APPENDIX 4-4

CONSTRUCTION AND ENVIRONMENTAL MANAGEMENT PLAN

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1. INTRODUCTION

This Construction and Environmental Management Plan (CEMP) has been prepared by MKO on behalf of the Applicant, Lemanaghan Wind Farm DAC, which intends to apply to An Coimisiún Pleanála (ACP) for planning permission to construct a renewable energy development which will comprise of 15 no. wind turbines and associated infrastructure within Lemanaghan Bog and adjacent townlands, near Ferbane, Co. Offaly. The Proposed Project includes for an onsite 220kV electricity substation and associated works connecting the onsite 220kV substation to the national electricity grid via the existing Shannonbridge-Maynooth 220kV overhead line (OHL) located in the townland of Cooldorragh, Co. Offaly.

As detailed in Section 1.1.1 in Chapter 1, for the purposes of this EIAR, the following references are used: 'Proposed Project', 'Proposed Wind Farm', 'Proposed Grid Connection', 'Proposed Wind Farm site' and 'site'. Please see Section 1.1.1 of this EIAR for further details. A detailed description of the Proposed Project is provided in Chapter 4 (Description of the Proposed Project) of this EIAR.

The CEMP has been prepared in conjunction with the Environmental Impact Assessment Report (EIAR) and the Natura Impact Statement (NIS) which will accompany the planning application for the Proposed Project to the competent authority. Should the Proposed Project secure planning permission, the CEMP will be updated in line with all conditions and obligations which apply to any grant of permission. The CEMP should be read in conjunction with the EIAR, NIS and planning drawings. The CEMP will also require updating by the selected contractor in order to identify, assess and satisfy the contract performance criteria as set out by the various stakeholders. The CEMP due to its structure and nature will also require constant updating and revision throughout the construction period as set out below. Therefore, this is a working document and will be developed further prior to and during the construction phase of the Proposed Project.

Triggers for amendments to the CEMP will include:

- Response to any specific requirements arising from conditions attached to a grant of planning permission;
- When there is a perceived need to improve performance in an area of environmental impact;
- As a result of changes in environmental legislation applicable and relevant to the Proposed Project;
- Where the outcomes from auditing establish a need for change;
- Where Work Method Statements identify changes to a construction methodology to address high environmental risk; and
- As a result of an incident or complaint occurring that necessitates an amendment.

This CEMP identifies the key planning and environmental considerations that must be adhered to and delivered during site construction. The Contractor, which will be appointed by the Project Developer prior to commencement of construction, will be required to implement all of the requirements set out in this CEMP. The CEMP may be updated and revised throughout the construction phase of the Proposed Project, but all future iterations must meet or exceed the standards and requirements set out in this document and the Project Developer must be satisfied that all requirements set out in this document can and will be implemented in full by the appointed contractor.

The CEMP will be prepared by the appointed Contractor and will be a single, amalgamated document that can be used during the construction phase of the Proposed Project, as a single consolidated point of reference relating to all construction, environmental and drainage requirements for the Planning Authority, Developer and Contractors alike. The CEMP may evolve over further iterations as the construction works progress, but at all times must meet or exceed the standards and requirements set out in this document. It will be the Contractor's current version of the CEMP, which at any point in

time, will guide the construction activities on site and the implementation of which will be audited by an independent Environmental Clerk of Works (EnvCoW).

1.1 Statement of Authority

The Construction and Environmental Management Plan was completed by Catherine Johnson, with input by Edel Mulholland, and reviewed by Ellen Costello and Sean Creedon, all of MKO.

Catherine is a Project Environmental Scientist and Climate Practitioner at MKO with over 3.5 years of consultancy experience in climate, renewable energy, and sustainability. Catherine possesses skills in mapping and design, which complement her experience in preparing comprehensive reports for EIAs for renewable energy developments. Catherine has a BSc in Earth and Ocean Science and an LLM in Global Environment and Climate Change Law.

Edel Mulholland is an Environmental Scientist with MKO with over 1 year experience. Edel holds BA (Hons) in Environmental Science from the University of Galway. Prior to taking up her position with MKO in September 2024, Edel worked as an Environmental Chemistry Analyst with Complete Laboratory Solutions, Co. Galway, where she assisted with water quality analysis. Since joining MKO, Edel has assisted in the submission of several renewable energy developments. Edel's key strengths and areas of expertise are in environmental policy, drafting EIAR chapters, field work and QGIS mapping.

Ellen Costello is a Senior Environmental Scientist with MKO with over 6 years' experience in private consultancy. Ellen holds a BSc (Hons) in Earth Science, and a MSc (Hons) in Climate Change: Integrated Environmental and Social Science Aspects where she focused her studies on renewable energy development in Europe and its implications on environment and society. Ellen's key strengths and expertise are Environmental Protection and Management, Environmental Impact Statements, Project Management, and GIS Mapping and Modelling. Since joining MKO, Ellen has been involved in a range of renewable energy infrastructure projects. In her role as a senior project manager, Ellen works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments.

This report has been reviewed by Sean Creedon (B.Sc., M.Sc.). Sean has 23 years' experience in planning and environmental impact elements within all stages of wind farm project delivery.

1.2 Scope of the Construction and Environmental Management Plan

This CEMP is presented as a guidance document for the construction of the proposed Lemanaghan Wind Farm which will comprise 15 no. wind turbines, and associated infrastructure within Lemanaghan Bog and adjacent townlands, near Ferbane, Co. Offaly. The Proposed Project includes for an onsite 220kV electricity substation and the Proposed Grid Connection, connecting the onsite substation to the national electricity grid via the existing Shannonbridge-Maynooth 220kV overhead line (OHL) located in the townland of Cooldorragh, Co. Offaly.

A detailed description of the Proposed Project is provided in Chapter 4 of the EIAR.

The CEMP is divided into ten sections, as outlined below.

Section 1 provides a brief introduction as to the scope of the report.

Section 2 outlines the site and Proposed Project details, detailing the targets and objectives of this plan along with providing an overview of construction methodologies that will be adopted throughout the Proposed Project.

Section 3 sets out details of the environmental controls to be implemented on site. Site drainage principles, traffic management, dust control, invasive species management and a waste management plan are also included in this section.

Section 4 sets out a fully detailed implementation plan for the environmental management of the Proposed Project outlining the roles and responsibilities of the project team.

Section 5 outlines the general Health and Safety measures that will be implemented on site during the construction phase of the Proposed Project.

Section 6 outlines the Emergency Response Procedure to be adopted in the event of an emergency in terms of site health and safety and environmental protection.

Section 7 consists of a summary table of all mitigation proposals to be adhered to during the Proposed Project, categorised into two separate headings, 1) pre-commencement measures; 2) construction-phase measures.

Section 8 consists of a summary table of all monitoring requirements and proposals to be adhered to during the Proposed Project, categorised into two separate headings, 1) pre-commencement measures; 2) construction-phase measures.

Section 9 sets out a programme for the timing of the works.

Section 10 outlines the proposals for reviewing compliance with the provisions of this report.

1.3 Targets and Objectives

The following key targets and objectives will inform the final detailed design should the Proposed Project secure planning permission and proceed to the construction phase. This includes consideration of the buildability of the designs that emerge:

- Ensure construction works and activities are completed in accordance with mitigation and best practice approach presented in the EIAR, NIS and associated planning documentation;
- Ensure construction works and activities have minimal impact/disturbance to local landowners and the local community;
- Ensure construction works and activities have minimal impact on the natural environment;
- Adopt a sustainable approach to construction and, ensure sustainable sources for materials supply where possible; and,
- Provide adequate environmental training and awareness for all project personnel.

The key site objectives are as follows:

- Use recycled materials if possible, e.g. excavated stone and overburden;
- Ensure sustainable sources for materials supply where possible;
- Avoidance of any pollution incident or near miss as a result of working around or close to existing watercourses and having emergency measures in place;
- Avoidance of vandalism;
- Keep all watercourses free from obstruction and debris;
- Correct implementation of the sustainable drainage system (SuDS) drainage design principles;
- Keep impact of construction to a minimum on the local environment, watercourses, and wildlife;
- Correct fuel storage and refuelling procedures to be followed;

- Good waste management and house-keeping to be implemented;
- Air and noise pollution prevention to be implemented;
- Monitoring of the works and any adverse effects that it may have on the environment. Construction Methods and designs will be altered where it is found there is an adverse effect on the environment;
- Comply with all relevant water quality legislation listed throughout this document; and,
- Ensure a properly designed, constructed and maintained drainage system appropriate to the requirements of the site is kept in place at all times.

2. SITE AND PROPOSED PROJECT DETAILS

2.1 Site Location

The Proposed Wind Farm is located approximately 3 kilometres (km) northeast of Ferbane and approximately 2.5 km southwest of the village of Ballycumber in Co. Offaly. The approximate centre of the site is X616027, Y728163 in Irish Transverse Mercator (ITM) coordinates. It is proposed to access the Proposed Wind Farm via 4 no. proposed access points; please see Section 4.7.1 of Chapter 4 Description of the Proposed Project for further information on site access. A site location context map and the EIAR Site Boundary are shown in Figure 2-1. The EIAR Site Boundary is shown overlain on aerial imagery in Figure 2-2. For clarity, the red line planning application boundary, i.e., the area in which the Applicant is applying for planning permission, is shown on Figure 2-3.

The Proposed Grid Connection will connect the Proposed Wind Farm to the national electricity grid. Underground electrical cables will transmit the power from each wind turbine to the proposed onsite 220kV substation. The Proposed Grid Connection will connect the Proposed Wind Farm into the national grid via the existing Shannonbridge-Maynooth 220kV Overhead Line (OHL) in the townland of Cooldorragh, Co. Offaly measuring approximately 0.8km in total length (comprising 0.4km of OHL from the proposed steel masts for loop-in/loop-out of the existing OHL). It is proposed to access the Proposed Grid Connection via 2 no. proposed access points. Please see Section 4.7.1 of Chapter 4 Description of the Proposed Project for further information on site access.

