and connected to the national grid.

3.2.6.2.1 *Alternative Proposed Project Design Iterations*

The final design of the Proposed Project, including the proposed turbine layout, takes account of all identified site constraints. The layout is based on the results of all site investigations that have been carried out during the EIAR process and the EIA informal scoping process with statutory and non-statutory consultees. As information regarding the Proposed Project was compiled and assessed, the number of turbines and the proposed layout have been revised and amended to take account of the physical constraints of the Proposed Project and the requirement for buffer zones and other areas in which no turbines could be located. The selection of the turbine number and layout has also had regard to wind-take and the separation distance to be maintained between turbines, as well as landscape and visual, noise and shadow flicker impacts. The EIAR and Proposed Project 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 Project layout has resulted following feedback from the various studies and assessments carried out as well as ongoing negotiations and discussions with landowners and consultees.

There were a number of reviews by the wind farm design team of the specific locations of turbines during the optimisation of the Proposed Project layout. The initial constraints study identified a significant viable area within the overall study area of the Proposed Project. Please refer to Figure 3-3 to Figure 3-6 to see the evolution of the turbine layout for the Proposed Project throughout the design process.

Proposed Project Layout Iteration No. 1

Iteration No.1 as shown in Figure 3-3 below is the initial 7 turbine layout which was presented to the project team for detailed investigations and assessment. This layout was based on a preliminary constraint mapping exercise and identification of a viable area for turbine siting.

Figure 3-3 Proposed Project Layout Iteration No. 1

MKO undertook a constraints mapping exercise and the results of this desk study helped optimise the layout, ensuring all proposed turbines were located outside all mapped environmental sensitivities buffers (e.g. 50m hydrological feature buffers). Based on this review, multiple turbine options were then considered, with 3 other turbine options being considered along with other ancillary infrastructure.

Based on results and feedback from the above surveys, amendments were made to Iteration No. 1, and these are further detailed below as Iteration No. 2.

Proposed Project Layout Iteration No. 2

As detailed above, a detailed constraints mapping exercise allowed multiple turbine options to be considered. Iteration No. 2 was based on updated constraints mapping exercise and identification of a viable area for siting of turbines. Constraints that were considered include relevant setback from sensitive receptors, setback from natural watercourses plus 50m buffer, and avoidance of ecologically sensitive and designated habitats.

Following the review of additional environmental and ecological constraints identified, further amendments and additions were made to the site layout. These are detailed below:

- 3 no. options for turbine layout with 3 no. turbine models under consideration;
- 38kV underground grid connection route to Dalton 110kV Substation;
- Ancillary infrastructure proposed:
  - Proposed tracks;
  - Proposed onsite 38kV substation;
  - 1 no. temporary construction compound; and
  - 1 no. permanent met mast

The above changes to the layout are reflected in Iteration No 2, see Figure 3-4 and Figure 3-5 below.

Figure 3-4 Proposed Project Layout Iteration No. 2- including grid connection route

