3.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

3.1 THE PROPOSED DEVELOPMENT – OVERVIEW

The proposed wind farm site is located across three bogs (Derryaroge, Derryadd and Lough Bannow) within the Mountdillon Bog Group in Co. Longford. Refer to Figures 1-1 and 1-2. There are works as part of the proposed development which will take place outside of the wind farm site along the turbine delivery route (TDR).

The proposed development is located within the townlands of Annaghbeg, Annaghmore, Ards, Ballynakill, Barnacor, Ballypheasan, Bogganfin, Cloonbearla, Cloonybeirne, Cloonbony, Cloonbrock, Cloonfiugh, Cloonfore, Cloonkeel, Cloontabeg, Cloontamore, Coolnahinch, Corlea, Corralough, Derraghan Beg, Derraghan More, Derryad, Derryaroge, Derryart, Derrygeel, Derryglogher, Derrynaskea, Derryoghil, Derryshannoge, Grillagh, Kilmakinlan, Monksland, Mount Davys, Rappareehill.

The proposed development comprises of the construction of 22 no. wind turbines and ancillary works including works along the TDR. The turbines will have a blade tip height of 190 m above the top of the foundation level and will be accessible from internal access routes within the Bord na Móna site. The overall area of the proposed wind farm site is approximately 1,900 hectares (ha) spread across the 3 no. bogs as detailed above.

The proposed development will comprise of the following:

- 22 no. wind turbines with a blade tip height of 190 m, blade rotor diameter of 165 m, hub height of 107.5 m and the associated infrastructure including tower sections, nacelle, hub, and rotor blades and all associated foundations and hard-standing areas in respect of each turbine;
- New internal site access roads, approximately 27,500 m in length including passing bays and associated drainage;
- 2 no. permanent Meteorological Masts, both of which will be 120 m in height, and associated hardstanding areas for both masts, as well as the decommissioning and removal of an existing 100 m Meteorological Mast on site in Lough Bannow Bog;
- 4 no. Borrow pits in Derryadd Bog; All works associated with the opening, gravel and spoil extraction, and decommissioning of the borrow pits;
- 4 no. temporary construction compounds, including material storage, site welfare facilities, and site offices;
- 4 no. temporary security cabins at the main construction site entrances as well as at a number of access points around the proposed wind farm site;
- 1 no. 110 kV electrical substation compound in Derryaroge Bog. The substation will consist of 2 no. control buildings, a 36 m high telecommunications tower, associated electrical plant and equipment, ground water well, wastewater holding tank and welfare facilities.
- All associated underground electrical and communications cabling connecting the turbines and masts to the proposed electrical substation, including road crossing at N63 and associated grid connection via a 110 kV loop-in connection to the existing Lanesborough-Richmond 110 kV overhead line which traverses the proposed wind farm site;
- 1 no. 16 MW battery storage facility;
- 2 no. Peat Deposition Areas, one to the north of the proposed substation compound in Derryaroge Bog and one in Derryadd Bog;

- New site access entrances, temporary improvements and modifications to existing public road infrastructure to facilitate delivery of abnormal loads including locations on N6 Eastbound Slip Road, N6/N61 Roundabout at Athlone, N61/N63 Roundabout at Roscommon, N63 Roscommon Arts Centre Roundabout and N61/N63 Roundabout, Northeast of Roscommon.
- Hinge 3 No. permanent lighting fixtures in Folio RN40465F in Roscommon town to facilitate the delivery of abnormal loads (i.e. turbine blades);
- Approximately 7,500 m of dedicated amenity access tracks to provide linkages between the proposed wind farm site roads, royal canal greenway (to the east), the Corlea Visitor Centre amenity areas (to the south) and the Midlands Trail Networks project (to the north);
- 3 no. permanent amenity carparks, one of which is situated in Derryaroge Bog (19 no. car parking spaces in total) and two carparks in Derryadd Bog (19 no. car parking spaces in each carpark);
- All associated site work and ancillary works including new drainage and updating existing drainage, access road, earthworks, site reinstatement and erosion control, which will be aligned with the existing and future site rehabilitation plans; and,
- A 10-year planning permission is being sought with a 30-year operational life from the date of commissioning of the entire wind farm.

All elements of the proposed development as listed above and any works required on public roads to accommodate turbine delivery, have been considered and are addressed as part of this EIAR.

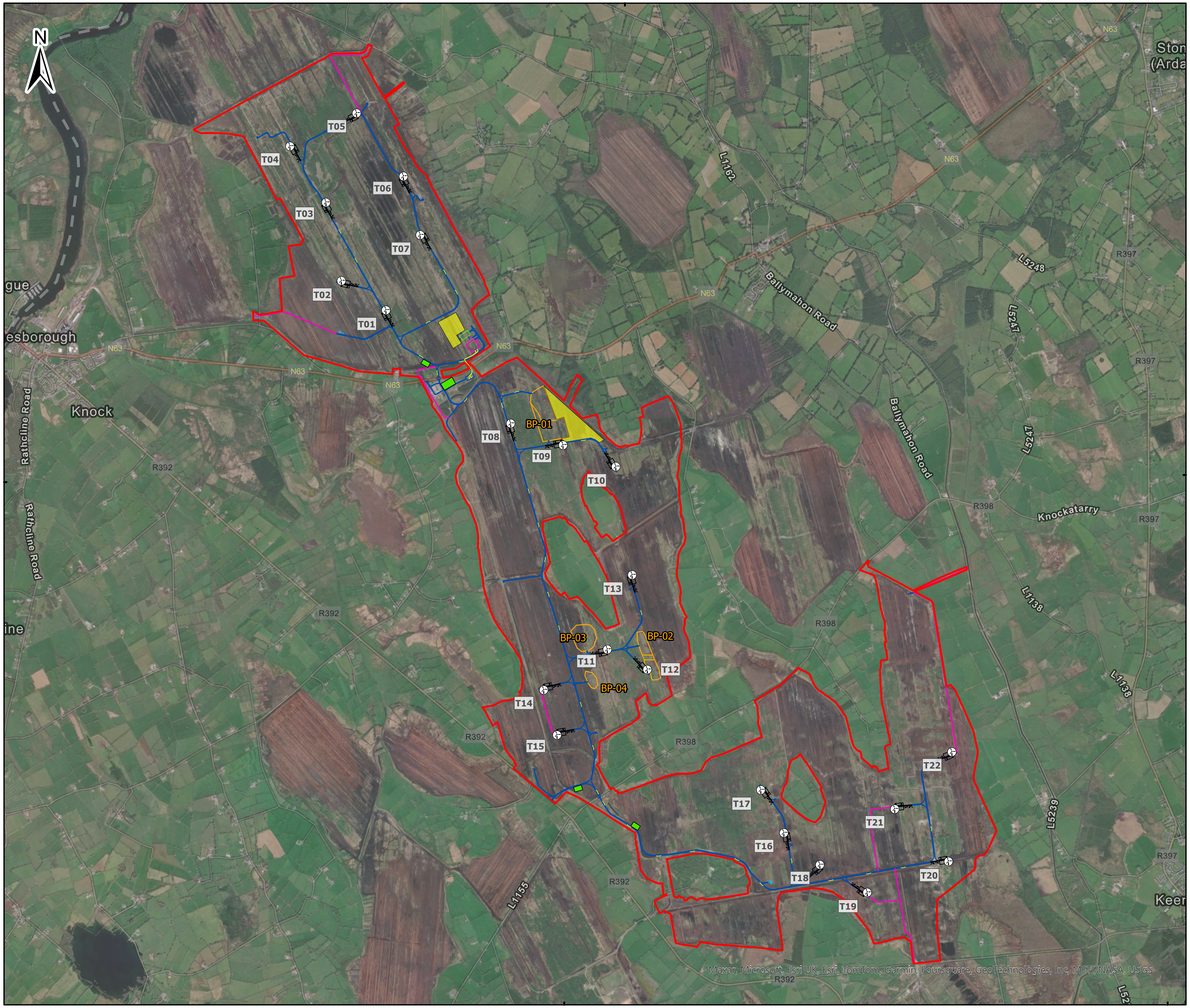
3.2 PROPOSED DEVELOPMENT LAYOUT

The layout of the proposed development provides for 22 no. wind turbines and 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. A comprehensive constraint exercise, as described in Chapter 4 (Consideration of Reasonable Alternatives), has been carried out to ensure that turbines and ancillary infrastructure are sited in the most appropriate areas of the wind farm site.

The turbine will have a top of foundation to blade tip height of 190 m. The blade rotor diameter will be 165 m with a corresponding hub height of 107.5 m.

The overall layout of the proposed development is shown in Figure 3-1. This figure shows the proposed locations of the wind turbines, hardstanding areas, passing bays, electrical substation, borrow pits, meteorological masts, temporary construction compounds, internal site access roads layout, the main site entrances, proposed amenity access tracks and associated car parks.

Detailed site layout drawings of the proposed development are included in Planning Drawings 11399-2010 – 11399-2016, Volume 3 Appendix 1-2.



Legend

- Proposed wind farm site boundary
- Turbine Layout

Site Layout

- 110kV Grid Connection
- Battery Storage EBOP Compound
- Passing Bay
- Crane Harstanding
- Amenity Carpark
- Amenity Track
- Internal Access Road
- Substation Telecom Tower
- Borrow Pit
- Met Mast
- Deposition Area
- Temporary Construction Compounds

0 1 2
Kilometres

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

Rev	Date	Description	By	Chkd.
A	22/01/2025	First issue	S.P	I.H

Client: Bord na Móna

Project: Derryadd Wind Farm

Title: Figure 3-1
Proposed Wind Farm Site Layout

Scale @ A3: 1:35,000

Prepared by:	Checked by:	Date:
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Map Ref: 11399-003-LAY.INFR-P.APP.BO-TOB-A

Draft: A

3.3 PROPOSED DEVELOPMENT COMPONENTS

3.3.1 Wind Turbines

3.3.1.1 Turbine Locations

The location of individual turbines is influenced by a range of design constraints. These constraints are established in advance of the design modelling of the turbine layout and have a significant effect on the output from the layout modelling. Refer to Section 4.3 of Chapter 4 (Consideration of Reasonable Alternatives) which references how the layout was developed.

The proposed wind turbine layout has been optimised using wind farm design software (a combination of WAsP (wind resource assessment software), WindPro Computational Fluid Dynamics and WindFarmer) to optimise the energy yield from the wind farm site, while maintaining sufficient distances between the proposed turbines to ensure turbulence and wake effects do not compromise turbine performance.

The ITM Grid Reference co-ordinates of the proposed turbine locations are listed in Table 3.1 below. The top of the foundation levels are also listed in Table 3.1.

Table 3-1 – Turbine Location Details

Turbine ID	Top of Foundation Level (mOD)	Easting's (ITM X)	Northing's (ITM Y)
T01	42.96	604,227	769,639
T02	40.13	603,784	769,930
T03	42.24	603,631	770,710
T04	38.75	603,273	771,269
T05	39.96	603,935	771,598
T06	38.87	604,401	770,970
T07	38.88	604,567	770,387
T08	44.89	605,467	768,512
T09	44.79	605,988	768,296
T10	44.58	606,513	768,082
T11	46.07	606,428	766,264
T12	50.16	606,826	766,064
T13	44.92	606,675	767,005
T14	44.23	605,796	765,861

Turbine ID	Top of Foundation Level (mOD)	Easting's (ITM X)	Northing's (ITM Y)
T15	42.32	605,928	765,413
T16	51.00	608,184	764,439
T17	53.51	607,954	764,867
T18	49.81	608,541	764,122
T19	51.79	609,013	763,846
T20	58.32	609,820	764,155
T21	49.97	609,286	764,676
T22	53.1	609,854	765,244

3.3.1.2 Wind Turbine Specifications

The exact rating and design of the proposed turbine type will be subject to a competitive procurement process that will only commence if and when the proposed development receives planning permission. The proposed turbine type will be detailed by the turbine manufacturer on award of the contract. It is known that the proposed turbines will be the typical three bladed, horizontal axis type with general specifications as follows:

- The turbines will have a tip height of 190 m above the top of foundation level;
- Rotor diameter will be 165 m with a corresponding blade length of 81 m;
- A turbine hub height of 107.5 m; and,
- Anticipated installed capacity of approximately 6MW per turbine resulting in an estimated 132MW in total for the wind farm.

The exact make and model of the turbine will be dictated by a competitive procurement process but will adhere to the specifications and parameters set out within 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 differences differentiating one from another.

A typical turbine begins generating electricity at wind speeds of 2.5 to 3.5m/s with optimum power generation at wind speeds of approximately 12 to 20m/s. Turbines usually shut down at wind speeds greater than 25m/s in order to protect themselves from excessive wear. Modern turbines typically turn at 9 to 18 revolutions per minute (rpm) depending on wind speed and type of turbine. The entire nacelle and rotor are designed to swing around, 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 22 No. turbines will rotate in the same direction. A control unit is located at the base of the turbine and an internal ladder leads up to the nacelle where the shaft, gearbox and generator are located.

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 and connected via low voltage cables to the wind turbine transformer. This transformer steps up the generated low voltage to medium voltage 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.

A drawing of the fixed dimensions of the proposed wind turbine type is shown in Planning Drawing 11399-2032.

3.3.1.3 Turbine Tower

The turbine tower is typically a conical steel tube with triple 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 typically 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 typically around 4 m in diameter, tapering to approximately 2 m where it is attached to the nacelle. The tower is accessed by a galvanised steel hatch door, which will be kept locked except during maintenance.

3.3.1.4 Turbine Blades

Wind turbine blades are airfoil-shaped blades that harness wind energy and drive the rotor of a wind turbine. The airfoil-shaped-design (which provides lift in a fixed wing aircraft) is used to allow the blades to exert lift perpendicular to wind direction. The difference in air pressure across the two sides of the blade creates both lift and drag. The force of the lift is stronger than the drag and this causes the rotor to spin. 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.

The wind farm has been designed to accommodate turbines with a blade length of 81 m. A traffic and transport assessment has been prepared as part of this EIAR (Chapter 15 Traffic and Transport) with Swept Path Analysis modelling undertaken for an 81 m blade. See Appendix 15-3 (Swept Path analysis - Abnormal Indivisible Load (AIL)) carried out by Pell Frishmann.

3.3.1.5 Turbine Foundations

Construction of the turbine bases will require excavation of the surrounding soil or peat from the foundation and crane hardstanding area to founding level with access being provided from adjacent tracks at or near the surrounding ground level.

Each wind turbine will require piled foundations, bored foundations or a gravity foundation of 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. Piled foundation, bored foundations and gravity foundation bases are generally 24-26 m in diameter with detailed foundation design being dictated by the local ground conditions.

Each wind turbine is secured to a reinforced concrete foundation that is installed below the finished ground surface. The size of the foundation will be dictated by the turbine manufacturer, and the final turbine selection will be the subject of a competitive procurement process.

Different turbine manufacturers use different shaped turbines foundations, ranging from circular to hexagonal and square, depending on the requirements of the final turbine supplier. The turbine foundation transmits any load on the wind turbine into the ground. After the foundation level of each turbine has been formed using piled foundations, bored foundations or a gravity foundation, the bottom section of the turbine tower or "cage" is levelled (Plate 3.1 below). Reinforcing steel is then built up around and through the cage (Plate 3.2 below), and the outside of the foundation is shuttered with demountable formwork to allow the pouring of concrete (Plate 3.3 below).

Piled foundations, bored foundations and gravity foundations are shown on Planning Drawings 11399-2042 to 2044.

Plate 3-1:Levelled Turbine Anchor Cage

Plate 3-2: Turbine Anchor Cage with Adjustment Feet

Plate 3-3:Completed Turbine Base Cage

3.3.1.6 Hardstand areas

Hardstand areas consisting of levelled, compacted hardcore and are required around each turbine base to facilitate access, turbine assembly and turbine erection. The hard-standing areas are typically to accommodate 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 turbine hardstanding areas are shown on Planning Drawing 11399-2031 and shown on the site layout drawings (Planning Drawing 11399-2010 to 2016) included with the Planning Application in Appendix 1-2. The hardstanding areas shown represent a design based on manufacturer's requirements and seeks to accommodate a number of different turbine types and models. This EIAR utilises this design when determine the quality, significance, extent and duration of potential effects.

3.3.1.7 Assembly Area

Unbound, levelled assembly areas will be located on either side of each hard-standing area as shown on Planning Drawing 11399-2031. These assembly areas are required for offloading turbine blades, tower sections and hub from trucks until such time as they are ready to be lifted into position by cranes.

3.3.1.8 Turbine Colour

The turbines are multi-ply coated to protect against corrosion. It is proposed that the turbines would 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:

- Department of the Environment, Heritage and Local Government (DoEHLG) – "Wind Farm Development – Guidelines for Planning Authorities" (2006);
- Department of Housing, Planning and Local Government (DHPLG) – "Draft Revised Wind Energy Development Guidelines" (2019); and,
- "The Influence of Colour on the Aesthetics of Wind Turbine Generators" – ETSU W/14/005333/00/2000.