The landcover within the site is a mixture of bare cutaway peat, re-vegetated bare peat, degraded raised bog, scrub, low woodland and remnants of high bog. Current land use within the Proposed Wind Farm comprises natural recolonisation of cutaway and degraded bog and small areas of active turbary. Approximately 17km of Bord na Móna (BnM) permanent fixed-gauge rail lines can be found running through Lemanaghan Bog. Current land use along the Proposed Grid Connection comprises degraded raised bog and land principally used for agriculture. Land-use in the wider landscape of the site comprises of BnM landholdings, forestry, agricultural land, cutover and cutaway peatland, one-off rural housing and small village settlements.

A full and detailed description of the Proposed Project (i.e. the Proposed Wind Farm and the Proposed Grid Connection) for the purposes of the planning application and the additional elements that form part of the overall project, assessed in the EIAR, is contained in Chapter 4 of the EIAR. The townlands within which the Proposed Project is located are listed in Table 1-1 in Chapter 1: Introduction of the EIAR.

Co. Roscommon

Co. Westmeath

Clara

Co. Offaly

Ferbane

Ferbane

Co. Galway

Co. Laois

0 2.5 5 km

Map Legend

EIAR Site Boundary

County Boundaries

Drawing Title

Site Location Context

Project Title

Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 2-1
Scale 1:100,000	Date 2026-02-26

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Map Legend

EIAR Site Boundary

0 2.5 5 km

Ordnance Survey Ireland Licence No. AR 0021821© Ordnance Survey Ireland/Government of Ireland

Drawing Title

EIAR Site Boundary

Project Title

Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 2-2
Scale 1:87,500	Date 2026-01-12

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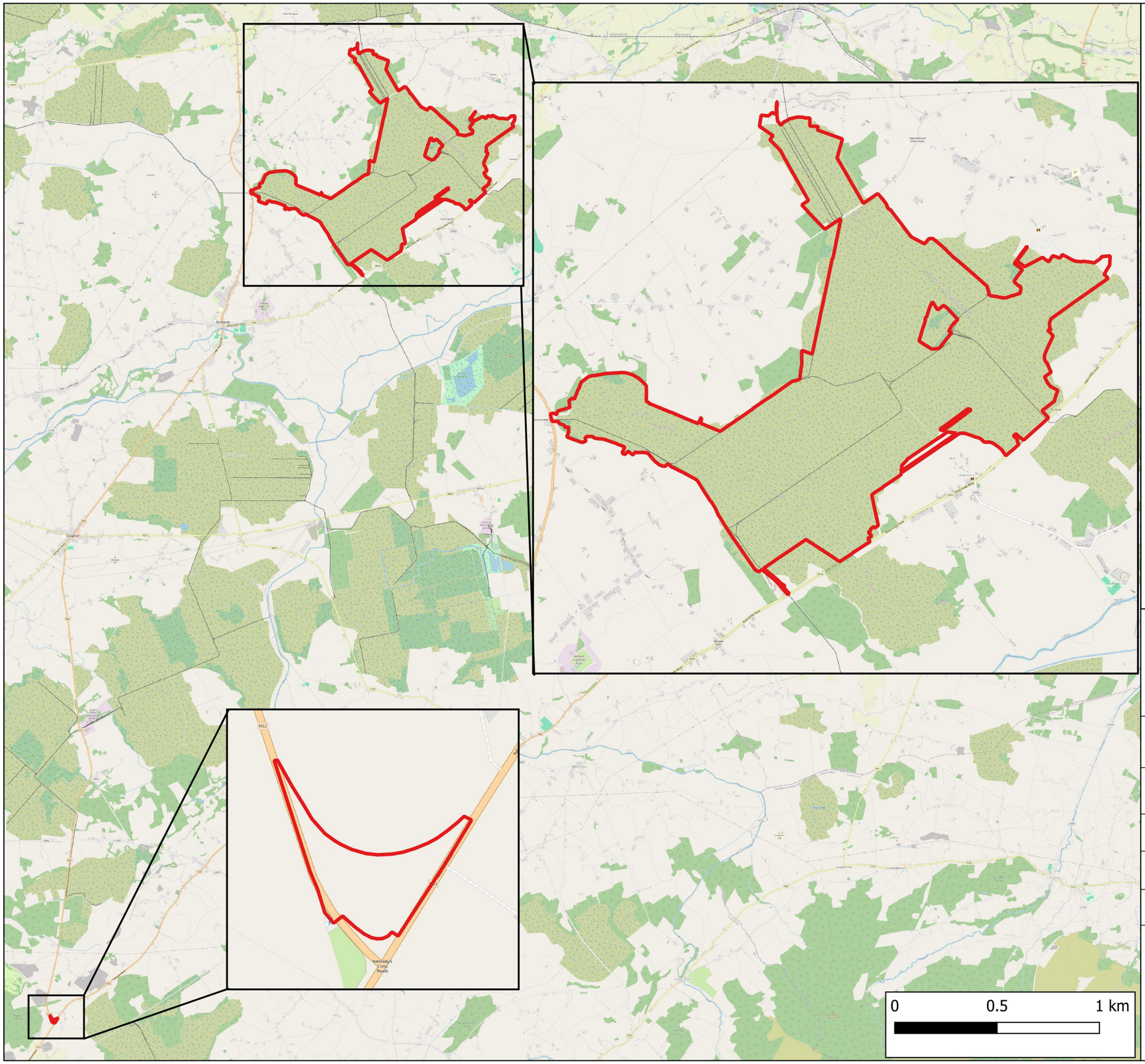

Drawing Title
Planning Application Red Line Boundary

Project Title
Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 2-3
Scale 1:90,000	Date 2026-01-19

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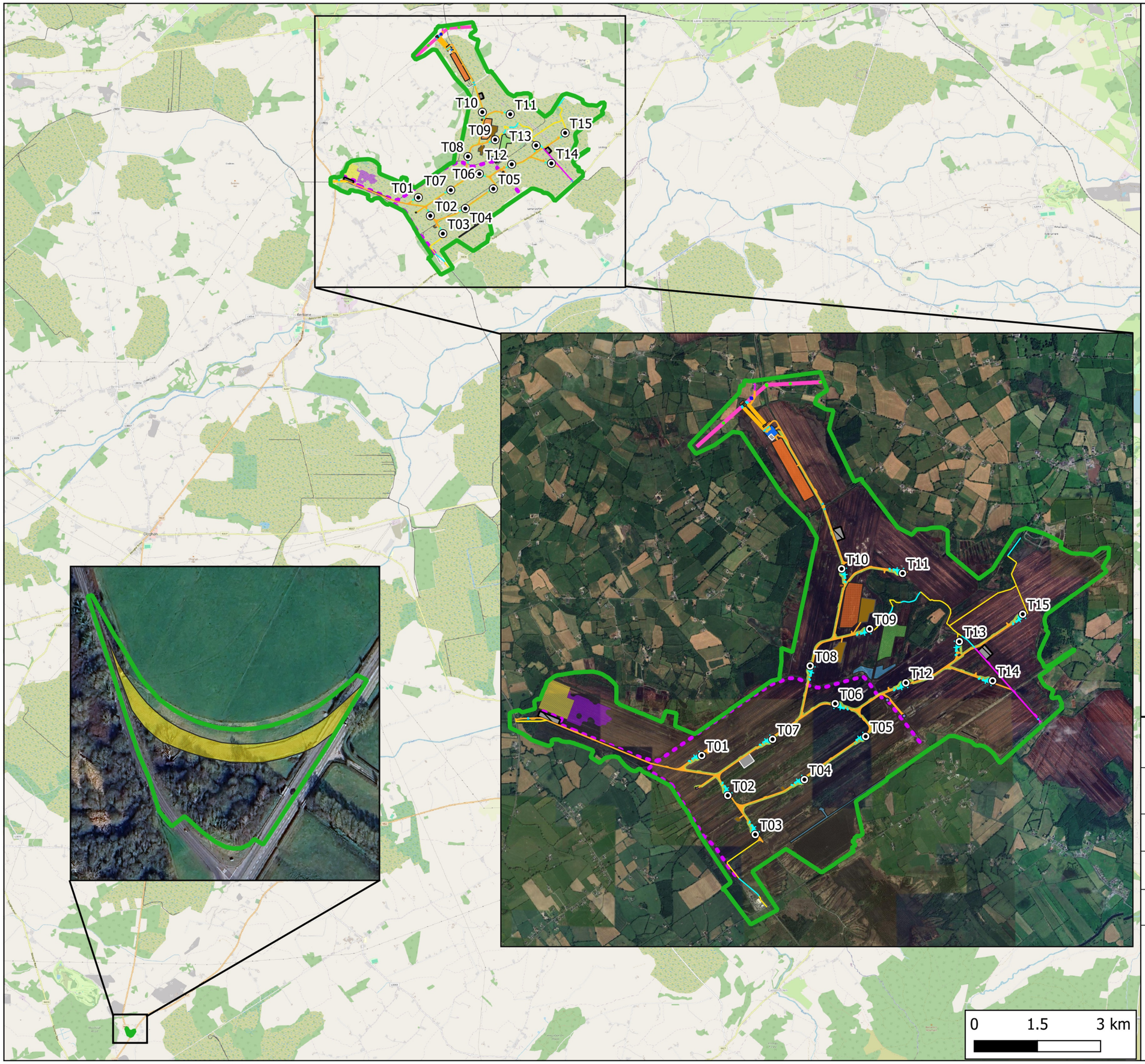
2.2 Description of the Proposed Project

This section of the CEMP describes the Proposed Project and all its component parts. The planning application for the Proposed Project will be made to An Coimisiún Pleanála. A detailed description of the Proposed Project is provided in Chapter 4 (Description of the Proposed Project) of this EIAR.

The Proposed Wind Farm layout is shown in Figure 2-4. The Proposed Grid Connection layout is illustrated on Figure 2-5. Figure 2-6 illustrates the overall layout of the Proposed Project (i.e. the Proposed Wind Farm and Proposed Grid Connection together).

Detailed site layout drawings of the Proposed Project are included in Appendix 4-1 to Chapter 4 of the EIAR.



Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Proposed Turbine Foundations
- Proposed Hardstands
- Proposed New Roads
- Proposed Temporary Access Track
- Proposed Upgrades to Existing Roads
- Proposed New Amenity Track
- Proposed Upgrades to Existing Roads for Amenity Track
- Proposed Lay By for Delivery Vehichles
- Proposed Gates
- Proposed Security Hut
- Proposed Onsite 220kV Substation
- Proposed Telecommunications Tower
- Proposed Met Mast
- Proposed Temporary Construction Compounds
- Proposed Amenity Carparks
- Proposed Peat Deposition Areas
- Pump Stations
- Proposed Pump Station Access Road
- Proposed Borrow Pits
- Proposed New Pylons
- Existing Pylon To Be Removed
- Existing Pylon
- Shannonbridge-Maynooth 220kV Overhead Line
- Proposed Overhead Line
- Proposed Tower Pads
- Proposed Crane Pads
- Proposed Gantry Structures

Ecological Enhancement

- Marsh Fritillary Habitat Creation
- Woodland Establishment
- Linear Habitat Replanting

Ornithological Enhancement and Mitigation

- Whooper Swan Wetland
- Lapwing Semi-Grassland Mosaic
- Proposed TDR SPA Works

Drawing Title
Proposed Wind Farm Layout

Project Title
Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 2-4
Scale 1:87,500	Date 2026-03-13

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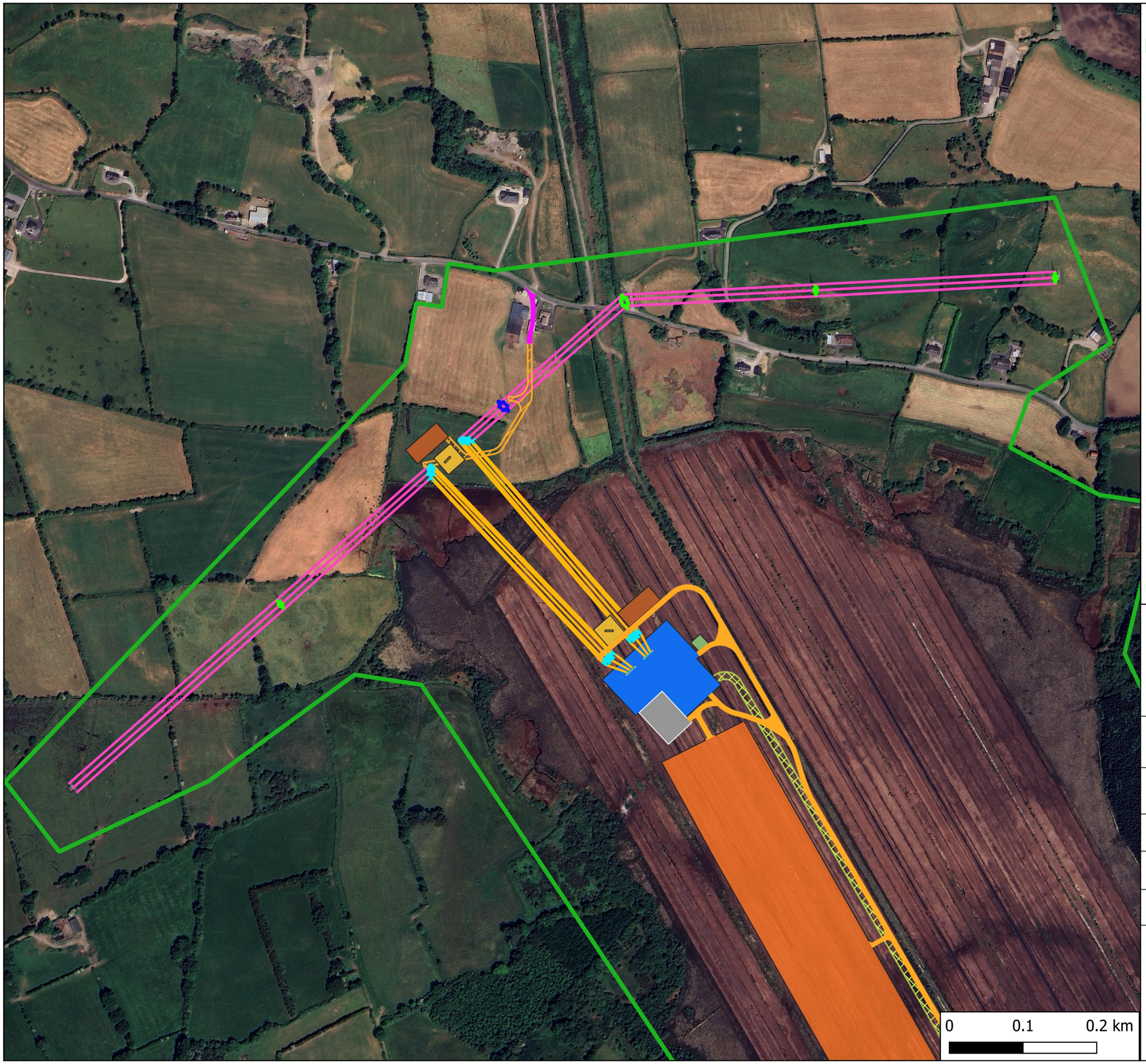

Map Legend

- EIAR Site Boundary
- Proposed Overhead Line
- Shannonbridge-Maynooth 220kV Overhead Line
- Existing Pylon To Be Removed
- Existing Pylons
- Proposed New Pylons
- Proposed Onsite 220kV Substation
- Proposed Telecommunications Tower
- Proposed Gantry Structures
- Proposed Temporary Construction Compounds
- Proposed Crane Pads
- Proposed Tower Pads
- Proposed New Roads
- Proposed Peat Deposition Areas
- Proposed Temporary Works Areas

Drawing Title
Proposed Grid Connection

Project Title
Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 2-5
Scale 1:5,000	Date 2026-02-10

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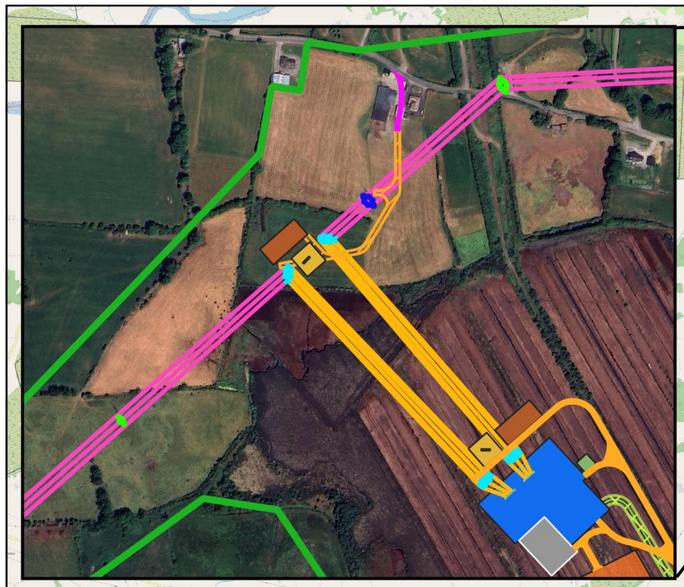

