

2.0 DESCRIPTION OF THE PROPOSED PROJECT

2.1 INTRODUCTION & BACKGROUND

This section of the EIAR describes the overall site and the main components of the proposed project and provides details on the construction, operation and decommissioning of the wind farm and associated infrastructure.

Cloghercor Wind Farm Ltd. proposes to develop the Cloghercor Wind Farm in Co. Donegal. It is proposed to supply the power from the Cloghercor Wind Farm to the Irish electricity network via loop-in 110kV underground cables (approximately 4.1 km cable length within approximately 3.36 km of internal access roads) to the existing overhead 110kV power line in the townland of Cloghercor, Co. Donegal.

A summary of the overall proposed project is as follows:

- Erection of 19 no. wind turbines with an overall blade tip height range from 185m to 200 m, a rotor diameter range from 149 m to 164 m, a hub height range from 112 m to 125 m, and all associated foundations and hard-standing areas in respect of each turbine;
- Construction of new site entrance with access onto the L6483 local road for the construction phase (operational phase maintenance traffic only), and utilisation of a permitted forest entrance (Pl. Ref. 1951040) to the L6483 as a second construction phase site access point. A third site entrance on the L6483 will form the operational phase public entrance to the wind farm;
- Improvements and temporary modifications to 5 no. locations adjacent to the public road to facilitate delivery of abnormal loads and turbine delivery on the R262 and N56 in the townlands of Tullycumber, Drumard, Darney, Cashelreagh Glebe and Aghayeevoige;
- Construction of an area of temporary hard standing to function as a blade transfer area to facilitate turbine delivery on the R262 in the townland of Drumnacross;
- Widening of sections of the L6363 and L6483 within the road corridor (up to 4.5 m running width) to facilitate delivery of abnormal loads/turbines in the townlands of Cloghercor, Shallogan More, Derryloaghan and Straboy;
- Construction of 2 no. temporary construction compounds with associated temporary site offices, parking areas and security fencing;
- Installation of 1 no. permanent meteorological mast with a height of 100 m;
- 4 no. borrow pits;
- Construction of new internal site access roads and upgrade of existing site roads, to include passing bays and all associated drainage;
- Construction of drainage and sediment control systems;
- Construction of 1 no. permanent 110kV electrical substation including:
 - 1 no. EirGrid control building containing worker welfare facilities and equipment store;
 - 1 no. Independent Power Producer (IPP) control building containing HV switch room, site offices, kitchen facilities, storeroom and toilet amenities.
 - All electrical plant and infrastructure and grid ancillary services equipment;
 - Parking;
 - Lighting;
 - Security Fencing;
 - Wastewater holding tank;
 - Rainwater harvesting equipment;
 - All associated infrastructure and services including site works and signage;
- All associated underground electrical and communications cabling connecting the wind turbines to the proposed wind farm substation;

- All works associated with the connection of the proposed wind farm to the national electricity grid, which will be via a loop-in 110 kV underground cable connection (approximately 4.1 km cable length within trenches on approximately 3.36 km of internal access roads) to the existing 110 kV overhead line in the townland of Cloghercor, Co. Donegal, with two new 16 m and 21 m high steel lattice end masts at each interface;
- Removal of 13 no. existing wooden polesets and 1 no. steel lattice angle mast between the two new interface end masts;
- 2 no. watercourse (stream) crossings on the grid connection route;
- All related site works and ancillary development including berms, landscaping, and soil excavation;
- Forestry felling to facilitate construction and operation of the proposed project and any onsite forestry replanting;
- Development of a permanent public car park with seating/picnic tables at the end of the construction phase of the development at the location where the proposed grid connection intersects the L6483;
- Permanent recreational facilities including marked walking trails along the site access roads and paths, and associated recreation and amenity signage; and
- Approximately 252 ha of biodiversity enhancement lands located over 3 km from the proposed wind turbines.

The proposed project, described above, includes all elements of the proposed development in addition to any works required on public roads to accommodate turbine delivery. The proposed project has been considered and has been addressed as part of this EIAR, with offsite forestry replanting considered within cumulative assessments. These offsite forestry replanting sites will be individually assessed as part of the forestry licencing process.

A 10-year planning permission and 35-year operational life from the date of commissioning of the entire wind farm is being sought for the proposed development, as described in Section 2.5, and does not include elements of the overall proposed project. There are a number of locations which require temporary additional works to accommodate oversize load delivery to site (for turbine components). The proposed development, under the current application, includes temporary works at 4 no. locations in the townlands of Drumard, Darney, Cashelreagh Glebe and Aghayeevoge Co. Donegal. A number of other temporary works areas/road widening do not form part of the current application but are part of the proposed project and therefore assessed as part of this EIAR and are located within the townlands of Tullycumber, Cloghercor, Shallogan More, Derryloaghan and Straboy, Co Donegal.

2.1.1 The Proposed Project Site

The proposed wind farm site (as presented in Figure 1-2 of this EIAR) is located within a peatland and forested landscape, between Doochary, Lettermacaward and Glenties, in Co. Donegal. The site of the proposed wind farm is located approximately 22 km northeast of Donegal town, and approximately 30 km southwest of Letterkenny. Throughout this EIAR, reference may be made to the EIAR study area. The EIAR study area will be separately defined within each chapter if required, but where this is not the case, it refers to the areas outlined in Figure 1-1 of this EIAR.

The site of the proposed wind farm (Figure 1-2 of this EIAR) has an area of approximately 1,945 ha and comprises a single, slightly elongated land parcel approximately 9.1 km long in the northeast/southwest direction and is approximately 3.7 km wide in a southeast/northwest direction at the widest point. The site lies between the R250 that runs from Glenties to Fintown and the River Gweebarra estuary.

The land use/activities on the site of the proposed wind farm are primarily commercial forestry, with some areas of open peatland that is extensively grazed. The surrounding landscape is a mixture of peatland, forestry, and agricultural land (Plate 2.1).



Plate 2-1: Existing Wind Farm Site (view north east from centre of the wind farm site towards Croaghleheen)

The landscape is predominately hilly to mountainous in the wider area, with the proposed wind farm site being located on an elevated area beside the Gweebarra river estuary with a topography of between 0m and 365 m OD. A number of other areas to the east and south of the site are also elevated. The most significant features in the surrounding landscape are the Gweebarra estuary valley, and the upland areas (including Aghla Mountain) within and around the proposed wind farm particularly to the east of the proposed wind farm, towards Fintown.

The proposed project is located within townlands of Clogherachullion, Cloghercor, Derryloaghan, Aghaveevoge, Cashelreagh Glebe, Darney, Drumard, Drumnacross, Shallogan More, Straboy and Tullycumber Co. Donegal. The proposed grid connection (including the proposed substation and connection masts) is located within the townland of Cloghercor Co. Donegal.

2.2 COMMUNITY BENEFIT PROPOSAL

The proposed project has the potential to bring significant positive benefit to the local community. The project will contribute annual rates to Donegal County Council and it will provide opportunity for local community investment in the project in line with the Renewable Energy Support Scheme (RESS) estimated at €500,000 per year for the first 15 years of the project. A community benefit fund will be put in place for the lifetime of the project to provide direct funding to those areas surrounding the project.

The RESS Terms and Conditions¹ were published in February 2020 and provide details on the Government requirements for community benefit funds for renewable energy projects that participate in the scheme. A significant annual community benefit fund of €500,000 per year for the first 15 years of the project will be established in line with Government policy which will include funding for both wider community initiatives and a Near Neighbour scheme focused on houses in close proximity to the project.

A recreational facility will be developed at the site as part of the proposed project, as detailed in Section 2.6.13 below. This will also provide a further benefit to the local community and the wider area.

Fund usage and administration

The Community Benefit Fund belongs to the local community. The premise of the fund is that it should be used to bring about significant, positive change in the local area. To make this happen, our first task will be to form a benefit fund development working group that clearly represents both the closest neighbours to the project as well as nearby communities. This group will then work on designing the governance and structure of a community entity that will administer the Community Benefit Fund. The fund will be operated in accordance with the Government of Ireland's Good Practice Principles Handbook for Community Benefit Funds, which will mean that the Fund will deliver initiatives that are in alignment with the UN Sustainable Development Goals².

Community Investment

The proposed RESS sets out that future renewable energy project proposals enable the possibility for local communities to invest in projects in a meaningful way as a means to directly gain from the financial dividends that a project can provide should it be consented, built and operated. In response to this, the Applicant has been working hard with external agencies to develop workable models of Community Investment. This element was not included in the existing RESS scheme but it is expected to form part of later RESS schemes which will apply to this proposed project.

2.3 LAND OWNERSHIP

A large portion of the proposed project is located on lands under the ownership and control of Coillte. The proposed wind farm site measures approximately 1945 ha, of which approximately 1,027 ha is owned by Coillte. The proposed project also has a number of third-party private landowners who have consented to the application and proposed project.

2.4 ON-SITE WIND RESOURCE

The layout of the proposed wind farm project has been designed to minimise the potential environmental impacts of the wind farm, while at the same time maximising the energy yields of the wind resource passing over the site. Available wind speed is a key factor in determining the economic viability of potential wind energy locations. In 2003, the Sustainable Energy Authority of Ireland (SEAI) produced a Wind Atlas with information on wind speed modelled at 50m, 75m and 100m

¹ <https://www.gov.ie/en/publication/36d8d2-renewable-electricity-support-scheme/> [Accessed January 2023]

² Renewable Electricity Support Scheme *Good Practice Principles Handbook for Community Benefit Funds* (2021) <https://www.gov.ie/pdf/?file=https://assets.gov.ie/140382/b5198da9-c6c7-4af2-bbb5-2b8e3c0d2468.pdf#page=null>

height above the ground. With turbine technology innovation, turbine models can now capture more of the wind current and have bigger rotors that radically change the economic viability of wind power. This has been reflected in the updated SEAI 2013 Wind Atlas which re-modelled wind speed data for a much wider range of 30m-150m height above ground level. The 2013 SEAI Wind Speed Atlas identifies the site as having a wind speed of between approximately 7.4 m/s and 8.3 m/s at 100m above ground level. This indicates that the site has a suitable wind resource for a commercial wind energy development.

2.5 PROPOSED DEVELOPMENT

The proposed development accounts for all related works falling under the planning application to An Bord Pleanála. The proposed development will comprise the construction of 19 no. wind turbines and all associated ancillary works.

The proposed development will constitute the provision of:

- Erection of 19 no. wind turbines with an overall blade tip height range from 185m to 200m, a rotor diameter range from 149m to 164m, a hub height range from 112m to 125m, and all associated foundations and hard-standing areas in respect of each turbine;
- Construction of new site entrance with access onto the L6483 local road for the construction phase (operational phase maintenance traffic only), and utilisation of a permitted forest entrance (Pl. Ref. 1951040) to the L6483 as a second entrance to the wind farm for the construction phase;
- Improvements and temporary modifications to 4 no. locations adjacent to the public road to facilitate delivery of abnormal loads and turbine delivery on the R262 and N56 in the townlands of Drumard, Darney, Cashelreagh Glebe and Aghayeevoige, Co. Donegal;
- Construction of an area of temporary hard standing to function as a blade transfer area to facilitate turbine delivery, with associated access to and from the public road R262, in the townland of Drumnacross;
- Construction of 2 no. temporary construction compounds with associated temporary site offices, parking areas and security fencing;
- Installation of 1 no. permanent meteorological mast with a height of 100m;
- 4 no. borrow pits;
- Construction of new internal site access roads and upgrade of existing site roads, to include passing bays and all associated drainage;
- Construction of drainage and sediment control systems;
- Construction of 1 no. permanent 110kV electrical substation including:
 - 1 no. EirGrid control building containing worker welfare facilities and equipment store;
 - 1 no. Independent Power Producer (IPP) control building containing HV switch room, site offices, kitchen facilities, storeroom and toilet amenities.
 - All electrical plant and infrastructure and grid ancillary services equipment;
 - Parking;
 - Lighting;
 - Security Fencing;
 - Wastewater holding tank;
 - Rainwater harvesting equipment;
 - All associated infrastructure and services including site works and signage;
- All associated underground electrical and communications cabling connecting the wind turbines to the proposed wind farm substation;
- All works associated with the connection of the proposed wind farm to the national electricity grid, which will be via a loop-in 110 kV underground cable connection (approximately 4.1km cable length in underground trenches along approximately 3.36km of site road) to the existing

110kV overhead line in the townland of Cloghercor, Co. Donegal, with 2 no. new 16m and 21m high steel lattice end masts at each interface;

- Removal of 13 no. existing wooden polesets and 1 no. steel lattice angle mast between the 2 no. proposed new interface end masts;
- 2 no. watercourse (stream) crossings on the grid connection route;
- All related site works and ancillary development including berms, landscaping, fencing and soil excavation;
- Forestry felling to facilitate construction and operation of the proposed development and any onsite forestry replanting;
- Development of a permanent public car park with seating/picnic tables at the end of the construction phase of the development with a new entrance on the L6483;
- Permanent recreational facilities including marked walking trails along the site access roads, and associated recreation and amenity signage.

A 10-year planning permission and 35-year operational life from the date of commissioning of the entire wind farm is being sought. Given the recent advances in turbine technology, and the anticipated lifespan of wind turbines, this is considered to be the optimal operational life for the proposed development. The duration of this operational life allows the proposed turbines to be used to generate clean renewable energy until they have reached the end of their life, rather than being removed prematurely.