3.3.1.9 Power Output

The proposed wind turbines have an assumed rated electrical power output of 6 MW. This may vary as a result of the final turbine type, power output modelling and turbine development over the period leading up to construction. For the purposes of this EIAR, a rated output of 6 MW has been used to calculate the power output of the proposed development, which would result in an estimated installed capacity of 132 MW.

Based on the above, the proposed wind farm has the potential to produce up to 337,645 MWh (Megawatt hours) of electricity per year, based on the following calculation: A x B x C = Megawatt Hours of electricity produced per year where:

- A = The number of hours in a year: 8,760 hours
- B = The capacity factor, which takes into account the intermittent nature of the wind, the availability of wind turbines and array losses etc. A capacity factor of 29.2%[1] is applied here and corresponds to the average wind capacity factor for the period 2023. Wind Capacity factor for 2024 is not available yet.
- C = Rated output of the wind farm: 132 MW

The MWh of electricity produced by the Proposed Development would be sufficient to supply a range of approximately 80,392 Irish households with electricity per year, based on the average

[1] energy-in-ireland-2024.pdf

Irish households using 4.2 MWh of electricity (this latest figure is available from the March 2017 CER Review of Typical Consumption Figures Decision)[2] .

3.3.2 Internal Site Access Roads

The proposed wind farm site will be accessed primarily via the main site access A to the southern part of Derryadd Bog, off the R392 and will facilitate both materials delivery (stone, steel and concrete) as well as large oversize components such as turbine blades, tower sections and substation components. Additional access points for HGVs and LGVs are provided on the N63 National Road (Existing Mountdillon access and site Access C (see figure 3-2 below)). Internal site access roads will be constructed as part of the initial phase of the construction of the wind farm. Material will either be won from the proposed borrow pits, if deemed suitable based on testing, or imported into the site to provide the required base of the internal site access roads. The internal site access roads will be a mixture of permanent (construction/operational and amenity) roads, and amenity access track (pathways/cycleways). The internal road layout and types are shown in Planning Drawing 11399-2033.

New internal site access road for construction traffic and shared vehicular road (Type 1 to 4), as shown in Planning Drawing 11399-2033), will have a running width of approximately 6 m, with wider section at corners and on the approaches to turbine locations. The amenity access tracks (Type 5 and 6) will be 3 m in width as shown in Planning Drawing 11399-2033. All new access roads will be constructed with a 2.5% camber to aid drainage and surface water runoff. The proposed new access roads will incorporate passing bays to allow traffic to pass easily while traveling around the site.

Two road construction methodologies will be used:

1. Floating Roads; and,
2. Founded Roads.

Typical road construction details are included in Planning Drawing 11399-2033 and detailed further in this chapter, see section 3.9.3.

3.3.3 Borrow Pits

There are four borrow pit locations identified to produce excavated material to provide fill material for roads (for permanent site access roads and amenity access tracks), passing bays, hardstands, upfill to foundations and temporary compounds, dependent on testing results. The borrow pits are all located within Derryadd Bog (i.e., centre of the proposed wind farm site as per Planning Drawing 11399-2010) and are at advantageous locations with regards to the hauling of materials within the site.

Approximate volumes of materials available on site are summarised in Table 3-2. The estimates are based upon specific dimensions to provide a safe working zone and to minimise land take.

[2] 2 Commission for Regulation of Utilities 2017: Review of Typical Consumption Figures – Decision

Paperhttps://www.cru.ie/document_group/review-of-typical-consumption-figures-decision-paper/

Table 3-2 Borrow Pit Summary

Borrow Pit	Approximate Surface Area (m^2)	Material composition
Borrow pit 1	112,514	Granular Fill / Rock
Borrow pit 2	50,881	Granular Fill / Rock
Borrow pit 3	46,009	Granular Fill / Rock
Borrow pit 4	13,745	Granular Fill / Rock

Using the average borrow pit depth of ca. 5.5m bgl, the available volume of useable material is 648,379m^3, which includes sand, gravel and stone. Refer to Chapter 9 (Land, Soils and Geology) for details. No blasting is proposed for extracting material from these borrow pits. Rock breaking, crushing and screening will be required for some of the material won from borrow pits, with some limited rock ripping. Extraction from borrow pits will be from above and below the water table.

No refuelling of machinery will occur within 50 m of surface water features. Refuelling of machinery will be carried out using a mobile double skinned fuel bowser to allow for ease of work. The fuel bowser will be re-filled off site or at the contractors site compound and will be towed around the site by a 4x4 jeep to where machinery is located. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations.

Given the volumes of material available from these borrow pits, it is possible that they will fulfil a large portion of the material requirements for the proposed wind farm site. The use of on-site borrow pits will reduce the environmental effect of other aspects of the development by reducing the need to transport material to the site.

Post-construction, the borrow pit area will be partially backfilled with overburden and excavated material from elsewhere on the site and permanently secured. A 2.4 m high chain-link security fence will be erected around the perimeter to prevent access as necessary, as per Planning Drawing 11399-2060 to 11399-2063. Appropriate health and safety signage will also be erected on the security fence and at locations around the borrow pits.

3.3.4 Sand and Stone Requirements

The volumes of granular fill (sand and stone) required for the construction of the proposed wind farm site, outlined in Table 3-3 below, have been estimated based on the proposed wind farm footprint, the anticipated excavation levels to suitable formation or suitable subgrade, and the proposed final levels for the infrastructure components. Construction grade granular fill and higher quality, final surfacing fill (including sand) will be required for the construction of the proposed wind farm site. Granular fill volumes have been estimated using the following methodology:

- The peat beneath the substation, all proposed hardstanding areas including temporary construction compounds will be excavated and replaced with construction grade granular fill up to the existing ground level.

- Roads will generally be constructed as floating roads except in areas with shallow peat and highly trafficked areas (e.g. site entrances and access roads in and out of borrow pits).
- The hardstanding areas and roads will be constructed to the 100-year flood level. Roads will generally comprise approximately 650 mm of granular fill and approximately 150 mm of final surfacing layer (or capping). Geotextile separators will be placed on the subgrade and geogrids will be installed within the road build-up.
- The proposed substation compound will be constructed to approximately 42.588mOD. The peat and unsuitable soil excavated beneath the substation footprint will be replaced with select granular fill in accordance with Eirgrid requirements. The final 250 mm shall comprise capping material.
- The internal site underground cable trenches will be approximately 1200 mm in depth. The cable trench will be backfilled up to approximately 600 mm with peat, within which the ducting will be placed. Suitable materials from the excavations of the trenches will be reinstated to form the final layer of the trench.

Table 3-3 outlines the volumes of both the construction grade and surfacing granular fill required.

Table 3-3 Granular Fill Volumes Required

Area		Surface Area m^2	Required stone material (m^3)	Borrow pit stone required (m^3)	Import stone requirement (m^3)	Stone from Turbine excavation (m^3)
Internal Haul Roadways	Enabling works	7,218	5,774	-	5,774	-
Passing Bays	Enabling works	458	275	-	275	-
Substation	Enabling works	15,250	45,750	-	45,750	-
Battery Storage/ EBOP compound	Enabling works	5,000	15,000	-	15,000	-
Construction Compounds 1, 2, 3 & 4	Enabling works	22,400	22,400	22,400	-	-
Internal Site Access Roads	Permanent works	146,070	116,856	102,249	14,607	-
Amenity Access Track	Permanent works	22,467	13,480	11,234	2,247	-

Passing Bays	Permanent works	13,835	11,068	11,068	-	-
Security Hut	Permanent works	600	480	480	-	-
Amenity Carpark	Permanent works	1,045	850	850	-	-
Pump Station Access Tracks & Hardstand Area	Permanent works	10,438	8,350	7,819	531	-
Met Mast Plinth & Hardstand	Permanent works	2,450	2,940	2,770	170	-
Turbine Foundations	Permanent works	11,682	42,845	-	5,841	37,004
Crane Hardstand	Permanent works	58,520	158,004	158,004	-	-
Grid Connection & 110kV access track	Permanent works	1,850	1,295	1,295	-	-
Total			**445,367**	**318,169**	**90,195**	**37,004**

Presently the estimated volumes of compacted material required for construction is 445,367m^3. As not all stone material can be sourced from the on-site borrow pits, importing of stone from licensed external quarries will be required. Stone material estimated to be required for import from local quarries include stone fill directly below the turbine foundation, the surface capping layer on the running surface of the proposed site roadways and hardstands, and all elements of the enabling works package including the substation and battery storage hardstand. An estimation of 90,195m^3 imported stone volume will be required.

3.3.5 Electricity Substation Compound

It is proposed to construct a 110 kV substation compound within the site to house the two control buildings; Transmission System Operator (TSO) substation and the Independent Power Producer (IPP), at the location shown on Planning Drawing 11399-2018 (refer to Section 3.3.7), and electrical apparatus necessary to facilitate the generated power from the wind turbines to export onto the transmission system. The layout of the proposed substation is shown on Planning Drawing 11399-2018. The construction and electrical components of the substations will be to ESB and EirGrid specifications within the parameters assessed. Further details regarding the connection between the substation and the national electricity grid are provided in Section 3.3.9. The footprint of the proposed substation compound is approximately 132 metres in length by approximately 101 metres. Refer to Planning Drawings 11399-2020 for the substation elevations.

3.3.6 Battery Storage

Provision has been made for a battery energy storage system. This includes 20 no. containerised modules with the following dimensions per container 13.5 m x 4.7 m x 2.8 m. The containerised modules will be mounted on concrete foundations; 2no. adjoining containers per foundation. Refer to Planning Drawing 11399-2019 and 11399-2021 for details.

3.3.7 Substation Control Buildings

The TSO and IPP control buildings will be located within the substation compound. The TSO control building will measure approximately 25 metres by 18 metres and approximately 9.7 metres in height. The IPP control building will measure approximately 19 metres by 12 metres and approximately 7.0 metres in height. Layout drawings of the control buildings are shown on Planning Drawings 11399-2022 and 11399-2023.

Both control buildings will include welfare facilities for the staff. Toilet facilities will be installed with a low-flush cistern and low-flow wash basin. Due to the specific nature of the proposed development, there will be a very small water requirement for occasional toilet flushing and hand washing and therefore the water requirement of the proposed development is minimal. It is proposed to install a groundwater well adjacent to the substation in accordance with the Institute of Geologists Ireland, Guide for Drilling Wells for Private Water Supplies (IGI, 2007). The well will be flushed to the ground and covered with a standard manhole. A pump house is not currently required as an in-well pump will direct water to a water tank within the roof space of the control building (subject to final design).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 EPA's '*Code of Practice: Wastewater Treatment and Disposal Systems Serving Single Houses'* (EPA, 2021) does not apply. Similarly, the EPA's manual on '*Treatment Systems for Small Communities, Business, Leisure Centres and Hotels'* (EPA, 1999) also does not apply, as it too deals with on-site treatment of wastewater.

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. When the final destination of the materials is known following the appointment of a permitted contractor, this information will be submitted to the Planning Authority if necessary.

3.3.8 Underground Cabling from Turbines to Substation

Each turbine will be connected to the proposed on-site 110kV substation via underground Medium Voltage (MV) cables. Fibre-optic cables will also connect each wind turbine to the wind turbine control system located within the IPP Control Building. The electrical and fibre-optic cables running from the turbines to the substation compound will be run in cable ducts approximately 1.2 m bgl within the proposed wind farm internal roadways, as shown on Planning Drawing 11399-2025.

3.3.9 Grid Connection

The proposed 110 kV substation will be connected to the national electricity grid via a loop-in connection to the nearby Lanesborough-Richmond 110kV Overhead Line (OHL) Network, located approximately 250 m south of the proposed substation. The loop-in connection will comprise of high voltage underground cables connecting the substation to the Lanesborough-Richmond 110kV OHL. Further detail on the grid connection methodologies is provided in Section 3.9.5 below. Refer to Planning Drawings 11399-2024 and 11399-2017.

3.3.10 Local Electricity Supply

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

Currently there is an electricity supply running along the N63 National Road, approximately 150 m from the proposed substation compound. 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 exact source of supply is to be confirmed, however, the supply will enter the site by either MV overhead line or MV underground cable. 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 AC distribution board.

3.3.11 Meteorological Masts

Two permanent meteorological masts are proposed as part of the proposed development; one within Derryaroge bog and another within Lough Bannow bog. The met masts will be equipped with wind monitoring equipment at various heights. The masts will be located as shown on the site layout drawing in Figure 3-1. Each mast will be a slender, free- standing lattice structure, each 120 metres in height, as shown in Planning Drawing 11399-2038.

The masts will be constructed on a hardstanding area of approximately 744 m^2, sufficiently large to accommodate the crane that will be used to erect the mast, adjacent to the proposed internal site access road.

3.3.12 Construction Compounds

Four temporary construction compounds are included as part of the proposed development (See Table 3-4); the four temporary compounds strategically situated to serve wind farm construction on all bogs (i.e. south of Derryaroge, south of Derryadd and north of Lough Bannow bogs).

Table 3-4 Construction Compounds

Compound No.	Location	Townland	Dimensions	Total Area (m^2)
1	Existing Mountdillon Works Yard	Cloonfore	130 m x 75 m	9,750 m^2
2	West of proposed onsite substation in Derryaroge Bog and North of Mountdillon Works	Cloonfore	100 m x 40 m	4,000 m^2
3	South of proposed T15 in Derryadd Bog	Derraghan More	100 m x 40 m	4,000 m^2
4	West of proposed T16 in Lough Bannow Bog	Cloontabeg	100 m x 40 m	4,000 m^2

The location of the proposed construction compounds is shown on the site layout Planning Drawing 11399-2010.

The construction compounds will typically consist of temporary site offices, staff welfare facilities, storage areas (including waste and recycling areas), and car-parking areas for staff and visitors. The layout of the temporary construction compounds is shown on Planning Drawings 11399 – 2029 to 2030.

Temporary toilets will be used during the construction phase as part of the welfare facilities for site staff and visitors. Wastewater from toilets will be directed to a sealed storage tank, which will be collected and tankered off site by an appropriately consented waste collector to wastewater treatment plants.

3.3.13 Temporary Security Cabins

Four temporary security cabins will be installed within the site for the duration of the construction phase of the proposed development. The temporary security cabins will be located at the main site entrance points; Site Entrance A, Site Entrance B, Site Entrance C and the existing entrance at Mountdillon Works.

Each security cabin will be the same prefabricated structure measuring 7.2 m by 2.5 m and 2.85 m in height. Each temporary security cabin will serve as the check in and check out point for staff and visitors during the construction phase only and will be removed as part of the post-construction reinstatement works upon commissioning of the proposed wind farm. Such areas are to be reinstated to its original site setting. The layout and sections of the proposed security cabins is shown on Planning Drawing 11399 – 2040.

3.3.14 Amenity Access Tracks and Carparks

3.3.14.1 Amenity Access Tracks

A total of approximately 18 km of wind farm internal site access roads within the proposed wind farm site will provide permanent amenity access (including pedestrian and cyclist access) once the proposed development construction phase has concluded. An additional approximately 7.5 km of dedicated amenity access track is also proposed to provide connectivity to local roads and allow local access to the wind farm amenity areas. These amenity access tracks will have a gravel/crushed stone finish surface and will be approximate 3 m in width on average. Figure 3-1 - Site Layout Plan outlines the final configuration of the wind farm site road with the additional dedicated amenity access tracks included in the layout plan.

The approximate 7.5 km of dedicated amenity access tracks will provide linkages between the proposed wind farm site roadways, royal canal greenway (to the east of the proposed wind farm site) and the Corlea Visitor Centre and amenity areas (to the south) and the Midlands Trail Networks project (Planning Reference No: 24/60132 (to the north)).

The amenity access points to the proposed wind farm site are illustrated in the Amenity Plan in Appendix 3-1 and in Figure 3-2 – Construction/Operational and Amenity Access Location Map.

3.3.14.2 Amenity Carparks

In addition to the amenity access tracks, 3 no. new permanent amenity car parks will be provided. Two of these car parks are located within the construction compounds (Compound No.1 and Compound No. 3) which will be converted into permanent amenity carparks following completion of the construction phase. The remaining carpark is located along the local access road on the western boundary of Derryaroge bog as shown in Figure 3-2 and Planning Drawing 11399-2050. The existing amenity carpark area at Corlea Bog (L1136 Local Road) adjacent to the proposed amenity access track in Lough Bannow Bog will accommodate amenity car parking access to the proposed development. Additionally, the carpark of the Midlands Trail Networks project (Planning Reference No: 24/60132), which is located across the local road, will connect to the proposed amenity access track north of Derryaroge Bog and will accommodate for amenity car parking access to the proposed development.

Drawing 11399-2050 illustrates the configuration of the proposed car parks, which includes for 15 no. car parking spaces, 3 no. disabled parking spaces, 1 no. bus parking area and suitable signage at each location.