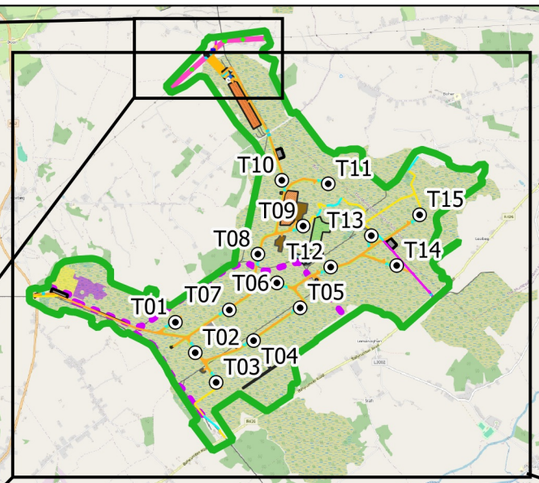

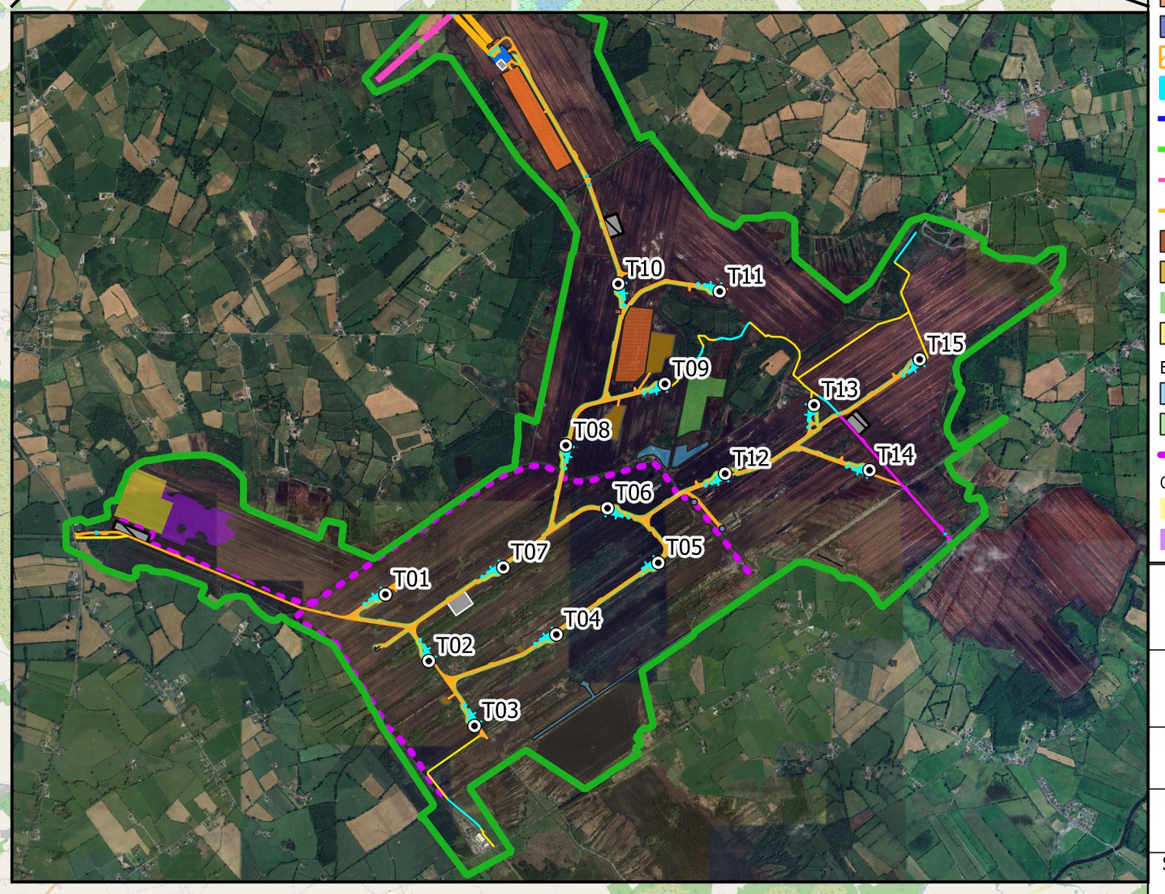

0 1.5 3 km

Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Proposed Turbine Foundations
- Proposed Hardstands
- Proposed New Roads
- Proposed Temporary Access Track
- Proposed Upgrades to Existing Roads
- Proposed New Amenity Track
- Proposed Upgrades to Existing Roads for Amenity Track
- Proposed Lay By for Delivery Vehichles
- Proposed Gates
- Proposed Security Hut
- Proposed Onsite 220kV Substation
- Proposed Telecommunications Tower
- Proposed Met Mast
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- Pump Stations
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- Existing Pylon To Be Removed
- Existing Pylons
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- Proposed Overhead Line
- Proposed Tower Pads
- Proposed Crane Pads
- Proposed Gantry Structures
- Proposed TDR SPA Works

Ecological Enhancement

- Marsh Fritillary Habitat Creation
- Woodland Establishment
- Linear Habitat Replanting

Ornithological Enhancement and Mitigation

- Whooper Swan Wetland
- Lapwing Semi-Grassland Mosaic

N

Drawing Title

Proposed Project Layout

Project Title

Lemanaghan Wind Farm, Co. Offaly

Drawn By	Checked By
CJ	EC
Project No. 200804	Drawing No. Figure 2-6
Scale 1:87,500	Date 2026-03-13

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2.3 Construction Management Practices Overview

2.3.1 Introduction

An experienced principal contractor will be appointed for the civil works for the construction phase of the Proposed Project. The appointed contractor for the works will be required to comply with this CEMP and any revisions made to this document in the preparation of method statements for the various elements of the construction phase of the Proposed Project. An overview of the proposed Construction Management Practices is provided below.

2.3.2 Overview of Proposed Construction Management Practices

The EIAR includes construction methodologies and management practices for various elements of work to be undertaken as part of the Proposed Project. Detailed construction methodologies are reproduced in the relevant sub-sections but will be superseded by an appointed contractor's construction method statements, which will form part of the CEMP. The following sections also outline the construction and environmental management practices to be deployed during the construction phase. The contractor's construction method statements will be prepared to take account of the detailed engineering, geotechnical and detailed drainage design which will be prepared prior to commencement of construction and all requirements of this CEMP.

Proposed Wind Farm

- Turbine Foundations;
- Hardstanding Areas;
- Assembly Areas;
- Site Roads (New and Upgrade to Existing Track) and Crane Pad Areas;
- Site Underground Electrical (33kV) and Communications Cabling;
- Cable Trenching;
- Site Entrance Management;
- Anemometry Mast;
- Decommissioning of Existing Anemometry Mast;
- Temporary Construction Compounds;
- Temporary Security Compounds and Gates;
- Biodiversity Mitigation and Enhancement Measures;
- Amenity Tracks and Carparks.
- Vegetation Removal and Replanting;
- Site Drainage System;
- Watercourse/Culvert Crossings;
- Peat Deposition Areas;
- Borrow Pit;
- Turbine Delivery Route Accommodation Works;

Proposed Grid Connection

- Onsite 220kV Substation and Control Buildings;
- Overhead Line Electrical Cabling Route;
- Bored Well;
- Telecommunications Tower.

2.3.3 Proposed Wind Farm

2.3.3.1 Turbine Foundations

Each wind turbine is secured to a reinforced concrete foundation that is installed below the finished ground level. The size of the foundation will be dictated by the turbine manufacturer, and the final turbine selection will be the subject of a competitive tender process. Different turbine manufacturers use differently shaped turbine foundations, ranging from circular to hexagonal and square, depending on the requirements of the final turbine supplier. Adopting a precautionary approach, however, a foundation area large enough to accommodate modern turbine models has been assessed in the EIAR. The turbine foundation transmits any load on the wind turbine into the ground. The maximum horizontal and vertical extent of the turbine foundations will be 28m and 4m respectively, which has been assessed in the EIAR.

Foundations for wind turbines may be of the gravity or bored piled type. Trial pitting and peat probing has been carried out at each of the turbine base locations to determine the approximate depth of excavation and fill required (refer to Section 4.4.3 of Chapter 4 of the EIAR). The geotechnical investigations to date indicate that the majority of the foundations at the Proposed Wind Farm site will be piled with some turbines able to utilise gravity foundations. Please see Table 2-1 for predicted foundation types at each turbine location. 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.

Table 2-1 Proposed Turbine Foundation Height and Type

Turbine ID	Ground Level (taken from Bore Hole, Trial Pit, and LiDAR Data) (mOD)	Height above ground level (m)	Proposed Top of Foundation (mOD)	Anticipated Foundation Type
T01	50.52	1.0	51.5	Piling
T02	50.9	1.0	51.9	Piling
T03	49.6	1.0	50.6	Piling
T04	51.7	1.0	52.7	Piling
T05	47.1	1.0	48.1	Piling
T06	48.5	1.5	50.0	Piling
T07	50.3	1.0	51.3	Piling
T08	49.6	1.0	50.6	Piling
T09	51.3	1.0	52.3	Piling
T10	52.7	1.0	53.7	Piling
T11	54.7	1.0	55.7	Piling
T12	47.0	1.5	48.5	Excavate/ Replace

T13	50.8	1.0	51.8	Piling
T14	47.9	1.0	48.9	Piling
T15	51.2	1.0	52.2	Excavate/ Replace

After the foundation level of each turbine has been formed using piled foundations, bored foundations or a gravity foundation on competent stratum (i.e., bedrock or subsoil of sufficient load bearing capacity), the "anchor cage" (which anchors the first section of the turbine tower to the foundation) is levelled and reinforcing steel is then built up around and through the anchor cage. The outside of the foundation is shuttered with demountable formwork to allow the pouring of concrete and is backfilled accordingly with appropriate granular fill to the finished surface level.

It is anticipated that the formation level of the turbine foundations will be on the lower mineral subsoil or bedrock. They will be formed at a suitable level directed by the Geotechnical Engineer/Designer. The foundations will be constructed as follows:

1. *The extent of the excavation will be marked out and will include an allowance for trimming the sides of the excavation to provide a safe working area and slope batter;*
2. *Where practical, the soil will be stripped over the area of the excavation and stored locally for reuse, the subsoil will be excavated and stored to one side for reuse during the landscaping around the finished turbine;*
3. *No material will be removed from the Proposed Wind Farm site with excavated peat and spoil being transported to the identified peat and spoil management areas within the Site.*
4. *All groundwater and surface water arising from turbine base excavation will be pumped to the dirty water system prior to discharge from the works area;*
5. *Soil excavation shall be observed by a qualified archaeologist in accordance with a scheme of archaeological monitoring to identify any significant remains as they come to light;*
6. *The foundations excavation will be raised to formation level by compacted layers of well graded granular material will be spread and compacted to provide a hard area for the turbine foundation.*

Standard excavated reinforced concrete bases will be completed as follows:

1. *A layer of lean-mix blinding will be laid approximately 75mm thick directly on top of the newly exposed formation, tamped and finished with a screed board to leave a flat level surface. The concrete should be protected from rainfall during curing and all surface water runoff from the curing concrete should be prevented from entering surface water drainage directly;*
2. *High tensile steel reinforcement will be fixed around the anchor cage in accordance with the designer's drawings & schedules. The foundation anchorage system will be installed, levelled and secured to the blinding using steel box section stools;*
3. *Ductwork will be installed as required, and formwork erected around the steel cage and propped from the backside as required;*
4. *The foundation anchorage system will be checked both for level and line prior to the concrete being installed in the base. These checks will be passed to turbine manufacturer for their approval;*
5. *Concrete will be placed using a concrete pump and compacted when in the forms using vibrating pokers to the levels and profile indicated on the drawings. Upon completion of the concreting works the foundation base will be covered and allowed to cure;*
6. *Steel shutters will be used to pour the circular chimney section;*

7. *Earth wires and drainage pipes will be placed around the base;*
8. *The foundation will be backfilled with a cohesive material, where possible using the material arising during the excavation or imported material and landscaped using the soil set aside during the excavation; and.*
9. *No excavated material will be removed from the Proposed Wind Farm site with excavated peat and spoil being transported to the identified peat and spoil management areas within the site.*

Reinforced concrete piled foundations will be completed as follows:

1. *The extent of the excavation will be marked out and will include an allowance for trimming the sides of the excavation to provide a safe working area and slope batter;*
2. *No excavated material will be removed from the Proposed Wind Farm site with excavated peat and spoil being transported to the identified peat and spoil management areas within the site.*
3. *A piling platform for the piling rig will be constructed by excavating to a suitable intermediate mineral subsoil and backfilling to formation level by compacted layers of well graded granular material spread and compacted to provide a hard area for the piling rig;*
4. *The piling rig, fitted with an auger, will then bore through the soft material with a sleeve fitted around the auger to prevent the sidewalls of the soil and overburden from collapsing. The borehole is then extended to a suitable depth into the subsoil/bedrock.*
5. *When the auger and the sleeve are removed high tensile steel cages will be lowered into the boreholes. These steel cages will extrude above the level of the top of the concrete pile.*
6. *As the auger is removed concrete is pumped into the borehole.*
7. *Reinforcing steel on the top of the pile will tie to the foundation base steel.*
8. *The procedure for standard excavated reinforced concrete bases as outlined above can be applied from here.*

2.3.3.2 Hard Standing Areas

Hard standing areas consisting of levelled and compacted hardcore are required around each turbine base to facilitate access, turbine assembly and turbine erection. The hard standing areas are used to accommodate cranes used in the assembly and erection of the turbine. The hardstands also allow for the offloading and storage of turbine components, and generally provide a safe, level working area around each turbine position. The hard-standing areas are extended to cover the turbine foundations once the turbine foundation is in place. All crane hardstand areas will be designed taking account of the loadings provided by the turbine manufacturer and will consist of a compacted stone structure. The crane hardstands will be constructed in a similar manner to the excavated site roads detailed in Section 2.3.3.4.2 below and will measure approximately 48m by 75m.

