

BORD NA MÓNA

Naturally Driven

Derryadd Wind Farm

Construction Environmental Management Plan (CEMP)

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Revision A

TOBIN CONSULTING ENGINEERS



Construction Environmental Management Plan (CEMP)

PROJECT: **Derryadd Wind Farm**

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1 INTRODUCTION

Bord na Móna Powergen Ltd. (a subsidiary of Bord na Móna Plc and hereafter referred to as Bord na Móna) is applying to An Bord Pleanála (ABP) for planning permission to develop a wind farm and all associated infrastructure at the Derryaroge, Derryadd, Derryshannoge and Lough Bannow substantially cutaway bogs within the Mountdillon peat production bog group in County Longford.

This Construction Environmental Management Plan (CEMP) has been prepared to outline the proposed management and administration of site activities for the construction stage of the proposed development, to ensure that all construction activities are undertaken in an environmentally responsible manner. This CEMP summarises the environmental commitments of the construction project, and the measures to ensure compliance with legislation and the requirements of statutory bodies. This CEMP will be a live document and will be reviewed and updated as necessary.

1.1 PROPOSED DEVELOPMENT

The proposed development comprises the construction of 24 no. wind turbines and ancillary works. The turbines will have a maximum blade tip height of 185m above the top of the foundation level and will be accessible from internal access routes within the Bord na Móna site. Bord na Móna intends to apply for a ten-year planning permission for the following:

- 24 no. wind turbines with an overall blade tip height of up to 185m and all associated hard-standing areas;
- 5 no. borrow pits;
- 3 no. permanent Anemometry Masts up to a height of 120m;
- Provision of new internal site access roads (permanent and temporary), passing bays, amenity cycleways, car parking and associated drainage;
- 1 no. 110kV electrical substation, including battery storage, which will be constructed within the ownership boundary of Bord na Móna, at one of two proposed locations on site: either Option A in Cloonfore townland or Option B in Derraghan More townland. The electrical substation will have 2 no. control buildings, associated electrical plant and equipment, battery storage containers and a wastewater holding tank;
- 5 no. temporary construction compounds, in the townlands of Cloonfore, Cloontabeg, Derraghan More, and Rappareehill (2 no.);
- All associated underground electrical and communications cabling connecting the wind turbines to the proposed substation at either Option A in Cloonfore or Option B in Derraghan More;
- All works associated with the connection of the proposed wind farm to the national electricity grid, which will be either to the existing Lanesborough/Richmond 110 kV line via overhead line (Option A) or to the existing Lanesborough/Mullingar 110 kV line via an underground or overhead line (Option B);
- Removal of existing meteorological masts;

- New access junctions, improvements and temporary modifications to existing public road infrastructure to facilitate delivery of abnormal loads and construction access, including locations on the N6, N61, N63, R392, R398, L11554, L1136 roads, access onto the local road in the townland of Cloonkeel, access onto the local road in the townland of Mount Davys and amenity access from the Royal Canal Tow Path (off the L5239);
- All related site works and ancillary development; and
- A 10-year planning permission and 30-year operational life from the date of commissioning of the entire wind farm.

A full description of the proposed development is provided in Chapter 2 of the EIAR.

As noted above, the application includes two potential substation locations - Option A in Cloonfore townland or Option B in Derraghan More townland - and associated grid connection options. The proposed wind farm connection to the national electricity grid will be either to the existing Lanesborough/Richmond 110kV line via overhead line to Option A, or to the existing Lanesborough/Mullingar 110kV line via an underground cable or overhead line to Option B. All new build transmission connection infrastructure for the proposed development is contained within the development site, aside from a short section of underground cabling along the R392. A detailed description of the grid connection is presented in Chapter 2 of the EIAR.

1.2 IMPLEMENTATION

Key to the implementation of this CEMP is the delegation of responsibility for the CEMP to the on-site Construction Manager or Project Environmental Engineer/Scientist (nominated by the main contractor) who will regularly liaise with and update Bord na Móna on all environmental issues relating to the project. As part of the contractual agreement, Bord na Móna will identify and appoint the relevant person to liaise with the authorities on environmental compliance throughout the construction of the project.

In terms of overall environmental responsibility, everyone on-site is responsible for ensuring that their actions constitute good environmental practice. All site personnel are charged with following good practice and encouraged to provide feedback and suggestions for improvements. All site personnel are also required to ensure compliance with the requirements of this CEMP.

1.3 DOCUMENT REVISIONS

It is intended that this document should be viewed as a live document, to be updated and agreed following the grant of planning permission and prior to commencement of construction. The CEMP will be subject to continual review to address, for example:

- Any conditions stipulated in the Planning Permission;
- To ensure it reflects best practice at the time of construction;
- To ensure it incorporates the findings of pre-construction site investigations; and
- To accommodate the working practices of the appointed contractor.

All of the information required for the CEMP will be highlighted in the specification for the Civil Engineering Works contract. The Contractor will be required to include further details and/or confirmation under the following headings (subject to appropriate planning conditions):

- Details of working hours and days;
- Details of emergency plan;
- Details of fuel storage areas (including location and bunding);
- Haul Routes;
- Truck wheelwash details (including measures to reduce and treat run-off);
- Dust management to prevent nuisance;
- Site run-off management;
- Noise management to prevent nuisance;
- Landscape management;
- Construction lighting details;
- Signage; and
- Project procedures & method statements.

1.4 SCOPE

This CEMP addresses all relevant aspects of the management of site preparation and construction work within the site. This CEMP takes into account a range of environmental management issues relating to the construction site and adjoining community. In order to ensure that the work is undertaken in a safe and effective manner, it is essential to identify the specific requirements for the site. This CEMP is divided into the following sections which outline all aspects of the construction phase of the project including the following:

- Duration and Phasing of the Works;
- Employment Creation;
- Facilities, Safety and Site Security;
- Noise Management;
- Air Quality Management;
- Surface Water Management;
- Management of Excavated Materials;
- Waste Management;
- Traffic Management;
- Ecology; and
- Cultural Heritage.

1.5 ENVIRONMENTAL TRAINING AND AWARENESS

To ensure that environmental issues are communicated and properly addressed and controlled during the construction works, this CEMP and its contents will be communicated to all site personnel, including management staff and operatives. The key elements of the CEMP will form part of the site induction which is mandatory for all employees, contractors and visitors attending the site.

Environmental toolbox talks will be provided to all site teams and sub-consultants on a regular basis. These will be targeted at particularly sensitive environmental issues such as:

- Works close to water;
- Water pollution and silt control;
- Water pollution in relation to cement & concrete handling;
- Spill control;
- Archaeology; and
- Waste management.

2 EXISTING SITE

The proposed development site has an area of approximately 1,900 hectares (ha) and is located approx. 2km east at the nearest point from Lanesborough, County Longford.

The site area is approximately 12km long in the north-west/south-east direction and is approximately 4km wide in an east/west direction. The site lies between the towns and villages of Lanesborough, Derraghan, Keenagh and Killashee while the main urban centre in the region is Longford Town. Derryaroge Bog to the north is adjacent to the River Shannon and Lough Bannow Bog is immediately to the west of the Royal Canal which runs in a north south direction. Lough Ree is located approx. 5km to the west of Derryadd Bog.

The land use/activities on the site are a mixture of active peat extraction, peat extraction works (administration offices, machinery maintenance and storage, stores, canteen), bare cutaway peat, re-vegetation of bare peat, and two existing wind monitoring masts on Derryaroge Bog and Lough Bannow Bog. These works, aside from the wind monitoring masts, form part of the Bord na Móna Mountdillon peat production facility in County Longford.

The surrounding landscape is a mixture of forestry, agricultural land and cutaway peatland. The landscape is predominately flat. The most significant features in the surrounding landscape are 'Bawn Mountain' which is located approximately 8km to the east of Lough Bannow Bog and Sliabh Bawn located 8km to the north-west of the proposed development.

The significant energy infrastructure that exists in the local area is Lough Ree Power located to the west of Derryaroge bog, and its associated grid infrastructure in the form of 110kV pylons network (in particular

the Lanesborough/Richmond and Lanesborough/Mullingar lines). Sliabh Bawn Wind Farm in County Roscommon is located approximately 8km north-west of the proposed development.

There are also a number of Bord na Móna rail lines that pass through the bogs facilitating the transportation of milled peat and ash.

At a greater distance from the site is the Skrine Wind Farm, located approximately 19km to the south-west of proposed development and the Roosky Wind Farm, located approximately 14.5km to the north of the proposed development.

In addition, the recently permitted refurbishment of the Cloon-Lanesboro 110 kV overhead line (Planning Re, 18/139, Longford Co. Co.) includes a proposal to refurbish the existing overhead line located primarily in Counties Galway and Roscommon, with 120m of the line located in County Longford, in the vicinity of Lanesborough substation.