3.3.15 Temporary Accommodation Works

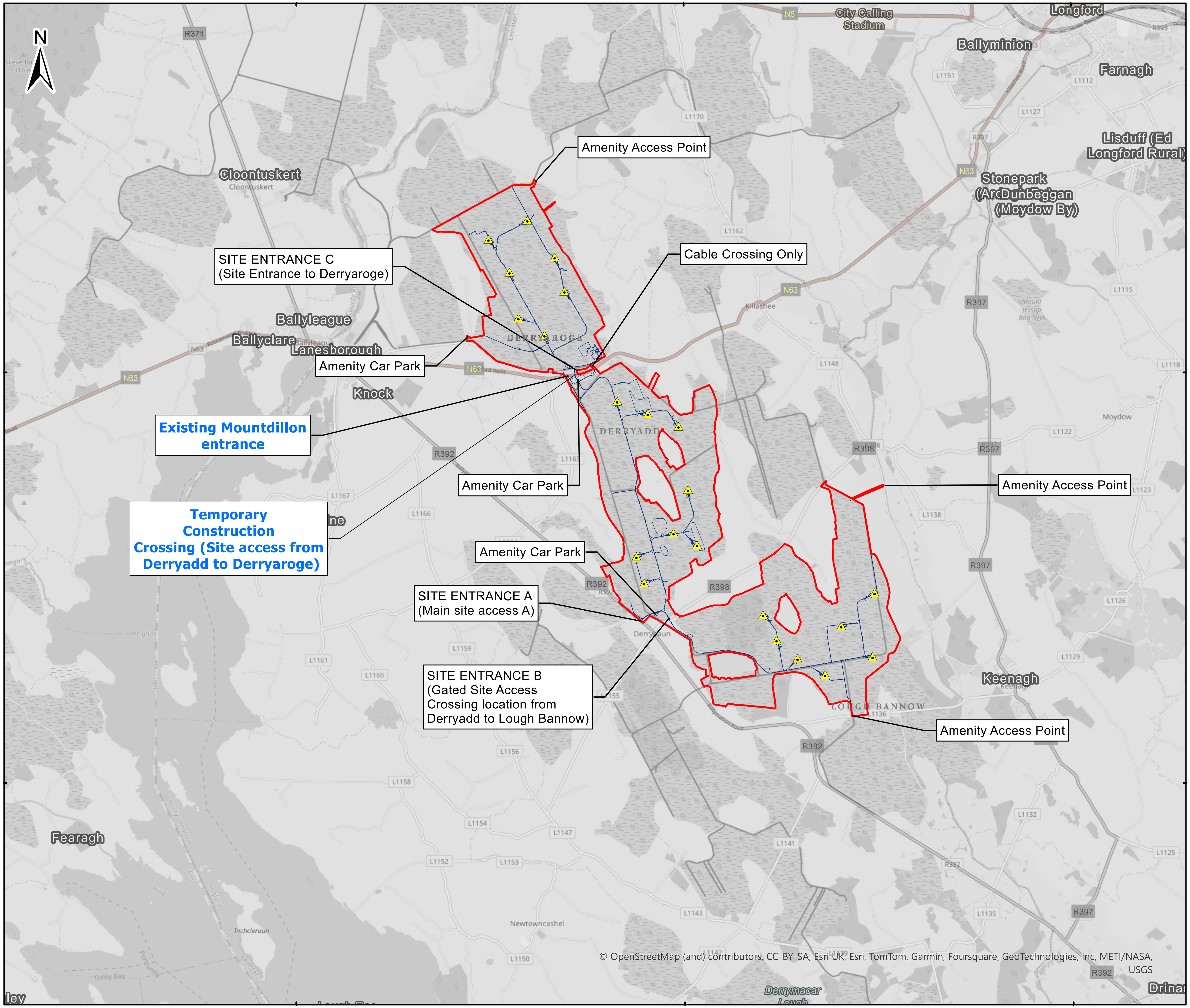
There are 5 no. locations (excluding Site Access A) along the TDR requiring temporary accommodation works in order to facilitate the delivery of turbine components to the proposed wind farm site. These Points of interest (POI) as detailed in Pell Frishmann (2023) Abnormal Indivisible Load Route Survey presented in Appendix 15-3 and illustrated in Figure 3-3 and are listed as follows:

- POI 1: N6 Eastbound Slip Road;
- POI 2: N6/N61 Roundabout at Athlone;
- POI 3: N61/N63 Roundabout at Roscommon;
- POI 4: N63 Roscommon Arts Centre Roundabout; and,
- POI 5: N61/N63 Roundabout, Northeast of Roscommon.

All accommodation works are contained within the extents of the road infrastructure and verge with the exception of POI 3 which encroaches on third party lands. Table 3-5 below details the extents of temporary accommodation works at each POI location.

Table 3-5 Proposed Temporary Accommodation Works

POI	Proposed Temporary Accommodation Works
1	The swept path assessment indicates that load bearing surfaces will be required on both sides of the slip road. On the inside of the bend, one road sign and one tree should be removed. On the outside of the bend, six chevron signs, bollard posts, one speed sign and one direction sign will need to be removed. Loads will straddle the centre line of the slip road and all marker post bollards will need to be removed. This should be done up to POI 2.
2	On the inside of the turn at the junction, five road signs, one lighting column and two posts should be removed. The splitter island on the approach arm should have an oversail surface provided and two road signs removed. The splitter island on the exit arm will also require an overrunning surface provided and two signs removed. One chevron sign should be removed from the central island of the junction.
3	Loads will require third party land to the southern verge, with loads oversailing the car park of the retail park (see Planning Drawing 11399 – 2057). This will require the removal two utility poles and one lighting column. Loads will then take a contraflow transit of the junction. This will require the provision of a load bearing surface on the entry splitter island and the central island of the junction. Two road signs and one bollard on the splitter island and the removal of one sign and trees on the central island will be necessary. The ground level of the central island will need to be lowered over the overrun area. On the exit arm, two road signs and one utility pole should be removed and an overrun surface required. A load bearing surface should be laid in the north western kerb and the kerb should be protected.
4	Loads will oversail the central island where two road signs should be removed. Loads will oversail the western verge on approach to the roundabout where two road signs should be removed. Loads will oversail the north western edge of the roundabout island where two road signs and two trees should be removed. On exiting the roundabout, loads will oversail the splitter island where one road sign should be removed.
5	Loads will overrun the entry splitter island where two signs and one bollard should be removed, and a load bearing surface provided. Loads will overrun the central island of the junction, where the ground level should be lowered and two signs and one tree removed. A load bearing overrun surface will be required. Loads will oversail the exit splitter island where two road signs and one bollard should be removed. The tree canopy of the northern verge should be trimmed back.



Legend

- Proposed wind farm site boundary
- Turbine Layout
- Site Layout

0 1.5 3
Kilometres

NOTES

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4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

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Rev	Date	Description	By	Chkd.

Client:

Bord na Móna

Project:

Derryadd Wind Farm

Title:

Figure 3-2
Construction/Operational and Amenity Access Location Map

Scale @ A3: 1:60,000

Prepared by: D.Ekpo
Checked by: I.Heanue
Date: January 2025

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Map Ref: 11399-016-ACCESS-LAY.INFR-TOB-A

Draft: A

3.4 COMMUNITY BENEFIT PROPOSAL

Bord na Móna presently manages 5 no. Community Benefit Funds at its wind farms in Mountlucas, Cloncreen, Sliabh Bawn, Oweninny Phase 2 and Bruckana. The first of these Funds were established in 2014 thanks to the help and cooperation of the communities surrounding the wind farms. The Community Gain Schemes for Mountlucas and Bruckana Wind Farms were set up on the basis of community involvement. Bord na Móna are launching an additional 2 no. funds this year; Timahoe North Solar Farm and Derrinlough Wind Farm.

The Mountlucas, Bruckana and Sliabh Bawn Community Funds consist of a fixed level of funding (based on the installed capacity of the wind farm) that is made available each calendar year for community led projects in the local area. During 2017 and 2018, a 'near neighbour' scheme was established for residents in the vicinity of these wind farms. The near neighbour schemes offer electricity bill payers living within a prescribed distance of a wind turbine an annual contribution towards their electricity usage as described in Section 3.4.1 below.

While the Cloncreen and Oweninny Wind Farm Phase 2 Community Funds are calculated in line with Renewable Energy Support Scheme (RESS) requirements and are linked to the generation of the wind farm on an annual basis. While both of these Funds include funding for community groups and near neighbours (similar to Mountlucas, Bruckana and Sliabh Bawn), they also include a Education Scholarship Fund to support local students in accessing further education. The Scholarship includes a monetary grant to successful applicants, for each year of study, up to a maximum of 4 years. The Scholarship may be used towards course fees, accommodation, tools, transport costs etc.

Bord na Móna is proposing to replicate its proven Community Benefit Fund model for Derryadd Wind Farm in accordance with best practice requirements. The Fund will look to support the local communities, near neighbours and local students.

A detailed description of the Community Benefit proposal is outlined below and in the 'Derryadd Wind Farm Community Report' in Appendix 1-6.

3.4.1 Community Benefit Fund

In addition to employment during the construction and operational phases of the proposed development and annual rates that will be paid to the local authority by the developer, a range of other benefits associated with the proposed development will be provided to the local community through the Community Benefit Fund. The Community Benefit Fund will development during the first year of operation and will include the following:

- The Fund will provide financial assistance to local communities and not-for-profit organisations within 10 km of the proposed development will be considered first and given priority - subject to the project meeting the overall terms and conditions of the Fund. A key criterion is that the projects and initiatives will benefit the communities surrounding the wind farm. A Fund Committee will be established and will consist of a a number of volunteer community representatives and the project Developer. Generally speaking, the Fund Committee should aim to represent the widest cross-section of the community possible.

- The Fund will also provide an Educational Scholarship Scheme to support a number of local students in accessing further education. It will provide a monetary grant to successful applicants, for each year of study, up to a maximum of 4 years, for a number of students (including apprenticeships) living in the vicinity the proposed development. The Scholarship may be used towards course fees, accommodation, tools, transport costs etc.

- The Fund will also implement a Near Neighbour Scheme which will offer principle primary residents within a prescribed distance of a wind turbine an annual contribution towards their electricity usage. In addition to the electricity contribution payment, this scheme will also offer participants a contribution towards the completion of energy measures on the property and/or education support. This is in line with existing near neighbour schemes that are active at other Bord na Móna operational wind farms.

The value of the Community Benefit Fund will be directly proportional to the energy produced at the site (per loss adjusted metered generation), which based on current Funds, will be in the region of €15 million over the lifetime of the project.

3.5 SITE ACCESS AND TRANSPORTATION

3.5.1 Construction / Operational Site Entrance

There will be a total of four proposed wind farm site entrances used to transport materials and equipment to the site during the construction phase. The new proposed main site access (Site Access A) will be located on the Lanesborough to Ballymahon road (R392). The existing site access (Existing Mountdillon Access) used presently for the machinery involved in ongoing decommissioning activities, will also be utilised by Light Vehicles (LVs) and Heavy Vehicles (HVs) during the construction and operation phase of the proposed development.

The four proposed site accesses are as follows:

- New proposed main site access (Site Access A) to the southern part of Derryadd Bog, off the R392;
- New proposed site crossing (Site Access B) from the South of Derryadd Bog to the northern part of Lough Bannow Bog, off the R398;
- Proposed new temporary site crossing (Site Access C) from the northern part of Derryadd Bog (Machine pass from Mountdillon Works yard) to Derryaroge Bog, required for large component transport across the N63 into Derryaroge as well as access into Derryaroge for HV's off the N63; and,
- Existing Mountdillon Access will be utilised by Light Vehicles (LVs) and Heavy Vehicles (HVs). A staggered junction will be constructed in the operational phase in line with TII guidelines (Between Mountdillon Access and Site Access C (northern arm)).

As above Site Access A will be the main construction entrance to the site and will facilitate both materials delivery to the site (stone, steel and concrete) as well as large oversize components such as turbine blades, tower sections and substation components.

During the operation phase, Site Access A will remain. Site Access B will be gated and used as necessary. Site access C will form a staggered junction in line with TII guidelines between the Existing Mountdillon Access and the northern arm of Site Access C during the operation phase (see planning drawings 11399-2056). The remaining southern arm of the new site access C will be permanently closed post construction. Refer to Figure 3-2.

Refer to Planning Drawings 11399-2051 to 11399-2056 for details of the site entrances during both construction and operation phases.

3.5.2 Amenity Site Entrances

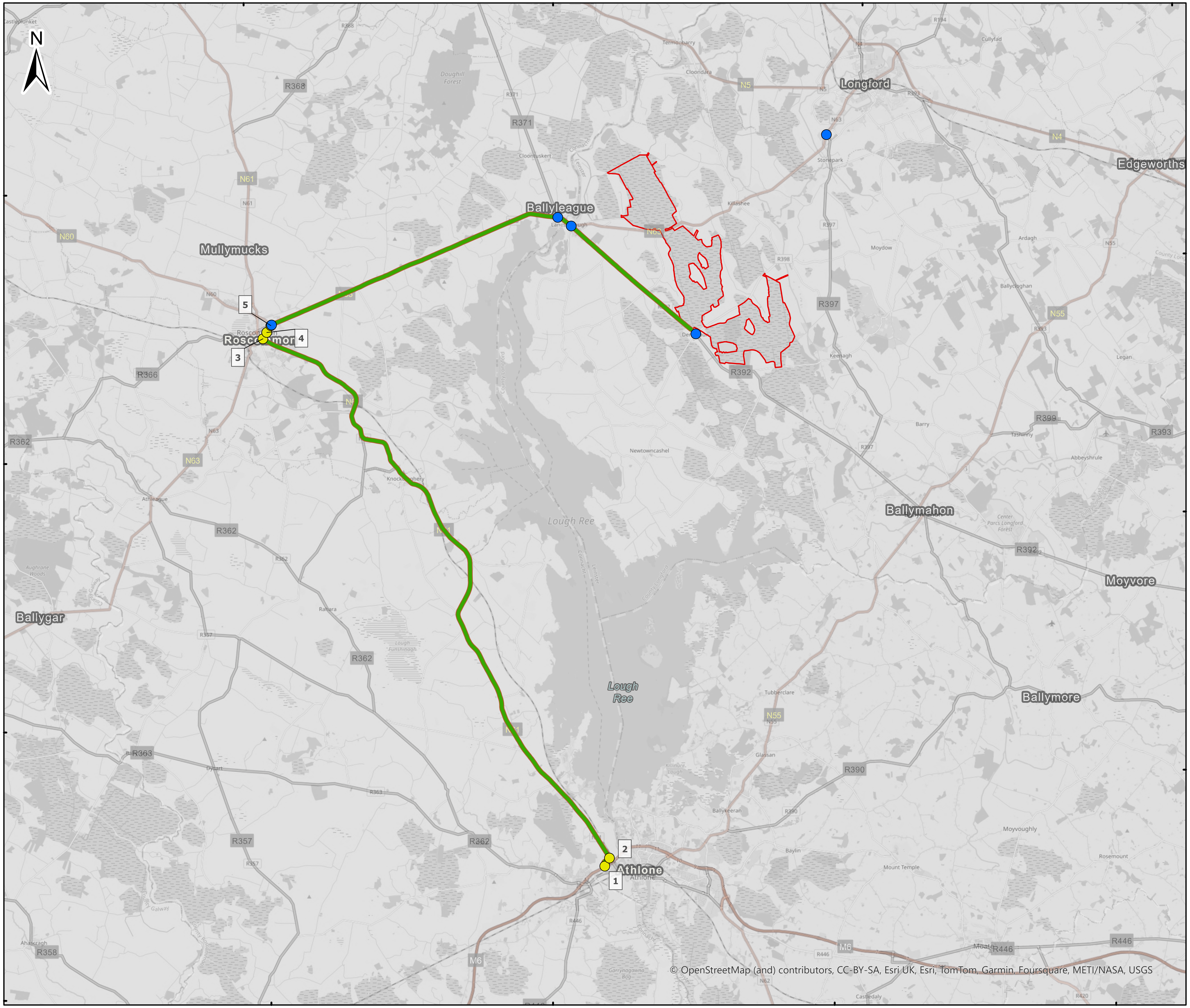
The amenity access points to the site are illustrated in the Amenity Plan in Appendix 3-1 and Figure 3-2– Construction/Operational and Amenity Access Location Map. The amenity access points will not be utilised by wind farm construction traffic. There will be a total of 6 no. amenity access points as described below. Each amenity access point is summarised below:

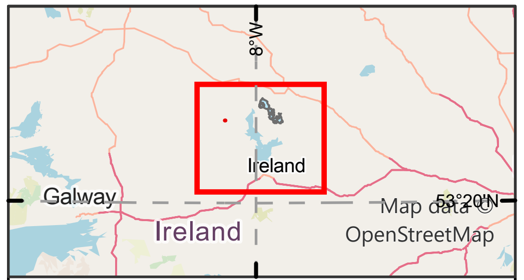
- Existing guarded rail crossing at southern part of Lough Bannow Bog from the L1136 Local Road. The amenity access point will make use of the existing amenity car park for Corlea bog on the opposite side of the local road;
- The main wind farm site access (Site Access A) from the R392 Ballymahon to Lanesborough Road which will be used for vehicular access with amenity car parking provided within the wind farm site following the completion of the construction phase;
- The existing entrance to Mountdillon Works Yard, off the N63 will also be used for vehicular access with amenity car parking provided within the wind farm site following the completion of the construction phase;
- New amenity access track from existing guarded rail crossing and machine pass junction at local access road in Ballynakill, northeast of Derryaroge Bog;
- New amenity access track and associated car park from existing machine pass junction at local access road between Cloonbony and Derryaroge Bogs; and,
- New amenity access track connecting Lough Bannow Bog to the Royal Canal Greenway to the southeast of the bog (pedestrian/bicycle access only with no carparking area).