The hardstanding areas shown represents a design based on manufacturer's requirements and seeks to accommodate a number of different turbine types and models.

The proposed hard standing areas for each individual turbine are shown as part of the detailed layout drawings included in Appendix 4-1 to Chapter 4 of the EIAR and using the precautionary principle, represent the maximum sizes required.

Figure 4-6 of Chapter 4 shows a bored turbine base layout and Figure 4-7 of Chapter 4 shows a gravity turbine base layout, including turbine foundation, hard standing area, assembly area, access road and surrounding works area.

2.3.3.3 Assembly Areas

Levelled assembly areas will be located on either side of the hard-standing area as shown on Figure 4-6 and Figure 4-7 of Chapter 4 of the EIAR. 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 and to assist the main crane during turbine assembly. A detailed drawing is presented in Appendix 4-1 to Chapter 4 of the EIAR.

2.3.3.4 Site Roads

To facilitate travel within the site and to connect the various project components together, existing onsite tracks will need to be upgraded, and new access roads will need to be constructed. The site makes use of the existing track network insofar as possible. It is proposed to upgrade approximately 1.14km of existing site roads and tracks and to construct approximately 17.1km of new internal access roads. The road construction techniques to be considered are as follows:

- Construction of New Floating Roads over peat;
  - Construction of New Floating Roads over an archaeological feature (i.e., a togher);
- Construction of New Excavated Roads through peat,
- Decommissioning of Temporary Access Road, and;
- Upgrades to Existing Roads.

The proposed access roads will be constructed using the methodology summarised below:

2.3.3.4.1 *Construction of New Floating Roads*

Floating access will be used in areas where the peat depth is in excess of 1m. This road construction type is selected for flat terrain i.e., typically less than 5-degree slope. Section details of New Floating Roads are shown in Figure 4-8 of Chapter 4 of the EIAR.

The construction methodology for the construction of floating roads, as presented in the *Peat and Spoil Management Plan* (Appendix 4-3 of the EIAR) is detailed below. This methodology includes procedures that are to be included in the construction to minimise any adverse impact on peat stability.

1. *Prior to commencing floating road construction movement monitoring posts will be installed in areas where the peat depth is greater than 2m.*
2. *Base geogrid to be laid directly onto the existing peat surface along the line of the road in accordance with geogrid provider's requirements.*
3. *Construction of road to be in accordance with appropriate design from the designer.*
4. *The typical make-up of the new floated internal road is up to 1,000mm [of selected granular fill with 2 no. layers of geogrid with possibly the inclusion of a geotextile separator (drawing P20-216-0600-0017 of Appendix 4-3).*
5. *Granular fill to be placed and compacted in layers in accordance with the TII Specification for Road Works, Series 600 (2013).*
6. *Following the detailed design of the floated internal roads it may be deemed necessary to include pressure berms either side of the internal road in some of the deeper peat areas. The inclusion of a 2 to 5m wide pressure berm (typically 0.5m in height) either side of the internal road will reduce the likelihood of potential bearing failures beneath the internal road.*
7. *The finished road width will be approximately 5.5m (5.0m running width), with wider sections on bends and corners.*
8. *Stone delivered to the floating road construction shall be end-tipped onto the constructed floating road. Direct tipping of stone onto the peat shall not be carried out.*

9. *To avoid excessive impact loading on the peat due to concentrated end-tipping all stone delivered to the floating road shall be tipped over at least a 10m length of constructed floating road.*
10. *Where it is not possible to end-tip over a 10m length of constructed floating road then dumpers delivering stone to the floating road shall carry a reduced stone load (not greater than half full) until such time as end-tipping can be carried out over a 10m length of constructed floating road.*
11. *Following end-tipping a suitable bulldozer shall be employed to spread and place the tipped stone over the base geogrid along the line of the road.*
12. *A final surface layer shall be placed over the full width of the floating road, as per design requirements, to provide a road profile and graded to accommodate wind turbine construction and delivery traffic.*

The construction methodology for floating roads crossing over archaeological features (i.e., a togher), as presented in the Peat and Spoil Management Plan is detailed below. There are two known locations where internal access roads cross archaeological features (togher), one between T10 and T11 and the other to the north of T10 on the access road that leads to the on-site substation.

1. *Geotextile layer to be placed on the surface of the peat, extending 5m either side of the toghers. The extent of the togher will be confirmed on site by an archaeological specialist.*
2. *A layer of clean sand, 0.5m in thickness, will be placed on top of the geotextile to act as a buffer between the togher and the access road. The top of the clean sand layer will be dead rolled, without vibration.*
3. *Base geogrid to be laid on top of the sand layer along the line of the road in accordance with geogrid provider's requirements. Geogrid to be laid across the full width of the road, including the widened area for the cable trench.*
4. *Construction of road to be in accordance with appropriate design from the designer.*
5. *The typical make-up of the new floated internal road is up to 1,000mm of selected granular fill with 2 no. layers of geogrid (drawing P20-216-0600-0025),*
6. *Granular fill for the road construction to be placed and compacted in layers in accordance with the TII Specification for Road Works, Series 600 (2013).*
7. *The access road at these locations is to be widened to accommodate the cable trench (as per drawing P20-216-0600-0025). A minimum of 2m horizontal space is required between the edge of the access road and the edge of the cable trench.*

2.3.3.4.2 Construction of New Excavated Roads

The construction methodology for the construction of new excavated access roads or tracks, as presented in the *Peat & Spoil Management Plan* in Appendix 4-3 of the EIAR, is detailed below.

1. *Prior to commencing the construction of the excavated roads movement monitoring posts will be installed in areas where the peat depth is greater than 2.0m.*
2. *Interceptor drains (i.e., clean water drains) will be installed upslope of the internal road alignment to divert any surface water away from the construction area.*
3. *Excavation of roads will be to the line and level given in the design requirements. Excavation will take place to a competent stratum beneath the peat, with due consideration to appropriate site drainage.*
4. *Road construction will be carried out in sections of approximately 50m lengths i.e. no more than 50m of internal road should be excavated without re-placement with stone fill.*
5. *Excavation of materials with respect to control of peat stability:*
   a) *Acrotelm (where present) or the upper layer of peat (to about 0.3 to 0.4m of peat) is generally required for landscaping and will be stripped and temporarily stockpiled for re-use as required. Acrotelm stripping will be undertaken prior to main excavations.*

b) *Where possible, the acrotelm shall be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation.*
c) *All catotelm peat or lower layers of peat (peat below about 0.3 to 0.4m depth) shall be transported immediately on excavation to the designated peat deposition areas.*

6. *Once excavated, non-catotelm peat will be temporarily stored in localised areas adjacent to excavations, where appropriate, for roads and hardstands before being placed into the permanent peat storage areas within the borrow pits and designated Peat Deposition Areas. All peat placement areas will be upslope of founded roads/hardstands and will be inspected by the Project Geotechnical Engineer before material is stored in the area. Alternatively, peat will be side- cast local to the excavation or along adjacent internal roads.*
7. *Side slopes in peat shall be not greater than 1 (v): 3 (h). This slope inclination will be reviewed during construction, as appropriate. Where areas of weaker peat are encountered then slacker slopes will be required. Battering of the side slopes of the excavations will be carried out as the excavation progresses.*
8. *End-tipping of stone onto the road during the construction/upgrading of the internal road will be carefully monitored to ensure that excessive impact loading, which may adversely affect the adjacent peat, is limited.*
9. *The excavated internal road will be constructed with a minimum of 800mm of selected granular fill. Granular fill to be placed and compacted in layers in accordance with the TII Specification for Road Works.*
10. *Internal roads to be finished with a layer of capping across the full width of the road.*
11. *A layer of geogrid/geotextile may be required at the surface of the competent stratum.*
12. *At transitions between floating and excavated roads a length of road of about 10m shall have all peat excavated and replaced with suitable fill. The surface of this fill shall be graded so that the road surface transitions smoothly from floating to excavated road.*
13. *Where slopes of greater than 5 degrees are encountered along with relatively deep peat (i.e. greater than 1.5m) and where it is proposed to construct the internal road perpendicular to the slope contours it is best practice to start construction at the bottom of the slope and work towards the top, where possible. This method avoids any unnecessary loading to the adjacent peat and greatly reduces any risk of peat instability.*
14. *A final surface layer shall be placed over the excavated road and graded to accommodate wind turbine construction and delivery traffic.*
15. *The construction and upgrading of internal roads in areas of deep peat (greater than 2m) will be inspected on a routine basis (by the Site manager/Ecological Clerk of Works/Project Geotechnical Engineer) during the works, particularly before/following trafficking by heavy vehicular loads.*

Section details of New Excavated Roads are shown in Figure 4-9 of Chapter 4 of the EIAR.

2.3.3.4.3 Decommissioning of Temporary Access Road

The Proposed Project will include the decommissioning of the temporary road facilitating access to Proposed Grid Connection infrastructure under the existing OHL. Once construction is completed this road will be closed, covered with a layer of topsoil and left to revegetate naturally.

2.3.3.4.4 Upgrade of Existing Roads

The construction methodology for the upgrades of existing access roads or tracks, as presented in the *Peat & Spoil Management Plan* in Appendix 4-3 of the EIAR, is detailed below.