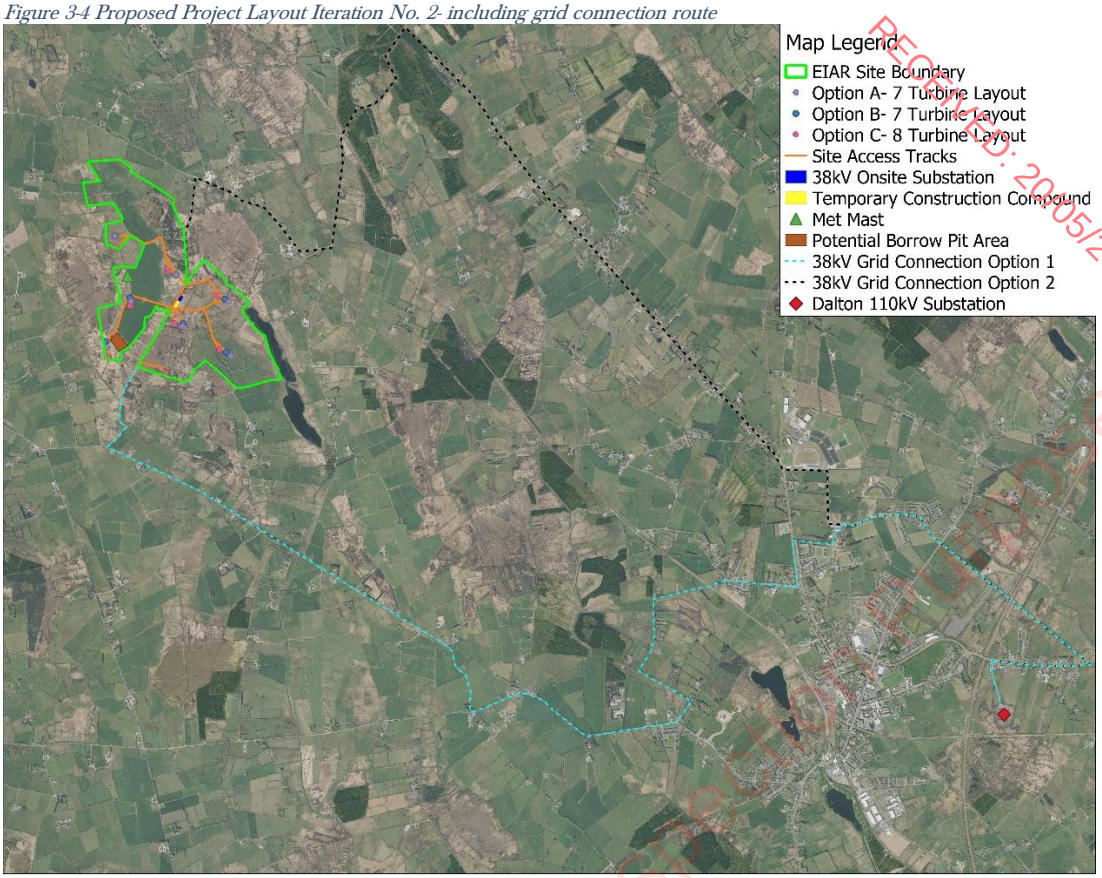
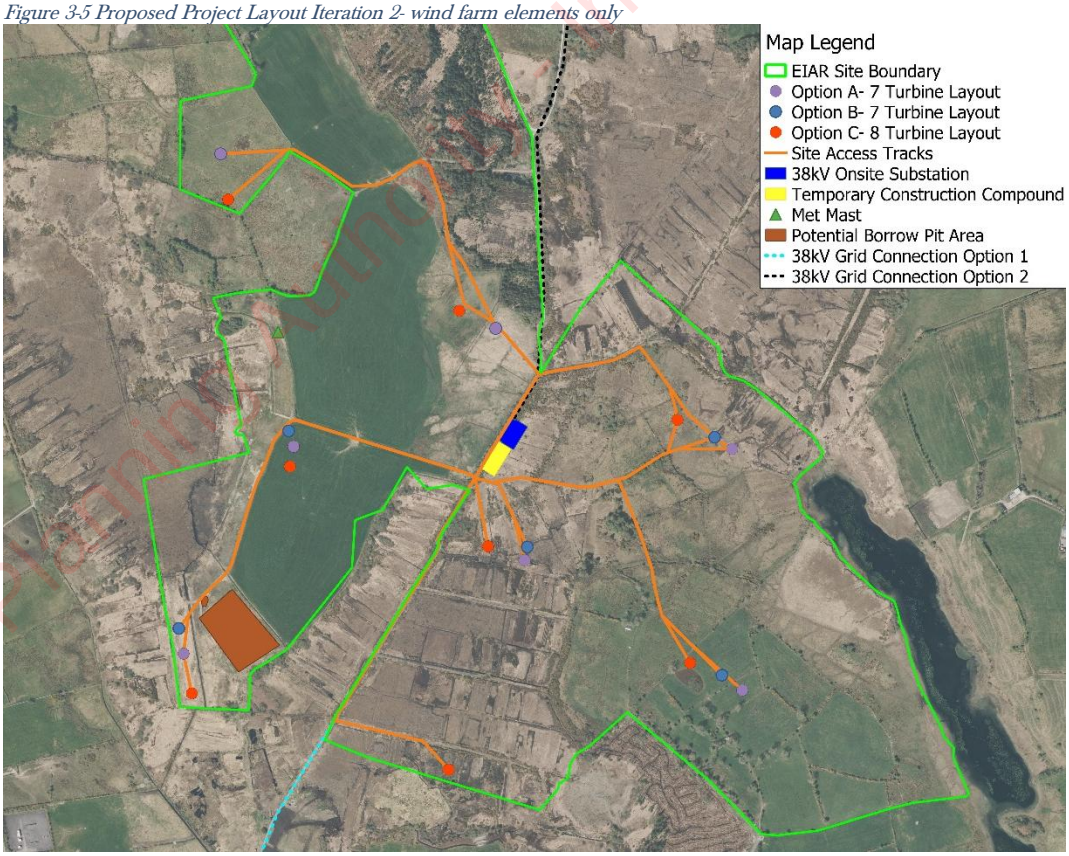