2.1 SUMMARY OF EXISTING SITE CONDITIONS

2.1.1 Land, Soils and Geology

The topography of the site is relatively flat with elevations ranging from 37m above ordnance datum (AOD) to 59m AOD. A number of glacial depositions known as drumlins are identified across the site resulting in local variations in topography. Localised, man made changes in topography in the form of areas of shallow excavation are also present due to the peat production on site.

The bedrock geology from the Geological Survey of Ireland (GSI) indicates that the region surrounding the site extents is characterised by 17 no. geological formations which are identified in Chapter 7 of the EIAR. The bedrock geology formations below the site boundary are identified as:

- Viséan Limestone (Undifferentiated);
- Argillaceous Limestones;
- Ballysteen Formation;
- Meath Formation;
- Moathill Formation;
- Rinn Point Limestone Formation;
- Waulsortian Limestones; and
- Lucan Formation.

No bedrock outcrops are indicated within the site extents in the geological mapping.

The EPA databases indicate that the site area is generally underlain by *Cutover raised peat*. The peat which is shown to underlie all of the bogs within the development boundary, is Quaternary in age.

There are also some bodies of till derived from limestones in the development areas. The bodies of till are related to the drumlins noted previously. Lacustrine Marls are also mapped within the study area and

proposed development site. Marl lacustrine sediment is common in post glacial lake-bed sediments, often found underlying peat bogs such as those at the proposed development.

Ground investigations indicate that the site is generally covered in peat which overlies soft to very soft silty clay or loose sand and gravels with numerous cobbles.

2.1.2 Hydrology and Hydrogeology

The proposed development site is located within the River Shannon catchment, located within the Shannon River Basin District and upstream of the Lough Ree Special Area of Conservation (SAC) (Site code: 00440). The site is not located in a delineated area for action as set out in the 2018-2021 National River Basin Management Plan ¹. The Royal Canal, located to the east of the proposed development, is not hydrologically linked to the proposed development site. Any rivers surrounding the site discharge to the River Shannon or to Lough Ree. The main regional surface water features include the following:

- Ballynakill River located to the north and west of the Derryadd and Derryaroge bog;
- Lough Bannow Stream and its tributaries located to the east of Lough Bannow;
- Ballynakill River and Lough Bannow Stream discharge to the River Shannon, north of Lanesborough; and
- Ledwithstown River (or Bilberry River) flows to the south of Lough Bannow bog and discharges to Lough Ree.

Extensive site drains and main drains are present within the Bord na Móna landholding. The site and main drains within the currently IPC Licenced site both store water and transmit it to main drains and ultimately to the settlement ponds. The storage capacity of run-off water in the drainage network lessens the impact of sediment mobilisation to receiving water, due to the low velocity of the water and the retention time in the drains. Final settlement occurs in the settlement ponds before discharging to the adjacent drains and streams.

The Office of Public Works (OPW) *Flood Hazard Database* was used to obtain information on historical flooding events within the proposed development area. No flood events were identified within 1km of the proposed development.

Reference to the National Aquifer Map prepared by the GSI (www.gsi.ie) indicates that there are three types of bedrock aquifer underlying the proposed site. The Derryaroge and Derryadd Bogs are underlain by a Regionally Important Aquifer – (Conduit) Karstified (Rkc). The Lough Bannow Bog and Derryshannoge Bog are underlain by a Locally Important Aquifer, which is Moderately Productive in local zones (LI). Groundwater flow paths within the aquifer are expected to generally follow the local surface water catchments.

¹ Department of Housing, Planning and Local Government (DoHPLG), River Basin Management Plan 2018 – 2021 (2018)

2.1.3 Ecology

There are no sites designated under the EU Habitats Directive and EU Birds Directive, i.e. SACs or Special Protection Areas (SPAs), respectively, located within the footprint of the proposed development. The nearest designated sites are Lough Ree SPA/ SAC located approx. 2km to the west, Ballykenny-Fisherstown Bog SPA approx. 4.7km to the north and Lough Bawn pNHA along the south-east margins of the site. A review of the ecological habitats encountered at the proposed development site are presented in Chapter 6 of the EIAR as well as details of the findings of breeding and wintering bird surveys, mammal surveys and other ecological surveys.

A Natura Impact Statement (NIS) has been completed for the proposed development and is submitted with the planning application.

3 CONSTRUCTION WORKS

3.1 DURATION AND PHASING OF THE PROPOSED DEVELOPMENT

It is expected that the overall construction phase of the development will take approximately 24 – 30 months from starting on-site to completion of the commissioning of the turbines. Pending planning approval, construction is scheduled for commencement in Q1 2021. All vegetation clearance that is required during the construction works is required to commence outside of the breeding bird's season which runs from 1 March to 31 August.

Construction sequencing can be broken down into three main phases:

- Civil engineering works – approx. 18 months;
- Electrical works – approx. 18 months (scheduled to commence shortly after civil works and run in parallel); and
- Turbine erection and commissioning – approx. nine months.

An indicative construction schedule is included in Appendix A.

The main tasks under each phase are outlined below:

Civil Engineering Works:

- Create new entrance(s) and hardcore existing entrances (where required).
- Construct new site roads (permanent and temporary), drainage ditches and culverts.
- Construct temporary roads and open borrow pits.
- Clear and construct hardcore area for temporary site offices. Install same.
- Construct remaining new roads, hard-standings and crane pads.
- Construct substation and associated drainage ditches and culverts.
- Construct remaining new roads, hard-standings and crane pads.

- Construct one of the two Substation Options (A or B) and the associated substation control buildings and groundworks for the substation compounds.
- Construct electrical apparatus bases/plinths and bund for transformer.
- Excavate/pile as required for turbine bases. Store soil/peat locally for backfilling and re-use. 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.
- Install meteorological mast(s).
- Install electrical ducting and cables.

Electrical Works:

- Install external electrical equipment at substation.
- Install transformer at substation compound.
- Erect stock proof and 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.
- Grid connection.
- Commission and test turbines.
- Complete site works and reinstatesite.
- Remove temporary site offices. Provide any gates, landscaping, signs etc. which may be required.

3.2 EMPLOYMENT

It is anticipated that between 100 and 120 persons will be directly employed on the project during peak construction. During construction, additional indirect employment will be created in the region through the supply of services and materials to the wind farm.

3.3 DESCRIPTION OF KEY PROJECT ELEMENTS

3.3.1 *Borrow Pits*

There are five potential borrow pit locations which have been identified to produce excavated material to provide fill material for roads (permanent, temporary, amenity), passing bays, hardstands, upfill to foundations and temporary compounds. The borrow pits are located towards the centre of Derryadd Bog and are at advantageous locations with regards to the hauling of materials within the site. It is anticipated that the borrow pits will be excavated as required.

Approximate volumes of materials available from the borrow pits are summarised in Table 3.1 below. The estimates are based upon specific dimensions so as to provide a safe working zone and to minimise land take.

Table 3.1: Borrow Pit Summary

Borrow Pit	Surface Area (m ²)	Material Composition
Borrow Pit 17-1	52,700	Rock
Borrow Pit 17-3	36,300	Granular Fill/Rock
Borrow Pit 17-4N	22,500	Granular Fill
Borrow Pit 17-4S	21,700	Granular Fill
Borrow Pit 17-5	13,700	Rock

The total approximate volume of potentially usable material is 958,100m³, including a 1.3 factor for bulking (Caterpillar, 2017). Where excavations extend into competent rock, they are likely to require very heavy ripping or blasting methods to extract the stronger rock. The depth of competent rock varies across each borrow pit.

Given the volumes of material available from these borrow pits, it is possible that they will fulfil a significant portion of the material requirements for the project. The use of on-site borrow pits will reduce the environmental effect of other aspects of the development such as 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. The temporary access roads to the borrow pits will be removed. Berms will be erected around the area to prevent access as necessary. Appropriate health and safety signage will also be erected on the berms and at locations around the borrow pit.

3.3.2 Access Roads

The proposed development site will be accessed via the N63, R392, R398 and L11554 roads. Site roads will be constructed as part of the initial phase of the construction of the wind farm. Material will either be imported into the site or won from the proposed borrow pits within the site, as outlined above, to provide the required base of the internal roads. The internal roads will be a mixture of permanent (construction/operational and amenity) roads, temporary (construction only) roads and amenity pathways/cycleways (permanent). New roadways will have a running width of approximately 6 metres (6.5m including shoulders), with wider section at corners and on the approaches to turbine locations. The proposed new roadways incorporate passing bays to allow traffic to pass easily while traveling around the site. All new roadways will be constructed with a 2.5% camber to aid drainage and surface water runoff. Typical Road Construction Details are included in Drawing No. 10325-2023 submitted with the planning application.