The amenity access points will not be utilised by wind farm construction traffic and will only be available to the public following completion of the wind farm construction phase. Refer to Planning Drawing 11399-2050 and 11399-2058 for details. Refer to Figure 3-2.

3.5.3 Turbine Component Transport Route

The turbine delivery route has been identified from a detailed Swept Path Analysis (SPA) and traffic and transport assessment. The port of entry is unknown as this is often determined by the turbine manufacturer which will be subject to a competitive procurement process. It is assumed that turbine delivery will be coming from Galway Port or Foynes Port. A detailed Swept Path Analysis using a non-segmented 81 metres turbine blade in length carried on a superwing carrier trailer from the final portion of the route has been completed from the N6 Eastbound Slip Road in Athlone (Refer to Figure 3-3 below). Chapter 15 (Traffic and Transport) and Appendix 15-3 provide greater detail of the Abnormal Indivisible Load (AIL) route assessment and SPA.





Legend

- Proposed wind farm site boundary
- Traffic count locations
- Turbine Delivery Route POI
- Turbine Delivery Route

0 75 150
Kilometres

NOTES

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Rev	Date	Description	By	Chkd.

Client:

Bord na Móna

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Derryadd Wind Farm

Title:

Figure 3-3
Abnormal Indivisible Load (AIL)
Delivery Routes /
Turbine Delivery Route (TDR)

Scale @ A3: 1:150,000

Prepared by: S.Pezzetta
Checked by: I.Heanue
Date: January 2025

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Map Ref: 11399-094-AIL..TDR-LAY.INFR-TOB-A
Draft: A

The deliveries of turbine components to the proposed wind farm site will be made in convoys of three to five vehicles and mostly at night when roads are quietest. Convoys will be accompanied by escorts at the front and rear operating a “stop and go” system. Although the turbine delivery vehicles are large, they will not prevent other road users or emergency vehicles passing, should the need arise. The delivery escort vehicles will ensure the turbine transport is carried out in a safe and efficient manner with minimal delay or inconvenience for other road users.

There will be some delays to local traffic at pinch points. During these periods, it may be necessary to operate local diversions for through traffic.

Prior to the construction of the proposed development a test run of the proposed transport operation along the proposed route will be completed using vehicles with attachments to simulate the dimensions of the turbine components. Following this test run, the Traffic Management Plan will be reviewed and updated with the haulage company when the final transport arrangements are known, delivery dates confirmed and escort proposals in place. The plan will then be submitted to the relevant County Councils for agreement in writing in advance of any abnormal loads using the local roads. The plan will provide for all necessary safety measures, including a convoy and Garda escort as required, off-peak turning/reversing movements and any necessary safety controls.

3.5.4 Construction Materials Transport Routes

Construction materials will be restricted to the following routes:

- Construction materials travelling west from Longford along the N63 accessing the site through the southern entrance to Derryaroge and the northern entrance to Derryadd at Mountdillon Works;
- Construction materials coming from Lanesborough access the site either along the N63, R392 or R398 and the site entrances along those roads; and,
- Construction materials from Ballymahon going north to the site along the R392 accessing the site at the entrance along this road to Derryadd or the entrances along the R398 to Derryadd or Lough Bannow.

3.5.5 Traffic Management

As described in Chapter 15 (Traffic and Transport), the successful completion of this proposed development will require significant co-ordination and planning, and a comprehensive set of mitigation measures will be put in place before and during the construction phase of the proposed development in order to minimise the effects of the additional traffic generated by the proposed development. The traffic management plan for the proposed development is included in Appendix 15-2.

3.6 SURFACE WATER MANAGEMENT

3.6.1 Existing Site Drainage

The proposed development is located within a former peat extraction site. An extensive network of drainage channels are present throughout the peatland which is managed under IPC licence P0504-01 Mountdillon Bog Group.

The surface of the cutover bog is drained by a network of parallel northwest-southeast generally orientated field drains that are typically spaced every 15 – 20 m. The field drains are approximately 0.5 - 1.5 m deep and in most areas, they intercept the mineral subsoil underlying the peat. These field drains mostly feed into larger surface water drains which drain the main catchments across the three bog formations. The surface water drains are primarily in a northwest-southeast orientation but there are a number of shorter cross drains which intersect the small field drains. There are also a number of pump stations located at low points in the larger drains to direct the surface water to the outfall locations and boundary drains. There are various outfalls on the bog boundaries which comprise mainly pumped outfalls but also some areas of gravity drainage. Surface water draining/pumped from the site is routed via existing IPC settlement / slit ponds (in accordance with the IPC licence requirements) prior to discharge into off-site drainage channels, streams and rivers which ultimately flow into the River Shannon and Lough Ree.

Over the lifetime of the bog, arterial drainage works were installed to achieve the levels of drainage required to allow the extraction of peat deposit to the bog floor, pumping of whole bog areas or certain portions of bog areas arose where gravity drainage did not provide the required environment for peat extraction.

Derryaroge bog has deep collector drains approximately every 300 m running north south, with smaller field drains running parallel at approximately 15 m centres. The field drains are connected by pipes at the low points, and these pipes are connected to the deep collector drains. Pumps (P07 & P09) lift water from the central collector drains to collector drains nearer to the periphery of the bog, and pumps on these peripheral drains (P05, P06 & P08) lift the water for discharge to surrounding watercourses.

Derryadd bog has smaller field drains running parallel at approximately 15 m centres and 6 pump station locations, P10-P15, however pump station P13 is not commissioned, and discharge is via a gravity outfall north of the pump station site.

Lough Bannow bog has smaller field drains running parallel at approximately 15 m centres and 3 pump station locations, P16-P18. There are existing IPC settlement / slit ponds upstream or downstream of the external pumping stations to allow sediment to settle out of the water before it is discharged to the external streams.

3.6.2 Preliminary Drainage Design Concept

The drainage layout for the construction phase of the proposed development has been designed to collect surface water run-off from hardstanding areas within the proposed wind farm site and discharge to temporary construction settlement ponds prior to entering existing IPC drainage system within the bogs. Hence any surface water from the proposed works that finds its way into the existing drainage system will then be captured in the existing system of IPC silt / settlement ponds, before final discharge to the receiving watercourse. The existing IPC silt / settlement ponds are upstream and downstream of the external pumping stations to allow sediment to settle out of the water before it is discharged to the external streams, which is managed under IPC licence P0504-01 Mountdillon Bog Group.

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. Suspended solid (silt) removal features will be implemented in accordance with CIRIA C697 SuDS Manual, and CIRIA C648 Control of water pollution from linear construction projects. Drainage details are proposed on Planning Drawings 20852-NOD-01-XX-DR-C-08001 to 20852-NOD-01-XX-DR-C-080015 and 20852-NOD-ZZ-DR-C-08001 to 20852-NOD-ZZ-DR-C-08005.

Within the proposed wind farm site layout there are sections of proposed floating road between turbine infrastructure. In these sections, and depending on intermediate topography, a collector drain (road/hardstanding water system) may be used during the construction phase, or over the edge (OTE) drainage will occur. Over the edge drainage allows runoff from site roads/access tracks to flow into local field drains and be managed via the existing site drainage system. OTE drainage will only occur where topography allows, and it is only proposed in areas of low risk and remote from outfall locations (at least 150 m from bog outfall locations). Silt traps and check dams will be installed in field drains downstream of OTE drainage areas, and these will provide attenuation and treatment of water from roads/hardstand areas.

During the construction phase, all runoff from works areas (i.e., hardstands, roads) will be attenuated and treated prior to being released within the proposed wind farm site. All drainage outfall from the proposed wind farm site is routed through existing IPC settlement / slit ponds. All temporary and permanent drainage from the site will be designed to have as a minimum three stages of treatment, as defined in the SuDS Manual. Management of runoff will include the following:

- Filtration of water through filter media (sand / stone check dam, silt fence);
- Detention / settlement in settlement ponds or behind check dam in swales; and,
- Conveyance of shallow depths of water in vegetated swale.

The main drainage design principles are outlined below:

- The roads are expected to be constructed of granular material, so a runoff coefficient of 0.6 is applied to the rainfall to determine the runoff volume. This gives an effective rainfall of 61.68 mm;
- Roads shall crossfall in one direction to the downgradient side following the natural gradient of the ground;
- Road drainage will be provided on the downgradient side of the road;
- The road will drain over the edge to a road drainage swale;
- Roadside swales will capture and attenuate the rainfall and will discharge by infiltration and evaporation. Based on a 6 m road width, the runoff per metre length of road will be 61.68 x 6 = 370 mm/m = 0.37 m3/m;
- Each swale will have a base width of 1 m and side slopes of 1V:2H, so a 250 mm depth on the swale will store a volume of 0.375 m3/m, which is sufficient to store the 100 year 24 hour storm, including allowance for climate change;
- Interceptor drainage will be provided on the upgradient side of the road to collect the drains crossed by the road;
- 600 mm culvert pipe is proposed for drainage crossing the infrastructure access tracks;
- 1200 mm culvert pipes are proposed for infrastructure crossing any large collector drains;
- Road drainage will be provided in swales with check dams;
- Each roadside swale will be arranged with 400 mm high check dams spaced so as to retain 100 mm of water at the upstream end of the swale when the downstream end is full. This will give an average depth of 250 mm across the length of the swale;
- Check dams will be installed at 300 m intervals where possible. The purpose of check dams is to provide flow attenuation, slow down runoff to promote settlement and to reduce scour and ditch erosion. The design of the check dam is such that small (20 mm) single sized stone which provides a large surface area is held in place by large (75 mm) single sized stone on the downstream side;
- The road drainage swales will be sized to act as attenuation storage for the 100 year 24 hour event. Swales will generally empty by infiltration and evaporation. This will return the runoff to the bog as close as possible to where it has fallen;

- Interceptor drains will discharge either to existing collector drains or will be piped under the road at intervals to allow the water to continue towards the existing drainage outlet.
- The existing drainage network will be retained where possible, in some locations the existing drainage is required to be rerouted around the wind farm infrastructure to maintain connectivity;
- For proposed floating road sections between turbines infrastructure, OTE drainage maybe incorporated;
- OTE drainage allows runoff from access tracks to flow into local field drains and be managed via the existing site drainage system;
- OTE drainage will only occur where topography allows, and it is proposed in areas of low risk and remote from outfall locations (at least 150 m from bog outfall locations).
- Silt traps and check dams will be installed in field drains downstream of OTE drainage areas, and these will provide attenuation and treatment of runoff from roads/hardstands;
- Pump stations will be upgraded for H&S requirements, refer to Table 3-6 for list of work at each pumping station;
- The existing pump discharge will not be increased;
- Temporary construction settlements ponds will be installed for dewatering at excavations of the wind farm infrastructure (substation, foundations, met mast etc);
- During the construction phase, dewatering silt bags will also be used as required. They can be used downgradient of turbine bases, where temporary pumping is required. Discharge from dewatering silt bags will flow into settlement ponds and treated water from settlement ponds will outfall to existing field drains and main drains; and,
- Culverts will be required where site roads and proposed hardstands cross the main bog drainage networks. These will be installed with a minimum gradient to reduce the entrainment of suspended solids. All culverts will be inspected regularly and maintained where appropriate. Culverts will remain in-situ during the operational phase of the proposed development.

The proposed development drainage will not significantly alter the existing drainage regime at the proposed wind farm site. Moreover, the proposed drainage system will be fully integrated into the existing bog drainage systems. Existing field drains and main drains will be routed under/around proposed internal site access roads and amenity access tracks using culverts as required.

The proposed operation phase drainage design is utilising the existing onsite drainage. Any surface water run-off will make its way into the existing field drains and existing IPC surface water settlement / slit ponds infrastructure before being discharged to the receiving watercourse through existing discharge points by pump or gravity flow. There will be no direct discharges from the proposed wind farm to any existing natural watercourse.

The surface water drainage system utilises sustainable drainage devices and methods where appropriate with surface water runoff to be maintained at existing runoff rates i.e. 1.7 l/ha/sec.

The proposed wind farm site drainage process flow is shown on Figure 3-4 below. The drainage design employs the various measures further described below and in Appendix 10-3 - Surface Water Management Plan (SWMP).

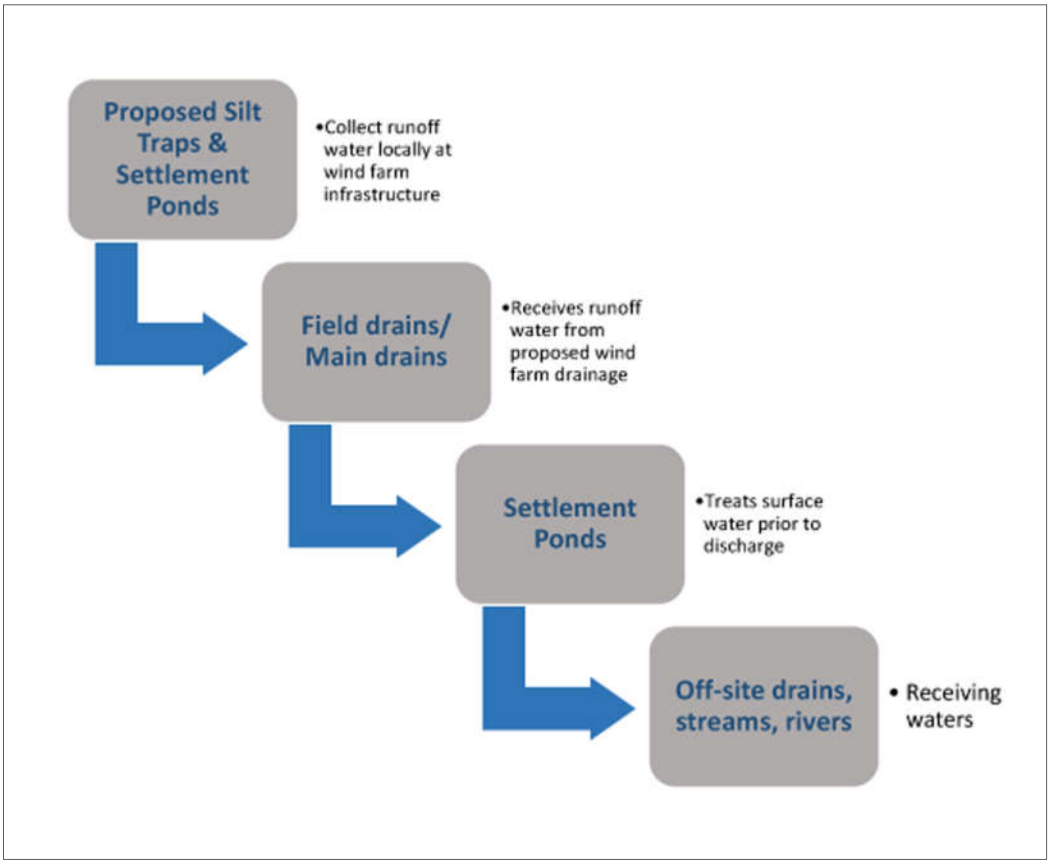

Figure 3-4 Proposed Wind Farm Drainage Process Flow

3.6.2.1 Pumping Stations

Pumping stations are required to be maintained and operational for the construction phase to maintain the existing site drainage network. For the operational phase of the proposed wind farm, pumping stations are required to be operational for the full life cycle of the proposed wind farm. The pumping station are required in case of emergency access into key infrastructure during the winter months and to prevent any electrical infrastructure damage from flooding. There are currently 2 types of pumps installed on the bog:

- Type A – Submersible pump; and,
- Type B – Screw pump.

Pumping Stations locations are shown on the drainage drawings 20852-NOD-01-XX-DR-C-08002 to 20852-NOD-01-XX-DR-C-08015 and construction details are shown on 20852-NOD-ZZ-DR-C-08001 to 20852-NOD-ZZ-DR-C-08005.