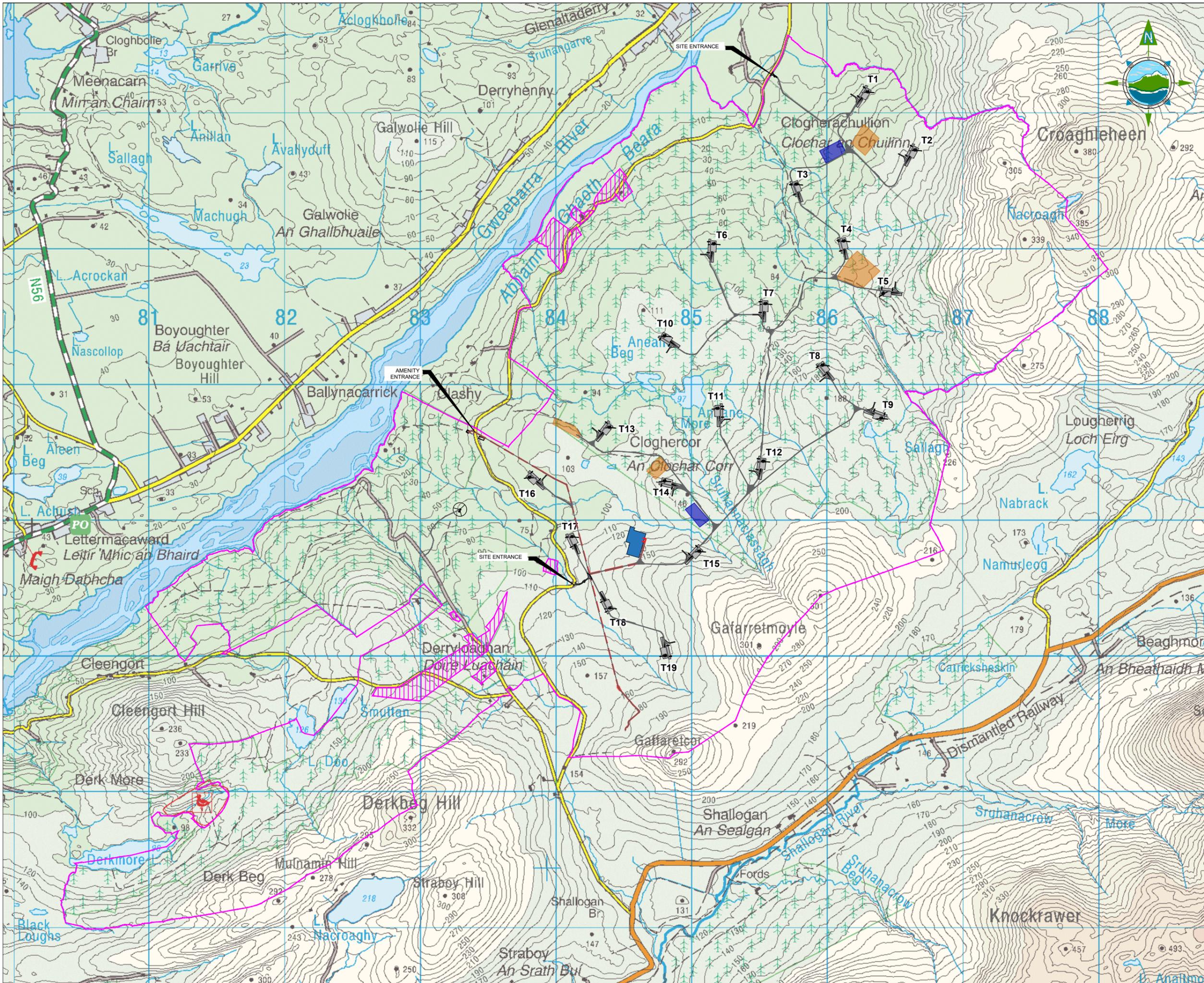
2.6 DEVELOPMENT LAYOUT

The layout of the proposed wind farm has been designed to minimise the potential environmental effects of the wind farm while at the same time maximising the energy yield of the wind resource passing over the site.

The overall layout of the proposed wind farm is shown in Figure 2-1. This figure shows the proposed locations of the wind turbines and associated hardstanding areas, passing bays, electrical substation, meteorological mast, temporary construction compounds, borrow pits, internal access roads and the main site entrance. Site layout drawings of the proposed development are included as Appendix 1-1 of this EIAR.

The layout reflects the outcome of the iterative design process. Further detail on the design philosophy, constraints and alternative turbine layouts and dimensions considered is detailed in Chapter 3 (Consideration of Reasonable Alternatives) of this EIAR.

The Grid Reference co-ordinates (ITM) of the proposed turbine locations are listed in Table 2-1 below.



- LEGEND:**
- PROPOSED WIND FARM SITE BOUNDARY
 - AREA EXCLUDED FROM BOUNDARY
 - ACCESS ROADS WITH PASSING BAYS
 - GRID CONNECTION ROUTE
 - TURBINE HARDSTAND
 - TURBINE LOCATIONS
 - TEMP. CONSTRUCTION COMPOUND
 - SUBSTATION LOCATION
 - BORROW PIT LOCATIONS
 - MET MAST LOCATION

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Rev	Date	Description	By	Chkd.
A	07.03.22	INFORMATION ISSUE	EB	OF

Client:
CLOGHERCOR WIND FARM LTD.

Project:
CLOGHERCOR WIND FARM

Title:
SITE LAYOUT

Scale @ A3: 1:25,000
 Prepared by: E. Beggs
 Checked: O. Fitzpatrick
 Date: January 23
 Project Director: S. Tinnelly
 Drawing Status: Information

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Drawing No.: **Figure 2.1**
 Revision: **A**

Table 2-1: Turbine Location Details (ITM Co-ordinates)

Turbine ID	Easting's (m)	Northing's (m)
T1	586252	904152
T2	586602	903723
T3	585725	903472
T4	586075	903054
T5	586366	902666
T6	585117	903032
T7	585498	902592
T8	585921	902139
T9	586352	901748
T10	584755	902355
T11	585145	901821
T12	585483	901431
T13	584348	901682
T14	584752	901287
T15	585010	900769
T16	583760	901313
T17	584073	900876
T18	584353	900350
T19	584759	900000

2.6.1 Power Output

The proposed wind turbines will have an assumed rated electrical power output of between 5-7.2 MW. This will be determined as a result of procurement of the final turbine type, power output and turbine development over the period leading up to construction. For the purposes of this EIAR, a minimum rated output of 5 MW and a maximum rated output of 7.2 MW has been used to calculate the power output of the proposed wind farm, which will result in an estimated installed capacity of between 95-136.8 MW.

Based on the above, the proposed wind farm has the potential to produce up to between 274,626 and 395,461 MWh (Megawatt hours) of electricity per year, based on the following calculation:

$A \times B \times C =$ Megawatt Hours of electricity produced per year where:

- A is the number of hours in a year: 8,760 hours
- B is the capacity factor, which takes into account the intermittent nature of the wind, the availability of wind turbines and array losses etc: 33%
- C is the rated output of the wind farm: minimum 95 MW, maximum 136.8 MW

The capacity factor of a wind farm takes into account the intermittency of the wind and is based on average wind speeds. The capacity factor of 33% is based on an EirGrid study of wind and solar energy in Region A from December 2021³.

The 274,626 to 395,461 MWh of electricity produced by the proposed wind farm will be sufficient to supply the equivalent of between 56,590 and 81,488 Irish households with electricity per year. This is based on the Sustainable Energy Authority of Ireland “Energy in Ireland 2021 Report” from December 2021, which details domestic consumption values for electricity customers in 2020. This report updates the average annual dwelling electricity consumption figure to 4,853 kWh per annum.

2.6.2 Wind Turbine Specification

The proposed turbines will have a tip height of between 185-200m. Detailed drawings, which accompany the planning application, show the parameters of the turbine that may be used for the proposed project, however, the exact make and model of the turbine will be dictated by a competitive tender process of the various turbines on the market at the time, but will have dimensions within the size envelope set out within the development description (i.e. overall blade tip height of between 185-200m, a rotor diameter of between 149-164m, a hub height of between 112-125m).

A drawing of the size envelope of the proposed wind turbine is shown in the detailed drawings in Appendix 1-1 of this EIAR.

Modern wind turbines from the main turbine manufacturers have evolved to share a common appearance and other major characteristics with only minor cosmetic details differentiating one from another.

The wind turbines that will be installed on site will be conventional three-blade turbines, geared to ensure that the rotors of all turbines rotate in the same direction at all times. Each discipline

³ <https://www.eirgridgroup.com/site-files/library/EirGrid/ECP-2-1-Solar-and-Wind-Constraints-Report-Area-I-v1.0.pdf>

within this EIAR has assessed the full range of various types and sizes of turbines within the above-mentioned envelope to ensure all scenarios within the proposed range have been assessed. The exact combination of rotor diameter and hub height will be dictated by the final selection of the turbine make and model at turbine selection stage/pre-construction. At this stage, new turbine models or variants may be available, due to advancements in technology, that were not on the market at the pre-planning / EIAR stage, but which will fit within the assessed turbine envelope.

The Wind Energy Development Guidelines (2006) are currently in force and are also the subject of a targeted review. The current design has had cognisance of the Draft 2019 guidelines, in particular in relation to:

- Shadow flicker – it is proposed to eliminate shadow flicker;
- Electrical grid connection – grid connection cables are proposed to be underground; and
- Proximity to sensitive receptors – a minimum turbine set-back of 4 times the maximum tip height (200m) is provided.

Further to this, the proposed layout has achieved a high level of separation between dwellings and turbines by providing a minimum separation distance of >800m which is in compliance with the setback requirements in the 2006 and Draft 2019 Guidelines.

2.6.2.1 Turbine Blades and Nacelle

The turbines will be of the generic three bladed, tubular tower model with horizontal axis. The rotor blades are bolted to the central hub, which is connected to the nacelle. The nacelle typically holds the following turbine components:

- Generator
- Electrical components
- Aviation lighting to IAA specifications

The blades of modern turbines are generally made of fibreglass or carbon fibre reinforced polyester and are aerodynamically shaped to improve efficiency and lower noise production.

A turbine blade usually begins generating electricity at wind speeds of 2 to 4m/s with optimum power generation at wind speeds of approximately 9 to 16m/s. Turbines usually shut down at wind speeds greater than 25m/s in order to protect themselves from excessive wear, although some turbines are designed to operate at up to 30m/s. Modern turbines typically turn at between 3 and 20 revolutions per minute (rpm) depending on wind speed and design of turbine.

The entire nacelle (shown in Figure 2-2) and rotor are designed to rotate, or 'yaw', in order to face the prevailing wind. A wind vane located on the nacelle of the turbine controls the yaw mechanism. Rotors of all the proposed turbines will rotate in the same direction. A control unit is located at the base of the turbine and an internal ladder or lift leads up to the nacelle where the shaft, gearbox and generator are located.

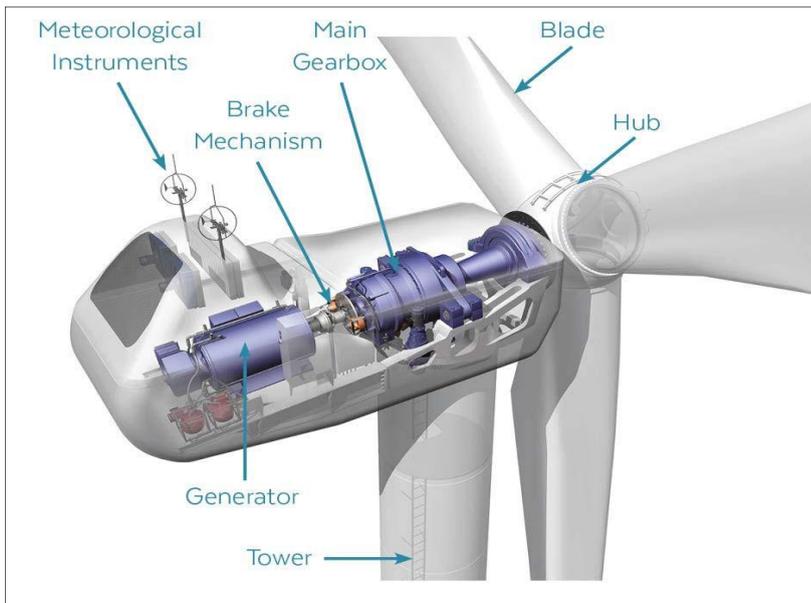


Figure 2-2 Turbine nacelle and hub components

2.6.2.2 Turbine Tower

The turbine tower is a conical steel tube with multiple-layer paint finish. Modern tower design also provides for the use of concrete sections. Towers generally comprise a steel ring at the base of the tower which is assembled on top of the concrete foundations using locally supplied concrete and then pre-stressed. The tower is delivered to site in three to six sections. The first section is bolted to the steel base, which is cast into the concrete foundation. The base of the tower is around 5m in diameter, tapering to approximately 2-3m where it is attached to the nacelle (Figure 2-2). The tower is accessed by a galvanised steel hatch door, which will be kept locked except during maintenance. The nacelle dimensions can vary depending on the final hub height and the model which is used. The exact details of the turbine tower will be dictated by final selection of the turbine make and model, but will be within the design envelope assessed, as described above.

2.6.2.3 Turbine Transformer

When operating, the rotational energy of the blades is utilised to drive the wind turbine generator. The generated power is in the form of low voltage (approximately 660 volts) and connected via low voltage cables to the wind turbine transformer located within the tower or in the turbine nacelle. This transformer steps up the generated low voltage to medium voltage (approximately 33kV) which supports a reduction of electrical losses when transmitting power over large distances. The medium voltage from the wind turbine transformers connects to the proposed on-site substation which again will be stepped up to high voltage for connection to the transmission system.

2.6.2.4 Turbine Foundations

Construction of the turbine bases will require excavation of the surrounding soil from the foundation and crane hardstanding area to founding level with access being provided from adjacent roads at or near the surrounding ground level. The soil will be replaced with granular fill where required.