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. Any surplus excavated material will be side-cast, profiled and bermed as close to the excavation areas as practical as set out in the Peat Management Plan in Appendix 7.3 of the EIAR. 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 or local quarries shall be placed to form the road foundation. In the event of large clay deposits being encountered in sections of road, a geotextile layer will be required at 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 truck movements. All permanent roads will be maintained for the duration of the project

3.3.3 Amenity Cycleways and Car Parks

A total of approx. 30km of amenity access (including pathways and cycleways) will be provided as part of the construction of the proposed development. The amenity cycleway will be mainly located on the proposed internal road network that will service the wind farm. These pathways/cycleways will have a gravel/crushed stone finish surface. In addition, there will be approximately 6.5km of dedicated amenity cycleway proposed to provide access points into the site from Lanesborough, the Royal Canal and the Corlea Trackway. The configuration of the dedicated amenity cycleway is outlined in the EIAR and is comparable to sections of the cycleway provided along the Royal Canal. The amenity access points to the site are discussed in the Amenity Plan presented in Appendix 2.3 to the EIAR.

In addition to the amenity cycleway, three new car parks will be provided. These car parks will be located at the southern boundary of Derryaroge bog adjacent to the existing access point, at the southern end of Derryadd Bog (also adjacent to an existing access point) and at the southern end of Lough Bannow Bog (north of the Corlea centre and opposite the Corlea walkway). Drawing No. 10325-2041 (submitted with the planning application) illustrates the configuration of the proposed car parks, including an overall total capacity for 15 no. vehicles and suitable signage at each location.

3.3.4 Turbine Foundations

Foundations for wind turbines may be of the gravity, rock anchored 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 will be piled. 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.

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 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 the Site 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 suitable material (Clause 804 hardcore material or similar) and/or lean mix concrete, compacted in 240mm layers, with enough compacted effort (i.e. compacted with seven passes using 12 tonne roller). 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 most likely be constructed by coring and inserting a steel sleeve which will be filled with reinforced concrete prior to sleeve removal. 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 600mm 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 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 100mm of blinding concrete laid on the formation material positioned using a concrete skip and an excavator to protect ground formation and to give a safe working platform.

An excavator with suitable approved lifting equipment will be used to unload reinforcing steel to required areas. The bottom mat of steel will be fixed prior to the tower cans, if used, being lifted into position. Steel cans, if used, will be lifted into position using a crane and approved lifting appliances and reinforcing steel will be positioned around cans in accordance with the turbine suppliers' requirements. The can will be levelled using the jacks at the base of the can. The top flange of the can 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 can will be checked again prior to, and during, the concrete pour. Alternative approaches such as the use of a foundation anchorage system will also be considered. The detailed design and exact dimensions will be determined once a turbine manufacturer has been selected following a competitive procurement process.

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

3.3.5 Turbines

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

- Maximum height envelope of 185m; and
- Installed capacities of approximately 4MW per turbine resulting in an estimated 96MW in total for the wind farm.

Hardstand areas consisting of levelled and compacted hardcore are required around each turbine base to facilitate access, turbine assembly and turbine erection. The hard-standing areas are typically used to accommodate cranes used in the assembly and erection of the turbine, offloading and storage of turbine components, and to 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 final size, arrangement and positioning of hard standing areas are dictated by turbine suppliers but will generally be in accordance with those shown in Drawing No. 10325-2021 (submitted with the planning application). The preliminary designs considered represent a worst-case scenario and are assessed as such in the EIAR.

Unbound, levelled assembly areas will be located on either side of the hard-standing areas also as shown on Drawing No. 10325-2021. 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.

3.3.6 Grid Connection

The proposed development will connect to the existing national grid via either of two substation location options (Option A and Option B) and associated grid connections. The proposed wind farm will connect to the grid via either 110kV overhead line or underground cable.

Substation Option A is situated in the townland of Cloonfore. The proposed connection methodology for Option A is an overhead line. The expected distance of new build overhead transmission line for this option is approximately 480m.

Substation Option B is situated in the townland of Derraghan More. Both underground and overhead options are considered for Option B. Should the overhead line be the preferred connection method, the

expected length of new build overhead transmission line for this option is approximately 1km. Where an underground cable is the preferred option, approximately 1.5km of 110 kV underground cable will need to be installed (750m distance from the substation to the existing overhead line).

3.3.6.1 110 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 site as indicated on the planning application drawings with the exception of where they will be laid in a short section of the public roadway. It should be noted that works within the public road will be subject to further consents/agreements (for example, road opening licences, etc.) with Longford County Council as appropriate.

Standard specifications for underground cables provided by the ESB are shown in Figure 3.1.

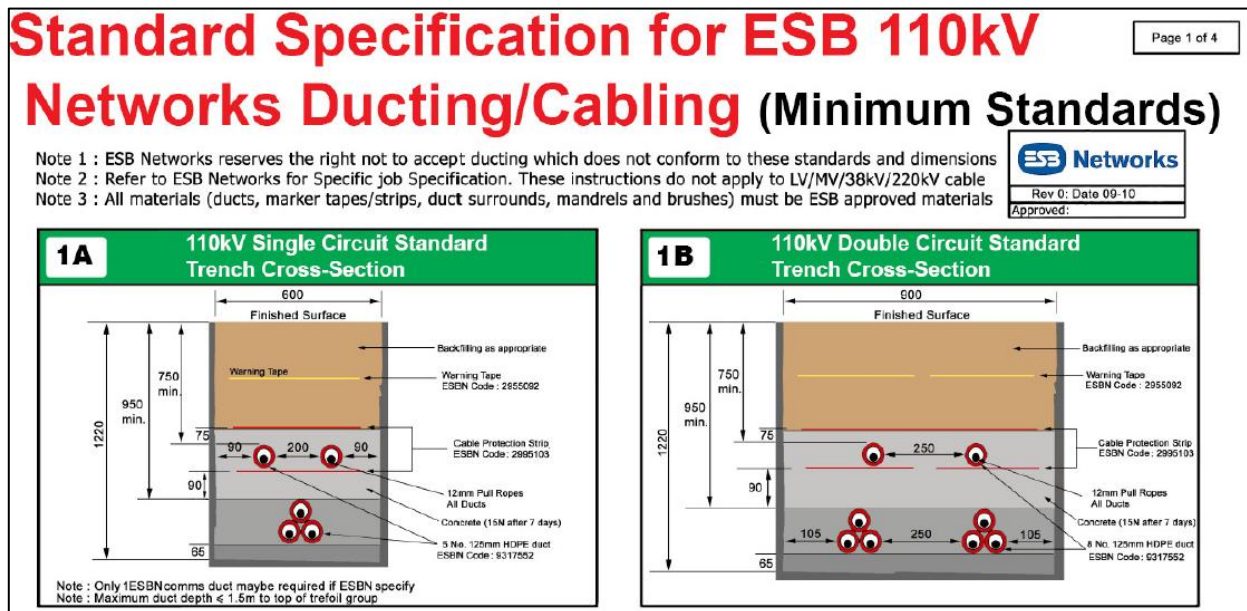


Figure 3.1: 110kV Cable Installation Specifications (Source: ESB Networks)

All cables will be laid in underground ducts and/or culverts. Ducts will be installed by open trenching. The typical sequence of operations for installing ducts in trenches is to strip off the ground material and top soil/peat. A trench is then formed to the required depth and width. The ducts are generally laid on a bed of lean mix concrete and surrounded with lean mix concrete. The small amount of surplus soil/peat will be used for local restoration and landscaping. Where the public road is excavated, or contaminants are found, the material will be removed from site and disposed at an appropriately licenced facility.

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

- The area where excavations are planned will be surveyed, prior to the commencement of works, with a cable locating tool and all existing underground services will be identified;
- A trench will be opened using an excavator to accommodate the formation required as per the agreed ESB Networks standards and specifications or any updated versions thereof;
- The excavated material will be cast to the side to be reused as backfilling material where appropriate;
- The trench will be surfaced as per the road surface specifications of the national or local public road or the wind farm road as appropriate; and
- Cable joint pits are typically located at approximately 500m intervals, each joint pit will be approximately 2.5m x 6m in size with a communications chamber and an earth link box in close proximity to the joint pit. The detail of which can be seen on Drawing No. 10325-2030 (submitted with the planning application) and is typically located off-road and adjacent to the public road and accessible for cable pulling and future maintenance.

Two cable interface masts will need to be inserted into the existing overhead line to facilitate the connection of the underground cables.