Figure 3-5 Proposed Project Layout Iteration 2- wind farm elements only



Following the amendments and additions noted above, Iteration No. 2, comprised 3 no. turbine layout options with 3 no. tip heights under consideration, these consisting of:

- **Option A:** 7 no. turbines with a tip height of 150m
- **Option B:** 7 no. turbines with a tip height of 160m
- **Option C:** 8 no. turbines with a tip height of 168m

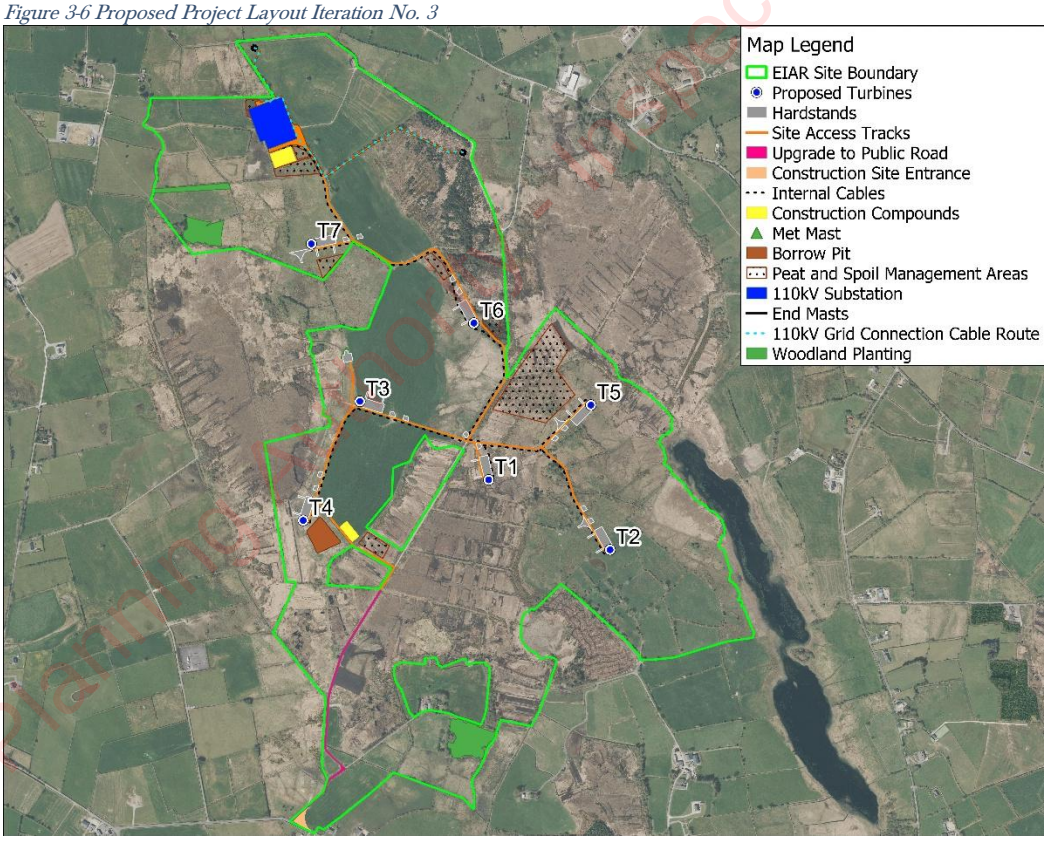
Other proposed infrastructure onsite included access tracks to cater for all turbine options, a 38kV onsite substation, permanent met mast and 1 no. temporary construction compound. Iteration No.2 also included a proposed 38kV underground grid connection route to Dalton 110kV Substation, with 2 grid route options being considered. In addition, a potential borrow pit location was identified on Site for further investigation, based on desktop assessment on local geology in the area.