Each wind turbine will require a reinforced concrete (RC) foundation comprising a base slab bearing onto rock or other competent substrata with a central upstand to support the tower. The foundations for each turbine will be designed by the appointed Civil Designer. The exact size of the foundation will be dictated by the turbine manufacturer, and the final turbine selection will be the subject of a competitive tender process. It is anticipated to be between approximately 20-26m in diameter with thickness of 3m at the centre tapering towards the edge. Different turbine manufacturers use different shaped turbine foundations, ranging from circular to hexagonal and square, depending on the requirements of the final turbine supplier. For the purposes of assessing the turbine range for this EIAR, a maximum volume of 1000m³ of concrete and a minimum volume of 550m³ has been assumed.

The turbine foundation transmits any load on the wind turbine into the ground. After the foundation level of each turbine has been formed on competent strata, the bottom section of the turbine tower or “can” is levelled (Plate 2.2 below). Reinforcing steel is then built up around and through the can (Plate 2.3 below), and the outside of the foundation is shuttered with demountable formwork to allow the pouring of concrete.



Plate 2-2: Levelled turbine tower “can” Plate 2-3: Steel reinforcement being added

2.6.2.5 Turbine Colour

The turbines are multi-ply coated to protect against corrosion. It is proposed that the turbines will be of an off-white or light grey colour to blend into the sky background. This minimises visual impact as recommended by the following guidelines on wind energy development:

- *Wind Farm Development – Guidelines for Planning Authorities* (2006);
- *Draft Revised Wind Energy Development Guidelines* (2019);
- “The Influence of Colour on the Aesthetics of Wind Turbine Generators” – ETSU W/14/005333/00/2000.
- Planning Advice Note 45, Annex 2: Spatial Frameworks and Supplementary Planning Guidance for Wind Farms (2008). The Scottish Office Environment Department
- Planning Policy Guidance Note 22: Renewable Energy Annex on wind energy. (1993) PPG22, Department of the Environment, Welsh Office.
- Technical Advice Note (TAN) 8: Renewable Energy (2005) Welsh Assembly Government

2.6.3 Turbine Delivery Route, Internal Access Roads and Hardstanding

2.6.3.1 Turbine Delivery Route

It is proposed that the turbine components will be delivered to the site via Killybegs Port in southwest County Donegal as shown in Figure 2-3. The route heads north from the port in Killybegs on the R263 to the N56 where it turns eastwards. The route then continues generally eastwards on the N56 to the junction with the R262, where it makes a northerly turn in the direction of Glenties. The route continues northwards to a proposed temporary blade

changeover location (where the turbine blades are mounted on a vertical blade transporter for the rest of the route). It then runs north to re-join the N56, where it turns eastwards to Glenties. In the town of Glenties the route joins the R250 and continues traveling in a north-easterly direction until turning to the northwest onto the L6363 local road. It then turns onto the L6483 where it continues to the site entrance for the proposed wind farm.

An assessment of the route between Killybegs Port and the site of the proposed wind farm has been carried out. A number of potential pinch points have been identified and assessed (see the Turbine Delivery Route Assessment Drawings as Appendix 2-1 to this EIAR). An assessment was carried out using site visits and Autotrack to determine what, if any, temporary works are required at these pinch points to allow the turbine components to be moved to the site. The outputs of this autotrack assessment are provided in the drawings of Appendix 2-1. Works range from hedgerow trimming/clearing to facilitate oversail to the temporary placement of hardcore to allow the oversize vehicles pass, or to allow the transfer of turbine blades between different vehicles. The required works at each location are detailed in the drawings within Appendix 1-1.

The current application includes the proposed temporary works along the public road corridor of the turbine delivery route, and further consents/agreements will be obtained for other works areas along the route, as required. All works along the route are assessed as part of this EIAR.

At the end of the construction phase, any areas which were given temporary hardcore surfaces will be reinstated by being covered in topsoil and reseeded. The field drain at the temporary blade changeover area will be restored during the first dry period after the turbines are delivered. Stock proof fences will be erected along the property boundaries. It is not anticipated that there will be any requirement to use these areas in the operational phase of the proposed project, except in the very unlikely event that a turbine requires a large replacement part such as a blade or tower section. This will need to be agreed with Donegal County Council and involved landowners, and relevant consents obtained if required in the unlikely event of such a situation.



- Legend ***
-  Proposed Wind Farm Site Boundary
 -  Turbine Delivery Route works

- Turbine Delivery Routes**
-  L6363
 -  N56
 -  R250
 -  R262
 -  R263
 -  Shore Road

* all land identified is within Boundary of the Proposed Project



NOTES
 1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
 2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
 3. DESIGNER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
 4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Issue	Date	Description	By	CHKD
A	24/01/2023	Final Issue	S.P.	J.S.

Client: Cloghercor Wind Farm Ltd.

Project: Cloghercor Wind Farm

Title: Figure 2-3: Turbine Delivery Route

Scale @ A4: 1:150,000

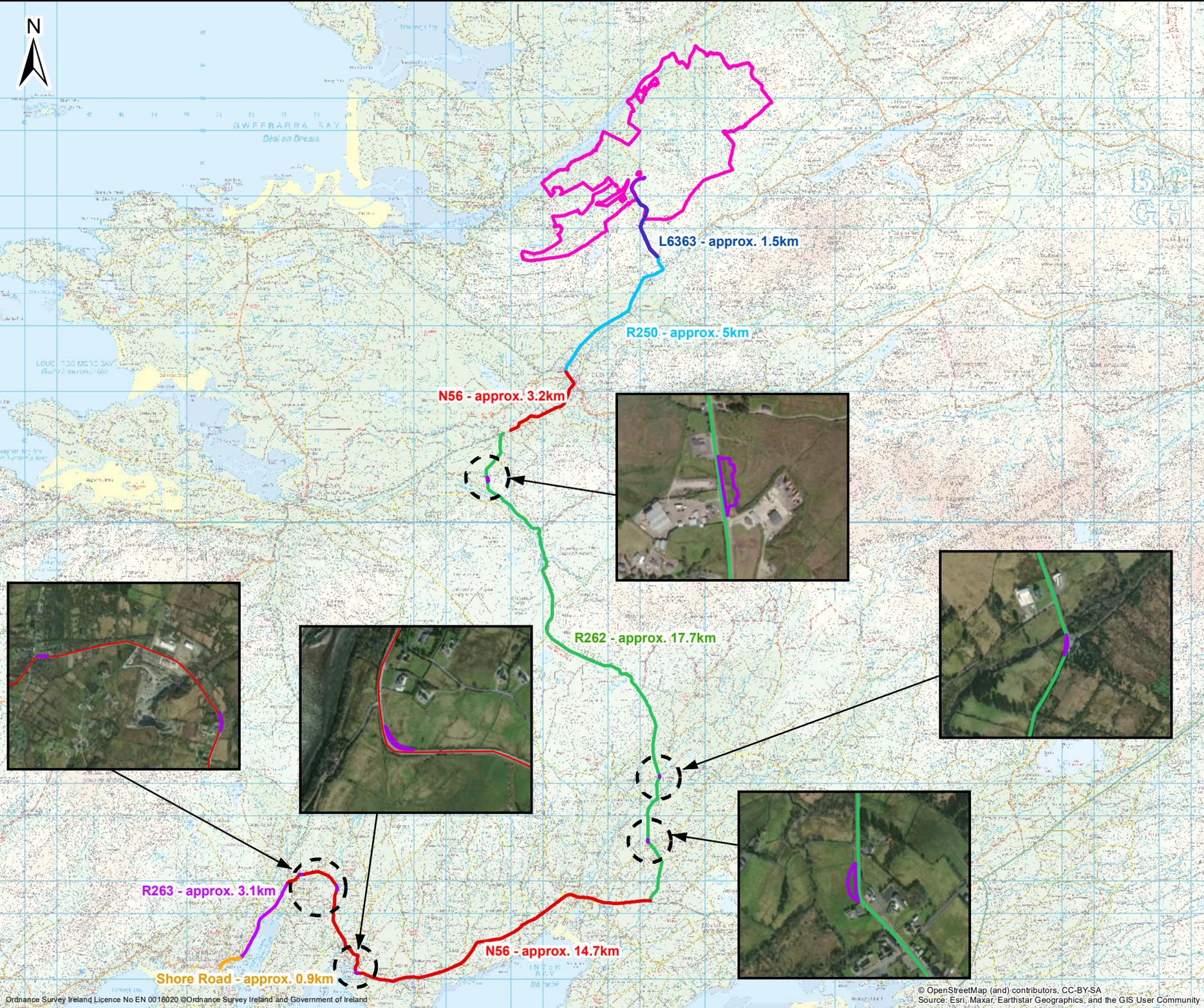
Prepared by: S. Peazzotta Checked: J. Staunton Date: January 2023

Project Director: O. Fitzpatrick

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2.6.3.2 Internal Access Roads

The proposed wind farm site will be accessed via the L6483 local road using two access points (See Figure 2-3). Access point one will be used as a main entrance point during the early stages of construction until such time as the internal access roads are constructed as far as access point two. At that stage access point two will be the main site exit and access point one will be the main site entrance. A one-way system will be in place for construction traffic on the local road network, as described in Chapter 16 (Traffic & Transportation).

Access point one will be located in the townland of Cloghercor on the L6483 and will be the single access/egress point for wind farm maintenance vehicles during the operational phase. During the construction phase, access point two will use a permitted, not yet constructed, forest entrance on the L6483, further east in the townland of Clogheracullion. It will not be used during the operational phase for the proposed wind farm and will be used as a forestry entrance only. Internal access roads will be constructed as part of the initial phase of the construction of the wind farm. Material will be sourced from the proposed onsite borrow pits to provide the required base material of the internal roads. The final graded surface material may be sourced from local quarries (such as Glenstone Quarry, Drimkeelan Sandstone Quarry and Mountcharles Sandstone Quarry all located to the south of the site), which are discussed in Chapter 16 (Traffic & Transportation). The internal roads will be permanent (construction/operational) roads.

During the operational phase, there will be a separate public entrance (access point three) in the townland of Cloghercor to easily access the proposed car park and amenity facilities (located at the intersection of the proposed grid connection cable and the L6483).

New roadways will have a running width of approximately five metres (5.5m including shoulders), with wider sections at corners and on the approaches to turbine locations. The proposed new roadways will incorporate passing bays to allow traffic to pass easily while traveling around the site. Soil excavated as part of the construction of the internal access roads will be sidecast, bermed and profiled on either side of the roadway as detailed in the Spoil and Peat Management Plan (Appendix 8-2). It is proposed that the majority of excavated material will be used locally on site for landscaping, with the remainder being used for borrow pit reinstatement.

All new roadways will be constructed with a 2.5% camber to aid drainage and surface water runoff. A drainage design has been provided for the proposed site roads. Road Construction Details and associated drainage design are included in the drawings of Appendix 1-1.

The majority of roads onsite will be of the excavated road type, with some floating roads in areas of peat, as described in Chapter 8 (Land, Soils & Geology) and represented on drawings in Appendix 1-1.

Occasional surface maintenance may be required in the operational phase of the proposed wind farm, but this is anticipated to be very minimal and will be dependent on the level of use on any section.

2.6.3.3 Hardstands

Hardstand areas consisting of levelled and compacted hardcore are required around each turbine base to facilitate access, turbine assembly and turbine erection. The hard-standing areas are used to accommodate large cranes used in the assembly and erection of the turbine, offloading and storage of turbine components, and generally provide a safe, level working area around each turbine position. The hard-standing areas are extended to cover the turbine foundations once the turbine foundation is in place. The size, arrangement and positioning of hard-standing areas

are dictated by turbine suppliers, but for the purposes of this planning application, a worst case design has been used to cover a range of different turbine models, measuring not greater than 168m at the longest point and 60m at the widest point. The turbine hard-standing areas are shown on drawings in Appendix 1-1. The hard-standing area is intended to safely accommodate a large 350-750 tonne SWL crane during turbine assembly and erection.

The hard-standing areas shown on the detailed layout drawings are indicative of the sizes required, but the extent of the required areas at each turbine location may be optimised within the area which has been assessed depending on topography, position of the site access road, the proposed turbine selection and the turbine supplier's requirements. The designs shown represent a worst case based on a number of typical designs from various manufacturers. The hardstands that will be constructed will be smaller than the proposed hardstand areas and will be located within the footprint of this. Occasional surface maintenance may be required in the operational phase of the proposed wind farm, but this is anticipated to be very minimal and infrequent. The EIAR utilises this worst case when determining the quality, significance, extent and duration of potential impacts.

2.6.3.4 Assembly Area

Unbound, levelled assembly areas will be located on either side of each hard-standing area, as shown on Drawings in Appendix 1-1. These assembly areas are required for offloading turbine blades, tower sections and hubs from trucks until such time as they are ready to be lifted into position by cranes. They will be surfaced with clause 804 material or similar.

2.6.4 Electrical Grid Connection

2.6.4.1 Onsite Electricity Substation

It is proposed to construct one onsite 110kV electricity substation within the site, as shown on the site layout drawings in Appendix 1-1. This will provide a connection point between the wind farm and the proposed grid connection point at the existing 110kV overhead line in Cloghercor.

The construction and electrical components of the substation will be to EirGrid and ESB specifications within the parameters assessed⁴ (copy available as Appendix 2-3). The dimensions of the proposed substation compound will be up to 202m in length by 125m in width. The substation footprint will include one control building and electrical components necessary to export generated power from the wind to the transmission system. A second smaller building will be required for switching procedure with site offices and welfare facilities.

The main control building will measure up to 18m by 25m and 8.3m in height. A second smaller switchgear building will measure up to 30m by 10m. Layout drawings of the both buildings are shown in the planning drawings in Appendix 1-1.