3.3.6.2 Overhead Lines

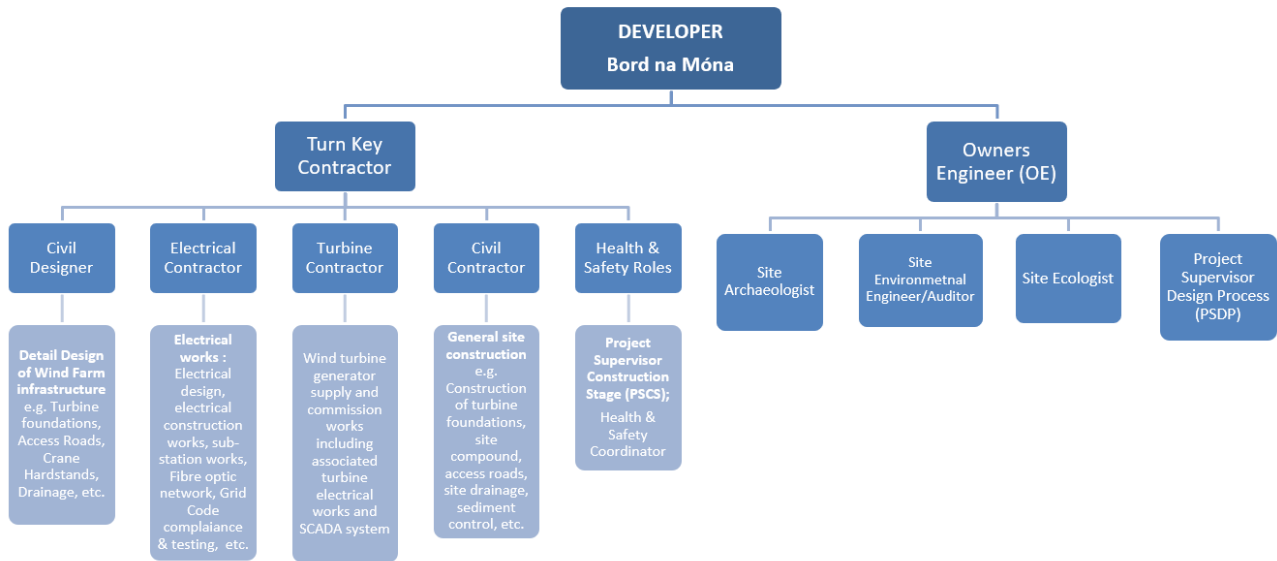
The typical methodology for construction of a short section of overhead line will involve the following:

- Insertion of two angle masts in the existing overhead line;
- Construction of two end masts near the proposed station;
- Construction of additional angle masts where the route from the existing line to the station changes direction; and
- Construction of intermediate towers/pole sets as necessary to achieve the design clearance of the line from the ground.

Further details on the installation of masts, pole sets and conductors are provided in Chapter 2 of the EIAR.

3.4 ROLES AND RESPONSIBILITIES

An indicative organisational chart is provided below which identifies typical roles and responsibilities on site during the construction phase of development. This will be subject to agreement during contract negotiations with the relevant parties.



3.5 CONSENTS, LICENCES, NOTIFICATIONS AND PERMISSIONS

The key consents, licences, notifications and permissions required for this project have been identified and are summarised here:

- Planning Permission and associated Planning Compliance;
- Commission for Energy Regulation (CER) Authorisation and Licence to Generate;
- A Commencement Notice for Development will be lodged with the Building Control Authority via the online Building Control Management System (BCMA) not less than 14 days and not more than 28 days before development works commence on site;
- Abnormal loads – it is envisaged that permits will be required for the abnormal loads that will be required for the delivery of turbine components to the site;
- Road opening licences as required for underground cable works;
- Archaeological excavation licence, as required;
- OPW Section 50 Consent for watercourse crossings;
- Inland Fisheries Ireland (IFI) method statement approval for works in or near to watercourses;
- National Parks & Wildlife Service (NWPS) – should there be any impacts on protected species and their habitats, resting or breeding places, licenses may be required under the Wildlife Acts or derogations under the Habitats Regulations; and
- 30-day prior notification to the Irish Aviation Authority (IAA) ahead of turbine erection works.

The consents, licenses, notifications and permissions listing will be reviewed prior to construction and regularly thereafter to ensure that the programme is achieved, and new consent requirements are identified as early as possible.

4 FACILITIES, SAFETY AND SITE SECURITY

The following section details plans to ensure the general public is adequately protected from activities associated with the proposed development during the construction phase. The main contractor will be required to implement documented strategies in order to provide a safe and secure site. The proposed development site will be kept neat and tidy to maintain public safety and local amenity.

4.1 CONSTRUCTION COMPOUND AND FACILITIES

At the commencement of the construction phase, five temporary compound areas will be constructed to provide office space, welfare facilities including canteen and toilets, hardstands for storing materials and hazardous materials.

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 areas shall be constructed to heights of 0.5 or 1.0m above existing ground level based on the various extents of potential surface water flooding across the site.

4.2 SAFETY AND SECURITY

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 stage.

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 main 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 Health and Safety 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 to be appointed in accordance with the provisions of the *Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2103), as amended*.

There will be a total of six wind farm entrances used to transport materials and equipment to the site. All are existing entrances with the exception of the proposed large component and construction entrance that will be located on the Lanesborough to Ballymahon road (R392) to the west of the proposed substation (Option B) and an entrance into the Derryshannoge Bog to be located along a local road (L11554) that accesses the R392 north of Derraghan Village. The existing entrances that have been

identified for the proposed development and are used presently for the machinery involved in the current peat harvesting activities are as follows:

- Existing entrance to the Southern part of Derryaroge Bog, off the N63;
- Existing entrance to the Northern part of Derryadd Bog, off the N63;
- Existing entrance to the Southern part of Derryadd Bog, off the R398; and
- Existing entrance to the Northern part of Lough Bannow Bog, off the R398.

The main entrance for the proposed development is located along the R392 (Lanesborough to Ballymahon) road. This entrance 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. The Derryshannoge access will be used for the grid connection works only (associated with Substation Option B) and, as such, will have a comparably low level of traffic and associated material deliveries.

4.3 SIGNAGE

Warning signs will be located along perimeter fencing of any areas under construction clearly indicating that construction works are underway. In consultation with Longford County Council, signage will be erected along the R392, N63, R398 and L1136 at suitable locations to warn public traffic of the location of the site entrances and the potential for the presence of slow-moving heavy vehicles on or adjacent to these roads.

4.4 EMERGENCY PLAN

The main contractor will be responsible for developing an emergency plan for the proposed development as part of the Health and Safety Plan, which will be activated in the event of an accident, fire, spillage, collapse of structures, failure of equipment etc. The emergency plan must include contact names and telephone numbers for the relevant local authorities (all sections/departments) including ambulance, fire brigade and An Garda Síochána. Water pollution incidents/accidental spills, preparedness and response are dealt with in further detail in Section 7.6.

4.5 COMPLAINTS

This section of the CEMP sets out a procedure to manage and resolve any complaints received from the public during the construction phase of the proposed development. The following measures will be adopted and refined, as necessary, taking account of any relevant planning conditions:

- Clearly display a Contact Board at the site perimeter so that the public know whom to contact if they have a complaint or comment;
- Personnel on site, including sub-contractors are required to perform their duties in accordance with this CEMP, and in such a way as to minimise the risk of complaints from third parties;

- All complaints received regarding the construction works will be recorded and categorised (e.g. noise, property damage, traffic, dust etc.) within a central *Site Complaints Log*. The *Site Complaints Log* will include the following key details:
 - Name, address and contact details of the complainant (with the complainant's permission);
 - Brief outline of the complaint;
 - Date of Complaint;
 - Name of person receiving complaint details; and
 - Agreed timeline for response to complaint.
- All complaints are to be communicated to the developer immediately;
- All complaints are to be followed up and resolved in so far as is practicable; and
- The complainant, developer and other stakeholders will be kept informed of the progress in resolving the complaint.

5 CONSTRUCTION NOISE MANAGEMENT

The potential noise impacts which may be generated during the construction phase of the proposed development are discussed in detail in Chapter 13 of the EIAR. The following section outlines the mitigation measures proposed to reduce the impacts of construction noise.

The main contractor will be required to have regard to BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites*², which offers detailed guidance on the control of noise and vibration from construction activities.

The following general measures will be implemented:

- limiting the hours during which site activities likely to create high levels of noise or vibration are permitted;
- establishing channels of communication between the contractor/developer, Local Authority and local residents;
- appointing a site representative responsible for matters relating to noise and vibration;
- monitoring typical levels of noise and vibration during critical periods and at sensitive locations; and
- keeping the surface of the site access roads even to mitigate the potential for vibration from lorries.

Furthermore, a variety of practicable noise control measures will be employed. These include:

- selection of plant with low inherent potential for generation of noise and/ or vibration; and

² British Standards Institute (BSI), *BS 5228-1:2009+A1:2014 Code of Practice for noise and vibration control on construction and open sites* (2008)

- placing of noisy/vibratory plant as far away from sensitive properties as permitted by site constraints.