The pump stations will be upgraded for health and safety purposes but will not have their flow rates changed. It is likely that pumps will be standardised to two models across the site to allow for efficient operation and maintenance. The pump configuration to be installed in each pump station will be selected based on the existing installed capacities to avoid significant changes in the maximum outflow from the site. The existing IPC settlement / slit ponds upstream of the external discharge will remain in use.

During construction of the upgraded pump stations discharging to the site boundaries, the flow rates of any temporary pumping facilities provided should not exceed the design flow rates at those sites. All existing screw pumps at the proposed wind farm site will be replaced with a new submersible pump of same size. Refer to Table 3-6 for a list of work required at each pumping station.

Table 3-6 Summary Description of the Pumping Stations for the Proposed Development

Pump Station No.	Summary Description of Works
P05	Supply and fit the existing Submersible Pump Station with new cover, instrument package, and Electrical Control Panel, complete in all respects including all cabling etc., undertake modifications to pipework as necessary, and commission the upgraded pumping station.
P06	Supply and fit the existing Submersible Pump Station with new cover, instrument package, and Electrical Control Panel, complete in all respects including all cabling etc., undertake modifications to pipework as necessary, and commission the upgraded pumping station.
P07	Decommission and remove the existing Screw Pump Station.
P08	Decommission and remove the existing Screw Pump Station. Excavate, supply, construct, install, and commission a new Submersible Pump Station.
P09	Decommission and remove the existing Screw Pump Station.
P10	Supply and fit the existing Submersible Pump Station with new cover and Electrical Control Panel, complete in all respects including all cabling etc., remove the existing three Pumps and replace with two new Pumps with an equivalent capacity, undertake modifications to pipework as necessary, and commission the upgraded pumping station.
P11	Fit the existing Submersible Pump Station with new cover and Electrical Control Panel, install a new pipe support bridge and undertake modifications to pipework as necessary, and commission the upgraded pumping station.
P12	Supply and fit the existing Submersible Pump Station with new cover, instrument package, and Electrical Control Panel, complete in all respects including all cabling etc., undertake modifications to pipework as necessary, and commission the upgraded pumping station.
P14	Supply and fit the existing Submersible Pump Station with new cover, instrument package, and Electrical Control Panel, complete in all respects including all cabling etc., undertake modifications to pipework as necessary, and commission the upgraded pumping station.
P15	Decommission and remove the existing Screw Pump Station.

	Excavate, supply, construct, install, and commission a new Submersible Pump Station.
P16	Supply and fit the existing Submersible Pump Station with new cover, instrument package, and Electrical Control Panel, complete in all respects including all cabling etc., undertake modifications to pipework as necessary, and commission the upgraded pumping station.
P17	Decommission and remove the existing Pump Station. Install a new Submersible Pump Station fitted with the existing Pumps, undertake modifications to pipework as necessary, and commission the upgraded pumping station
P18	Supply and fit the existing Submersible Pump Station with new cover, instrument package, and Electrical Control Panel, complete in all respects including all cabling etc., undertake modifications to pipework as necessary, and commission the upgraded pumping station.

Open drainage channels are to be constructed to maintain drainage connectivity due to the decommissioning of pump stations P07 and P09 as per drainage drawing 20852-NOD-01-XX-DR-C-08002 and 20852-NOD-01-XX-DR-C-08003 and construction detail drawings 20852-NOD-ZZ-DR-C-08001 to 20852-NOD-ZZ-DR-C-08005.

The existing pumping stations listed in Table 3-6 shall be upgraded or replaced to meet current health and safety standards. The upgrades are aimed at achieving the following:

- Minimising Health and Safety risks during construction and commissioning.
- Minimising the operation period risks to the Health & Safety of the Public and of the Pump Station Operations and Maintenance Personnel.
- Ensuring that the Pump Station Sites and associated infrastructure are secure from tampering.
- Ensuring that the Pump Station Control system is functional and robust, and that the operator will be notified automatically of any fault conditions.
- Optimising the Pump Station Network.
- Maintaining the existing bog conditions while allowing for future control changes during bog rehabilitation works.

The new upgraded pumping stations will be submersible pumping stations with lockable access covers and removable gratings.

Pump station pipework is to be placed below ground or if placed above ground it will be encased in an earthen bund. The bund shall comply with the normal requirements for trench backfill. Any above ground valve will not be within the bund but will be contained in a lockable safety cage to prevent unauthorised access. Rising mains from the new or upgraded pumping stations to the existing pump station discharge outlets will be HDPE or other approved material. Please refer to drawings 20852-NOD-ZZ-DR-C-08001 to 20852-NOD-ZZ-DR-C-08005 for proposed new pumping station works.

The pumping stations are designed as rectangular steel structures in order to be lighter to transport over the soft ground, and in order to allow silt removal by use of an excavator bucket.

The top frame must be safely removable for sump cleaning. The locations of instruments and equipment have been determined and positioned to avoid interference with excavator placement for cleaning operations.

The pump stations will be designed to pump at a rate of 1.7 l/s/ha from their contributing catchment.

New internal site access roads will be constructed for access into each pumping station for maintenance and operational purposes. Please see drawing for proposed pumping station layout 20852-NOD-ZZ-XX-DR-C-08001 to 20852-NOD-ZZ-XX-DR-C-08015.

3.6.2.2 Interceptor Drains

Interceptor drains/diversion ditches will be installed ahead of the main earthworks activities to minimise the effects of collected water on the stripped/exposed soils once earthworks commence. This drainage will integrate into the existing site drainage. These drainage ditches will be installed on the upgradient boundary of the areas affected by the access track earthworks operations and installed ahead of the main track construction operations commencing. They will generally follow the natural flow of the ground. The interceptor drains will intercept any storm water surface run-off and collect it to the existing low points in the ground, allowing the clean water flows to be transferred independently through the works without mixing with the construction drainage. It will then be directed to areas where it can be redistributed over the ground by means of a level spreader.

3.6.2.3 Swales

Track edge drainage/swales are required to control run-off from the running surface to lower water levels in the subgrade, to control surface water and to carry this flow to outlet points. Swales along internal site access roads are to be installed in advance of the main construction phase. On sections of road where there is significant longitudinal gradient, regular surface water interception channels will be employed – these will typically be at 10-20 meter intervals to collect any surface water that is discharging as sheet flow along the road and discharge the flow into the roadside swale.

3.6.2.4 Temporary Construction Settlement Ponds

Run-off arising from the proposed development will discharge into temporary construction settlement ponds specifically constructed for managing surface water from the construction of the wind farm. Temporary construction settlement ponds will be located downstream of road swale sections and at turbine/hardstand locations, to manage/buffer volumes of runoff discharging from the drainage system during periods of high rainfall, thereby reducing the hydraulic loading to watercourses. Temporary construction settlement ponds will be located as close to the source of sediment as possible while also maintaining the appropriate setback distance from existing watercourses (i.e. 50 m). A number of temporary construction settlement ponds will be established during the construction phase along roadways, hardstands and in areas of high construction activity to minimise silt laden run-off entering the drainage network.

Once treated in the temporary construction settlement pond, the treated surface water will then be allowed to spread across the adjacent cutaway peatland / dispersed across vegetation to further filter the discharge. Dispersal in this manner has the effect of allowing the smaller particle sizes to be taken up and naturally filtered by the vegetation. A typical detail of the proposed temporary construction settlement ponds is shown on Planning Drawing 11399-2034. Temporary construction settlement ponds will require regular inspection and cleaning when necessary. This will be carried out under low or zero flow conditions so as not to contaminate the cleaned surface water from the settlement pond and in accordance with the existing IPC license SOP (Standard Operating Procedure). All temporary construction settlement will be removed post construction. Subject to potential planning permission and associated conditions, and prior to commencement of construction activity, this drainage design (including construction specific measures) will be reviewed by the appointed Contractor.

A Surface Water Management Plan (SWMP) has been prepared and is included as Appendix 10-3 of the EIAR. The purpose of this plan is to ensure that all site works are conducted in an environmentally responsible manner so as to minimise any adverse effects from the proposed development on surface water quality. The plan will incorporate the following specific objectives:

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

During the operational phase of the proposed development the management of surface water will be carried out in accordance with the proposed design and associated management features. The design of the wind farm has been developed following a detailed examination of the existing drainage system on site. The drainage design ensures that any surface water arising from the proposed wind farm operation will be contained and treated to ensure it can be dispersed out from the proposed development without any significant effect.

The decommissioning phase will utilise the proposed operation phase infrastructure and follow future best practise decommissioning measures in place to minimise effects.

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.

3.6.3 Silt control

Silt control measures e.g., silt bags, will be implemented as required during the construction process. Refer to Plate 3-4. Dewatering silt bags 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 by a licensed waste contractor.

Proprietary settlement tanks are designed to capture silt and suspended solids – Refer to Plate 3-4. Settlement Tanks feature a series of integral weir walls which aid effective settlement of the solids. Their design enables two or more units to be linked together for multi-stage settlement, should this be required.

Check dams will be installed within drainage ditches located within the proposed wind farm site boundary. Check dams will be keyed 200 mm into the drain. The dam will initially be built up with >100 mm stone. Clean well graded stone will be used to complete the check dam to a height of 500 to 750 mm above the invert of the swale/drain. Aggregate size for stone check dams will be between 10-40 mm clean stone. An area of 1.2 m downstream will be protected to dissipate energy from the dam using geotextile and 100 mm stone.

Plate 3-4 Examples of Proprietary Silt Control Measures

In specific locations, silt fences will be installed as an additional water protection measure around existing watercourses, particularly where works are proposed within the 50 m buffer zone of a stream. Refer to Plate 3-5. The silt fences will be erected as per the manufacturer's guidelines and will be positioned to allow an appropriate working area. The silt fences will be installed under the ECoW supervision and will be maintained until all ground disturbance has ceased and vegetation re-established. Once installed, the silt fence will be inspected regularly during construction and more frequently during heavy rainfall events. The ECoW will also supervise the removal of the silt fences following the completion of the works. Additional silt fencing and emergency spill kits will be kept on site for use in emergencies.

Plate 3-5 Examples of Silt fences

3.6.4 Over the Edge Drainage (OTE)

Within the proposed wind farm layout there are sections of proposed floating road between turbine infrastructure. In these sections, and depending on intermediate topography, a collector drain may be used during construction phase, or over the edge (OTE) drainage will occur. Over the edge drainage allows runoff from access roads/tracks to flow into local field drains and be managed via the existing site drainage system. OTE drainage will only occur where topography allows, and it is only proposed in areas of low risk and remote from outfall locations (at least 150 m from bog outfall locations). Silt traps and check dams will be installed in field drains downstream of OTE drainage areas, and these will provide attenuation and treatment of runoff from roads.

3.6.5 Check Dams

Drainage gradients within the proposed site are generally low, and as such the use of and spacing between check dams is less frequent than on hillside sites. The velocity of flow in the interceptor drains and collector drains will be controlled by check dams, which will be installed at regular intervals along the drains to ensure flow in the drain is non-erosive.

Check dams will also be installed in some existing drainage channels that will receive waters from works areas of the site. Check dams will restrict flow velocity, minimise channel erosion and promote sedimentation behind the dam. The check dams will be installed as the interceptor drains are being excavated. Check dams may also be installed in some of the existing field drains on the proposed wind farm site, downstream of where drainage swales connect in to.

The proposed check dams will be made up of stone. Clean 4 to 6-inch stone will be built up on either side and over the straw bale to a maximum height of 600 mm over the bottom of the interceptor drain. In smaller channels, a stone check dam will be installed and pressed down into place in the bottom of the drainage swale with the bucket of an excavator. The check dams will be installed at regular intervals along the interceptor drains to ensure the bottom elevation of the upper check dam is at the same level as the top elevation of the next down-gradient check dam in the drain. The centre of the check dam will be approximately 150 mm lower than the edges to allow excess water to overtop the dam in flood conditions rather than cause upstream flooding or scouring around the dams. Check dams will not be used in any natural watercourses, only artificial drainage channels (field drains) and interceptor/collector drains. The check dams will be left in place at the end of the construction phase to limit erosive linear flow in the drainage swales during extreme rainfall events.

Check dams are designed to reduce velocity and control erosion and are not specifically designed or intended to trap sediment, although sediment is likely to build up. If necessary, any excess sediment build up behind the dams will be removed. For this reason, check dams will be inspected and maintained regularly to insure adequate performance during construction. Maintenance checks will also ensure the centre elevation of the dam remains lower than the sides of the dam.

3.6.6 Culverts

Culverts will be required where site roads, crane pads and turbine hardstands cross main bog drainage networks. Indicative locations of the culverts are shown on 20852-NOD-01-XX-DR-C-08002 to 20852-NOD-01-XX-DR-C-08015. Culverts of 600 mm and 1200 mm in diameter shall be provided, a typical detail of which is shown on Planning Drawing 11399-2035. The proposed culverts and any diversion of the existing main drainage network across the proposed wind farm site are specified in the site layout Planning Drawings 20852-NOD-01-XX-DR-C-08002 to 20852-NOD-01-XX-DR-C-08015. All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance.

3.7 PEAT MANAGEMENT

The site which is generally flat consists predominantly of bare, locally re-vegetated cutaway peat and shallow peat with an established drainage network. Bord na Móna has experience managing peat in similar terrain, both during peat extraction operations and during wind farm construction projects, particularly Mountlucas, Bruckana, Cloncreen and Oweninny wind farms. These projects have demonstrated safe and effective methods for peat management and storage. The proposed methodology as outlined in the Peat and Spoil Management Plan (Appendix 9-2) is summarised below.

- Care shall be taken during peat excavation to ensure it is segregated from other soil types; therefore, particular care will be taken to review recorded peat depths. Peat shall be separated and stored by type, namely the acrotelmic and catotelmic layers. Peat and spoil shall be separated and stored separately. Plant movements and haul distances related to earthworks activity and peat excavation shall be kept to a minimum, material repositories shall be located at least 50 m away from watercourses, including site ditches to reduce the potential for sediment to be transferred into the wider hydrological system;
- Controlled quantities of peat and spoil shall be side-cast adjacent to access roads and other infrastructure only where it can be placed in a stable formation, i.e. where the topography and ground conditions allow;
- Peat and spoil shall only be cast to safe heights and slope angles, considering the topography and the ground conditions. This height shall be no more than 1m, and the slopes shall be not greater than 1 (V): 3 or 4 (H) unless a site-specific assessment during detailed design indicates a greater height and angle is safe;
- The effect of drainage or water runoff shall be considered when placing landscaping rising adjacent to access roads. Landscaping material shall not interfere with drainage, risk blocking of drainage systems or runoff into drainage systems; and
- Peat repository area location has been designed and identified in an area where the topography (slope angle <5°), peat depth, resulting stability assessment (FoS of >1.3 for 1.0 m peat surcharge) and other environmental constraints (including 50 m buffer from all watercourses) have allowed. The area is free of existing peat and drainage cuttings within the internal structure. These areas are designated for the permanent placement of up to 1 m of peat material.

3.7.1 Peat Quantities

The quantity of peat and non-peat material (spoil) requiring management for the proposed development has been calculated, as presented in Table 3-7 below. These quantities were calculated as part of the Peat and Spoil Management Plan in Appendix 9.2 of this EIAR.

Table 3-7 Approximate Peat and Spoil Volumes Requiring Management

Development Components	Peat Volumes (m^3)	Spoil Volumes (m^3)
22 no. Turbines and Hardstanding Areas	70,2823	142,811
Site Access Roads	3,840	0
Temporary Construction Compounds and Security Cabin Compounds	0	0
Substation	49,585	5,490
Battery Storage	4,242	1,818
2 Met Masts and hardstands	3,528	504
Borrow Pits	156,126	419,184
Cable and grid route connection	12,096	0
Total Peat and Spoil to be managed (m^3)	299,700	569,807

Note, a factor of 20% (bulking factor of 15% and contingency factor of 5%) has been applied and is included to the excavated peat and spoil volumes above to allow for expected increase in volume upon excavation and to allow for a variation in ground conditions across the proposed development site.

3.8 CONSTRUCTION MANAGEMENT

3.8.1 Construction Timing

Approximately 100-120 persons will be employed during the peak construction period and it is estimated that the construction phase will take approximately 24 months from starting onsite to completion of turbine commissioning. A reduction in construction staff on site is expected when the construction activities are more technical and less labour intensive.

It is assumed that some staff will arrive to the site by LVs (10 staff) and the remaining via minibus with approximately 15 persons per vehicle to limit traffic movements.

All vegetation clearance that is required during construction works will commence outside the breeding bird 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 08:00hrs and 20:00hrs weekdays and between 08:00hrs and 13:00hrs on Saturdays. However, to ensure that optimal use is made of good weather period or at critical periods within the programme (i.e. concrete pours) or to accommodate delivery of large turbine component 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 the local Planning Authority.