Layout Iteration No. 2 was presented to the project team for detailed investigations and assessment. These investigations included detailed habitat mapping, ecological surveying and hydrological and investigations of the Site.

Proposed Project Layout Iteration No. 3

After all detailed site investigations were completed, the layout was revised and defined. Iteration No. 3 which is presented in Figure 3-6 below, was developed based on the additional collation of all on-site constraints such as peat probing, trial pitting and further ecological assessment.

Figure 3-6 Proposed Project Layout Iteration No. 3



Iteration No. 3 consisted of the following:

- 7 no. turbines with a tip height of 160, including associated foundations and hardstands;
- 1 no. meteorological (met) mast;
- 2 no. temporary construction compounds;

- Proposed site access tracks, including upgrades of local roads (L15053);
- Proposed borrow pit;
- Proposed internal cables;
- Proposed 110kV underground grid connection to 2 no. new proposed end masts;
- Proposed 110kV onsite substation;
- Potential peat storage areas; and
- Enhancement proposals consisting of woodland planting

As noted above, Iteration No. 3 includes for 7 no. turbines. Based on the constraints and available lands, a 7 no. turbine layout was advanced over an 8 no. turbine layout. A 7 no. turbine layout for the Site was seen as most appropriate and less significant when compared to an 8 no. turbine layout. A 7 no. turbine layout has reduced impacts on residential amenity, biodiversity, water as well as other ecological and environmental constraints when considering the smaller development footprint when compared to an 8 no. turbine layout. All associated ancillary infrastructure was then developed around this turbine layout, as shown in above Figure 3-6.

A change to the grid connection occurred due to a number of constraints being identified along the 38kV underground grid cabling route. This was namely the crossing of Irish Rail infrastructure being required which would necessitate further engagement with Irish Rail as well as watercourse crossings which would require a larger engineering input. Based on this, a need to find a less constrained route to a grid connection was required. A proposal to break into the existing 110kV Cloon to Castlebar OHL was seen as less intrusive and this was progressed as seen above in Figure 3-6. This includes a new proposed 110kV on site loop-in substation location, with a 110kV underground grid connection being proposed to 2 new end masts on site. The location of the 110kV onsite substation was selected based on proximity to the existing 110kV Cloon to Castlebar OHL in addition to all on site ecological and environmental constraints.

Please see Section 3.2.7 for further detail on assessment of alternative grid connection options and substation location selection at the Site.

Habitat enhancement was also advanced as part of this layout update, with proposed areas for woodland planting being identified.

Proposed Project Layout Iteration No. 4 – Final Proposed Project Layout

Advancing on the previous iteration, Iteration No. 4, as presented in Figure 3-7, allowed for further changes to the layout based on continuous feedback from the project team. These are:

- Proposed turbine layout was confirmed;
- Refined borrow pit footprint;
- Temporary construction entrance identified;
- The access track layout and hardstand orientations were realigned to further avoid sensitive ecological receptors;
- The position of the 110kV Substation was optimised to align with the internal track network;
- Temporary construction tracks, widening areas and hardstand areas where included within the final design;
- Local road 15053 proposed for upgrade following traffic assessment;
- Temporary construction compound footprints amended;
- Potential peat and spoil management areas were finalised; and
- Enhancement proposals were refined and finalised.