The substation and compound will be surrounded by steel palisade fencing which will be approximately 2.6m in height. Internal fences will also be provided to segregate different areas within the main substation compound. Lighting will be required on site and this will be provided

⁴ EirGrid specification for the underground cabling can be accessed at: <https://www.eirgridgroup.com/site-files/library/EirGrid/10-110-kV-Underground-Cable-Functional-Specifications.pdf>

by lamp standards located around the substation and exterior wall mounted lights on both buildings.

The main control building and smaller switchgear building will include the (Independent Power Producer) IPP and ESB control room, as well as an office space and welfare facilities for staff during the operational period. Toilet facilities will be installed with a low-flush cistern and low-flow wash basin. Due to the specific nature of the proposed project, there will be a very small water requirement for occasional toilet flushing and hand washing. It is proposed to install a rainwater harvesting system as the source of water for this, with all potable water being brought onsite in bottles.

It is proposed to manage wastewater from the staff welfare facilities in the control buildings by means of a sealed storage tank, with all wastewater being tankered off-site by a permitted waste collector to a wastewater treatment plant. It is not proposed to treat wastewater on-site, and therefore the guidelines and legislation surrounding that do not apply.

Such a proposal for managing the wastewater arising on site has become standard practice on wind farm sites, which are often proposed in areas where finding the necessary percolation requirements for on-site treatment would be challenging and has been accepted by numerous Planning Authorities and An Bord Pleanála as an acceptable proposal. The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. Full details of the proposed tank alarm system will be submitted to the Planning Authority in advance of any works commencing on-site.

The wastewater storage tank alarm will be integrated with the on-site electrical equipment for alarm notification that will be monitored remotely 24 hours a day, 7 days per week. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended), will be employed to transport wastewater away from the site. It is anticipated that this material would be collected by a waste collector in Donegal. It is envisaged (and for the purposes of this EIAR assumed) that any such contractor will access the site via the R250 and L6363.

2.6.4.2 Internal Underground Cabling

Each turbine will be connected to the proposed on-site substation at Cloghercor via underground MV cables. Fibre-optic cables will also connect each wind turbine to the wind turbine control system located within the control building. The electrical and fibre-optic cables running from the turbines to the onsite substation compound will be run in cable ducts approximately 1.5 metres below the ground surface within the proposed internal roads and/or their verges (or within a directional drill bore where a stream is required to be crossed).

2.6.4.3 Grid Connection Route

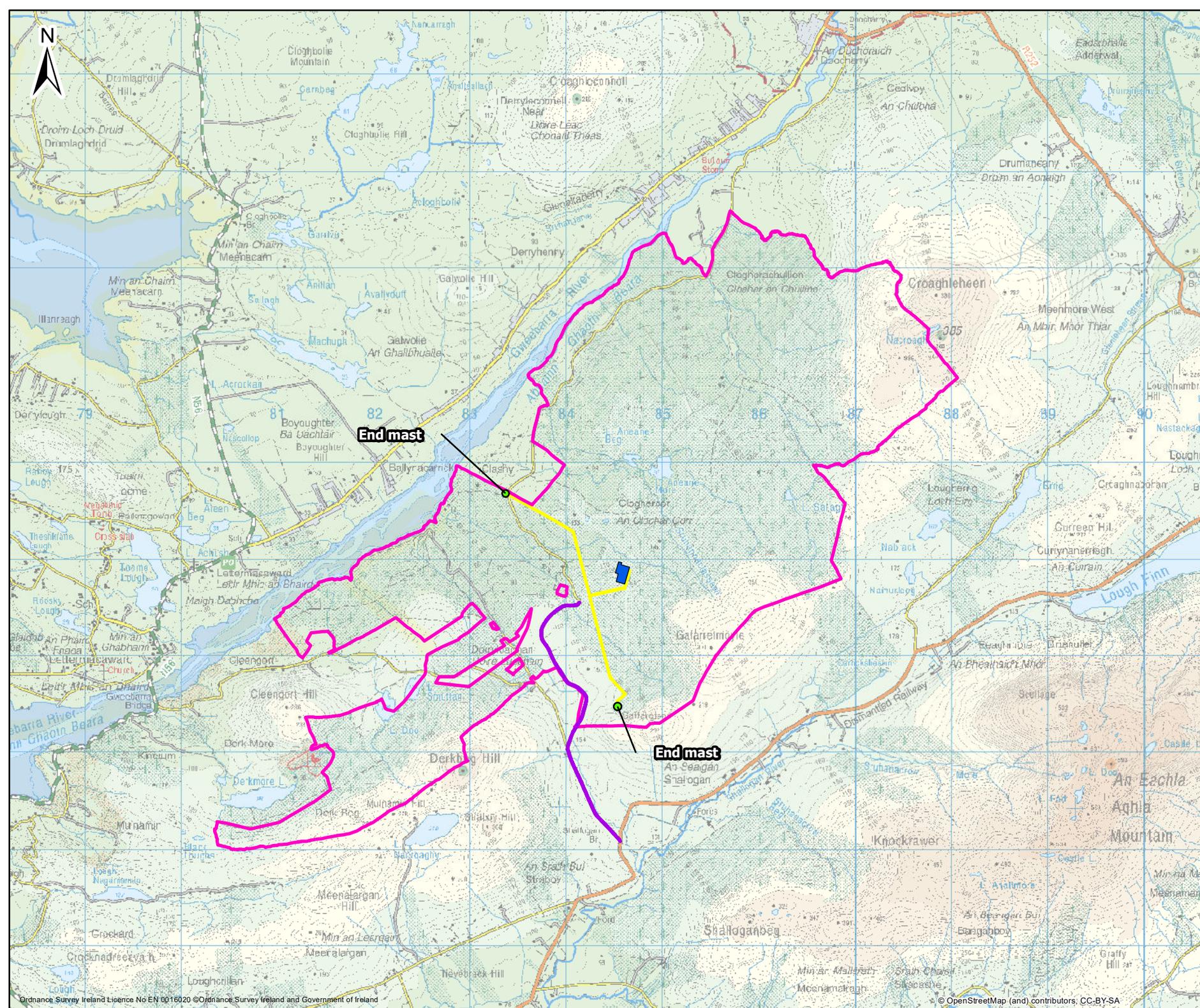
Connection will be sought from the grid system operators by application to EirGrid. It is proposed that the proposed onsite substation will connect via 110 kV underground cable to an existing overhead line, though no new sections of overhead lines are required for this connection.

The proposed route of this underground cabling route is provided in Figure 2-4. The overall length of the grid connection between the proposed substation and the existing overhead line is approximately 3.86km, all of which are within the site of the proposed wind farm boundary, with almost no use of public roads apart from a single location where it perpendicularly crosses the L6483. Sections of the underground cabling will double-up within the same trench, resulting in a longer length of cable than length of trench. Two new overhead end masts will be required at

the interface points on the existing overhead line, to allow the connection to be made. Twenty six existing wooden polesets and one steel end mast (drawing 05725-DR-100 in Appendix 1-1) will be removed as part of the grid connection works.

The grid connection will cross perpendicular to a section of public road in proximity to the most northern interface end mast (End Mast 147A). Furthermore, the second interface end mast will be located between the existing pole sets 161 and 162 respectively. Further information of these interface end masts can be seen in the drawings of Appendix 1-1.

The grid connection construction methodology is described in Section 2.10.7 below, and a detailed report is provided as Appendix 2-4.



- Legend ***
- Proposed Wind Farm Site Boundary
 - Turbine Delivery Route works
 - Proposed Grid Connection Route
 - Substation Location

* all land identified is within boundary of the Proposed Project



NOTES
 1. DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
 2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
 3. WORK COMMENCED TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
 4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MSL UNLESS STATED OTHERWISE

Issue	Date	Description	By	Checked
A	24/01/2023	Final Issue	S.P.	J.S.

Client: Cloghercor Wind Farm Ltd.

Project: Cloghercor Wind Farm

Title: Figure 2.4:
Proposed Grid Connection Route

Scale @ A4: 1:50,000

Prepared by: S. Peazzotta
 Checked: J. Staunton
 Date: January 2023
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The proposed underground cabling will traverse off-road internal access tracks purposely build for the wind farm. The cables will be laid in trenches as per EirGrid Specification (See Typical Trench Bedding Details in Appendix 2-3). There will be 2 no. stream crossings along the grid connection route. No instream works are proposed for any natural stream. Further information on the grid connection stream crossings can be found in Section 2.10.7 below.

2.6.5 Joint Bays

Joint bays are pre-cast concrete chambers where individual lengths of cables are joined to form one continuous cable. Joint bay locations have been selected to maximise the lengths of cables, following consideration of cable detailed design issues, the space requirements for cable drums and cable pulling equipment as well as the impact on local residents and road users. The joint bays will be located at various points along the ducting route as specified by EirGrid requirements and as shown in the drawings of Appendix 1-1.

A joint bay will be constructed in a pit. The bay will measure up to 6m x 2.5m x 2m deep as shown in the drawings of Appendix 1-1. A reinforced concrete base and sides will be constructed in the bay to accommodate the jointing enclosure.

Communication chambers, which are similar to small manholes, will also be installed at the joint bay locations to facilitate connection of fibre-optic communication cables.

2.6.6 Watercourse Crossings

There are 2 no. watercourse (stream) crossings on the proposed grid connection route. The locations of these crossings are shown on Figure 2-4. A number of minor forestry drainage channels were also present, though these remain dry for the vast majority of the time. Section 2.10.7 below provides further details on the methods proposed to cross each location.

The internal site cabling for power and communication cables will be in trenches within the internal access roads, and where stream crossings are required they will be built into the bridge deck formation, avoiding any in-stream works.

2.6.7 Rural (Local) Electricity Supply

As part of the development, a rural/local supply will be required as a back-up power supply to the proposed substations for light, heat and power purposes, and to the proposed met mast. The rural/local supply will be designed and constructed by ESB Networks.

It is not anticipated that there will be any significant works required for this, and it will be similar to what normally occurs for new house connections. Should permission be granted the details of the connection route and works will need to be determined by ESB Networks prior to construction, but as it will be a local electrical connection, the works will be minimal in nature.

The rural/local supply will have an associated step-down transformer (i.e. MV to LV) and will enter the substation building by underground cable and terminate onto the control building distribution board.

2.6.8 Meteorological Mast

One permanent meteorological mast is proposed as part of the proposed project. The mast will be equipped with wind monitoring equipment at various heights. The mast will be located as

shown on the site layout drawing in Figure 2-1 and will be a slender, free-standing lattice structure of 100 metres in height, as shown in the drawing of Appendix 1-1.

The mast will be constructed on a hardstanding area of approx. 25m x 25m and will be used to erect the mast, adjacent to an existing site road.

2.6.9 Forestry

A large portion of the proposed works are located within an area which is currently planted with forestry. Some of this area is located within Coillte lands, while some is located within private lands. As part of the proposed project, there will be a requirement to fell some of this forestry in the areas immediately around the footprint of the wind farm infrastructure. The total area of forestry to be felled is estimated to be between 69.8ha - 90.9ha, as shown in Appendix 2-5. As a commercial crop, this forestry is scheduled to be felled in the future regardless of the proposed wind farm being constructed or not.

For the footprint of the infrastructure, as part of the proposed wind farm, there will be full tree removal to facilitate the windfarm development infrastructure. Due to the fact there are many ages classes that are to be felled i.e. commercial and non-commercial timber, it is envisaged that any commercial timber will be removed from the site for haulage to a timber sawmill. A report detailing the forestry felling is provided as Appendix 2-5.

The proposed project must have obtained planning consent before an application can be made for a felling license from the Forest Service as per their policy on tree felling for wind farms. As part of this process, an area of at least an equivalent size to that which was felled must be replanted. This replanting land can be located anywhere within the state, provided an afforestation license is granted for the land. This replanting will be carried out at a number of suitable technically approved afforestation sites the state, and these will be located in a different county, therefore not having any cumulative impacts with the proposed wind farm (i.e not in the same river catchment, no ecological connections and with no potential for visual/landscape cumulative impacts with the wind farm.

2.6.10 Spoil Management

The use of the borrow pits shall be phased. This will then allow materials to be placed in the first borrow pit thereby minimizing the volume of soils requiring temporary storage. In order to further reduce temporary storage requirements, reinstatement of soils and turves around infrastructure, and in restoration and landscaping works on areas of excavated / disturbed ground, will be carried out during the construction phase or as soon as is practical after the completion of the works in any one area of the site. Approximately 178,000m³ will be excavated from the borrow pits onsite. A total of 184,000 m³ will be used to reinstate the borrow pit area as well as for landscaping.

Topsoil and sub-soil are to be stockpiled separately. Turves will be stored turf side up and will not be allowed to dry out. Stockpiles are to be isolated from any surface drains and a minimum of 50m away from watercourses. Measures such as interceptor ditches around the bases of these areas, sediment traps and seeding of the bunds shall be incorporated to prevent runoff of suspended solids laden surface water and soil erosion. No permanent spoil or stockpiles will be left on site.

The method for restoration of excavated or disturbed areas is to encourage stabilisation and early establishment of vegetation cover, where available, vegetative sods/turves or other topsoil

in keeping with the surrounding vegetation type will be used to provide a dressing for the final surface.

To prevent erosion and run-off and to facilitate vegetation reinstatement, any sloped embankment will be graded such that the slope angle is not too steep and that embankments match the surrounding ground profile.

2.6.11 Stone and Fill Requirements

As part of construction of the proposed project, a significant amount of stone and aggregate fill material will be required. This will be used under and around key infrastructure including the turbines, substation, site roads, hardstands and construction compounds. The following are the approximate estimates of the material requirements at the various main infrastructure locations:

- Internal Access Tracks – 40,000m³ of which 34,000m³ will come from onsite borrow pits;
- Substation and Construction Compounds – 28,000m³ of which 24,000m³ will come from onsite borrow pits;
- Turbine Foundations – 20,200m³ from external source; and
- Turbine Hardstand, Blade set-down area and vehicle turning area – 144,700m³ of which 120,000m³ will come from onsite borrow pits.