1. *Internal road construction shall be to the line and level requirements as per design/planning conditions.*
2. *For upgrading of existing excavated internal roads (Type A) the following guidelines apply:*

a) *Excavation of the widened section of internal road should take place to a competent stratum beneath the peat (as agreed with the designer) and backfilled with suitable granular fill.*
b) *Benching of the excavation may be required between the existing section of internal road and the widened section of internal road depending on the depth of excavation required.*
c) *The surface of the existing internal road should be overlaid with up to 500mm of selected granular fill.*
d) *Internal roads to be finished with a layer of capping across the full width of the track*
e) *A layer of geogrid/geotextile may be required at the surface of the existing internal road and at the base of the widened section of internal road (to be confirmed by the designer).*
f) *For excavations in peat, side slopes shall be not greater than 1 (v): 3 (h). This slope inclination should be reviewed during construction, as appropriate. Where areas of weaker peat are encountered then slacker slopes will be required to ensure stability.*

3. *The finished road width will have a running width of 5m, with wider sections on bends and corners.*
4. *On side long sloping ground any road widening works required will be done on the upslope side of the existing internal road, where possible.*
5. *At transitions between new floating and existing excavated roads a length of about 10 to 20m shall have all peat excavated and replaced with suitable fill. The surface of this fill shall be graded to accommodate wind turbine construction and delivery traffic.*

The section of road undergoing upgrades is shown in Figure 4-10 of Chapter 4 of the EIAR.

2.3.3.4.5 *Underpass Extension at Site Entrance 1*

To facilitate delivery of turbine components to the Proposed Wind Farm it is proposed to extend the existing underpass located along the N62 national road.

The proposed underpass extension will be carried out at an existing underpass which traverses beneath the N62 in order to facilitate the delivery of abnormal loads. To ensure turbine components safely enter the Proposed Project site, it is intended to construct the underpass extension in an eastwards direction to establish a temporary access junction for turbine delivery vehicles to allow access to the Proposed Project site.

The construction methodology for the underpass extension is identified below:

1. *Remove overgrowth on the eastern side of the underpass for the full extent of the proposed extension.*
2. *Confirm locations of watermain and other services and provide protection to same as required.*
3. *Remove wing wall at eastern side of underpass and store for possible reuse.*
4. *Excavate and construct blinding layer recast arch system.*
5. *Install segmental precast concrete arch to match existing.*
6. *Install precast concrete wing walls.*
7. *Remove existing fence at the southeast corner of the underpass.*
8. *Backfill around underpass extension to form new bell mouth area taking care to balance the backfill levels on each side of the arch.*
9. *Extend 450mm diameter drainage pipes to the end of the extension.*

2.3.3.5 Site Underground Electrical and Communication Cabling

The transformer in each turbine and the met mast will be connected to the proposed on-site 220kV substation through a network of underground electrical and communication cabling. The electrical and fibre-optic cabling connecting the proposed turbines to the proposed onsite 220kV substation compound will be run in cable ducts adjacent to the proposed internal roads and buried directly alongside the internal roads at depths of approximately 1.2m below ground level to the top of the duct as shown in Figure 4-12 of Chapter 4. Please note, at 2 no. locations the cable will be floated alongside the proposed new floating road to minimise impacts on cultural heritage. Please see Section 2.3.3.4.1 above for further details on the construction methodology.

The routes the cables will follow the access roads to each proposed turbine location and will cross the L7002 local road at 1 no. location (X615527, Y730068). The proposed underground 20kV or 33kV cable routes are illustrated on the site layout drawings included as Appendix 4-1; the exact number and configuration of cable may vary within the cabling trench. Figure 4-11 of Chapter 4 shows the proposed cable trench variations for 33kV cable trenches proposed which will all be utilised within the site; i.e., 1 no. cable trench, 2 no. cable trench, or 3 no. cable trench which will be placed within the ground adjacent to proposed internal roads to facilitate the connection of the proposed turbines to the proposed onsite 220kV substation. Please see Appendix 4-1 Planning Drawings for further detail on the location for each cable trench variation proposed. The exact configuration of the underground cabling will be set by the requirements of the electrical designers at detailed design stage.
Clay plugs (water flow barriers) will be installed at regular intervals of not greater than 50m along the length of the trenches where required to prevent the trenches becoming conduits for runoff water. Backfill material will be compacted in layers with engineer-approved specified material, which may be imported onto the Proposed Project site should sufficient volumes of suitable material not be encountered during the construction phase of the Proposed Project.

2.3.3.6 Site Entrance Management

The Proposed Project site is currently served by a number of existing tracks and access roads due to its previous use as a commercial bog. As part of the Proposed Project, it is proposed to upgrade 3 no. existing entrances and facilitate 2 no. new site entrances.

Due to the nature of the Proposed Project, all proposed works will be local to the Proposed Project site and as such, the construction phase will utilise 4 no. site entrance locations. Of the 4 no. construction site entrance locations, 3 no. are existing site entrances that will be upgraded, and 1 no. is a proposed new entrance on the northern side of the L7002 local road. An existing agricultural site entrance off the L7001 local road network will also be upgraded to facilitate construction phase access to the Proposed Grid Connection infrastructure located under the existing Shannonbridge-Maynooth 220kV OHL. Use of existing road (which will be upgraded) and temporary construction track will be established from the existing entrance off the L7001 local road to the Proposed Grid Connection infrastructure located under the existing OHL. Following the construction of this infrastructure, this temporary track will be covered with a layer of topsoil and reseeded and the existing road and entrance will continue to facilitate agricultural activities. Please see Table 4-9 of Chapter 4 of the EIAR for further detail.

All proposed site entrances were subject to swept path analysis assessment to identify the turning areas required, as described in Section 15.1 of the Traffic and Transport Assessment. Appropriate sightlines will be established for the safe access and egress of traffic.

In addition to the gravel, cobbles and boulder material to be extracted from the proposed borrow pits, it is anticipated that engineering fill and higher quality, surfacing granular fill and sand will be sourced from local, authorised quarries.

2.3.3.7 Anemometry Mast

One permanent anemometry mast (met mast) is proposed as part of the Proposed Project. The anemometry mast will be equipped with wind monitoring equipment at various heights. The mast will be located within the Proposed Wind Farm at ITM X614131, Y727021 as shown on the site layout in Figure 4-1 of Chapter 4 the EIAR and will be a slender structure of 145 metres in height. The mast will be a free-standing structure normally constructed with a reinforced concrete gravity foundation designed to cater for the mast loadings. A hard-standing area sufficiently large to accommodate the installation crane will be constructed adjacent to an existing track. The proposed anemometry mast is shown in Figure 4-13 of Chapter 4 of the EIAR.

The met mast foundation will be formed at a suitable level directed by the Geotechnical Engineer/Designer. The foundation area will be prepared as follows:

1. *The extent of the excavation will be marked out and will include an allowance for trimming the sides of the excavation to provide a safe working area and slope batter;*
2. *Where practical, the soil will be stripped over the area of the excavation and stored locally for reuse, the subsoil will be excavated and stored to one side for reuse during the landscaping around the finished met mast;*
3. *No material will be removed from site with excavated spoil being transported and stored in the identified spoil management areas within the site.*
4. *All groundwater and surface water arising from met mase base excavation will be pumped to the dirty water system prior to discharge from the works area;*
5. *Soil excavation shall be observed by a qualified archaeologist in accordance with a scheme of archaeological monitoring to identify any significant remains as they come to light;*
6. *The foundations excavation will be raised to formation level by compacted layers of well graded granular material will be spread and compacted to provide a hard area for the met mast foundation.*

The met mast foundation will then be installed using the standard excavated reinforced concrete bases methodology as detailed in Section 2.3.3.1.

2.3.3.8 Decommissioning of Existing Anemometry Mast

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

1. *Mobilise on site with 1 no. tractor and trailer and 1 no. 13+ tonne excavator. Excavated soil will be appropriately tested and transported off site by a licensed waste transfer hauler as required.*
2. *Establish safe working area around mast.*
3. *Climb mast and remove instruments and logger box.*
4. *On one side of the mast, transfer guy ropes from ground anchors to the 13+ tonne excavator.*
5. *Cut guy rope attached to 13+ tonne excavator to allow mast to fall.*
6. *Excavate mast anchors and anchor bases making good the ground.*
7. *Dismantle and remove mast components and accessories from site using trailer.*
8. *Demobilise from the site.*

2.3.3.9 Temporary Construction Compounds

There are 5 no. temporary construction compounds proposed as part of the Proposed Project, they will be located in the townlands of Corbane, Lisdermot, Cor More and Cor Beg, Straduff, Tumbeagh,

Cappanalosset, Cooldorragh, and Lemanaghan within the Proposed Project site. These temporary construction compounds are detailed in Table 4-2 of Chapter 4 of the EIAR.

The construction compounds will be constructed using excavate and replace methods but may be floated or partially floated pending the results of the detailed ground investigations. The construction methodology for the temporary construction compounds is as follows:

1. *The area to be used as the compound will be marked out at the corners using ranging rods or timber posts. Drainage runs, and associated settlement ponds will be installed around the perimeter (refer to Section 3.2 below);*
2. *The compound will be established using a similar technique as the construction of new roads as discussed below;*
3. *Where required, a layer of geogrid will be installed, and compacted layers of well graded granular material will be spread and lightly compacted to provide a hard area for site offices and storage containers;*
4. *Areas within the compound will be constructed as site roads and used as vehicle hard standings during deliveries and for parking;*
5. *A bunded containment area will be provided within the compound for the storage of lubricants, oils and site generators etc.;*
6. *A waste storage area will be provided within the compound;*
7. *If necessary the compound will be fenced and secured with locked gates, although fencing would only be utilised where significant risk of danger to third parties or vandalism is envisaged;*
8. *During the construction phase, a temporary toilet block unit will located within the temporary construction compound for use during the construction phase. Elsewhere on site, self-contained port-a-loo with an integrated waste holding tank will be used on site for toilet facilities. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by an appropriately consented waste collector to wastewater treatment plants, and;*
9. *The water supply to the site will be from a temporary water storage tank which will be filled using a mobile water tank which will source water locally as required;*
10. *Upon completion of the construction phase of Proposed Project, the 5 no. proposed temporary construction compounds will be removed, with the areas associated with Temporary Construction Compound 1, Temporary Construction Compound 3 and Temporary Construction Compound 4 being utilised for amenity car parks during the operational phase.*
    a) *The concrete foundations associated with Temporary Construction Compound 2 and Temporary Construction Compound 5, and the areas associated with Temporary Construction Compound 1, Temporary Construction Compound 3 and Temporary Construction Compound 4 that will not be used for amenity car parks, will be reinstated with previously excavated peat, and either be reseeded or left to revegetate naturally.*

2.3.3.10 Temporary Security Cabins and Proposed Gates

During the construction phase, 4 no. temporary security cabins will be installed within the Proposed Project site for the duration of the construction phase located at the 4 no. construction phase entrance points (please see Table 4-9 in Chapter 4 of the EIAR for detail on each site entrance location and for the location of each security compound). During the construction phase, each temporary security cabin will have a gate installed which will be manned by security stationed within each temporary security compound. The gates will remain on the site during the operational phase to facilitate access during the operational phase of the Proposed Project. Each gate will have a locking mechanism and will be used in the operational phase for amenity purposes and for maintenance and monitoring activities.