Iteration No. 4 comprises 7 no. turbines with a tip height of 160m, a rotor diameter of 136, and a hub height of 92m. The turbine numbering has been renumbered in the final design iteration to reflect operational access to the site.

The borrow pit reduced in size based on the stone requirement needed. This allowed for a more refined design that reduced the impact on land take within the Site.

Initially, the Applicant considered using the existing L15053 local road to the south of the Site for delivery of turbines and abnormal loads to the Site. Following autotrack assessment (see Section 15.1 of Chapter 15 for further detail) and further site walkovers, it was deemed more appropriate to construct a temporary construction site entrance off the L1505. This temporary construction entrance would ensure the safe access of all construction traffic to the site for the duration of the construction phase. Upgrade works were also identified as being required to the L15053 as the existing road would require widening to facilitate turbine delivery to the Site.

The internal site access track layout was also redesigned as part of final design, with the track layout being redesigned to avoid marsh fritillary habitat and Molinia meadow identified on site. The site access track layout in the north of the site from the 110kV substation to the proposed end masts was revised to minimise loss of treeline and hedgerow.

Temporary construction tracks, widening areas and hardstand areas were also incorporated as part of the access track design to minimise the permanent footprint of the site. Following the traffic and transport assessment being carried out, a passing bay was also included as part of the final design, this being located along the L15053. This is further detailed below in Section 3.2.5.3.

The footprint of the temporary construction compounds was amended, with a slightly larger wind farm construction compound footprint being proposed as part of the final design to facilitate the most efficient flow of construction processes within the Site.

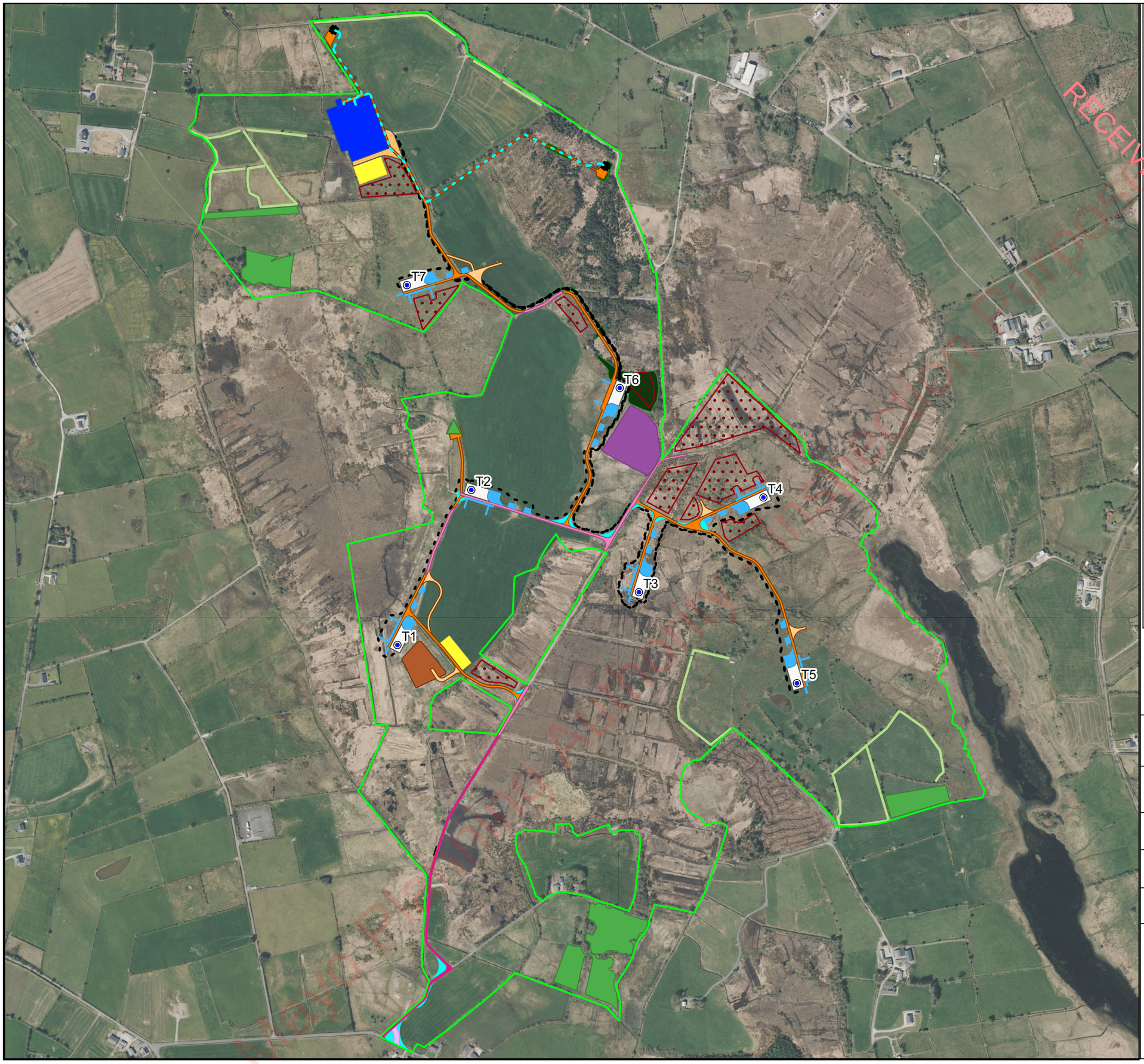
The peat and spoil management areas underwent detailed multidisciplinary site-surveys to ensure that the proposed areas were suitable from a geotechnical, hydrological, and ecological perspective. After all surveys were completed, the proposed peat and spoil management areas were redesigned and reduced in size to ensure that they do not encroach on any ecological constraints or hydrological buffers.