By sourcing the majority of the required stone volume from the onsite borrow pits as described above, the volume of traffic that will occur on public roads in the area will be significantly reduced. Further information on the proposed traffic volumes and impacts are discussed in Chapter 16 of this EIAR (Traffic & Transportation).

Hardstands and site roads will be constructed to be above the existing ground level. The lower layer of this will be lower grade stone, with the top 150mm being high quality compacted gravel. Internal cable trenches which connect each turbine to the proposed onsite substation will be up to a maximum of 1500mm deep, with the first 600mm being backfilled with sand. The excavated material will be used to complete the backfilling to the surface.

2.6.12 Borrow Pits

It is proposed that 4 no. borrow pits will be constructed as part of the proposed project, in order to provide a source for the majority of stone material requirements within the site itself. These are located near T13, T14, T4/T5, and T1/T2, with each covering an area of approximately 1.1ha, 1.3 ha, 4.6ha and 2.4ha respectively. The locations of these borrow pits can be seen on the site layout drawings in Appendix 1-1. Having four borrow pits onsite will minimise material transport on site and will minimise the depth to which the borrow pit excavations will be required.

Further details of the site investigations that were carried out and the stone type/suitability are provided in Chapter 8 (Land, Soils & Geology).

Once the required rock has been extracted from each borrow pit, they will be reinstated using any surplus inert material from the site (including peat) and made secure using permanent stock proof fencing.

Rock and fill material may need to be extracted from a number of proposed turbine foundation locations as part of the required excavations there. In that case, this material will be used where possible to replace the material requirements from borrow pits, meaning the figures above may be lower than mentioned above. It is proposed that the onsite borrow pits will be used for the long-term storage of peat which is excavated around the site. Once all of the required stone has been mined from each borrow pit, it will be reinstated using excess spoil from the site, most of

which will be peat. As these will be excavated into the ground, peat stability risks associated with storage will be mitigated.

2.6.12.1 Rock Extraction methods

The rock will be extracted from the proposed borrow pits using two main methods: Rock breaking and rock blasting. It is anticipated that the primary method will be rock breaking.

2.6.12.2 Rock Breaking

Rock breaking can be used to extract rock in many situations and is particularly suitable for any brittle rock and rock near the surface. A hydraulic rock breaking attachment is fitted to the arm of a large tracked excavator, and this breaks large pieces of rock from the ground. These large rocks are broken down into smaller pieces using these hydraulic rock breaking attachments, until they are small enough for use or to fit into a rock crusher. At that point, a large loader feeds them into a mobile rock crusher, where they are crushed, graded into various sizes, and removed by the loader for use on site. The potential noise impacts of rock breaking have been assessed in Chapter 12 (Noise & Vibration).

2.6.12.3 Rock Blasting

Rock blasting is an effective way to produce a large volume of broken stone in a very short time, as the blasts only last a number of milliseconds. All parts of the blasting process from drilling to explosives handling to execution of the blast itself will be designed and carried out/overseen by a specialist engineer. In order to carry out a blast, a number of holes are drilled into the rock over several days. Once these are prepared, the required amount of explosives will be brought to the site and installed in the holes. The explosive material will not be stored on site, and the transport and handling of the material, as well as the carrying out of the blast will be carried out with agreement and supervision of An Garda Síochána. The charges will be set, the area will be cleared and the blast carried out by a specialist engineer.

After a blast, the rock will be able to be loaded into a crusher with a loader and processed for use on site.

Based on site investigations undertaken within the proposed project site rock blasting will be required due to the strength and low fracture density of the underlying granite bedrock. In the event when blasting is required, local residents and noise sensitive locations will be notified of the upcoming blast. The potential noise impacts of blasting have been assessed in Chapter 12 (Noise & Vibration).

2.6.13 Recreational Facilities

Cloghercor Wind Farm Ltd. is committed to enhancing the recreation experience currently on offer in the area as part of the proposed project. A summary of the proposed recreation plan is set out below. Further information is provided in the full recreation plan (Appendix 2-6).

The proposed wind farm site is an accessible area with existing forest road infrastructure. A commercial forest, it is already used by some nearby residents for walking. However, there is limited use of the forest for walking by outlying communities possibly due to the absence of signage and insufficient awareness of the opportunities.

Following an examination of the current use of the site and the opportunities for enhancement in consultation with key stakeholders a recreational plan has been incorporated into the proposed project.

The main themes of walking, signage, car parking and associated trail infrastructure identified have been addressed as follows:

- Walking: 2 no. trail loops of different lengths and thus differing degrees of difficulty have been proposed:
 - Loop 1 (circa 8km walking trail)
 - Loop 2 (circa 10km walking trail)
- Car parking: A permanent public car park is proposed at the end of the construction phase of the development at an existing forest entrance on the L6483. This will provide a trailhead/landing point for visitors to the site and enable visitors from the surrounding area to visit the amenity facilities.
- General information and wind farm information signs are also proposed around the site to attract visitors to the site and promote interest in the provision of renewable energy at this location. A general information/welcome sign is also proposed at the above-mentioned car park.
- Directional signs along the internal site roads are proposed at junctions to direct visitors appropriately.
- A viewing area to enjoy the Gweebarra vista, with an information panel and seating area.

2.6.14 Biodiversity Enhancement Lands

It is proposed to ensure that appropriate land management practices are in place for approximately 252 ha of existing extensively farmed land. These land management practices will be prescribed to enhance those lands as suitable habitats for Red Grouse and the Irish Hare, as detailed in Appendix 7-9 (Golden Eagle Habitat Management Plan). Both species are key prey resources for the Irish Golden Eagle population. These lands will be located at least 3km from a proposed wind turbine.

The objective of the habitat management plan will be to enhance populations of Red Grouse and Irish Hare, which are key prey resources for the Irish Golden Eagle population. The habitat management plan for these lands, available in Appendix 7-9, includes details of the range of management measures that will be available to be implemented. A bespoke habitat management plan will be prepared for each landholding, which will select the relevant measures that are applicable to the land, based on the habitats present and their condition.

2.6.15 Site Entrance

The construction of a new site entrance for the proposed wind farm is located along the L6483 road between Doochary and the L6363. This entrance will be the main construction phase entrance to the site. It will facilitate material deliveries to the site (stone, steel and concrete) and staff access, as well as large oversize components such as turbine blades, tower sections and substation components. For further information see Chapter 16 (Traffic & Transportation) and the Traffic Management Plan (Appendix 2-7). This entrance will also be used for wind farm maintenance vehicles during the operational phase of the proposed project as well as ongoing forestry activities. It is also proposed to utilise a permitted forest entrance further north along this same L6483 road as a second/alternative construction phase entrance. A new entrance on the L6483 (northwest of the proposed T16) will be used as the entrance to an operational phase public car park and amenity facilities.

The proposed site entrances on the L6483 will have adequate visibility as also discussed in Chapter 16 (Traffic & Transportation).

2.6.16 Turbine and Construction Material Transport Routes

Turbine and Construction materials will be restricted to the following routes:

- Construction materials coming from all directions will approach along the R250 accessing the site entrance from the south via the L6363 and L6483; and
- Turbine and oversized loads will access the site from the N56 along the R250 accessing the site entrance from the south via the L6363 and L6483.

2.6.17 Traffic Management

As described further in Chapter 16 of this EIAR, Traffic and Transport, the successful completion of this project will require significant co-ordination and a comprehensive set of mitigation measures. As outlined in Section 16.4 of this EIAR, these mitigation measures will be put in place before and during the construction and operational phase of the project in order to minimise the effects of the additional traffic generated by the proposed project. A Traffic Management Plan proposed for the project is included as Appendix 2-7.

2.7 SURFACE WATER MANAGEMENT

2.7.1 Existing Site Drainage

The proposed wind farm is located within the Gweebarra-Sheephaven Water Framework Directive (WFD) catchments (hydrometric area) which covers an area of 1451km² in west Donegal. These catchments are further subdivided into sub-catchments with the site located within the Gweebarra_SC_010 WFD sub-catchment and the Mulnamín_Beg_010 WFD river sub-basin which covers an area of 32.4km². All of these waters are of moderate to steep gradient, representing natural watercourses typical eroding/upland rivers, that are actively eroding, where there is little or no deposition of fine sediment.

Streams flow in a general southeast to northwest direction into the Gweebarra Estuary. It is noted that all the streams within the site are collectively identified as the Mulnamín Beg 10 subcatchment.

Lough Aneane More and Aneane Beg are located downgradient of T6 and T11 towards the centre of the site. A small lake, Lough Sallagh, is located to the south of T9. Derkmore Lough and a smaller unnamed lake are located to the west of the ownership boundary but are not hydrologically connected to the proposed wind farm.

The afforested site and adjacent lands also include man-made drains which flow into the watercourses mentioned above. These are primarily used to assist in the drainage of forestry and agricultural land-use. Small streams and drainage ditches on site will be crossed by the proposed access tracks.

Further details on the existing and proposed site drainage are provided in Chapter 9 of this EIAR, Hydrology & Hydrogeology.

2.7.2 Drainage Design Concept

The proposed surface water drainage system utilises sustainable drainage devices and methods.

The drainage layout for the operational stage of the proposed project has been designed to collect surface water run-off from roads, crane pads and hardstanding areas for treatment and to maintain the existing site discharge rates. Run-off arising from the development will discharge into settlement ponds specifically constructed for managing surface water from the wind farm. Details and locations of the proposed settlement ponds are shown on the drawings of Appendix 1-1. Once treated in the settlement pond the treated surface water will then be allowed to spread across the adjacent lands via a level spreader /diffuser which will minimise any risk of soil erosion and allow further filtration of any remaining sediment particles. This treated water will ultimately percolate to ground or travel over-ground and be assimilated into the existing drainage network within the boundary of the proposed project at appropriate greenfield run-off rates. There will be no direct discharges from the wind farm to any existing natural watercourse.

During the construction phase, all run-off from construction areas will be controlled and treated to reduce suspended solids concentration prior to being discharged into the existing drainage network or overland. A number of temporary settlement ponds will be established during the construction phase along roadways and in areas of high construction activity to minimise silt laden run-off entering the drainage network. The settlement ponds will be designed to provide sufficient retention time and a low velocity environment to allow suspended solids to fall out of suspension prior to allowing the water to outfall to the receiving environment. Further information on the runoff calculations and site drainage is provided in Chapter 9 (Hydrology & Hydrogeology). The proposed locations of the permanent and temporary settlement ponds, and details of same are shown on the drawings of Appendix 1-1.

A Surface Water Management Plan (SWMP) has been prepared (Appendix 9-1). The purpose of this plan is to ensure that all site works are conducted in an environmentally responsible manner so as to minimise any potential adverse impacts from the proposed project on surface water quality. The plan incorporates the following specific objectives:

- Provide overall surface water management principles and guidelines for the construction phase of the proposed project;
- Address erosion, sedimentation and water quality issues; and
- Present measures and management practices for the prevention and/or mitigation of potential downstream impacts.

During the operational phase of the project, the management of surface water will be carried out in accordance with the proposed design and associated management features such as settlement ponds which will have been installed during the construction phase and will be maintained through the operational phase. The drainage design will ensure that any surface water arising from the proposed wind farm during operation will be contained and treated to ensure it can be dispersed out from the proposed project without any significant impact on existing downstream activities.

The decommissioning phase will not require any significant works that will impact on the drainage network. Works in this phase will primarily involve disassembling the turbines and removing off-site. It is not envisioned that site roads, turbine foundations or the grid connection infrastructure would be removed. The site roads would remain as part of an amenity facility while the hardstand material could be removed and along with the turbine foundations, covered in topsoil and revegetated. The substation and grid connection infrastructure will form part of the permanent national grid network.

The protection of water quality and prevention of pollution events requires a sustained and concentrated input from the Contractor with regard to the provision and maintenance of sediment control structures. The drainage system is described in further detail in Chapter 9 of this EIAR (Hydrology & Hydrogeology).

2.7.2.1 Silt Control

Silt control measures e.g. check dams and silt bags, will be implemented during the construction process.

Dewatering silt bags (See Figure 2-5) allow the flow of water through them while trapping any silt or sediment suspended in the water. The silt bags provide a passive non-mechanical method of removing silt from silt-laden water collected from works areas within a construction site. Silt bags will be disposed of by a licensed waste contractor.

In specific locations, silt fences (See Figure 2-5) will be installed as an additional water protection measure around existing watercourses, particularly where works cannot be avoided within the 50-metre buffer zone of a natural stream. These trap sediment particles in a fine mesh and allow water to pass through. Works within 50m of such streams are avoided where possible.

A mobile silt-buster (See Figure 2-5) can be employed at the site, which uses advanced filtration technology to remove suspended particles from the water. Such a measure is most likely to be deployed in the turbine excavations or borrow pits during periods of activity but can be used at any excavation location) This is very effective, with a small footprint, and is also very mobile with the potential to move around the wind farm site. These units are recommended by the Scottish Environmental Protection Agency (SEPA) and the UK Environmental Agency for use on construction sites for the treatment of pumped dirty water.