3.8.2 Construction Sequencing

The construction phase can be broken down into three main phases:

1. Civil engineering works: approximately 18 months;
2. Electrical works: approximately 18 months (will commence shortly after the civil works and will then run in parallel); and,
3. Turbine erection and commissioning: approximately 9 months.

The main tasks under each phase are outlined below.

Civil Engineering Works:

- Create new entrance(s) and hardcore existing entrances (where required).
- Construct new internal site access roads, drainage ditches and culverts. The internal site access roads will be a mixture of permanent (construction/operational and amenity) internal site access roads and amenity access tracks.
- Construct internal site access roads to borrow pit locations and open borrow pits.
- Clear and hardcore area for temporary construction compounds, including material storage, site welfare facilities, and site offices and install.
- Construct turbine hard-standings and crane pads.
- Construct substation compound and associated drainage ditches and culverts.
- Construct electrical apparatus bases/plinths and bund for transformer.
- Excavate/pile as required for turbine bases. Sidecast or store soil/peat locally for backfilling and re-use, if deemed feasible.
- Place blinding concrete to turbine bases using either a piled solution or on competent strata. Fix reinforcing steel and anchorage system for tower section. Construct shuttering. Fix any ducts etc. to be cast in. Pour concrete bases. Cure concrete. Remove shutters after 1-2 days.
- Decommission existing 100 m high meteorological mast at Lough Bannow bog.
- Install new 120 m high permanent meteorological masts.

- Excavate cable trenches and install electrical ducting.

Electrical Works

- Install external electrical equipment at substation.
- Install transformer at substation compound.
- Erect palisade fencing around substation area.
- Install internal collector network and communication cabling.
- Construct grid connection.

Turbine Erection and Commissioning

- Backfill tower foundations and cover with suitable material.
- Erect towers, nacelles and blades.
- Complete electrical installation.
- Commission and test turbines.
- Complete site works and reinstate site.
- Remove temporary construction compounds including material storage, site welfare facilities, and site offices. Construct permanent amenity parking in location of temporary compounds no. 1 and 3.
- Provide any gates, landscaping, signs, etc. which may be required.

The phasing and scheduling of the main construction task items are outlined in Table 3-8 below, where January 2027 has been selected as an arbitrary start date for construction activities. Refer to the Peat and Spoil Management Plan (Appendix 9-2) for further details on the construction methodology.

Table 3-8 Indicative Construction Schedule

Ref	Task Name	Task Description	Jan-27	Feb-27	Mar-27	Apr-27	May-27	Jun-27	Jul-27	Aug-27	Sep-27	Oct-27	Nov-27	Dec-27	Jan-28	Feb-28	Mar-28	Apr-28	May-28	Jun-28	Jul-28	Aug-28	Sep-28	Oct-28	Nov-28	Dec-28
1	Site Health & Safety																									
2	Site Compounds	Site compounds, site access, fencing, gates																								
3	Site Roads	Construct roads, install drainage measures, install culverts, install water, create borrow pits																								
4	Turbine Hardstands	Excavate base, construct hardstand areas																								
5	Turbine Foundations	Fix steel, erect shuttering, concrete pouring, strip shuttering																								
6	Substation Construction & Electrical Works	Construct substation, underground cabling between turbines, cabling to substation																								
7	Backfilling & Landscape	Backfill and reinstate excavated material, landscaping																								
8	Turbine Delivery & Erection	Turbine component deliveries, assemble and erection of turbines																								
9	Substation Commissioning																									
10	Turbine Commissioning																									

3.9 CONSTRUCTION METHODOLOGIES

3.9.1 Temporary Compounds, Hardstands, Material Storage Areas and Site Offices

At the commencement of the construction phase, 4no. temporary compound areas will be constructed to provide site offices, staff welfare facilities, storage areas (including waste and recycling areas), and car-parking areas for staff and visitors.

The site accommodation is likely to consist of temporary porta-cabins constructed on a granular platform. The peat/topsoil will be stripped where hardstands or development is proposed. The hardstanding's will be constructed to heights of >0.5 m above existing ground level based on the various extents of potential surface water flooding across the site.

Ground investigation in the form of peat probing and trial pitting has been carried out along the proposed turbine and hardstanding locations to inform the depth of excavation and upfill required. Preliminary volume calculations provide an estimation of fill required for the hardstands and access tracks (see section 3.3.4).

It is likely that the majority of this material volume (particularly subbase) will be obtained from onsite borrow pits. Any volumes of materials required from offsite quarries will only be sourced from those which are within a reasonable proximity of the site. The layout of the temporary construction compounds is shown on Planning Drawings 11399 – 2029 to 2030.

3.9.2 Turbine Foundations

Foundations for wind turbines may be of the gravity, bored or piled type. Trial pitting and/or windrow sampling has been carried out at each of the turbine base locations. The geotechnical investigations to date indicate that the majority of the foundations at the proposed wind farm site will be piled with some turbines being able to utilise gravity foundations. Piling depths will depend on site conditions. These will be established by detailed post-consent geotechnical investigations. Pre-construction final design will be carried out. Additional geotechnical investigations will be undertaken at each turbine location with associated sampling and laboratory testing.

For the piled turbine foundations, the piling type and configuration, as shown on Planning Drawing 11399-2044, could be up to 50 - 70 no. 300 mm x 300 mm square concrete driven piles or up to 20 no. 600 – 1200mm cylindrical piles diameter bore piles for the bored turbine foundations, as shown on Planning Drawing 11399-2043. While final piling depths will depend on localised ground conditions as discussed, the drawings detail a piling depth of 15 m – 18 m for indicative purposes.

A gravity type configuration is illustrated in Drawing 11399-2042.

A Peat Stability Risk Report has been prepared for the proposed development, including the turbine foundations, and is included in Appendix 9-3.

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 placed across the site as close to the excavation as practical. A five-metre-wide working area will be required around each turbine base, with the sides of the excavated areas sloped sufficiently to ensure that slippage does not occur. Material excavated to create the working area will be stored locally away from any sensitive environmental receptors for later reuse in backfilling the working area around the turbine foundation. The excavated material will be surrounded by silt fences to ensure sediment-laden run-off does not occur.

The formation material will be approved by an Engineer as meeting the turbine manufacturer's requirements. In the case of gravity foundations, if the formation level is reached at a depth greater than the depth of the foundation, the ground level will have to be raised with compacted structural fill. 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. In the case of piled foundations, the piling of concrete piles to the required depth will be carried out. The piles will either be constructed by coring and inserting a steel sleeve which will be filled with reinforced concrete prior to sleeve removal or driven. Where piling is carried out soil/peat will be excavated with the provision of a surrounding work area to allow placing of shuttering etc.

An embankment approximately 600 mm high will be constructed around the perimeter of each turbine base where required and a fence or berm will be erected 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 pedestrian walkway to a standard 1:12 grade (appropriate for designated walking routes and recreational trails).

There will be a minimum of 100 mm of blinding concrete laid on the formation material positioned using concrete skip and 360° excavator to protect ground formation and to give a safe working platform.

An approved and certified mobile telescopic crane or teleporter of suitable size will be used to unload reinforcing steel to required areas. The turbine anchor cage will be assembled and lifted into position using a crane and approved lifting appliances, prior to fixing the bottom matt of steel, reinforcing steel will be positioned around the anchor cage in accordance with the turbine suppliers' requirements. The anchor cage will be levelled using the adjustable base plates at the base of the anchor cage. The top flange of the anchor cage will be checked to ensure it is level using an automatic optical level. The remaining reinforcing steel will then be fixed, and earthing material attached. The level of the anchor cage will be checked again prior to, and during the concrete pour. The detailed design and exact dimensions will be fixed in accordance with the turbine suppliers' requirements once a turbine manufacturer has been selected following a competitive procurement process.

Formwork to concrete bases will be propped/supported sufficiently so as 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 up to existing ground level. The working area around the perimeter of the foundation will be backfilled with suitable material.

3.9.3 Internal Site Access Roads and Crane Pad Areas

Internal site access roads will be constructed to each turbine base and at each base a crane hard standing will be constructed to the turbine manufacturer's specifications. Tracked excavators will carry out excavation for roads with appropriate equipment attached. Material excavated to create the working area will be stored locally for later reuse in backfilling the working area around the turbine foundation, if deemed suitable based on testing. Any surplus excavated peat will be side cast, profiled and bermed as close to the excavation areas as practical as set out in the Peat and Spoil Management Plan (see Appendix 9-2). A two to three-metre-wide working area will be required around each hard-standing area, with the sides of the excavated areas sloped sufficiently to ensure that slippage does not occur.

When the formation layer has been reached, stone from the on-site borrow pits and/or local quarries shall be placed to form the road foundation. In the event of large clay deposits being encountered in sections of site access road, a geotextile layer will be required at sub base level. The sub grade will be compacted with the use of a roller or other approved compaction method. The final top layer 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. All site roads will be maintained for the duration of the proposed development.

3.9.4 Borrow Pits

Extraction from borrow pits will be from above and below the water table.

The construction of the borrow pits will follow a standard sequence as follows;

- Prior to work commencing, an extensive GPR scan for hidden services will be carried out and services will be relocated where required.
- The working area will be cordoned using temporary fencing.
- Extraction plant and vehicles on low loaders will be mobilised to site.
- An interceptor drain will be installed upslope of the borrow pit, where necessary. This drain will divert any surface water away from the borrow pit and hence prevent water from ponding and lodging during construction and when reinstated.
- Peat layer will be stripped and stored in the peat deposition area adjacent to the borrow pit. Other extracted materials deemed unsuitable following testing, for re-use will be temporary stored in the adjacent deposition area.
- Peat and spoil materials will be stored separately but spoil material can be used in cell berms to contain excavated peat material. Slopes of a maximum of 1(H):3(V) will be used in peat material and 1(H):2(V) in spoil material. However suitable drainage will be required.
- Material will be extracted using excavators.
    - A large rock breaking excavator progressively breaks out the solid rock from the ground in the borrow pit areas
    - A smaller rock breaker, in the 30-40 tonne size range, then breaks the rocks down to a size that can then be fed into a crusher
    - Other extracted materials deemed unsuitable following testing, for re-use will be reinstated within the borrow pits.
- Material will be processed to crush cobbles and boulders by using a mobile crusher and screener. The extracted, broken rock is loaded into a mobile crusher using a wheeled loading shovel and crushed down to the necessary size of graded stone required for the on-site civil works.
- The processed material will be stockpiled in designated areas within the borrow pit.
- A site access road to the borrow pit will be constructed to tie in with the internal site access road infrastructure.
- Processed material will be loaded into lorries or articulated dumpers and transported to areas within the site for the construction of internal roads, hardstand, compound and other infrastructure which require stone fill.
- Temporary excavation side slopes will be designed by a geotechnical engineer.

- Temporary control of groundwater within the borrow pits may be required and measures will be determined as part of the ground investigation programme. A temporary pump and suitable outfall locations will be required during construction.
- Temporary construction settlement ponds have been designed at the lower side/outfall location of the borrow pits.
- Upon completion, all faces of excavation will be constructed to safe permanent side slopes to be designed by a geotechnical engineer.
- Infilling of the peat and spoil will commence at the back edge of the borrow pit and progress towards the borrow pit entrance.
- The acrotelm layerwill be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the peat and spoil.
- Extraction plant and vehicles on low loaders will be demobilised via internal site roads and main site entrance.

3.9.5 Substation and Grid Connection

The main elements of the electricity substation, which comprises the Transmission System Operator (TSO) substation and the Independent Power Producer (IPP) substation, will be constructed as follows:

- The area of the onsite electrical substation will be marked out using ranging rods or wooden posts and the soil and overburden stripped and removed to nearby temporary storage area for later use in backfilling/landscaping. Any excess material will be stockpiled in the nearby peat deposition area to the north of the substation location.
- The foundations will be excavated down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it. An anti-bleeding admixture will be included in the concrete mix. The block work walls will be built up from the footings to damp proof course level and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors.
- The block work will then be raised to wall plate level and the gables & internal partition walls formed. Scaffold will be erected around the outside of the building for this operation. The timber roof trusses will then be lifted into position using a telescopic load all or mobile crane depending on site conditions.
- The roof trusses will then be felted, battened, tiled and sealed against the weather. The electrical equipment will be installed and commissioned. The base for the 36 m telecommunications mast will be formed and the mast sections and associated equipment installed. Perimeter fencing will be erected.

The construction and components of the substation have been designed to ESB/Eirgrid specifications. The substation and buildings will be accessible from a dedicated road as shown on Planning Drawing 11399-2017.

The proposed wind farm will connect to the existing national grid via a loop-in connection in the form of a 110 kV underground cable from the proposed 110 kV substation to the existing Lanesborough-Richmond 110 kV OHL as previously described.

The substation compound includes the construction and placement of battery storage units to the north of the compound. The proposed construction of the battery storage area will include development of civil works for siting the battery storage units and associated ancillary equipment. The battery units and ancillary equipment will be crane lifted and affixed into their final positions. Once fixed into position, all electrical connections will be made and commissioned prior to entering into service.

3.9.6 Grid Connection

All new build transmission infrastructure required for the proposed development is contained within the proposed wind farm site, while the proposed underground cables will cross under the N63 National Road which is located between the substation and Lanesborough-Richmond OHL. The proposed grid connection requires approximately 460 meters of 110 kV underground cable (UGC) installation from the 110 kV onsite substation to the existing OHL to the south. The entire UGC has been assessed throughout this EIAR.

The 110 kV cable route as shown on Planning Drawing 11399- 2017 from the proposed substation to the existing Lanesborough-Richmond 11 0kV OHL requires both trenching and horizontal directional drilling (HDD) construction methods. The location, description and methodology amendments are summarised in Table 3-9 below and detailed in Appendix 3-3 (TLI Outline Construction Methodology_110kV Substation and connections).

Table 3-9 Cable Route Installation Methodology

Location	Description	Installation Methodology
Substation to N63 – N63 to Loop in Masts	Trenching	• All existing underground services shall be identified on site prior to the commencement of construction works; • At watercourse crossings, the contractor will be required to adhere to the environmental control measures outlined within the planning application and accompanying reports, the detailed Construction Environmental Management Plan (CEMP) to be prepared prior to the commencement of construction, and best practice construction methodologies; • In the event that culverts require removal for ducting installation, it is proposed that a suitable method of damming the water source and pumping the water around the work area would be set out in a method statement and agreed with the relevant stakeholders. Once the ducts are installed the culvert will be reinstated to match existing levels and dimensions. If works of this nature are required, the contractor will liaise with Inland Fisheries Ireland in advance of works; • Excavated material shall be employed to backfill the trench where appropriate and any surplus material will be stockpiled in the peat deposition area. • The excavated trench will be dewatered if required, from a sump installed within the low section of the opened trench. Where dewatering is required, dirty water will be fully and appropriately attenuated, through silt bags, before being appropriately discharged to vegetation or surface water drainage feature; • Where required, grass will be reinstated by either seeding or by replacing with grass turves; • No more than a 100 m section of trench will be opened at any one time. The second 100 m will only be excavated once the majority of reinstatement has been completed on the first; • The excavation, installation and reinstatement process will take on average of 1 no. day to complete a 100 m section; • Following the installation of ducting, pulling the cable will take approximately 1 no. day between each joint bay, with the

Location	Description	Installation Methodology
		jointing of cables taking approximately 1 week per joint bay location.
N63 National Road Crossing	Horizontal Directional Drilling (HDD)	• Work areas will be fenced on both sides of the HDD away from the N63 road. • The drilling rig and fluid handling units located on one side of the crossing will be stored on double bunded 0.5 mm PVC bunds which will contain any accidental fluid spills and storm water run-off. • Entry and exit pits (1 m x 1 m x 2 m) will be excavated; the excavated material will be temporarily stored within the works area and used for reinstatement or disposed of to a licensed facility. • A 1 m x 1 m x 2 m steel box will be placed in each pit. This box will capture any drilling fluid returns from the borehole. • The drill bit will be set up by a surveyor, and the driller will push the drill string into the ground and will steer the bore path under the stream-ways and the forestry. • A surveyor will monitor drilling works to ensure that the modelled stresses and collapse pressures are not exceeded. • The drilled cuttings will be flushed back by drilling fluid to the steel box in the entry pit. • Once the first pilot hole has been completed a hole-opener or back reamer will be fitted in the exit pit and will pull a drill pipe back through the bore to the entry side. • When all bore holes have been completed, a towing assembly will be set up on the drill and this will pull the ducting into the bore. • The steel boxes will be removed, and the drilling fluid disposed of to a licensed facility. • The ducts will be cleaned and proven and their installed location surveyed. • The entry and exit pits will be reinstated as per the landowners' requirements. • 3 Days are assumed for completion of this work.
Crossing point at Existing Culverts	Utilising Existing Culvert at drain	• Where the cable route intersects with culverts, the culvert will remain in place (where possible) and the ducting will be installed either above or below the culvert to provide minimum separation distances in accordance with ESB and Uisce Éireann specifications. • In the event that culverts require removal for ducting installation, it is proposed that a suitable method of damming the water source and pumping the water around the work area would be set out in a method statement and agreed with the relevant stakeholders. Once the ducts are installed the culvert will be reinstated to match existing levels and dimensions. If works of this nature are required, the contractor will liaise with Inland Fisheries Ireland in advance of works; • Sufficient space for the proposed 110 kV cable to perform an over-the-top crossing between the top of the culvert material and the surface of the road.