5.1 NOISE MANAGEMENT

The following list of measures will be implemented, where necessary, to ensure compliance with the relevant construction noise criteria:

- No plant used on site will be permitted to cause an on-going public nuisance due to noise;
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations;
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract;
- Compressors will be attenuated models, fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers;
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use;
- Any plant, such as generators or pumps, which is required to operate before 07:00hrs or after 19:00hrs will be surrounded by an acoustic enclosure or portable screen;
- During the construction programme, supervision of the works will include ensuring compliance with the limits detailed in Table 13.13 of the EIAR;
- The hours of construction activity will be limited to avoid unsociable hours, where possible. Construction operations shall generally be restricted to between 07:00hrs and 19:00hrs on weekdays and Saturdays. However, to ensure that optimal use is made of good weather period, critical periods within the programme (i.e. concrete pours) or to accommodate delivery of large turbine components along public routes, it may be necessary on occasion to work outside of these hours. Any such out of hours working will be agreed in advance with the Local Authority.

Where rock breaking is employed in relation to the proposed borrow pits, the following are examples of measures that will be considered, where necessary, to mitigate noise emissions from these activities:

- Fit suitably designed muffler or sound reduction equipment to the rock breaking tool to reduce noise without impairing machine efficiency;
- Ensure all leaks in air lines are sealed;
- Erect acoustic screen between compressor or generator and any noise sensitive areas. Where possible, line of sight between the top of machine and reception point needs to be obscured; and
- Enclose breaker or rock drill in portable or fixed acoustic enclosure with suitable ventilation.

Air overpressure from a blast is difficult to control because of its variability, however, much can be done to reduce the effect. A reduction in the amount of primer cord used, together with the adequate burial of

any that is above the ground, can give dramatic reduction to air overpressure intensities especially in the audible frequency range. Most complaints are likely to be received from an area downwind of the blast site, and therefore, if air blast complaints are a continual problem, it would be advisable to postpone blasting during unfavourable weather conditions if possible. As air blast intensity is a function of total charge weight, then a reduction in the total amount of explosives used can also reduce the air overpressure value.

Further guidance will be obtained from the recommendations contained within *BS 5228: Part 1* and the *European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1988* in relation to blasting operations.

Other methods used to minimise noise impacts will consist of some or all the following:

- Restriction of hours within which blasting can be conducted;
- A publicity campaign undertaken before any work and blasting starts (e.g. 48 hours written notification);
- The firing of blasts at similar times to reduce the ‘startle’ effect;
- On-going circulars informing people of the progress of the works;
- The implementation of an onsite documented complaints procedure as outlined in Section 4.5 above;
- The use of independent monitoring by external bodies for verification of results; and
- Trial blasts in less sensitive areas to assist in blast designs and identify potential zones of influence.

5.2 VIBRATION MANAGEMENT

Recommended vibration limit values are set out in Chapter 13 of the EIAR. It should be noted that these limits are not absolute but provide guidance as to magnitudes of vibration that are very unlikely to cause cosmetic damage. Magnitudes of vibration slightly greater than those in Chapter 13 of the EIAR are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Where there is existing damage these limits may need to be reduced by up to 50%.

Typical noise emission levels from piling operations are presented in Chapter 13 of the EIAR (Table 13.13). With regards to piling it is considered that, based on the large distances between locations where piling will take place and the nearest sensitive receptors, no significant impact will be experienced. Therefore, no mitigation measures are proposed.

Specific to blasting, the following mitigation measures will be employed to control the impact during blasts:

- Trial blasts will be undertaken to obtain scaled distance analysis;
- Ensuring appropriate burden to avoid over or under confinement of the charge;
- Accurate setting out and drilling;

- Appropriate charging;
- Appropriate stemming with appropriate material such as sized gravel or stone chipping;
- Delay detonation to ensure small maximum instantaneous charges;
- Decked charges and in-hole delays;
- Blast monitoring to enable adjustment of subsequent charges;
- Good blast design to maximise efficiency and reduce vibration; and
- Avoid using exposed detonating cord on the surface.

6 AIR QUALITY MANAGEMENT

The potential air quality impacts which may be generated during the construction phase of the proposed development are discussed in detail in Chapter 12 of the EIAR. The following section outlines the mitigation measures proposed to reduce the impacts on air quality from construction activities.

Dust or pollutants generated from the proposed development will typically arise from:

- Movement of construction vehicles;
- Transportation of turbines and construction materials to and within the site;
- Crushing of rock for use as base for hardstanding areas (i.e. roads);
- Movement and placement of stockpiles (excavated peat, soils/fill materials); and
- Wind generated dust from stockpiles and exposed unconsolidated soils.

The predicted increase in traffic volumes resulting from the construction phase is unlikely to significantly increase levels of air pollutants or cause a breach of the air quality standards.

The following measures will be implemented to minimise air quality impacts during construction works:

- Minimisation of extent of working areas;
- Stockpiling of excavated materials will be limited to the volumes required to practically meet the construction schedule;
- Drop heights of excavated materials into haulage vehicles will be minimised to a practicable level;
- Daily inspections by site personnel to identify potential sources of dust generation along with implementation measures to remove causes where found;
- Provision of a dust suppression measures (e.g. sweeps/covers/water bowsers) will be used on stockpiles and the road surface (materials coming to site will only use specified haul routes) during periods of extended dry weather;
- On-site borrow pits are being used where possible to minimise quantities being brought to site;
- Vehicles and plant will be routinely serviced to minimise the exhaust emissions during construction; and
- Vehicles will not be left running unnecessarily and low emission fuels will be used where possible.

7 SURFACE WATER MANAGEMENT

This section describes the surface water management measures to be implanted during the construction of the proposed development. The decommissioning phase of the project will require the same precautionary measures as the construction phase and is therefore not discussed separately.

During construction works, the protection of water quality and prevention of pollution events requires a sustained and concentrated input from the contractor with regard to the provision and maintenance of sediment control structures.

The following documents were used for reference in the preparation of this section:

- CIRIA Document C503 – Environmental Good Practice on Site;
- CIRIA document C532 – Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors;
- CIRIA document C533 – Environmental Management in Construction;
- CIRIA document C649 – Control of Water Pollution from Linear Construction Projects;

7.1 DRAINAGE MEASURES DURING CONSTRUCTION

The Surface Water Management Plan (SWMP) for the proposed development is included as Appendix 8.4 to the EIAR and sets out the high-level drainage design for the operational phase of the development. The SWMP also includes provision for the construction of temporary surface water management infrastructure to ensure the protection of the existing bog drainage network during the construction of the wind farm. 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. A number of temporary peat settlement ponds will be established during the construction phase along roadways and in areas of high construction activity to minimise silt laden run-off entering the drainage network. The temporary settlement ponds shall be reinstated upon completion of the main construction works.

Oil interceptors will be installed at machinery refuelling locations to eliminate the potential for any fuel discharge into the surface water network.

7.2 EROSION AND SEDIMENT CONTROL

The following mitigation measures and best practice will be adopted for the construction phase of the wind farm to reduce the impacts associated with erosion and sediment laden surface water run-off. A range of techniques will be used to minimise impacts including:

- Undertaking works in compliance within this CEMP;
- Ensuring works in watercourses (including crossings) are designed and constructed to minimise impacts and methodologies are pre-approved by Bord na Móna, IFI and OPW;

- Monitor weather forecasts and plan work accordingly. Reduce or stop earthworks during periods of heavy or prolonged rainfall;
- Soil stripping and excavation works will be required for new access roads, amenity trails, crane pads, turbine foundations and borrow pits. Bord na Móna have extensive knowledge of excavations works in boglands and all method statements for works will be agreed with the Bord na Móna in advance of commencement;
- A hardstanding area will be constructed at the temporary site facilities for fuel storage, machinery refuelling, chemical storage and waste management to ensure that any spills or leaks in the area are not permitted to infiltrate to ground and will be retained in a drainage channel which will pass through an oil interceptor;
- Where practicable, construction works are to be staged so as to minimise the extent and duration of disturbance of the bog (e.g. plan for progressive site clearance, only disturbing areas where they are scheduled for current construction works);
- 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 any watercourse;
- All surface water run-off from the roads, crane pads and hardstanding areas will pass through settlement ponds prior to discharge into the existing bog drainage network. It is proposed to locate additional temporary settlement ponds adjacent to borrow pits and associated stockpile areas as well as provide additional temporary settlement ponds along roadways where significant construction activity will take place;
- Indicative details of the proposed settlement pond design are presented in Drawing No. 10315-2024 (submitted with the planning application). The settlement pond design will utilise the natural permeability of the existing ground conditions, using a peat pond to attenuate run-off flow and promote suspended solids settlement. The pond will not be lined allowing stored water to naturally infiltrate to ground where possible. Inflow to the pond will be via a swale including a check dam to slow down water flow and minimise disturbance of settled material in the pond;
- Indicative locations for the permanent settlement ponds are shown on Drawing No.'s 10325-2005 to 10325-2012 (submitted with the planning application) and will be constructed at the same time as the roads and hardstand areas. Additional temporary settlement ponds will be constructed, as required, on site. The outfall from the settlement ponds will be into the existing bog field drainage network or the main drainage network, where possible;
- Permanent and temporary settlement ponds will be regularly inspected to ensure effective and successful operation throughout the construction works;
- Stone based check dams or similar will be installed at regular intervals along the roadside swales. Check dams reduce erosion and gulying in the channel by slowing down the run-off flow and allows sediments to settle;
- All stockpiled material will be battered back to reduce the rainfall erosion potential;

- Silt fences are to be located at the toe of stockpiled areas to reduce sediment transport. All silt fencing on site will also require regular cleaning and maintenance in accordance with best practice guidelines;
- Silt build up within settlement ponds, check dams and silt fences will be removed as required to ensure no carryover/breakthrough of suspended matter downstream in the drainage system. Any sediment removed will be disposed of in an appropriate manner so as to prevent any reintroduction into the drainage system;
- Cable trenches will be excavated during dry periods where possible, in short sections and left open for minimal periods, to avoid acting as a conduit for surface water flows; and
- Trafficking on site will be kept to a minimum. No haul roads will be used other than the proposed site roads. Where haul roads pass close to watercourses, silt fencing will be used to protect the streams.