Check dams (also known as silt traps) will be used throughout the proposed site drainage system to minimise sediment transport (See Figure 2-5). They will generally be spaced at regular intervals along the proposed drainage network. These will slow down the movement of water in site drains, and thereby reduce the amount of sediment transported by the water. Stones/gravel will be used at each dam to reduce soil erosion, to stabilise the dam and aid in filtration. Settlement ponds (See Figure 2-5) will be constructed at various locations around the site of the proposed wind farm, particularly in areas of high activity as described in further detail in Section 2.7.2 above. Depending on this area being drained and the site conditions, there may be multiple settlement ponds positioned in sequence. These ponds cause the water velocity to slow down significantly, allowing suspended solids to precipitate out, with rock curtains and geotextile membranes positioned to capture any sediments that do not settle out. They are constructed using an excavator, with regular inspections and maintenance to ensure they are operating efficiently. They will be emptied as required to remain effective. They will be constructed and maintained as per the *Good Practice during Wind Farm Construction* document⁵.

Level spreaders/diffusers will be used where overland discharge of water is carried out. They prevent soil erosion at these locations by spreading out and slowing down the water.

⁵<https://www.nature.scot/sites/default/files/2018-08/Guidance%20-%20Good%20Practice%20during%20wind%20farm%20construction.pdf>



Figure 2-5: Examples of Proprietary Silt Control measure Trench Drainage

Trenches will be required as part of the proposed project, primarily for installation of ducting and cables between each wind turbine and the onsite substation, and as part of the grid connection works to connect to the existing 110kV overhead line. It is not anticipated that drainage will be a significant issue in the proposed project trenches, but the following measures will be employed to reduce the potential for water build up in trenches, and to deal with any water that does arise.

- Trenches will be dug in short sections at any one time to avoid potential for water flowing through them.
- Excavation works will not be carried out during periods of heavy precipitation.
- In the event that some surface water does accumulate in the trench, this will be allowed to percolate into the ground naturally. In the unlikely event that this is too slow, the water can be pumped/vacuum tanked out and released into the proposed wind farm drainage system for subsequent treatment.
- Any excavated material which is not transported away immediately will be stored on the up-gradient side of the trench so that the downgradient trench will collect any runoff that does occur. In the event that unusually heavy precipitation is forecast, this will be temporarily covered with a protective plastic sheet.

2.7.3 Culverts & Clear-Span Bridges

Culverts will be required where site roads or hardstands cross minor forest drain networks. The use of culverts will only be employed for minor field/forest drains (which are dry or stagnant) or proposed new site drainage channels and will not be used to cross any streams on site. There

are 12 stream crossings required for the proposed site road network, for which the proposed crossing methodology is a clear-span bridge. The use of a clear-span bridge here will avoid the requirement for in-stream works. All proposed stream crossings will utilise clear span structures. For the clear span structures, the existing banks will remain undisturbed and no in-stream excavation works are proposed. Therefore, there will be no direct effect on the stream at the proposed crossing location.

Where culverts are required for smaller drains, precast concrete or plastic culverts of between 300-900mm in diameter shall be provided, a typical detail of which is shown in Appendix 1-1. The clear-span bridges will be sufficiently above the stream to allow unrestricted flow of water beneath. The proposed clear-span bridge location and design detail are provided in Appendix 1-1. The construction method for these structures is described in Section 2.10 below.

2.8 CONSTRUCTION MANAGEMENT

2.8.1 Construction Activities and Timing

A CEMP is included as Appendix 2-2 of this EIAR. This sets out the main environmental considerations and mitigation measures to be incorporated into and complied with during each phase of the proposed project and will be referred to by the main contractor onsite. The CEMP will be updated prior to construction to account for any alterations to mitigation measures that may have been added during the planning process and to comply with any conditions.

It is anticipated⁶ that 96-139 persons will be employed during the peak construction period (See Chapter 5 – Population and Human Health) and it is estimated that the construction phase will take approximately 24 months from starting onsite to completion of commissioning of the turbines. Where practical, vegetation clearance that is required during construction works will commence outside the breeding birds season, which runs from the 1st of March to the 31st of August.

The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 7:00hrs and 19:00hrs weekdays and between 7:00hrs and 14:00hrs on Saturdays.

However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (i.e. concrete pours) or to accommodate delivery of large turbine components along public routes it could be necessary on occasion to work outside of these hours. Any such out of hours working will be agreed in advance with Donegal County Council.

The construction phase can be broken down into 5 no. main phases as follows (there will be overlap between these):

- 14 months – Civils (including site roads, hardstands, turbine foundations, forestry felling, drainage)
- 6 months – Electrical grid connection/substation installation and commissioning
- 12 months – Site electrical (installing between turbines and substation, pulling cables)
- 4 months – Turbine deliveries and erection
- 2 months – Commissioning

The phasing and scheduling of the main construction task items are outlined in Figure 2-6, where January 2026 has been selected as an arbitrary start date for construction activities. Where there

⁶ http://www.ewea.org/fileadmin/files/library/publications/reports/Wind_at_work.pdf

is overlap between phases, this reflects the anticipated progression of work through the site, with different areas within the site at different stages of completeness

ID	Task Name	Task Description	2026 Q1 Jan-Mar	Q2 Apr-Jun	Q3 Jul-Sep	Q4 Oct-Dec	2027 Q1 Jan-Mar	Q2 Apr-Jun	Q3 Jul-Sep	Q4 Oct-Dec
1	Site Health and Safety		[Active]							
2	Site Compounds	Site compounds, site access, fencing, gates	[Active]							
3	Site Roads	Construct roads, install drainage measures, install culvert, install water protection measures	[Active]							
4	Turbine Hardstands	Excavate base, construct hardstanding areas	[Active]							
5	Turbine Foundations	Fix steel, erect shuttering, concrete pour	[Active]							
6	Substation Construction & Electrical Works	Construct substation and grid connection, underground cabling between turbines	[Active]							
7	Backfilling & Landscaping		[Active]							
8	Turbine Delivery and Erection		[Active]							
9	Substation Commissioning		[Active]							
10	Turbine Commissioning		[Active]							

Figure 2-6: Indicative Construction Schedule

2.9 CONSTRUCTION METHODOLOGIES

2.9.1 Site Roads (including passing bays)

Site roads will be constructed to each turbine location, and to all proposed site infrastructure as shown in the site layout drawings of Appendix 1-1, with a proposed running width of 5m. Passing bays will be included along roads strategically, as indicated in Appendix 1-1, and there will be a number of site entrances. There are three road construction methodologies to be considered at the proposed project: upgrading of existing site roads; floating new road and excavated new road. These are described below in further detail.

Sections of new roads and upgraded roads are shown on drawings in Appendix 1-1. Where required, the road widths will be increased to a maximum of 9.5m to form the indicated passing bays, as shown in drawings in Appendix 1-1.

2.9.1.1 Excavated New Road

Tracked excavators will carry out excavation for roads with appropriate equipment attached. Any surplus excavated material will be dealt with as set out in the CEMP (Appendix 2-2 of this EIAR), within the spoil management section. Where the proposed project footprint is located on any mineral-based soil, this material can be either side-cast, profiled and bermed as close to the excavation areas as practical, or in the case of peat it will be used to reinstate the borrow pits). Peat has a limited potential for use in site landscaping. The sides of the excavated areas will be battered/sloped sufficiently to ensure that slippage does not occur.

When the topsoil has been removed and/or the formation layer has been reached, stone from the onsite borrow pits shall be placed to form the road foundation. In the event of large clay deposits being encountered in sections of road, a geotextile layer will be required at subbase level. The sub grade will be compacted with the use of a roller or other approved compaction method. The final top dressing of unbound material will not be provided until all turbine bases have been poured. This prevents damage to the wearing course due to stone and concrete trucks movements. This capping surface may be required to be sourced from local quarries.

Once no further stone material is required from the proposed on-site borrow pits (i.e. at the end of the civil works stage of the project construction phase), any material which had been temporarily stored on the site will be used to re-instate the borrow pits.

All on-site roads will be maintained for the duration of the construction and operational phases of the project.

2.9.1.2 Floating New Road

Monitoring posts will be installed prior to construction to monitor movement of soils in the area around the construction. A base geotextile membrane will be laid directly on top of the peat/soil surface, and a suitable granular fill will be placed on top of this. The stone will be levelled with an excavator or bulldozer and rolled to provide a suitable surface. The stone material will either be tipped over a long area (>10m) or in several small piles rather than being tipped in one location to prevent excess soil loading and compaction.

To ensure a smooth transition between excavated and floating access track, a short (10-20m) length of the access track will have all peat excavated and filled with a suitable fill, which will be graded to allow for an appropriate transition.

The final top dressing of unbound material will not be provided until all turbine bases have been poured. This prevents damage to the wearing course due to stone and concrete trucks movements. This capping surface may be required to be sourced from local quarries. All on-site access tracks will be maintained for the duration of the construction and operational phases of the project.

Sections of a new floating access track are shown on the planning drawings (Appendix 1-1). Access track widths will be increased to form the indicated passing bays, as shown on drawings in Appendix 1-1.

2.9.1.3 Upgrade of Existing Site Road

The site of the proposed project has an existing network of site roads present which have been incorporated into the proposed design as much as possible.

Where an existing road needs to be widened, it will be carried out on one or both sides as required, and the same steps as described in the new road construction above will generally be followed. Tracked excavators will carry out excavation for roads with appropriate equipment attached. Any surplus excavated material will be dealt with as set out in Section 2.10.1.1 above. When the topsoil has been removed and/or the formation layer has been reached, stone from the onsite borrow pits shall be placed to form the road foundation. The foundations will be built up to the same height as the existing road and if appropriate the entire width of the road will be built up to the required level. In the event of large clay deposits being encountered in sections of road, a geotextile layer will be required at subbase level. The sub grade will be compacted with the use of a roller or other approved compaction method. The final top dressing of unbound material will not be provided until all turbine bases have been poured. This prevents damage to the wearing course due to stone and concrete trucks movements. This capping surface may be required to be sourced from local quarries.

Once no further stone material is required from the proposed on-site borrow pits (i.e. at the end of the civil works stage of the project construction phase), any material which had been temporarily stored on the site will be used to re-instate the borrow pits.

All on-site roads will be maintained for the duration of the construction and operational phases of the project.

Further details of the construction methodology for upgrading existing site roads is provided in the Spoil Management Plan, provided as part of the CEMP in Appendix 2-2.

2.9.2 Proposed Clear-Span Bridge & Culverts

There are 12 proposed stream crossing as part of the proposed works, as shown on the site layout drawings (Appendix 1-1). This crossing method will avoid in-stream works entirely at these stream crossing locations. Firstly, the site access tracks will be constructed as far as possible to allow easy access to the works area. Following this, the topsoil will be stripped from the foundation footprint on either side of the stream, taking care to avoid disturbing any part of the stream bed or banks. Suitable stone fill material (clause 804 or similar) will be added in layers and compacted to form the base of the foundation. The precast clear-

span bridge will be placed onto this either as one or more pieces. There will be no requirement for large-scale casting of wet concrete. Following this, barriers will be attached to the sides of the bridge structure, and the site access tracks will be constructed over the structure.

There are 2 no. upgrades needed for existing piped culverts (see Section 9.4 of Chapter 9 (Hydrology and Hydrogeology)). Where plastic culverts are required on site, they will be over-sized for the expected water flow rates, and to allow passage of fauna through. They will be installed with a minimum gradient of 1%. The plastic pipe will be placed into the drain bed, and some of the substrate will be placed within the pipe to benefit biodiversity (for further information see Section 6.4.3 of Chapter 6 of this EIAR (Biodiversity)). The use of corrugated culverts will aid in the retention of sediment, thereby naturalising the culvert bed. Large stones will be placed at the culvert outfall to dissipate any flow and reduce the potential for erosion. The culverts will be inspected regularly to ensure they do not become blocked.

2.9.3 Proposed Site Drainage

The site of the proposed wind farm will have both temporary (for the duration of the construction phase) and permanent drainage infrastructure installed as part of the proposed site development. These features include site drains and silt control measures (check dams/silt dams) as described in Section 2.8 above.

The site drainage measures will be installed from the outset, being constructed at the same time as the initial civils works (site roads, hardstands, etc.). This will ensure that there is no uncontrolled runoff from the site during proposed works. Excavators will be used to construct the main drainage features (drains, settlement ponds, etc.), while small items such as silt dams/check dams will be constructed manually. Silt fences which trap suspended particles will be erected manually ahead of civil works as required on particularly steep ground, or near streams.

2.9.4 Temporary Compounds

At the commencement of the construction phase, a temporary compound area will be constructed to provide office space, welfare facilities, car parking and hardstands for storing materials. At a later stage of the site development (when the construction works reach the northern end of the site) a second compound area will be constructed there as per the proposed site layout to provide additional facilities onsite. These will cover approximately 1.4 and 1.7ha each, and the 2 no. locations are shown on the site layout drawings (Appendix 1-1). At the end of the construction phase, the compounds will be removed, with any stone being used towards reinstatement of the nearest onsite borrow pits. After removal of the compound, the area will be replanted with forestry as described in Appendix 2-5.

The site accommodation will consist of temporary porta-cabins constructed on a granular platform. The topsoil will be stripped where development of the temporary compounds are proposed. The compounds shall be constructed to heights of up to approximately 0.5m above existing ground level.

2.9.5 Public Car Park & Recreation Area

During the operational phase of the proposed project, a gravel public car park for the proposed amenity trails will be located at a new entrance on the L6483 (See the Drawing

10798-2003, in Appendix 1-1). This will be constructed in a similar way to the site roads, on a granular platform. The topsoil will be stripped where development of the car park is proposed. Stone fill will be used with a well compacted suitable stone for the surface layer. A number of picnic tables will be installed and informational signage, including a site map will be placed adjacent to the car parking area. Further detail on the recreational plan for the proposed project is included as Appendix 2-6 (Recreational Development Plan).

2.9.6 Turbine Hardstand, Foundations and Erection

The topsoil will be stripped where development of the hardstands are proposed. The hardstands shall be constructed to heights of up to approximately 0.5m (on average) above existing ground level.