Due consideration will be given to the possible presence of existing underground and overhead services, traffic management requirements and existing ground conditions within the designated working area for the grid connection. Any such steps will be determined during detailed design stage, and will include engagement with the relevant authorities, undertaking ground penetrating radar and Cable Avoidance Tool (CAT) scans.

The proposed underground cable route lies within the proposed wind farm boundary, so the disruption to the traffic and the public will be minimal. Before the construction commences, contractors will carry out a detailed site investigation along the proposed route in advance of the approved designs being finalised for the UGC trenching and ducting civil works. These site investigations will follow the proposed cable route and ensure sufficient space to install a 110 kV cable trench typically measuring approximately 0.6 m (width) by 1.2 m (depth). Refer to Planning Drawing 11399-2026 for the proposed cable trench arrangement.

A typical underground cable duct installation is shown in Plate 3-6 below.

Plate 3-6 Typical Cable Duct Installation

At the crossing point on N63 National Road, the cable duct will be drilled under the road using single shot Horizontal Directional drilling (HDD). The cable duct will be drilled at 2 m bgl. A launch pit for the directional drilling run will be excavated on one side of the road and a reception pit will be excavated on the other side. A pilot borehole will be drilled on the proposed route and this hole will be enlarged by passing a larger cutting tool of sufficient diameter to allow the cable duct to pass. The cable duct will be pulled through the hole by the drill stem and cutting head to allow for the centring of the pipe through the newly cut hole.

The proposed design for the 110 kV Loop-In from the existing OHL will require two new Line Cable Interface Masts (LCIM), which will be constructed under the existing Lanesborough-Richmond 110kV OHL, as represented on Plate 3-7. The existing OHL conductor will be terminated at these towers connecting to the substation via underground cable as shown on Planning Drawing 11399-2017 and 11399- 2024. LCIMs are used where a high-voltage underground cable connects to an overhead line and comprises of a mast and associated equipment.

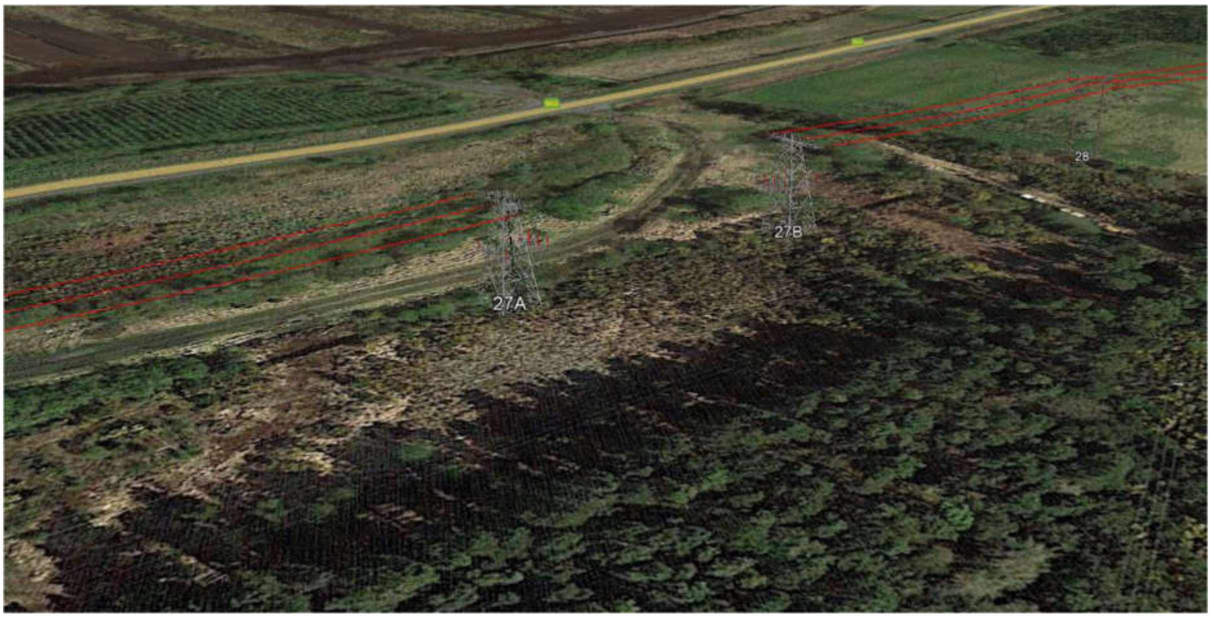

Plate 3-7 Image representing the two proposed Line Cable Interface Masts

The proposed LCIMs are within the proposed wind farm site. Each mast has a footprint of approximately 40 m^2 and an overall height of approximately 16 m. They will be lattice steel structures with cross-arms which can extend over the base footprint and internal bracing. Refer to Planning Drawing 11399-2024.

The duration of works of the overhead line construction is expected to be approximately 12 weeks. Construction of foundations for the masts will take approximately 7 days each with time allowing for curing of the concrete, erection of the masts circa 5 days each, weather dependant. Stringing of conductor will be a 2 week process and final connection to the existing grid will be carried out by ESBN (ESB Networks) and at that point in time commissioning of the substation can start.

3.9.6.1 110 kV Underground Cables

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 station buildings and the Line Interface Cable Masts.

The cables will be installed primarily within the proposed wind farm site as indicated on the planning application drawings. It should be noted that an underground cable crossing of the N63 National Road will be carried out by horizontal directional drilling (HDD) as detailed in section

3.9.6. Refer to Figure 3.5 below and Planning Drawing 11399-2026 which details the standard specification for the installation of 110 kV ducting/cabling.

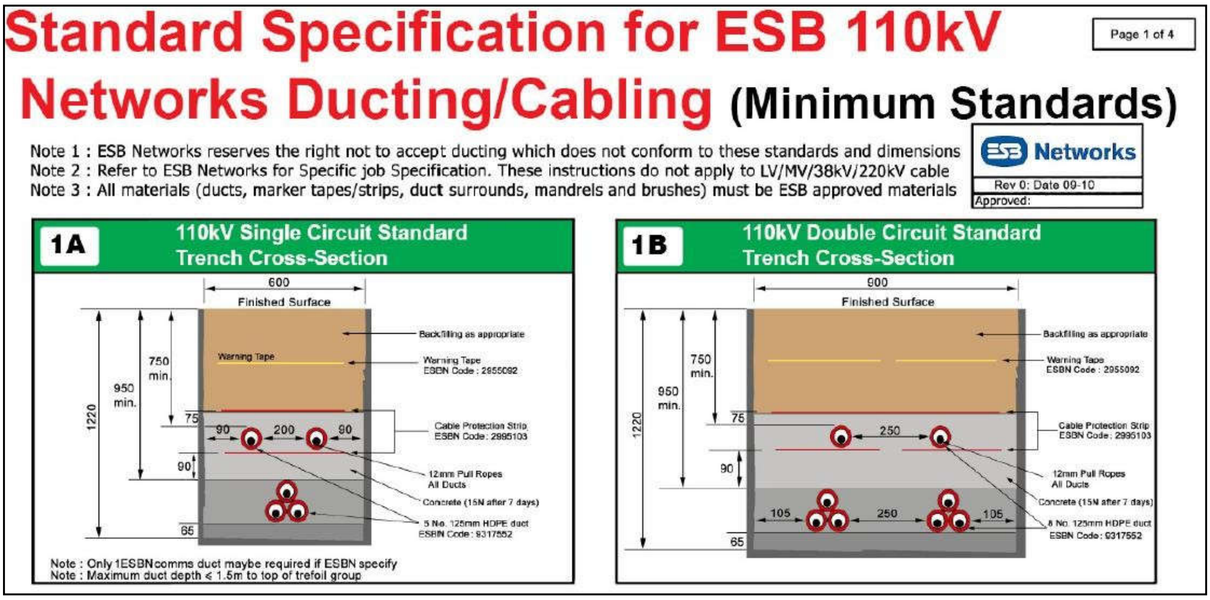

Figure 3-5 Standard ESB Specification For 110kV Cabling diagram

3.9.6.2 Cable Ducting

All cables will be laid in underground ducts. Ducts will be installed mostly by open trenching with the exception of the stretch of HDD under the N63. The typical sequence of operations for installing ducts in trenches is to strip off topsoil/peat. A trench is then formed to the required depth and width, typically measuring approximately 0.6 m (width) by 1.2 m (depth). The ducts are generally laid on a bed of lean mix concrete and surrounded with lean mix concrete. The small amount of surplus soil/peat will be used for local restoration and landscaping or backtracked to the nearby peat deposition area. Excavation works should be monitored and in the highly unlikely event that contaminants are encountered these will need to be segregated from all uncontaminated soils, temporarily stored (any stockpiles should be lined and covered by heavy duty 1000-gauge plastic), sampled and analysed for relevant parameters (Waste Acceptance Criteria suite e.g. Rilta Disposal Suite). Any contaminated soils must be characterised as per the requirements of the relevant Waste Acceptance Criteria (WAC) under the relevant European Communities Council Decision (EC) (92003/33/EC) and classified in accordance with the requirements of the EPA as set out in the following documents 'Waste Classification List of Waste & Determining if Waste is Hazardous or Non-hazardous' (EPA, 2018). Any contaminated soils must be transported by appropriately permitted hauliers and disposed of to an appropriate EPA licensed Waste Facility in accordance with all relevant waste management legislation.

3.9.6.3 Cable Interference Masts (Loop-in Towers)

Two cable interface masts (loop-in towers) will need to be inserted into the existing Overhead Line to facilitate the connection of the underground cables. The existing OHL conductor will be terminated at these two towers in order to facilitate a new OHL loop into the proposed 110kV substation. The existing conductor will be removed between the loop in towers with the new connection looped through to the proposed 110kV substation. The new loop in structure locations have been selected based on, ground profiles, allowable angles and ruling span checks. The following section outlines the methodology to be followed during construction works of the new loop in tower structures which will be constructed underneath the existing Lanesborough-Richmond 110kV overhead line:

1. Mast sites are scanned for underground services such as cables, water pipes etc. using ground penetrating radar and Cable Avoidance Tool (CAT). Consultation with Bord na Móna will help to identify hazards and ensure there are no unidentified services in the area.
2. For each leg of the 2 No. masts (8 legs in total) a foundation approximately 4 m x 4 m x 3 m deep is required, see plate 3-8 below for detail. To allow for safe construction the excavation will be stepped back which requires additional area to be excavated, or shutter piles used if ground material is not suitable for benching. The formation levels (depths) will be checked by the onsite engineer. The excavated material will be temporarily stored close to the excavation and excess material will be used as berms along the site access roads.
3. To aid construction, a concrete pipe is placed into each excavation to allow operatives level the mast at the bottom of the excavation. The frame of the reinforcing bars will be prepared and strapped to a concrete pipe with spacers as required. The reinforcing bars will be lifted into each excavated foundation using the excavator and chains/slings. The base and body section of each mast will then be assembled next to the excavation.
4. Concrete trucks will pour concrete directly into each excavation in distinct stages.
5. A final pour for the mast is the encasing of the mast leg which will be finished 300 mm over finished ground level. The leg of the mast is required to be shuttered with metal panels to form the required shape.
6. Once the concrete is set after five days the shuttering is removed and if used sheet piles removed.
7. The Mast foundations will be backfilled one leg at a time with the material already excavated at the location. The backfill will be placed and compacted in layers. See plate 3-9 below for typical finish detail. All dimensions will be checked following the backfilling process. All surplus excavated material will be removed from the mast locations and stored in berms for reuse across the construction site.
8. As the masts are located under the existing 110kV line, the line will be de-energised by ESB so work can commence on the construction of the masts.
9. An earth mat consisting of copper or aluminium wire will be laid circa 400mm below ground around the mast. This earth mat is a requirement for the electrical connection of the equipment on the mast structure.
10. Once the base section of each mast is completed and the concrete sufficiently cured, it is ready to receive the mast body.
11. A hardstand area for the crane will be created by laying geogrid material on the ground surface and overlaying this geogrid with a suitable grade of aggregate.
12. A physical barrier (Heras Fence Site Boundary) will be put in place to restrict plant from coming too close to the OHL.
13. The mast will be constructed lying flat on the ground beside the recently installed mast base.
14. The conductor will be moved off centre using a stay wire and weights to anchor the stay wire to ground.
15. The mast section will be lifted into place using the crane and guide ropes.
16. The body sections will be bolted into position.
17. The conductor will be centred over the masts and held in place. Once the conductor is secured at both ends it is then cut and attached onto each mast. The section of

conductor in between the two masts will be removed and utilised as connector wire for the new masts.

18. Down dropper conductors (For Electrical Connections, Insulators, Surge arrestors), shackles and all associated accessories required for transition from line to cable will be installed on the interface masts.
19. The circuit will be tested in both directions before the line is re-energised. Plate 3-10 below displays a typical LTM energised and operational.

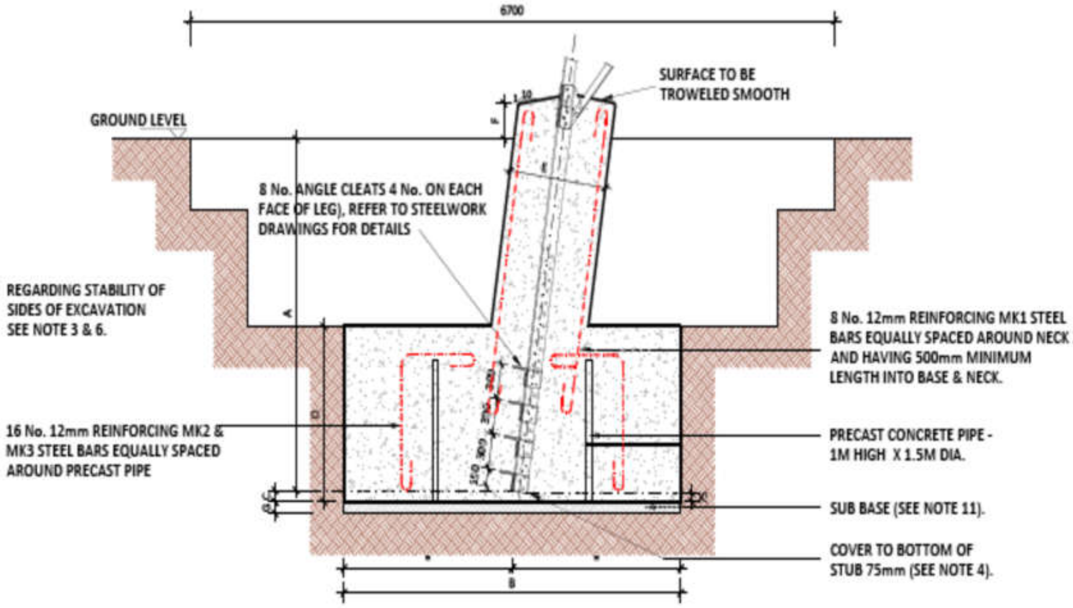

Plate 3-8 Steel Lattic Tower Foundation Detail

Plate 3-9 Steel lattice tower foundation complete

Plate 3-10 Typical Completed End Mast Tower

3.9.7 Decommissioning of Existing Meteorological Mast

The proposed development will include the decommissioning of the existing 100 m high meteorological mast on the site. This work will include the following steps:

- Day one
    - Mobilise on site with one tractor and trailer and one 13 tonne + excavator.
    - Excavated soil will be appropriately tested and transported off site by a licensed waste transfer hauler as required.
    - Establish safe working area around mast.
    - Climb mast and remove instruments and logger box.

- Day two
  - On one side of the mast, transfer guy ropes from ground anchors to the 13 Tonne + excavator.
  - Cut guy rope attached to 13 T+ excavator to allow mast to fall.
  - Excavate mast anchors and anchor bases making good the ground.
- Day Three
  - Dismantle and remove mast components and accessories from site using trailer.
  - Demobilise from the site.

3.9.8 Permanent Meteorological Mast

Two permanent meteorological masts are proposed as part of the proposed development; one within Derryaroge bog and another within Lough Bannow bog. The installation of the two meteorological masts will be carried out by a small crew, following a typical installation sequence as follows:

- An access road will be extended towards the mast location from the internal site road. Associated drainage infrastructure will be extended also;
- A small aggregate crane pad will be constructed in front of the proposed mast locations;
- General construction methods for the above site access roads and hard standing will match those described for wind farm access roads 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 will be excavated followed by shuttering, steel fixing and finally concrete pouring by ready mix truck. The foundation shall be approximately 10 m x 10 m;
- Following crane setup, the mast sections will be delivered and unloaded by truck;
- In accordance with an agreed lifting plan, mast sections will be lifted by crane into place. Wind speeds will be monitored at all times during lifting operations by the lead climber and crane operator;
- Mast sections will be bolted together by climbers; and

Following erection of main mast sections, lightning protection and other ancillary components will be fixed to the mast.