7.3 CONCRETE MANAGEMENT

Concrete (specifically, the cement component) is highly alkaline and any spillage to a local watercourse would be detrimental to water quality and fauna and flora. Concrete is required for the construction of the turbine and substation bases and foundations and only ready-mix concrete batched off-site will be used. After concrete is poured at a construction site, the chutes of ready mixed concrete trucks must be washed out to remove the remaining concrete before it hardens.

Wash-out of the main concrete body will not be permitted on site, wash out is restricted only to chute wash-out. Wash down and wash-out of the concrete transporting vehicles will take place at an appropriate facility off-site, preferably at the premises of the concrete supplier. The best management practice objectives for concrete chute wash-out are to collect and retain all the concrete washout water and solids in leak proof containers or impermeable lined wash out pits, so that the wash material does not reach the soil surface and then migrate to surface waters or into the ground water. The collected concrete washout water and solids will be emptied on a regular basis. 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.

The arrangements for concrete deliveries to the site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site concrete body washout and discussing emergency procedures.

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.

Because of the scale of the main concrete pours that will be required to construct the proposed development, 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; and
- Ensuring that covers are available for freshly placed concrete to avoid the surface washing away in heavy rain.

7.4 FUELS, OILS AND CHEMICALS – SPILL CONTROL

Poor storage, lack of care during refuelling, vandalism and poorly maintained plant can all result in a spillage of fuel, oil or chemicals potentially leading to environmental harm. Where possible, refuelling will be carried out off-site, however for construction machinery that will be based on-site continuously, a limited amount of fuel will be required to be stored on-site.

The following mitigation measures with regard to spill control will be employed on site:

- On-site refuelling will be carried out using a mobile double-skinned fuel bowser;
- Any bulk fuel and oil storage tanks used will be bunded and a minimum bund capacity of 110% of the tank capacity will be provided;
- All containers of oil and fuel will be stored in a secure, bunded and hard-covered area;
- Regular checks of tanks, containers and bunds for damage and leaks will be carried out;
- All fuel and oil deliveries will be supervised;
- Containers and tanks will be locked when not in use;
- Spill kits will be provided adjacent to fuel storage and refuelling areas and site personnel will be fully trained in the use of spill kits;
- A drip tray or absorbent mat will be placed under all static plant and mobile plant during fuelling;
- All spillages will be cleared up and reported immediately;
- All contaminated spill management materials will be disposed of in the appropriate manner;
- The removal of contaminated water from bunds and trays will be carried out by an appropriate contractor; and
- Fuels, oil and chemicals will not be stored, and refuelling will not take place within 50m of a watercourse or drain.

7.5 WORKS NEAR WATERCOURSES

It is proposed to install culverts anywhere the proposed road layout intersects a stream or main drain. Culverts are to be of a size adequate to carry expected peak flows.

In-stream works will be kept to a minimum but will be required to construct culverts at water crossings as shown in the site layout plans. Typical culvert details are shown in Drawing No. 10325-2025 (submitted with the planning application). All in-stream works will be carried out in accordance with the advice of and in consultation with IFI and sufficient notice will be given to IFI before pre-approved in-stream works commence.

7.6 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. Any surface water monitoring requirements which are stipulated in the IPC Licence for the Mountdillon Bog Group will continue to be fulfilled for the lifetime of the facility. During the construction phase, field testing and laboratory analysis of a range of parameters should be undertaken at adjacent watercourses, specifically following heavy rainfall events (i.e. weekly, monthly and event based).

Records of all maintenance and monitoring activities associated with the construction phase will be required to be retained by the main contractor on-site. All maintenance and monitoring carried out in accordance with the existing IPC Licence will be maintained by Bord na Móna in accordance with current practices and Licence requirements.

8 MANAGEMENT OF EXCAVATED MATERIALS

The following section details plans to manage the excavation, temporary storage, movement and placement of materials that will occur during the construction of the proposed development.

Once surface water management control measures outlined above are in place; peat, surface vegetation and overburden will be stripped off the surface of each construction area and stored appropriately. The construction footprint and ground/habitat disturbance will be kept to the minimum required. Working areas will be carefully planned to encompass the minimum area necessary to facilitate good working practices and to achieve suitable gradients for reinstatement, landscaping and restoration purposes. Working areas, including access roads, borrow pits, hardstands and foundations, are to be clearly defined on site.

8.1 PEAT EXCAVATION

Floating roads will be used, where appropriate, which will minimise the quantity of peat excavation. Peat removal will be carried out in accordance with the Peat Management Plan in Appendix 7.3 of the EIAR. Where possible, material excavated to create the working areas will be stored locally for later reuse in backfilling around turbine foundations and other structures. Any surplus excavated material will be sidecast, profiled and bermed as close to the excavation areas as practical.

All excavated peat will be reused on-site and there will be no requirement for the removal of peat off-site.

8.2 BORROW PITS

As previously outlined, there are five potential borrow pit locations identified at the site. The borrow pits are located towards the centre of Derryadd Bog and their locations will provide ease of distribution across the site.

It is estimated that the approx. volume of potentially reusable material in the borrow pits is 958,100 m³ which will be used to provide fill material for roads, passing bays, hardstands, upfill to foundations and temporary compounds. It is anticipated that the material available in the borrow pits will fulfil a significant proportion of the fill material required for the project.

To control excess runoff, borrow pit drainage and sediment control measures will be constructed in advance of the borrow pit excavation works as described in Section 7 above.

The material excavated from the borrow pits will be stored in stockpiles for processing i.e. grading, crushing etc. A safe set back distance of >2m will be kept between the toe of stockpiles and the excavation edge of the borrow pits.

Post-construction, any excess overburden material will be partially backfilled into the borrow pits. Further to the above, this will limit the likelihood of the removal of excavated materials from the site.

The opening of the borrow pits will involve the excavation of peat and other unsuitable overburden down to the level of a competent bearing strata over the area of the borrow pit.

8.3 TEMPORARY STORAGE OF EXCAVATED MATERIALS

There will therefore be a requirement to temporarily store excavated soil on site prior to its permanent placement. Insofar as is possible, the use of the borrow pits shall be phased such that the first borrow pit will be excavated to completion prior to commencing the opening of the next borrow pit. This will then allow materials to be placed in the first borrow pit thereby minimising the volume of excavated materials requiring temporary storage. In order to further reduce temporary storage requirements, reinstatement of materials around infrastructure, and in restoration/landscaping works on areas of excavated/disturbed ground, will be carried out during the construction phase or as soon as is practical after the completion of the works in any one area of the site.

Stockpiles are to be isolated from any surface drains and a minimum of 50m away from watercourses. Silt fencing is to be erected around each temporary storage area. Measures such as interceptor ditches around the bases of these areas, sediment traps and seeding of the bunds shall be incorporated to prevent runoff of suspended solids laden surface water and soil erosion.

9 WASTE MANAGEMENT

Any waste materials generated on-site during the construction of the proposed development will be handled and managed in accordance with the requirements of the *Waste Management Act 1996, as amended*, and associated Regulations. All waste will be stored in segregated waste containers at the temporary construction compounds and collected by appropriately licensed waste contractors. All waste materials transferred off-site for disposal or recovery will be taken only to suitably permitted waste facilities.

The following measures will be adopted for the management of waste from the proposed development:

Waste Minimisation

- Reduce waste or surplus materials on site by avoiding over-estimation of purchasing requirements, minimising packaging materials and buying environmentally approved and recycled content products;
- Ensure materials are not delivered to site damaged and unusable;
- Where possible, establish a 'take back' system with suppliers;
- Where possible, purchase environmentally approved and recycled content products; and
- Limit the amount waste going to landfill by reusing and recycling where possible.