During the operational phase, the temporary security cabins will be removed from the site, however the concrete foundation of these cabins will be left in situ as this is the most environmentally prudent

option. These concrete foundations will be reinstated with previously excavated peat, and either be reseeded or left to revegetate naturally.

The security cabins will be prefabricated structures measuring 7.2m by 2.5m and 2.85m in height. The cabins will serve as the check-in and check-out point for staff and visitors during the construction phase. The temporary cabins will be removed as part of the post-construction reinstatement works of the wind farm development. The layout and sections of a security cabin is shown on Figure 4-19 of the EIAR within the detailed planning drawings contained in Appendix 4-1, the locations are shown in Figure 4-1 of Chapter 4 of the EIAR.

2.3.3.11 Biodiversity Management and Enhancement Measures

A Biodiversity Management and Enhancement Plan (BMEP) has been prepared for the Proposed Project and is included as Appendix 6-5 of this EIAR. This plan has been developed to offset the loss of habitats identified within the Proposed Project site and further enhance the biodiversity of the site and its environs. These measures have also been considered in the cultural heritage assessment included in Chapter 13: Cultural Heritage and landscape and visual impact assessment which is included in Chapter 14: Landscape & Visual, of this EIAR. Similarly, the drainage design for the Proposed Project, which has been prepared by Hydro Environmental Services Ltd. (HES) and is included in Appendix 9-1 of this EIAR has taken the BMEP measures into consideration from a drainage perspective.

The BMEP will be implemented at the start of the construction phase. A suitably qualified contractor and ecologist will be onsite during all enhancement and mitigation works to confirm that the management objectives are in place and in line with the required timelines.

The Ecological Clerk of Works (ECoW) will be responsible for the monitoring of the Proposed Project site, determining that all measures are achieving the desired results and, where necessary, amending the BMEP to achieve the required results; please see Section 4.1.2 below for further detail on the role of the ECoW. The Project Archaeologist will be responsible for ensuring that all relevant setbacks are adhered to and that there are no negative effects on unknown subsurface archaeology, please see Section 4.1.5 below for further detail on the role of the Project Archaeologist. The monitoring programme will be in place for the lifetime of the Proposed Wind Farm. The Applicant will also be responsible for ensuring compliance with planning conditions and engaging with statutory bodies and advisory agencies as required.

Please note that irrespective of the consenting or construction of the Proposed Project, the measures outlined in the Draft Cutaway Bog Decommissioning and Rehabilitation Plan (Draft Rehabilitation Plan) (Appendix 2-4) will be implemented by BnM in agreement with the EPA, per BnM's IPC Licence Obligations (P0500-01). The Draft Rehabilitation Plan included provides a description of Lemanaghan Bog and its ecology and has been taken account in describing the baseline environment in this EIAR. It also provides a framework and outline of the works that will be undertaken to achieve the aims of successful rehabilitation (the criteria for which are defined in the plan) and a timescale for when the various elements of the Draft Rehabilitation Plan will be implemented. Please see Section 4.6 of the EIAR and Section 2.10.2.2 of the EIAR for further detail.

2.3.3.11.1 *Ornithological Mitigation and Enhancement*

Whooper Swan

An enhancement area is proposed for whooper swan to replace the loss of roosting habitat to the Proposed Project. The c. 10ha area is proposed in the northwest of the Proposed Project site, (please see Figure 3-1 in Appendix 6-5 for location details) in an area of bare cutover peat. The measures proposed includes the controlled flooding of an area of approximately 10ha to a depth of approximately 1.5m. This will be achieved by creating an encircling embankment to contain the water. The controlled flooding will be such that water will be present during the winter months when whooper

swan are present (October to March). Visual screening from the internal road and car park will be created via planting of native scrub of *c.*3m width.

The construction methodology to create a shallow water body of approximately 10ha and 1.5m depth to accommodate winter roosting whooper swan will be achieved as follows:

1. *Wetland creation: the proposed approximately 10ha shallow water body (wetland) will be created with encircling embankments. The internal embankment height will be approximately 2m to ensure the target depth of 1.5m of water can be accommodated. The top width of the embankment should be a minimum of 5m with a slope of 3:1.*
2. *The embankment is formed using a bulldozer to push the peat into place, which is then shaped by an excavator. As the peat is shaped by the excavator, it should be compacted to make the peat less permeable.*
3. *Water levels will be managed with drop board sluices. Such sluices allow water to be retained in winter to achieve a 1.5m depth for roosting whooper swans. In the summer, the water level will be dropped to encourage revegetation. The water level will be controlled by an appropriate sluice. The following specifications have been provided for example purposes.*
4. *The sluice unit should consist of a metal sluice frame, with softwood drop boards, twin wall (e.g. 600mm) plastic pipe to create a sealed edge on the boards and a large outflow pipe to allow the water from inside the embankment to flow through the embankment wall without damaging it.*
5. *A gap is created in the embankment wall with an excavator. The drop board sluice is installed in the outer wall of the embankment, and an outflow pipe is put in position such that it bridges the gap between the sluice and the (future) water body inside the embankment. The sluice structure and pipe are lowered into position with the excavator. The level of the structure will ensure that the required depth of water can be maintained. A laser level should be used to ensure accuracy. Once the sluice and pipe structure is in place, the peat can be backfilled to reinstate the embankment wall. Drop boards can then be added to the sluice frame to the required height. The rubber seals are used to edge the boards to maintain a waterproof seal.*
6. *The top of the embankment, above the target water level of 1.5m, will include overflow pipes to avoid high water levels eroding channels through the top of the embankment.*
7. *To the west of the proposed winter roosting wetland is a proposed car park, Site Entrance 1 and an access road that runs south from the entrance to the wind farm. The proposed car park and road will be screened with a 3m wide native treeline (e.g. birch and willow spp). The planting will abut the road and be planted at a density of 3-5 plants per meter (depending on the age/size of the plants when planted). Slow-release fertiliser will be applied to the area to accelerate the establishment of the screen. The screen will run from the northernmost extent of the car park to the southernmost reaches of the enhancement area, plus 500m.*
8. *Herbicides and pesticides are not permitted within the enhancement area.*
9. *In the event of any invasive species being recorded within the area identified for enhancement measures, an invasive species management plan will be put in place to eradicate any stands of such species. A pre-commencement survey for invasive species will be undertaken as part of preparatory work and if any such species are recorded an invasive species management plan shall be prepared.*
10. *Maintenance is expected to be low. Occasionally, drop boards from the sluice gate may need to be replaced if they are damaged.*

Breeding Lapwing

An enhancement area is proposed for lapwing to replace the breeding habitat lost to the Proposed Project. The 10ha area is proposed in the west of the Proposed Project site adjacent to Site Entrance 1 (see Table 4-9 in Chapter 4), in an area of bare cutover peat (please see Figure 3-1 of the BMEP for

location details). The enhancement areas proposed has been designed to adhere to a 30m buffer applied to all recorded monuments found within this area of the site.

The construction methodology to create good quality breeding lapwing habitat that is defined as having a stable water table, an open aspect throughout, a short sward and reduced predation will be achieved as follows:

1. *The area will first need to be levelled (re-profiled) to stabilise the water table and facilitate the mowing necessary to maintain the required open aspect. A bulldozer is used to level/remove the camber from the former peat production fields and infill the drains. Drains will be infilled around the perimeter first and as a priority, as the proposed predator-proof fencing would be made ineffectual if mammalian predators could travel under the fence via a drainage channel. If there is not sufficient peat to infill the remaining sections of the drains, the edges will be re-profiled with a tapered edge. This measure will facilitate easy egress for chicks should they fall into a drain. The newly created c.10ha field should be at least the level of the surroundings peat to avoid large areas of pooling water.*
2. *Using an excavator, six wader scrapes will be excavated to a maximum depth of 30-45cm, with gentle sloping edges to provide foraging areas for breeding waders and their chicks. The scrapes will be evenly distributed throughout the c.10ha area and preferentially placed in locations of existing hollows.*
3. *Slow-release fertiliser will be applied to accelerate the revegetation of the area in the first growing season. Reapplication as necessary in subsequent years until 60% of the area has revegetated. As revegetation may be uneven, fertiliser application may need to be targeted to the underperforming areas.*
4. *Mowing will not be required until revegetation exceed 60% of the lapwing breeding area to a height of 5cm in late winter (before March 1st) as per BTO recommendations[1] and/or when tree seedlings (e.g. birch seedlings) are recorded within the enhancement area. Once the requirement for mowing is triggered, it will be undertaken annually thereafter.*
5. *Mowing should be undertaken in late winter before March 1st, before earlier breeding birds arrive in March (Joys & Crick 2004). Mowing will be undertaken with low-pressure tracking machinery to avoid damaging the developing sward. The annual mowing is likely to produce permanent grassland, which is an important foraging resource for breeding lapwing (Galbraith, 1988).*
6. *In areas where mowing is not possible, e.g. around wader scrapes, tree seedlings will be hand-pulled or cut to the ground by hand.*
7. *Herbicides and pesticides are not permitted within the enhancement area.*
8. *Invasive species management will be undertaken as outlined for whooper swan.*