Ground investigations in the form of trial pitting, probing, and use of augers have been carried out along the proposed turbine locations and hardstanding locations to inform the depth of excavation and upfill required (See Appendix 8-1 (Site Investigation Report)). Following site visits and site design, volume calculations provide an estimation of worst-case fill required for the hardstands.

This is predicted to be up to 144,700m³ of material. This material volume will be obtained primarily from the onsite borrow pits with only the surface 150mm layer to come from local quarries which are within reasonable proximity to the site.

The geotechnical investigations to date indicate that the foundations at the proposed wind farm will be excavated. Piling is not anticipated to be required.

Each of the turbines to be erected on site will have a reinforced concrete base. Overburden will be stripped off the foundation area to a suitable formation using a 360° excavator and will be stored as detailed in the CEMP (Appendix 2-2), within the Spoil Management section. The sides of the excavated areas will be sloped sufficiently (2:1 or as determined by a suitably qualified site engineer) to ensure that slippage does not occur. Precise excavation depths and batter requirements will depend on soil types locally and the turbine manufacturer requirements. Material excavated to create the working area will be stored locally for later reuse in backfilling the working area around the turbine foundation, or for reinstatement elsewhere on site (such as the borrow pits). If the excavated material is peat, it will be brought straight to reinstate the borrow pit. The excavated material will be smoothed with the back of an excavator bucket and surrounded by silt fences to minimise the potential for sediment-laden run-off occurrence.

In the case of gravity foundations, if the formation level is reached at a depth lower than the depth of the foundation, the ground level will have to be raised with clause 804 hardcore material and/or lean mix concrete, compacted in layers as required, with sufficient compaction effort. Drainage measures will be installed to protect the formation by forming an interceptor drain around the perimeter of the base which will outfall out at the lowest point level with the spreader or settlement pond. It is not anticipated that piled foundations will be required.

An embankment approximately 600mm high and a fence or berm will be constructed around the perimeter of each turbine base to prevent construction traffic from driving into the excavated hole and also to demarcate the working area. All necessary health and safety signage will be erected to warn of deep excavations etc. Access to and from excavated bases will be formed by excavating a gangway to a standard 1:12 grade, thereby allowing safe passage into/out of the foundation area.

Approved lifting equipment will be used to unload reinforcing steel to required areas. The bottom mat of steel will be fixed prior to the tower cans, if used, being lifted into position and reinforcing steel will be positioned and fixed in accordance with the turbine suppliers' requirements. The detailed design and exact dimensions will be determined once a turbine manufacturer has been selected following a competitive procurement process.

Formwork to concrete bases will be propped/supported sufficiently to prevent failure. Concrete for bases will be poured using a concrete pump. After a period of time when the concrete has set sufficiently, the top surface of the concrete surface is to be finished with a power float.

Once the base has sufficient curing time it will be filled with suitable fill (i.e. hardcore) up to existing ground level. The working area around the perimeter of the foundation will be backfilled with suitable material (hardcore). These hardstand areas around the turbines will be levelled, compacted and finished with a suitable surface material for traffic (clause 804 or similar) as per the site access tracks and remainder of the hardstand areas.

2.9.7 Grid Connection

As stated above, the proposed wind farm will connect to the existing national grid via the onsite substation and associated underground grid connection. The onsite substation and associated grid connection has been assessed in this EIAR, along with the required works to allow connection to the grid at the existing overhead line in Cloghercor.

Once fixed into position, the substation and electrical grid connection will be commissioned and made live to allow removal of the existing wooden polesets, part of the overhead line. The internal site cabling (between turbines and the substation) will remain off until the turbines are being commissioned and the wind farm enters into service.

Full details of the description of the Grid Connection works, and the construction methodologies for each element are provided in Appendix 2-4. The construction methodologies for the various elements of the grid connection are summarised below.

2.9.7.1 110 kV Substation and Electrical Works

The proposed substation will be designed and constructed to meet all the required EirGrid/ESB standards within the parameters assessed in this EIAR. An area will be levelled and built to the required level with stone fill material, capped by high quality compacted stone. Two control buildings will be constructed using traditional techniques for constructing small buildings (i.e. concrete block walls, timber and slate tile roof). Foundations will be built for all of the proposed electrical infrastructure. All the electrical equipment will be installed to EirGrid/ESB requirements. Perimeter fencing will be constructed around the substation compound for security and safety purposes. The substation and electrical infrastructure will be commissioned. Further information and drawings of the substation and electrical infrastructure are provided in Appendix 1-1 while the associated construction methodologies are provided in Appendix 2-4.

2.9.7.2 110 kV Underground Cable Trenches

The number and layout of cables is an important consideration in the design of the site. Minimum safety distances and angles etc. must always be maintained. This has been a fundamental consideration in determining the final location of the substation buildings and electrical infrastructure. Further information and drawings of the underground 110kV

cable trenches are provided in Appendix 1-1 while the associated construction methodologies are provided in Appendix 2-4. Copy of EirGrid 110 kV cable installation specifications are provided as Appendix 2-3.

The cables will be installed for the majority within the internal access roads and partly within the existing public road corridor for a perpendicular crossing as indicated on the site layout drawings in Appendix 1-1 and described in Section 2.6.4 above. A section of the route (approximately 1km) will also be located within/adjacent to the proposed main site access road, but an access track will be put in place over the entire route. It should be noted that works within the public road corridor will also be subject to further consents/agreements with local authorities, for example a Road Opening Licence as appropriate.

A Traffic Management Plan (TMP) has been prepared for the proposed project and is included as Appendix 2-7. This is a living document and will be updated ahead of construction to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by the Board, in the event planning permission is granted. Also, a confirmatory survey of road condition, including the condition of all road water crossings on the route, will be carried out along the grid connection route in advance of any works.

All cables will be laid in underground ducts. Ducts will be installed mostly by open trenching. The typical sequence of operations for installing ducts in trenches is to firstly strip off the ground material and topsoil (if present). A trench is then formed to the required depth and width. The ducts are generally laid on a bed of lean mix concrete and surrounded with lean mix concrete. Any surplus soil (after trench reinstatement) will be used for local restoration and landscaping or used for borrow pit reinstatement on site. Where contaminants are found (or where bitumen-based materials are present) the material will be removed from site and disposed at an appropriately licenced facility. The top of the trench will generally be finished at ground level with a surface suitable for vehicular use as per EirGrid/ESB specifications. The use of gravel in this instance will ensure the track is permeable and eliminate the potential for surface water runoff.

The underground cable required to facilitate the grid connection will be laid beneath the ground surface and/or public road using the following methodology:

- The area where excavations are planned will be the subject of a confirmatory survey, prior to the commencement of works, with a cable locating tool and all existing underground services will be identified.
- A verification condition survey will be carried out for all parts of the route within the public road. Details of this survey will be agreed with the local authority in advance of the survey.
- A trench will be opened using an excavator to accommodate the formation required.
- The excavated material will be cast to the side to be reused as backfilling material where appropriate. This material will not be stored in the vicinity of any watercourse and will be smoothed with the back of an excavator bucket to minimise runoff. It will be cast on the upgradient side of the trench, so if any runoff did occur it will run into the down gradient trench. Excess material will be used on the site of the proposed wind farm for local landscaping, borrow pit reinstatement.
- Silt fences will be installed alongside the road/works areas as required near streams.
- Clay dams/plugs will be installed at regular intervals (depending on the gradient) to prevent conduit flow of water within the trench.

- Works will not be carried out during periods of heavy precipitation. In the event that some surface water does accumulate in the trench, this will be allowed to percolate into the ground naturally.
- The trench will be surfaced as per the road surface specifications of the local public road, the wind farm road, or (in the case of off-road section) an EirGrid/ESB specification gravel access track capable of supporting maintenance vehicles if required.
- Cable joint pits are normally located at regular intervals as shown in the site layout drawings (Appendix 1-1). Each joint pit will be approximately 2.5m x 6m in size with a communications chamber and an earth link box in close proximity to the joint pit as shown in the detail drawing (Appendix 1-1). They have been located where possible in accessible areas away from watercourses. They will be constructed off the public road. A temporary surface is provided over these for safety and to allow easy access until the cables are pulled, after which time the area will be permanently reinstated/surfaced as appropriate. The location of these joint pits are provided on site layout drawings provided in Appendix 1-1.
- It is anticipated that construction will be carried out by a single team (with plant items likely to include excavators and dumpers) along the route, but there is a possibility to use two separate teams to speed up the construction. It is expected that each team could lay approximately 150m of the route per day.

Further details on the design for the grid connection cable trenches are provided in Appendix 1-1 while the associated construction methodologies are provided in Appendix 2-4.

2.9.7.3 Overhead Line End Masts

Twenty six existing wooden polesets and a single steel lattice angle mast (Drawing 05725-DR-100 in Appendix 1-1) between the two new interface end masts will be removed as part of the grid connection works. Once the new underground cable is energised the wooden polesets and steel angle mast will be removed by an excavator and incorporated back into the stock for further use, in line with ESB best practise procedures.

The new interface end masts at the northern and southern ends of the proposed grid connection will be constructed by installing the foundations and lower section of the mast first. The upper sections of the masts will only be constructed when the rest of the grid connection infrastructure is ready to become live. This approach will minimise the amount of time the main 110kV line must be switched off. Further details on the design for these end masts are provided in Appendix 1-1 while the associated construction methodologies are provided in Appendix 2-4.

2.9.7.4 Stream Crossings

The proposed grid connection contains 2 no. stream crossings. These are shown in Figure 2-4 and the site layout drawings in Appendix 1-1. Table 2-2 below details the proposed methodologies for crossing the given watercourses shown in Figure 2-4.

Table 2-2: Watercourse crossing details

Watercourse Crossing No.	Crossing details	Proposed crossing methodology	In Stream works required?
1	Stream	Directional Drilling	No
2	Stream	Directional Drilling	No

The construction methodologies for the crossings are provided below. The route also contains minor forestry drains which are usually dry, and only contain water during periods of heavy rainfall. These will be crossed using open trench crossings during dry periods.

2.9.7.5 Crossing Methodology: Directional Drilling

A launch and reception pit is required for directional drilling, with each measuring approximately 1m wide, 2m long and 1m deep. Two ducts will be required at each crossing location. A specialised directional drill machine will be anchored to the ground and will drill at a suitable shallow angle to allow it to achieve the required depth for the bore. If ground conditions are unfavourable, the drilling process may need to be repeated using progressively larger drill heads until the required size is achieved. The drilling process involves pumping a drilling fluid through the drill head which is inert, natural and biodegradable (e.g. Clear Bore™). This fluid will be used sparingly and only as required to avoid an excess and will be appropriately stored when not in use. This fills voids locally around the drill head and enables the drill to progress without the hole collapsing. Should any excess drilling fluid occur, it will be contained and removed for disposal at a licensed waste facility. The duct will be positioned, and the launch and reception pits will be refilled.

Further details of this crossing method are provided in Appendix 1-1 while the associated construction methodologies are provided in Appendix 2-4.

2.9.8 Turbine Delivery Accommodation Works Areas

Where works are needed along the public road corridor to facilitate deliveries to site, they will be agreed in advance with the local authority and carried out to the appropriate standard (TII, purple book, etc.).

Where a temporary surface is needed for the turbine delivery route (including the blade changeover area), works will start with the clearing of any vegetation, and the topsoil will be stripped and either used locally for landscaping purposes/bermed for later use in reinstatement or used for borrow pit reinstatement onsite. Where local use for landscaping does occur it will be smoothed off with the back of a bucket and seeded with a suitable grass seed mix. Silt control curtains will also be employed within 50m of a surface watercourse. Topsoil material will not be used locally within 50m of a stream, and peat material will not be used if found to be present at any location. It is anticipated that the majority of material will be taken to the wind farm site for borrow pit reinstatement. It may also be taken to a local licensed/permitted waste facility if found to contain any contaminants such as bitumen. Suitable fill material (broken stone and clause 804) will be used to create a firm running area for the passage of turbine delivery vehicles. The areas will be fenced off when the delivery is not occurring. After the delivery of turbines to site, the site will be re-instated to the original condition with removal of the temporary surface, and any removed vegetation will be reseeded/replanted with a similar native species composition.

2.9.9 Permanent Meteorological Mast

The met mast installation works shall be carried out by a small crew and are described as follows:

- An access track shall be extended towards the mast location from the existing forestry track. The access track shall be 3.5m in width. Associated drainage infrastructure shall be extended also.
- A small aggregate crane pad shall be constructed in front of the proposed mast location.
- General construction methods for the above access track and hard standing shall match those described for wind farm access tracks and hard standings however the dimensions and stone depth requirements of the infrastructure will be considerably less than that required for that serving the wind turbine construction.
- The foundation shall be excavated followed by shuttering, steel fixing and finally concrete pouring by ready mix truck. Excavation and concrete operations shall be carried out in accordance with the CEMP (Appendix 2-2). The foundation shall be 10m x 10m x 1.8m in size.
- Following crane setup, the mast sections shall be delivered and unloaded by truck.
- In accordance with an agreed lifting plan, mast sections shall be lifted by crane into place. Wind speeds shall be monitored at all times during lifting operations by the lead climber and crane operator.
- Mast sections shall be bolted together by climbers.
- Following erection of main mast sections, lightning protection and other ancillary components shall be fixed to the mast.

The masts will be decommissioned using a similar methodology as the construction except in reverse.

2.9.10 Biodiversity Enhancement Lands

It is proposed to ensure that land management practices for approximately 252 ha will be prescribed to enhance those lands as suitable habitats for Red Grouse and the Irish Hare. This is discussed in detail in Chapter 7 of this EIAR (Ornithology). These lands are shown in Figure 1-1.

The land management being proposed for this area will involve vegetation management through livestock grazing and/or cutting and will not involve any excavations or construction. Agricultural land management practices for each plot of land will be prescribed and agreed with land owners.