Waste Storage & Segregation

- Ensure all waste materials are handled and stored correctly;
- All wastes will be segregated, and containers labelled appropriately;
- Provision will be made for transfer of waste on a daily basis from canteens, offices etc. to larger containers;
- Waste will be stored in appropriate containers which take into consideration the physical properties, chemical composition, quantities and hazardous nature of the waste; and
- Waste containers will be secure to prevent the uncontrolled release of waste and stored in designated areas, with necessary containment and protection measures to prevent uncontrolled releases.

Reuse & Recycling

- Provisions will be made for the re-use or recycling of timber, paper, cardboard, glass and other materials, where appropriate.

Waste Removal & Disposal

- All waste (materials that cannot be reused or recycled) from the site will be removed off site by a suitably approved and licensed waste contractor to a licensed waste facility.

9.1 HAZARDOUS WASTE

Any hazardous wastes generated on site will be stored in a dedicated hazardous waste storage area adjacent to the temporary construction compounds. All hazardous waste will be stored where secondary containment is provided (bundled areas) to prevent any contamination of the subsurface in the event of a release.

Waste oil collection will be provided in a purpose built double skinned tank in the hazardous waste storage area. All oil containers will be placed in covered bunds. Solid hazardous waste (e.g. rags and oil contaminated materials) will be segregated from non-hazardous waste and placed in approved containers for removal off-site. These materials will be collected and transferred off-site by the appointed hazardous waste contractor.

10 TRAFFIC MANAGEMENT

Delivery of construction materials, including turbine components, to the proposed development site will be restricted to the following routes:

- Construction materials coming west from Longford along the N63 accessing the site through the southern entrance to Derryaroge and the northern entrance to Derryadd;
- Construction materials coming from Lanesborough access the site either along the N63, R392 or R398 and the site entrances along those roads;
- Turbine and oversized loads access the site from Lanesborough going south along the R392 accessing the site through the entrance on that road;
- 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; and
- A limited amount of construction materials such as steel, stone and concrete will access the Derryshannoge Bog using the L11554 entrance. These materials will either be transported north from Ballymahon or south from Lanesborough along the R392.

The proposed port for the arrival of the turbine equipment has not been determined at this stage. However, for the purpose of the traffic impact assessment in the EIAR, it is assumed that the large wind farm components will be delivered to the site via the M6 motorway in the proximity of Athlone. At present, it is determined that the optimum delivery route from the M6 Motorway to the site for abnormal loads would be as follows:

- Exit the M6 at Junction 12 and travel north on N61 for approximately 48km to Roscommon;
- Turn right on the N61 in Roscommon at the Circle K roundabout, and continue straight through the Roscommon Mart Roundabout on the N61;
- Turn right off the N61 onto the N63 at the Lidl Roundabout in Roscommon;
- Travel east on the N63 for approximately 15 kms to Lanesborough; and

- Turn right onto R392 and travel southeast for approximately 6.5km to the proposed site entrance.

Further details on turbine deliveries and predicted impacts on the road network are presented in Chapter 14 of the EIAR.

The proposed haul route to the site for general HGV construction traffic consists of the route proposed for the turbine plant traffic that travels through Lanesborough and then splits with deliveries accessing the site at Site Access Junction 1 on the N63 or accessing the site via Site Access Junction 2 on the R392. These site access locations are shown on Figures 14.2 and 14.5b in the EIAR.

In order to minimise the effects of the additional traffic generated by the proposed development during the construction phase, the following mitigation measures are proposed:

- A detailed Traffic Management Plan (TMP), incorporating all the mitigation measures set out below, will be finalised and agreed with the relevant road's authorities and An Garda Síochána prior to construction works commencing on site. The detailed TMP will incorporate any relevant planning conditions and will include the following:
 - Traffic Management Co-ordinator – a competent traffic management co-ordinator will be appointed for the duration of the project and this person will be the main point of contact for all matters relating to traffic management;
 - Delivery Programme – a programme of deliveries will be submitted to Longford County Council (LCC) in advance of the delivery of the turbine components to site;
 - Information to locals – Local residents in the area will be informed of any upcoming traffic related matters, e.g. temporary lane/road closures (if required) or any night deliveries of turbine components, via letter drops and posters in public places. Information will include the contact details of the Contract Project Co-ordinator, who will be the main point of contact for all queries from the public or local authority during normal working hours. An "out of hours" emergency number will also be provided.
 - Pre and Post Construction Condition Survey – A pre-condition survey of roads on approach to the site will be carried out prior to construction commencement to record the condition of the road. A post construction survey will be carried out after works are completed. The timing of these surveys will be agreed with LCC;
 - Liaison with Local Authorities – Liaison with LCC and other Local Authorities, including the roads and transport section, through which the delivery route traverses and An Garda Síochána, during the delivery phase of the large turbine vehicles, wherein an escort for all convoys will be required;
 - Temporary Alterations – Implementation of temporary alterations to road network at critical junctions as outlined in the EIAR;
 - Identification of delivery routes – These routes will be agreed and adhered to by all contractors.

- Travel plan for construction workers – While the traffic impact assessment has assumed the worst case that construction workers will drive to the site, the main contractor will be required to provide a travel plan for construction staff and sub-contractor construction staff, which will include the identification of routes to/from the site and identification of an area for parking;
- Temporary traffic signs – As part of the traffic management measures, temporary traffic signs will be put in place at all key junctions, including the access junctions on the N63, R392, R398 and L1136. All measures will be in accordance with the *Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works*³ and *Guidance for the Control and Management of Traffic at Roadworks*⁴. A member of construction staff (flagman) will be present at all junctions during peak delivery times;
- Delivery Times of Large Turbine Components – The management plan will include the option to deliver the large wind turbine plant components at night in order to minimise disruption to general traffic during the construction stage;
- Additional Measures – Various additional measures will be put in place in order to minimise the effects of the development traffic on the surrounding road network including wheel washing facilities on site and sweeping/cleaning of local roads as required;
- Re-instatement Works – All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers;
- Road Opening Licence – Roads works associated with the grid connection cabling will be undertaken in line with the requirements of a road opening licence as agreed with the relevant Local Authorities;
- Trench Reinstatement – Trenches on public roads, once backfilled, will be temporarily reinstated to the satisfaction of the Local Authorities. Following temporary reinstatement of trenches, sections of public roads along which the cable route travels will receive a surface overlay subject to agreement with the road's authority.

11 ECOLOGY/BIODIVERSITY

During the construction phase of the development, the following mitigation measures are proposed to avoid, prevent or reduce effects to key receptors:

- Where areas of potentially sensitive breeding bird habitat (e.g. birch scrub) is proposed to be removed during construction, these works will be timed to avoid the breeding birds nesting season, 1st of March to 31st of August. This measure will avoid any potentially significant effects.
- The majority of construction activity will take place during daylight hours, thereby avoiding disturbance to nocturnal fauna. Drewitt and Langston (2006) present this recommendation as

³ Department of Transport, Tourism and Sport (DTTAS), *Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works* (2010)

⁴ DTTAS, *Guidance for the Control and Management of Traffic at Roadworks* (2010)

industry best practise ⁵. On occasion deliveries (such as oversize deliveries) may arrive outside daylight hours and concrete pours for the turbine foundations may commence and conclude at dawn/ dusk. This will be an infrequent occurrence of short duration and will therefore not have any significant disturbance effects on fauna within the vicinity of the proposed development area.

- No turbines are located in high (local) value habitats and all are located in habitats not evaluated as key ecological receptors and typically of low ecological value. This mitigation by avoidance will reduce potential habitat loss impacts for key avian species.
- The proposed turbine locations and access routes will avoid potential breeding sites that protected mammals such as otter, badger and bats typically use including; field boundaries (treelines/hedgerows), stream/rivers and associated riparian habitats, old buildings, caves, bridges and souterrains. This measure will avoid any potentially significant effects.
- Following detailed design consideration, and as required, temporary silt screens will be installed in drains/small streams deemed to be possibly at risk of water pollutant discharge. Mitigation for in-stream works will follow IFI recommendations.
- During the construction phase as part of the CEMP, ecological monitoring will take place by a suitably qualified Ecological Clerk of Works (ECoW) The role of the ECoW will include:
 - Supervision of construction works and ensure compliance with legislation;
 - Monitoring habitats and species during the course of construction works and effectiveness of mitigation;
 - Provision of advice regarding the avoidance and minimisation of potential disturbance to wildlife;
 - Provide recommendations on appropriate responses/actions to site specific issues (e.g. identification of previously unrecorded breeding sites during construction works); and
 - Liaison with National Parks and Wildlife Service (NPWS), IFI and other prescribed authorities, when required.
- If encountered during construction, the spread and introduction of alien invasive species and noxious weeds will be avoided by adopting appropriate mitigation measures as per guidance issued by the NRA (2010) ⁶. The mitigation/control measures adopted will depend on the type of invasive species encountered. Some control and management measures include; physical (cutting, digging, excavating) and chemical control (herbicides). All vehicles and equipment should be cleaned before entering and exiting the site. Although no non-native invasive plant species (as per the Third Schedule Part 1 of the *European Communities Regulations 2011*) were recorded during baseline surveys; any invasive plant material noted (during construction activities) on site will be removed off site and disposed of at appropriate licensed waste disposal facility. Any alien invasive species found to occur within 15m of working areas will require a

⁵ Janss, G.F.E., *Avian mortality from power lines: a morphologic approach of a species-specific mortality*. Biological Conservation 95:353-359 (2000).