As part of the final design iteration, enhancement proposals were finalised to ensure that the Proposed Project has a positive effect on local biodiversity. Measures such as hedgerow planting, native woodland planting, and habitat enhancement for marsh fritillary have been proposed, with further details being available in Appendix 6-4 BMEP and alternatives detailed below in Section 3.2.5.5.

The final Proposed Project layout as presented in Figure 3-7 takes account of all site constraints (e.g. ecology, birds, water, archaeology, etc) and design constraints (e.g. setback distances from houses and distances between turbines on site etc). The layout also takes account of the results of all site investigations and baseline assessments that have been carried out during the EIAR process.

The final chosen turbine layout is considered the optimal layout given it has the least potential for environmental effects.

A comparison of the potential environmental effects of initial iterations of the turbine layout as compared against the final turbine layout are presented in Table 3-4 below.



Map Legend

- EIAR Site Boundary
- Proposed Turbines
- Proposed Turbine Hardstands
- Temporary Hardstand Areas
- Proposed Borrow Pit
- Peat and Spoil Management Areas
- Proposed Met Mast
- Proposed Internal Cables
- Proposed Felling
- Proposed 110kV Substation
- Proposed Construction Compound
- Proposed 110kV Grid Connection Cable Route
- Proposed End Masts
- Proposed Upgrade to Existing Access Tracks
- Proposed New Access Tracks
- Proposed Upgrade to Public Road
- Temporary Construction Tracks
- Temporary Site Entrance
- Temporary Widening Areas
- Proposed Passing Bay
- Proposed Marsh Fritillary Enhancement Areas
- Proposed Woodland Planting
- Linear Planting and Enhancement

Drawing Title

Proposed Project Layout Iteration No. 4 - Final Proposed Project Layout

Project Title

Proposed Cunlaghfadda Green Energy Project

Drawn By	Checked By
NS	ÓM
Project No. 220825	Drawing No. Figure 3-7
Scale 1:8,000	Date 2026-04-24

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