3.9.9 Groundwater Well

The groundwater well near the substation will be constructed in line with a common domestic borehole using a drilling rig. The rig will be reversed to the target drill site using every care to get to the exact proposed well location. Final plumbing and centralising will be completed utilising hydraulic jacks and packing plates to ensure a secure base for the rig. When this has been achieved and only then the mast will be erected, and final levelling will take place.

Open hole drilling will commence using a rotating drill head to accommodate a 200 mm outer conductor steel casing to adequate depth. A nominal 125 mm PVC well sleeve- mid range will be placed within the borehole once drilling head and string have been removed.

The drill string is that part of the drilling unit which works mainly within the borehole, connecting the surface drill rig to the bit. In effect the main function of the drill string is the efficient transmission of power in the deepening hole. As required the drill pipes are mechanically lifted into place and released when the drill pipe is over the table. The next pipe is then screwed into the last drill pipe and torqued up as drilling continues.

Air and water will be used to flush out the hole as drilling proceeds. Discharge water and drill cuttings will be diverted to an adapted skip by bauer pipe from drill table at the back of the drilling rig. This will allow settlement of fines and sediment.

An in-well pump will direct water to a water tank within the roof space of the proposed control building (subject to final design).

3.10 ENVIRONMENTAL MANAGEMENT

3.10.1 Construction Phase Monitoring and Oversight

It is now well-established that a Construction and Environmental Management Plan (CEMP) must be prepared before any construction work begins on a wind farm site and submitted to the Planning Authority for approval.

It is now well-established that a Construction and Environmental Management Plan (CEMP) must be prepared before any construction work begins on a wind farm site and submitted to the Planning Authority for approval.

A CEMP has been prepared for the proposed development and is included in Appendix 3-2. The CEMP will be updated prior to the commencement of the construction of the wind farm, to ensure that all mitigation measures, conditions and / or alterations to the EIAR and application documents that may emerge during the course of the planning process are included. Following the update, the CEMP will be submitted to the Planning Authority for written approval.

All of the mitigation measures specified in the EIAR, NIS, CEMP and any other documents enclosed in the planning submission will be implemented, and the construction contractor will be responsible for actioning and communicating the requirements with all staff on-site. The implementation of the mitigation measures will be overseen by the supervising Ecological Clerk of Works (ECoW), ecologists, archaeologists and/or geotechnical engineers, as appropriate.

3.10.2 Waste Management

The Contractor will prepare a detailed Construction Resource and Waste Management Plan (RWMP) in accordance with the relevant following guidance 'Best Practice Guidelines for the preparation of resource & waste management plans for construction & demolition projects' (EPA, 2021). The Construction RWMP will provide a mechanism for monitoring and auditing waste management performance and compliance for the duration of the proposed development. The document will also provide a detailed overview of key waste management considerations for the proposed development and will be fully implemented onsite for the duration of the construction phase of the proposed development.

The Waste Management Act 1996 and its subsequent amendments provide for measures to improve performance in relation to waste management, recycling and recovery. The Act also provides a regulatory framework for meeting higher environmental standards set out by other national and EU legislation.

The Act requires that any waste related activity must have all necessary licenses and authorisations. It will be the duty of the Resource and Waste Manager on the site of the development to ensure that all contractors hired to remove waste from the site have valid Waste Collection Permits. It will then be necessary to ensure that the waste is delivered to a licensed or permitted waste facility. The hired waste contractors and subsequent receiving facilities must adhere to the conditions set out in their respective permits/licenses and authorisations.

The RWMP will provide systems that will enable all arisings, movements and treatments of construction waste to be recorded. This system will enable the contractor to measure and record the quantity of waste being generated. It will highlight the areas from which most waste occurs and allows the measurement of arisings against performance targets. The RWMP can then be adapted with changes that are seen through record keeping.

3.10.3 Groundwater management

The proposed wind farm site is not located within a designated drinking water supply zone. There are no EPA registered drinking water supplies within 1 km downgradient of the proposed wind farm site. Dewatering will be required intermittently during the 2-year construction period. The anticipated dewatering for borrow pits is 1 year and 2-3 months for turbine bases.

Groundwater inflows to excavations will need to be pumped out, resulting in short term localised drawdown of the water table and potential discharges to the surface water. Interceptor cut-off drains around the borrow pits will be provided to divert overland flows and prevent these flows from entering the borrow pits. These flows will discharge diffusely overland, creating a buffer before entering the existing surface water management infrastructure.

3.10.4 Surface Water Monitoring during Construction

The surface water drainage system will require regular inspection during construction works and during operations to ensure that it is working optimally. The surface water management plan (Appendix 10-3) details the monitoring procedures to be followed during the construction phase. Where issues arise, the works should be stopped immediately and the source of potential impacts on the surface water quality investigated.

Records of all maintenance and monitoring activities associated with the construction site will be retained by the Contractor on-site.

3.10.5 Concrete Deliveries

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 require cleaning, 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, or a concrete wash unit. This type of unit catches the solid concrete and filters and holds wash liquid for pH adjustment and further solids separation. The residual liquids and solids can be disposed of off-site at an appropriate waste facility. Where temporary lined impermeable containment areas are used, such containment areas are excavated and lined with an impermeable membrane.

The areas are generally covered when not in use to prevent infill of rainwater. In periods of dry weather, the areas can be uncovered to allow much of the water to be lost to evaporation. At the end of the concrete pours, any of the remaining liquid contents is tankered off-site. Any solid contents that will have been cleaned down from the chute will have solidified and can be broken up and disposed of along with other construction waste.

Due to the volume of concrete required for each turbine foundation (approximately 950 m^3), and the requirement for the concrete pours to be continuous, deliveries are often carried out outside normal working hours in order to limit the traffic impact on other road users, particularly peak period school and work commuter traffic. Such activities are limited to the day of turbine foundation concrete pours.

The risks of pollution arising from concrete deliveries will be further reduced by the following:

- Concrete trucks will not be washed out on the site but will be directed back to their batching plant for washout other than the delivery chutes.
- Site roads will be constructed to a high standard to allow transport of the turbine components around the site, and hence, concrete delivery trucks will be able to access all areas where the concrete will be needed. No concrete will be transported around the site in open trailers or dumpers so as to avoid spillage while in transport. All concrete used in the construction of turbine bases will be pumped directly into the shuttered formwork from the delivery truck. If this is not practical, the concrete will be pumped from the delivery truck into a hydraulic concrete pump or into the bucket of an excavator, which will transfer the concrete to the location where it is needed.
- The arrangements for concrete deliveries to the site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site full washout and discussing emergency procedures.
- Clearly visible signage will be placed in prominent locations close to concrete pour areas specifically stating washout of concrete lorries is not permitted on the site.

3.10.5.1 Concrete Pouring

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. Special procedures will be adopted in advance of and during all concrete pours to minimise the risk of pollution. These may include:

- Using weather forecasting to assist in planning large concrete pours and avoiding large pours where prolonged periods of heavy rain is forecast.
- Restricting concrete pumps and machine buckets from slewing over watercourses while placing concrete.
- Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets.
- Ensuring that covers are available for freshly placed concrete to avoid the surface washing away in heavy rain.
- Disposing of surplus concrete after completion of a pour will be off-site.

3.10.6 Refuelling

Wherever possible, vehicles will be refuelled off-site. This will be the case for regular, road-going vehicles. However, for construction machinery that will be based on-site continuously, a limited amount of fuel will have to be stored on site.

No refuelling of machinery will occur within 50 m of surface water features. Refuelling of machinery will be carried out using a mobile double skinned fuel bowser to allow for ease of work. The fuel bowser will be re-filled off site or at the contractors site compound and will be towed around the site by a 4x4 jeep to where machinery is located. Spill kits (fuel absorbent material and pads) will be stored in the event of any accidental spillages. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations. Only designated trained and competent operatives will be authorised to refuel plant on site.

3.10.7 Road Construction

3.10.7.1 Permanent Roads, including Amenity Access Tracks (founded/floating)

The construction methodology for founded roads/ amenity access tracks, is summarised as follows:

- Interceptor drains will be installed upslope of the access road alignment to divert any surface water away from the construction area.
- Excavation of roads will be to the line and level given in the detailed design requirements. Excavation will take place to a competent stratum beneath the peat (as agreed with the site designer).
- All excavated peat will be placed/spread and profiled for temporary storage or side-cast alongside the excavations where possible.
- Side slopes of the excavations will be battered as the excavation progresses.
- The surface of the excavated road will be developed using granular fill. The depth will vary based on the depth of peat and on the designer requirements.
- A layer of geogrid/geotextile may be required at the surface of the competent stratum (to be confirmed by the designer).
- A final unbound surface layer shall be placed over the excavated road, as per design requirements, to provide a road profile and graded to accommodate wind turbine construction and delivery traffic.
- An additional 50 mm surface of quarry dust will be placed over the roads selected for use as amenity access tracks.
- Permanent founded roads for wind farm access will be designed to a running width of approximately 6 m, while permanent roads for amenity use will be designed to approximately 3 m in width.
- During the operational phase of the proposed development all surface water run-off from hardstanding areas within the proposed wind farm site will be collected and discharge to settlement ponds prior to entering existing drainage system within the bogs. This treated water will then move into the existing bog drainage network.

The construction methodology for permanent floating roads/amenity access tracks, is summarised as follows:

- A geotextile separation layer is placed on the existing ground surface.
- A biaxial geogrid is then placed over the geotextile.
- Where the California Bearing Ratio (CBR) of the underlying material is >1%, 400 mm of class 1A/6F2/6I/6J material followed by 100 mm of a compacted Clause 804 will be used for a running layer to give a total road thickness of 500 m.
- Where CBR of the underlying material is <1%, 300 mm of Class 1A/6F2/6I/6J material will be placed, followed by a second layer of biaxial geogrid, followed by 300 mm of Class 1A/6F2/6I/6J material, followed by a 100 mm of a compacted Clause 804 running layer for a total road thickness of 700 mm.
- Permanent floating roads for wind farm access will be designed to a running width of approximately 6 m, while permanent roads for amenity use will be designed to approximately 3 m in width.
- Over the edge (OTE) drainage will be used along sections of proposed floating road between turbine infrastructure. OTE drainage will only occur where topography allows, and it is only proposed in areas of low risk and remote from outfall locations. Over the

edge drainage allows runoff from site roads/access tracks to flow into local field drains and be managed via the existing site drainage system.

Typical sections of a new internal site access road and amenity access tracks are shown on Planning Drawing 11399-2033. Where shown on the planning drawings, the road widths will be increased to form the indicated passing bays.

3.10.8 Dust Suppression

In periods of extended dry weather, dust suppression may be necessary along haul roads and around the borrow pit area(s) to ensure dust does not cause a nuisance. If necessary, water will be taken from settlement 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 would 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.

3.10.9 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 vehicles begin to make regular or frequent deliveries to the site (e.g., with steel, ducting 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. Refer to Planning Drawing 11399-2041 for details.

However, in the interest of best practice and to avoid the potential for the transfer of invasive plant species into the site, it is proposed to install a self-contained wheelwash systems at the proposed wind farm site. Planning Drawing 11399-2041 includes typical details of a proposed self-contained wheelwash system which will be installed as part of the construction phase of works. Wheelwash systems will be located at all construction and delivery entrances of the site (Site Access A, B and C), off the R392, N63 and R398, as shown on Planning Drawings 11399-2012 and 11399- 2015.

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

3.11 HEALTH AND SAFETY

The proposed development will be designed, constructed, operated and decommissioned in accordance with all relevant Health and Safety Legislation, including:

- Safety, Health and Welfare at Work Acts 2005 to 2014;
- Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2020;
- Safety, Health and Welfare at Work (Construction) Regulations 2013; and
- Safety, Health and Welfare at Work (Work at Height) Regulations 2006.

Aspects of the proposed development that will present health and safety risks 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 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.

3.11.1 Construction Phase

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 on a preliminary basis at the procurement stage and developed further at construction phase.

All hazards will be identified, and risks assessed. Where elimination of the risk is not feasible, appropriate mitigation and/or control measures will be established. The contractor will be obliged under the construction contract and current health and safety legislation to adequately provide for all hazards and risks associated with the construction phase of the project. Safepass registration cards are required for all construction, delivery and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme card where required. The developer is required to ensure a competent contractor is appointed to carry out the construction works. The contractor will be responsible for the implementation of procedures outlined in the Safety and Health Plan. Public safety will be addressed by restricting site access during construction. Appropriate warning signs will be posted, directing all visitors to the site manager.

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. These roles have been performed by Tobin Consulting Engineers up to the end of the planning stage of the project.

The PSDP appointed for the construction stage shall be required to perform their duties as prescribed in the Safety, Health and Welfare at Work (Construction) Regulations. These duties include (but are not limited to):

- Identify hazards arising from the design or from the technical, organisational, planning or time related aspects of the project;
- Where possible, eliminate the hazards or reduce the risks;
- Communicate necessary control measures, design assumptions or remaining risks to the PSCS so they can be dealt with in the Safety and Health Plan;
- Ensure that the work of designers is coordinated to ensure safety;
- Organise co-operation between designers;
- Prepare a written Safety and Health Plan;
- Prepare a safety file for the completed structure and give it to the client; and,
- Notify the Authority and the client of non-compliance with any written directions issued.

The PSCS appointed for the construction stage shall be required to perform their duties as prescribed in the Safety, Health and Welfare at Work (Construction) Regulations. These duties include (but are not limited to):

- Development of the Safety and Health Plan for the construction stage with updating where required as work progresses;
- Compile and develop safety file information

- Reporting of accidents / incidents;
- Weekly site meeting with PSCS;
- Coordinate arrangements for checking the implementation of safe working procedures. Ensure that the following are being carried out;
- Induction of all site staff including any new staff enlisted for the project from time to time;
- Toolbox talks as necessary;
- Maintenance of a file which lists personnel on site, their name, nationality, current Safe Pass number, current Construction Skills Certification Scheme (CSCS) card (where relevant) and induction date;
- Report on site activities to include but not limited to information on accidents and incidents, disciplinary action taken and PPE compliance
- Monitor the compliance of contractors and others and take corrective action where necessary; and
- Notify the Authority and the client of non-compliance with any written directions issued.

3.11.2 Operational Phase

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 such as, amenity access points and carparks, setting out the conditions of public access under the relevant legislation and providing normal hours (and out of hours) contact details. Staff associated with the project will conduct frequent visits, which will include inspections to establish whether any signs have been defaced, removed or are becoming hidden by vegetation or foliage, with prompt action taken as necessary.

Signs will also be erected at suitable locations across the site as required for the ease and safety of operation of the wind farm. These signs include:

- Buried cable route markers at 50 m (maximum) intervals and change of cable route direction;
- Directions to relevant turbines at junctions;
- “No access to Unauthorised Personnel” at appropriate locations;
- Speed limits signs at site entrance and junctions;
- “Warning these Premises are alarmed” at appropriate locations;
- “Danger HV” at appropriate locations;
- “Warning – Keep clear of structures during electrical storms, high winds or ice conditions” at site entrance;
- “No unauthorised vehicles beyond this point” at specific site entrances; and,
- Other operational signage required as per site-specific hazards.

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 for access for emergency services at all times.

The components of a wind turbine are designed to last up to 30 years 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.

3.12 WIND FARM OPERATION

The proposed wind farm development is expected to have a lifespan of 30 years. During this period, on a day-to-day basis, the wind turbines will 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. 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 substations components and site tracks will also require periodic maintenance in accordance with appropriate operation maintenance plans, procedures and health and safety plans.

Once operational, the wind farm will support 6 – 8 long term, high quality technical jobs in operation and maintenance as well as a number of jobs in ancillary functions.

3.13 WIND FARM DECOMMISSIONING

As stated previously the wind turbines proposed as part of the proposed development are expected to have a lifespan of 30 years. Following the end of their lifespan, the wind turbines may be replaced with a new set of machines, subject to planning permission being obtained, or the site may be decommissioned fully, with the exception of the electricity substation and amenity access tracks.

Upon decommissioning of the proposed wind farm, the wind turbines would be disassembled in reverse order to how they were erected. All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and would be covered with earth and 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 majority of the site roadways will be in use for additional purposes to the operation of the wind farm (such as a mature amenity and recreational use) by the time the decommissioning of the project is to be considered, and therefore it will be more appropriate to leave the site roads in situ for future use.

The on-site substation and all the associated transmission infrastructure i.e. underground cables and overhead lines 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 and will be managed by EirGrid/ESB. Therefore, the substation will be retained as a permanent structure and will not be decommissioned.