2.10 ENVIRONMENTAL MANAGEMENT

2.10.1 Construction Phase Monitoring and Oversight

The requirement for a Construction and Environmental Management Plan (CEMP) to be prepared in advance of any construction works commencing on any wind farm site and submitted for agreement to the Planning Authority is now well-established.

A CEMP has been prepared for the proposed project and is included in Appendix 2-2. The CEMP will be updated prior to commencement of development to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned and will be submitted to the planning authority for written approval.

The construction contractor will be responsible for implementing the mitigation measures specified in the EIAR and CEMP and for communicating the requirements with all staff on-site. Their implementation of the mitigation measures will be overseen by the supervising Ecological Clerk of Works (ECoW), ecologists, archaeologists and/or geotechnical engineers, as appropriate.

The surface water drainage system will require regular inspection during construction works and during operations to ensure that it is working optimally. This is discussed further in the CEMP (Appendix 2-2).

2.10.2 Concrete Deliveries & Pouring

Only ready-mixed concrete will be used during the construction phase, with all concrete being delivered from local batching plants in sealed concrete delivery trucks. The use of ready-mixed concrete deliveries will eliminate any potential environmental risks of on-site batching. When concrete is delivered to site, only the chute of the delivery truck will be cleaned, using the smallest volume of water necessary, before leaving the site. Concrete trucks will be washed out fully at the batching plant, where facilities are already in place. The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area. These residual liquids and solids will be disposed of off-site at an appropriate waste facility (nearest one is located south of Donegal Town). Where temporary lined impermeable containment areas are used, such containment areas are either excavated and lined with an impermeable membrane or involve creating a temporary pool with a ring of straw square bales covered in a heavy gauge plastic sheet. This washout will be located near the site entrance so that it is easily accessed when departing all turbine locations. The location is shown on layout drawings in Appendix 1-1.

Due to the volume of concrete required for each turbine foundation (assumed approximately 1,000 m³ as a worst case per turbine, but the exact figure will vary according to turbine manufacturers requirements and may be less than this), and the requirement for the concrete pours to be continuous, deliveries are often carried out outside normal working hours. Such activities are limited to the day of turbine foundation concrete pours, which are completed in a single day per turbine.

Because of the scale of the main concrete pours that will be required to construct the proposed wind farm, the main pours will be planned weeks in advance, and refined in the days leading up to the pour. Disposing of surplus concrete after completion of a pour will be off-site at the concrete production facility.

The CEMP (Appendix 2-2) provides further details of best practice and environmental considerations in relation to concrete deliveries and concrete pouring.

2.10.3 Refuelling

Any easily manoeuvrable road-going vehicles will be refuelled off-site. For any vehicles which are slow moving or tracked or those for whom regular trips off-site to refuel will not be practical, on-site fuelling will be required.

A limited amount of fuel will need to be stored on the site within the construction compounds for this purpose, and this will be within a double skinned and bunded mobile tank which can be moved around the site using a 4x4 vehicle to refuel. This will be stored in the construction compound when not in use.

A spill kit in the form of a supply of fuel absorbent material and mats and a drip tray will be kept with the tank at all times. The drip tray and fuel absorbent mats will be used at all times during refuelling. Similar spill kits will be stored in each construction compound, and at the on-site substation in case of emergency.

No refuelling will be carried out within 50m of a stream.

Only designated trained and competent operatives will be authorised to refuel plant on site.

In the event of an accidental fuel spill, the source of the spill will be fixed, fuel will be contained and cleaned as quickly as possible using the fuel absorbent material in the spill kits. The incident will be reported to the site manager and Environmental Clerk of Works, and appropriate remediation will be carried out (i.e. soil removal for safe disposal at a licensed waste facility south of Donegal Town, etc.).

The CEMP (Appendix 2-2) provides further details of best practice and environmental considerations in relation to this.

2.10.4 Dust Suppression

In periods of extended dry weather, dust suppression may be necessary along haul roads and along the site roads to ensure dust does not cause a nuisance. If necessary, water will be taken from settling ponds in the site's drainage system and will be pumped into a bowser or water spreader to dampen down haul roads and site compounds to prevent the generation of dust. Silty or oily water will not be used for dust suppression, because this will transfer the pollutants to the haul roads and generate polluted runoff or more dust. Water bowser movements will be carefully monitored, as the application of too much water may lead to increased runoff. The CEMP (Appendix 2-2) provides further details of best practice and environmental considerations in relation to this.

2.10.5 Waste Management

The CEMP (Appendix 2-2) provides an overview of the best practice in waste management during all phases of the proposed project, with a view to reducing, reusing, recycling and recovering waste produced, in that order of preference. Waste disposal will be avoided where possible. The WMP and waste management practices associated with the proposed project will be in accordance with relevant provisions of the Waste Framework Directive (Directive 2008/98/EC on waste), the Waste Management Act 1996 as well as all other Irish and EU legislation.

The main site contractor will appoint a Waste Manager who will ensure that all waste contractors have the correct permits for any waste streams they are removing from site, and that they are taking it to the appropriately licensed/permitted waste facilities. They will also ensure that all parts of the WMP will be implemented onsite.

2.10.6 Vehicle Washing

Wheels or vehicle underbodies are often washed before leaving sites to prevent the build-up of mud on public (and site) roads. Site roads will be already formed using on-site materials before other road-going trucks begin to make regular or frequent deliveries to the site (e.g. with steel or concrete). The site roads will be well finished with compacted hardcore, and so the public road-going vehicles will not be travelling over soft or muddy ground where they might pick up mud or dirt.

However, in the interest of best practice and to avoid the potential for the transfer of alien invasive plant species into the site, it is proposed to install a self-contained wheel-wash system near the project site entrance (access points one and two). The drawings in Appendix 1-1 include typical details and proposed location of a proposed self-contained wheel-wash system which will be installed as part of the construction phase of works.

A road sweeper will be available if any section of the surrounding public roads becomes soiled by vehicles associated with the proposed project.

The CEMP (Appendix 2-2) provides further details of best practice and environmental considerations in relation to this.

During the operational phase, the onsite access tracks will be maintained in good condition, and any vehicles that need to access the site will be generally keeping on these surfaces. As a result of this, and the low volume of traffic expected on site, it is not anticipated that a wheel washing facility would be required during the operational phase.

2.10.7 Major Accidents and Natural Disasters

A review of the potential for the proposed project to be a source of hazard or interact with other sources of hazard, and that could result in a major accident and/or disaster during its construction and operation was undertaken.

This review looked at the existing design and mitigation measures committed to as part of this EIA, to determine if adequate controls are in place to control any risk of an unplanned but possible event occurring during construction and operation.

In this regard, possible major accidents that could occur as a result of the proposed project (and its associated works) include:

- Loss of critical infrastructure;
- Significant contamination;
- Turbine collapse;
- Traffic accident;
- Turbine or substation fire or explosion; and
- Wind turbine rotational failure.

Possible natural disasters that might occur and potentially impact the proposed project (and its associated works) include:

- Flooding
- Severe weather;
- Fire;
- Peat stability; and
- Landslide.

The above potential major accidents and natural disasters are considered where relevant throughout the EIA chapters, as listed below;

- Loss of critical infrastructure resulting in power failure has been addressed in the design measures incorporated into the grid connection of the proposed project;
- Risk of contamination through spillages or leakages onsite is assessed in Chapter 9 (Hydrology & Hydrogeology);

- Risk of fires, explosion and turbine collapse in terms of human health is assessed in Chapter 5 (Population & Human Health). An emergency response plan is included in the CEMP (Appendix 2-2).
- Risk of traffic accident onsite is assessed in Chapter 16 (Traffic and Transportation);
- Risk of wind turbine rotational failure is discussed in Chapter 5 (Population & Human Health);
- Risk of flooding is assessed within the Flood Risk Assessment, provided as Appendix 2-8 to this EIAR;
- Risk of severe weather is assessed in Chapter 14 (Air Quality and Climate);
- Risk of peat instability and landslide is assessed in Chapter 8 (Land, Soils & Geology). A Peat Risk Stability Assessment is provided as Appendix 2-9 to this EIAR.

2.11 HEALTH AND SAFETY

The proposed Cloghercor Wind Farm will be constructed, operated and decommissioned in accordance with all relevant Health and Safety Legislation as described in the CEMP (Appendix 2-2).

Aspects of the development that will present health and safety issues include:

- Health and safety aspects of construction activities;
- General construction site safety (e.g. slip/trip, moving vehicles etc);
- On site traffic safety (during construction and operational phases) associated with localised high road embankments;
- Traffic safety during the transport of oversized loads to the site;
- Lifting of heavy loads overhead using cranes;
- Working at heights; and
- Working with electricity during commissioning.

A Health and Safety Plan covering all aspects of the construction process will address the Health and Safety requirements in detail. This will be prepared prior to the construction stage. Further details are provided in the CEMP (Appendix 2-2).

The scale and scope of the project requires that a Project Supervisor Design Process (PSDP) and Project Supervisor Construction Stage (PSCS) are required to be appointed in accordance with the provisions of the Safety, Health and Welfare at Work (Construction) Regulations. The PSDP role has been performed by TOBIN Consulting Engineers up to the end of the planning stage of the project.

The PSDP and PSCS appointed for the project shall be required to perform his/her duties as prescribed in the Safety, Health and Welfare at Work (Construction) Regulations as described in the CEMP (Appendix 2-2).

None of the construction, operational or decommissioning phases of the project are anticipated to cause a significant negative impact to safe practice of agricultural, forestry and commercial activities outside the development footprint.

It is not anticipated that the operation of the wind farm will present a danger to the public and livestock. Rigorous safety checks are conducted on the turbines during design, construction, commissioning and operation to ensure the risks posed to staff, landowners and general public are negligible.

Access to the turbines is through a door at the base of the structure, which will be locked at all times outside maintenance visits.

Signs will be erected at suitable locations across the site as required for the ease and safety of operation of the wind farm. Further details are provided in the CEMP (Appendix 2-2).

The emergence of the Covid-19 virus in Ireland in the early part of 2020 has presented a new human health risk and concern amongst the general public across the country and within the proposed project study area. Proposals relating to Covid-19 (which could apply to similar other pandemics) are discussed in Chapter 5 (Population and Human Health).

An operational phase Health and Safety Plan will be developed to fully address identified Health and Safety issues associated with the operation of the site and providing access for emergency services at all times.

The components of a wind turbine are anticipated to have a useful lifespan up to 35 years or more and are equipped with a number of safety devices to ensure safe operation during their lifetime. During the operation of the wind farm regular maintenance of the turbines will be carried out by the turbine manufacturer or appointed service company. A project or task specific Health and Safety Plan will be developed for these works in accordance with the site's health and safety requirements.

2.12 WIND FARM OPERATION

The proposed wind farm project is expected to have a lifespan of 35 years. This is the anticipated useful lifespan of wind turbines which are being produced for the market today. The lifespan of wind turbines has been increasing steadily in recent years and allowing this duration will improve the overall carbon balance of the development, therefore maximising the amount of fossil fuel usage that will be offset by the wind farm. Leaving the wind turbines in-situ until the end of their useful lifespan would make the most sense from an environmental viewpoint, particularly in relation to carbon savings. During this operational period the wind turbines will generally operate automatically, responding by means of anemometry equipment and control systems to changes in wind speed and direction.

The wind turbines will be connected together, and data relayed from the wind turbines to a control centre off site. Each turbine will also be monitored off-site by the wind turbine supplier or Operations and Maintenance (O&M) service provider. The monitoring of turbine output, performance, wind speeds, and responses to any key alarms will be monitored at a control centre 24-hours per day.

Each turbine will be subject to a routine maintenance programme involving a number of checks and changing of consumables, including oil changes. In addition, there will be a requirement for unscheduled maintenance, which could vary between resetting alarms to major component changes requiring a crane. Typically, maintenance traffic will consist of four-wheel drive vehicles or vans. The electricity substation components and site roads and drainage will also require periodic maintenance in accordance with appropriate operation maintenance plans, procedures and health and safety plans.

Once operational, it is estimated that the wind farm will support 2-3 full-time long term, high quality technical jobs on site in operation and maintenance as well as a more significant number of jobs in ancillary functions (estimated to be a total of between 29-47 jobs

between direct and indirect employment based on research⁷). See Chapter 5 (Population and Human Health) for further information.

2.13 WIND FARM DECOMMISSIONING

As stated previously the wind turbines proposed as part of the proposed project are expected to have a lifespan of 35 years. Following the end of their useful life, the wind turbines may be replaced with a new set of machines, subject to planning permission being obtained, or the site will be decommissioned fully, with the exception of the electricity substation.

Upon decommissioning of the proposed wind farm, the wind turbines will be disassembled in reverse order to how they were erected. All above ground turbine components will be separated and removed off-site for recycling. Turbine foundations will remain in place underground and will be covered with earth and allowed to revegetate or reseed as appropriate. Turbine hardstands will be removed, and the areas also allowed to revegetate or reseed as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in potentially significant environment nuisances such as noise, dust and/or vibration. The site roadways may be in use for additional purposes to the operation of the wind farm (e.g. for forest/agricultural and recreational access) by the time the decommissioning of the project is to commence, and therefore it will likely be more appropriate to leave the site roads in situ for future use.

The on-site substation will not be removed at the end of the useful life of the wind farm project as it will form part of the national electricity network. Therefore, the substation will be retained as a permanent structure and will not be decommissioned.

A detailed decommissioning plan will be agreed in advance of works taking place with Donegal County Council. A decommissioning plan is contained within the CEMP (Appendix 2-2).

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<https://opus.lib.uts.edu.au/bitstream/10453/43718/1/Rutovitzetal2015Calculatingglobalenergysectorjobsmethodology.pdf>