⁶ NRA (now Transport Infrastructure Ireland), *Guidelines on The Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads* (2010).

specialist method statement for its eradication to avoid the spread of invasive species, this will ensure compliance with the *European Communities (Birds and Natural Habitats) Regulations 2011* (S.I. No. 477 of 2011). The presence of alien invasive species and requirement for actions will be confirmed by the ECoW prior to the commencement of works.

- A bat roost survey in areas of suitable habitat will be carried out prior to commencement of construction. Ivy covered trees (if confirmed to contain a bat roost) that require felling will be left to lie for a period of 24 hours to allow bats to escape. Large trees that are identified as bat roosts will be felled carefully, using the gradual dismantling technique by a tree surgeon under the supervision of a bat specialist.
- Lighting will be avoided where possible, except where it is required for health and safety reasons, as it deters some bat species from foraging.
- For bats, mitigation is best achieved through avoidance. It is proposed that the measures detailed in Table 11.1 be put in place to avoid or lessen the degree of impacts on local bat populations during construction.

Table 11.1: Bat Mitigation Measures Recommended during the Construction Phase

<p>High Level Bat Mitigation – Leisler’s bats This applies to T2 and T12</p>	<p>High Level Bat Mitigation This applies to T4, T10, T19 and T22 This applies to Internal Road Network between T4 – T5</p>	<p>Medium Level Bat Mitigation This applies to T1, T3, T5, T11 and T18</p>	<p>Low Level Bat Mitigation This applies to T7, T8, T9, T20, T21, T23 and T24.</p>
<p>A zone of 200m around the wind to reduce favourability of this zone for foraging and commuting bats.</p>	<p>A zone of according to English Nature calculation around the wind turbines (from the tip of the blade) should be cleared of tall vegetation (shrubs, trees, scrub etc.) to reduce favourability of this zone for foraging and commuting bats.</p>	<p>A zone of 50m around the wind turbines (from the tip of the blade) should be cleared of tall vegetation (shrubs, trees, scrub etc.) to reduce favourability of this zone for foraging and commuting bats.</p>	<p>A zone of 50m around the wind turbines (from the tip of the blade) should be cleared of tall vegetation (shrubs, trees, scrub etc.) to reduce favourability of this zone for foraging and commuting bats.</p>
	<p>A corridor of 50m along the haul roads (between T4-T5) should be cleared of tall vegetation (i.e. >1m height - shrubs, trees, scrub etc.) to reduce favourability of this zone for foraging and commuting bats. A low level of vegetation should be maintained for the entire operational phase.</p>		
<p>Complete clearance work during the autumn and spring months. Complete clearance work at least 6 months prior to installation of wind turbines. Studies have shown that bats are attracted to clear felled forestry areas due to increase insect loading. This has been shown to occur for a period of 3-6 months before the insect</p>	<p>Complete clearance work during the autumn and spring months. Complete clearance work at least 6 months prior to installation of wind turbines. Studies have shown that bats are attracted to clear felled forestry areas due to increase insect loading. This has been shown to occur for a period of 3-6 months before the insect</p>	<p>Complete clearance work during the autumn and spring months. Complete clearance work at least 6 months prior to installation of wind turbines. Studies have shown that bats are attracted to clear felled forestry areas due to increase insect loading. This has been shown to occur for a period of 3-6 months before the insect</p>	<p>Complete clearance work during the autumn and spring months. Complete clearance work at least 6 months prior to installation of wind turbines. Studies have shown that bats are attracted to clear felled forestry areas due to increase insect loading. This has been shown to occur for a period of 3-6 months before the insect</p>

<p>High Level Bat Mitigation – Leisler’s bats This applies to T2 and T12</p>	<p>High Level Bat Mitigation This applies to T4, T10, T19 and T22 This applies to Internal Road Network between T4 – T5</p>	<p>Medium Level Bat Mitigation This applies to T1, T3, T5, T11 and T18</p>	<p>Low Level Bat Mitigation This applies to T7, T8, T9, T20, T21, T23 and T24.</p>
<p>loading reduces to pre-cleared felled levels.</p>	<p>loading reduces to pre-cleared felled levels.</p>	<p>loading reduces to pre-cleared felled levels.</p>	<p>loading reduces to pre-cleared felled levels.</p>
<p>Provide “bat habitat” of 2 hectares/wind turbine. This land should be located at least 1km away from the nearest wind turbine. Natural regeneration of peat bog by scrub vegetation is recommended 1km outside the zone of the wind farm.</p>	<p>Provide “bat habitat” of 2 hectares/wind turbine. This land should be located at least 1km away from the nearest wind turbine. Natural regeneration of peat bog by scrub vegetation is recommended outside the zone of the wind farm.</p>	<p>Provide “bat habitat” of 1 hectares/wind turbine. This land should be located at least 1km away from the nearest wind turbine. Natural regeneration of peat bog by scrub vegetation is recommended outside the zone of the wind farm.</p>	<p>Provide “bat habitat” of 0.5 hectare/wind turbine. This land should be located at least 1km away from the nearest wind turbine. Natural regeneration of peat bog by scrub vegetation is recommended outside the zone of the wind farm.</p>

12 CULTURAL HERITAGE

12.1 PRE-CONSTRUCTION

Some parts of the bog are overgrown preventing a full assessment of potential cultural heritage impacts. The National Monuments Service, Department of Culture, Heritage and the Gaeltacht (DCHG), requires these areas to be cleared. The clearance of overgrown areas is to be monitored by an archaeologist, under licence as issued by the Minister under Section 26 of the *National Monuments Acts 1930 to 2014*.

In the event that archaeological features, finds and/or deposits are encountered during the monitoring, all relevant authorities will be notified immediately. Preservation in-situ or preservation by record (excavation) may be required.

12.2 CONSTRUCTION PHASE

As above, all ground disturbance associated with the construction of the proposed development will be monitored by a suitably qualified archaeologist working under licence as issued by the Minister.

In the event that archaeological features, finds and/or deposits are encountered during construction, all relevant authorities will be notified immediately. Preservation in-situ or preservation by record (excavation) may be required.

13 CONCLUSION

This Construction Environmental Management Plan presents a summary of the overall proposed development works, the management of the site during the construction works and the mitigation measures required to ensure the proposed works do not have a significant effect on the environment. This document is prepared in accordance with Best Practice documents outlined above and set out in the EIAR.

Prior to commencement of construction, the appointed main contractor will be required to update this document with site specific details including the location of spill kits on the site, the layout of the construction compounds, machinery pre-start checklists and provide details on the persons responsible for environmental management for the duration of the project. The updated CEMP will also be required to include any specific construction phase environmental management procedures identified in the grant of planning for the development. The final CEMP document will be required to be submitted to Bord na Móna for approval prior to commencement of the works.

The contractor will also be required to provide a Construction Health and Safety Plan prior to commencement of construction activities which will be submitted to Bord na Móna for approval.

APPENDIX A

Indicative Construction Schedule

Indicative Construction Schedule

ID	Task Name	Task Description	Q1 2021 Jan-Mar	Q2 Apr-Jun	Q3 Jul-Sept	Q4 Oct-Dec	Q1 2022 Jan-Mar	Q2 Apr-Jun	Q3 Jul-Sept		
1	Site Health and Safety		[Blue shaded area]								
2	Site Compounds	Site compounds, site access, fencing, gates	[Blue shaded area]								
3	Site Roads	Excavation/upgrade roads, install drainage measures, install culvert, install water protection measures, open borrow pits	[Blue shaded area]								
4	Turbine Hardstands	Excavate base, construct hardstanding areas			[Blue shaded area]						
5	Turbine Foundations	Fix steel, erect shuttering, concrete pour			[Blue shaded area]						
6	Substation Construction & Electrical Works	Construct substation, underground cabling between turbines, export cabling		[Blue shaded area]							
7	Backfilling & Landscaping						[Blue shaded area]				
8	Turbine Delivery and Erection					[Blue shaded area]					
9	Substation Commissioning						[Blue shaded area]				
10	Turbine Commissioning							[Blue shaded area]			



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