Predator-proof Fencing

The fence specification has been chosen in order to successfully exclude ground predators potentially present in this area (e.g. Red Fox, Badger, Otter, American Mink, Irish Stoat and Pine Marten). The construction methodology for predator-proof fencing is detailed below:

1. *The fence will be installed immediately after the works associated with the bulldozer and excavator.*
2. *The fencing will be installed around the perimeter of the c. 10ha breeding lapwing area.*
3. *Strainer posts shall be a minimum of 3.5m long, have a minimum diameter of 15cm and shall be driven a minimum of 90cm into the ground. Strainers shall be placed at the beginning and end of every length of fencing and at ever change of direction where*

[1] https://www.bto.org/sites/default/files/lapwing-habitat-guide.pdf

the angle is greater than 30°. Strainers must also be used to accommodate any significant change in gradient and be strutted in the line of the fence. Strainers on 90° corners must be H framed and strutted. Maximum distance between strainer posts shall not exceed 100m. Strainers shall be incised (posts to be treated in accordance with IS 436);

4. *Intermediate posts shall be around 2.5m long, have a minimum diameter of 10cm and shall be driven a minimum of 60cm into the ground.*
5. *Intermediate posts shall be spaced at no more than 2.5m intervals and be H framed on every change of direction. Posts shall be incised (posts to be treated in accordance with IS 436);*
6. *High tensile 1580mm Tornado badger wire R15/158/5, to a height of 130cm off the ground forms the main body of the fence; the bottom 28cm is to be buried;*
7. *The Tornado badger wire is to be overlain with 16-gauge, hot dipped galvanised 25mm square weld mesh (clipped to the top of the badger wire using hog rings) and both are to be dug in (by pulling back and relaying the sod) to prevent animals digging under the fence.*
8. *Four strands of high tensile 12-gauge electric wire, tensioned and placed along the outside of the fence at 3cm, 15 cm and 25cm height above the top of the badger wire using UV resistant screw insulators. A fourth strand to be attached above these via 20cm UV resistant offset insulators to give total fence height of around 170cm. All strands connected to a single circuit although the second line at 15cm is an Earth wire. An additional live wire, connected to the single circuit, to be attached using UV resistant screw insulators on the inside of the fence at around 100cm to stop stock rubbing on posts;*
9. *All wire to be connected using Gripple wire joiners;*
10. *All access gates should be a minimum of 3.6m wide and at least 1.2 m high. All steel gates shall be hot dip galvanised in accordance with EN 1461 and 12 be overlain with 16-gauge, hot dipped galvanised 25mm square weld mesh, square cornered at bases and with hot dipped galvanised 45° angled brackets attached at top and overlain with same hot dipped galvanised weld mesh. Hot dipped galvanised gate post, concreted in, to be used and these to be independent of any strainer / fence post (two gates already have galvanised gate posts, and these can remain and be used). Gates to be hung using suitably sized proprietary gate hangers and the gate base shall be around 3cm above the ground. The gates also must be fitted with an adequate system which shall securely keep the gate closed. Handle openings must be secured against predators. Each gate to have a poured concrete apron buried (25- 30cm) under the gate to prevent digging;*
11. *Insulated underground cable (IB5) is to be buried under each gate, connecting the electric wires either side and ensuring the fence remains live when gates are opened;*
12. *There are no watercourse flow points within the proposed predator exclusion fence area. However, at any gullies or other similar depressions where deemed required, dams to prevent otter / mink access whilst maintaining flow through will be installed. To use a 300mm twin wall corrugated unperforated drainage pipe and 10-15cm or similar crushed rock. Ensure to incorporate buried Tornado badger wire above. At each pipe ends use hot dipped galvanised 25mm square weld mesh in a frame secured to the pipe to prevent animals gaining access but at same time allows for the mesh to be removed easily to clear debris. In addition, fix a section of Tornado badger wire across the watercourse width, around 5m upstream of the drainage pipe to act as a catch point to keep most debris away from the 25mm square weld mesh panel at the pipe end; and,*
13. *Supply and installation of a solar panelled fencer (PEL Unigizers - High Power Solar Fencers - PE406S or similar) and 4 x 1.5m earth bars.*

2.3.3.11.2 Ecological Mitigation and Enhancement

Marsh Fritillary Habitat Enhancement

Surveys undertaken within the Proposed Project site identified small, scattered areas of suitable habitat, associated with dry meadows and grassy verges (GS2).

It is proposed to enhance approximately 6.7 ha of grassland (GS2) habitat to improve its suitability for marsh fritillary by increasing habitat heterogeneity and the abundance and accessibility of devil's-bit scabious. These measures are designed to function as a potential network of habitats within the wider landscape, which is recognised as important for the long-term viability of marsh fritillary metapopulations.

Enhancement will focus on three existing areas of grassland habitat within the Proposed Project site that already exhibit characteristics suitable for marsh fritillary, as shown in Figure 3-1 of the BMEP.

The marsh fritillary enhancement measures will be implemented as follows:

1. *Enhancement areas will be clearly marked to prevent inadvertent encroachment by construction activities and to ensure management actions are confined to the defined areas.*
2. *Planting will be undertaken to increase the abundance and distribution of devil's-bit scabious within the enhancement areas using an appropriate native source.*
3. *Management will aim to maintain a heterogeneous sward structure, comprising a mosaic of shorter and taller vegetation, rather than a uniform sward. It will also maintain the abundance of devil's-bit scabious within the enhancement areas by preventing competitive exclusion by rank grasses or scrub.*
4. *Where vegetation becomes overly rank or scrub encroachment occurs, targeted and localised management (e.g. selective cutting or clearance) will be undertaken to retain open conditions.*
5. *No fertilisers, slurry, herbicides or pesticides will be applied within the marsh fritillary enhancement areas.*
6. *Field operations such as rush or scrub control should only be carried out November to February when caterpillars are in hibernation and less vulnerable to disturbance.*

Native Hedgerow Planting

It is proposed to plant approximately 6.5 km of native hedgerow within the Proposed Project site. The locations of proposed hedgerow planting are shown on Figure 3-1 of the BMEP and have been selected to enhance ecological connectivity across the site by linking existing features such as woodland edges and watercourse corridors and to support commuting routes for bats and other species. All proposed hedgerow planting is located within areas of cutover peat (PB4).

Species composition will comprise approximately 75% hawthorn, comprising a mix of planting stock including whips and selected advanced nursery stock (typically 10–12 cm girth), to increase early structural diversity. The remaining 25% will be made up of a mix of locally appropriate native species, including:

- Hazel (*Corylus avellana)*
- Blackthorn (*Prunus spinosa*)
- Rowan (*Sorbus aucuparia*)
- Elder (*Sambucus nigra*)
- Goat willow (*Salix caprea*)
- Grey willow (*Salix cinerea*)

The native hedgerow planting and management will be implemented as follows:

1. *All tree planting will be undertaken by hand by suitably qualified arborist*
2. *Hedgerows will be pit-planted into areas of cleared vegetation, with soil carefully firmed around the root system to ensure stability and successful establishment. This involves using a spade to dig a hole with roots placed in the centre. Soil is then placed around the hedgerow and firmed in, ensuring the tree is upright.*
3. *Riparian hedgerow planting along the Lemanaghan Stream will be carried out by hand only, with care taken to minimise soil disturbance and avoid sediment runoff. Strictly no fertilisers will be used within riparian planting areas.*
4. *Hedgerows will be managed on a 2–3 year cutting rotation, where trimming is required, to promote structural diversity.*
5. *Cutting will be undertaken between November and January, avoiding the bird nesting season (March 1st to August 31st) and periods of peak pollinator activity.*
6. *Hedgerows will be developed to an average height of approximately 2.5 m, with an 'A-shape'.*
7. *Ivy (Hedera helix) will be retained where it establishes naturally, provided it does not compromise hedge structure.*
8. *Grassy margins adjacent to hedgerows will be retained to allow flowering ground flora to develop and to further enhance habitat value.*
9. *No fertilisers, slurry, herbicides or pesticides will be applied.*

Native Woodland Planting

It is proposed to provide approximately 7.8 ha of native woodland enhancement within the Proposed Project site, as shown on Figure 3-1 of the BMEP. The proposed woodland area is located within recolonising peatland habitat where natural succession is already occurring, and the enhancement measures are intended to diversify structure and species composition through targeted planting.

Local variation in ground levels and hydrological conditions within the proposed planting area will be taken into account during implementation. LiDAR topographic data and onsite observations will be used to inform species selection and planting layout, to ensure that planting is appropriate to local conditions. Where lower lying or wetter areas are identified, planting will be adapted accordingly, either through the use of appropriate wet woodland species or by allowing areas to remain as more open or transitional habitats. This approach will ensure that woodland enhancement is aligned with site conditions and allows for the gradual establishment of a structurally diverse woodland/wetland mosaic alongside ongoing peatland rehabilitation.

The native woodland planting measures will be implemented as follows:

1. *Planting areas will be clearly marked prior to works to define the extent of planting.*
2. *Thin stakes or sticks will be used to mark the rows or areas of trees to be planted.*
3. *Trees will generally be planted at approximately 2 m spacing. Shelterbelt planting may be applied by planting up two lines of trees as a staggered row.*
4. *Newly planted trees will be protected as required using appropriate tree guards to prevent browsing by wild animals such as deer.*
5. *New tree planting will be kept weed and litter free until the new plants are established, particularly from ruderal weeds. Healthy growth will be maintained by allowing the plant to occupy as much of the planting areas as possible to allow them to achieve as close their natural form as possible.*
6. *During spring and autumn maintenance periods all trees and plants will be checked and adjusted/replaced as required, soil firmed, and any dead wood present removed back to healthy tissue and mulch added if required. Where tree guards are no longer required these will be removed to avoid damage to the tree.*
7. *During the first growing season, all standard trees/ semi-mature trees will be watered regularly during any prolonged dry periods during the growing season (i.e. in April,*

May, June, July and August). During the second growing season the trees will be kept well-watered as often as required, particularly during June, July and August.

8. *Trees will be inspected following the main growing season (i.e. in September) for the first five years of growth, where the requirement for replacement planting will be assessed. If any trees are dead or damaged these will be replaced using the same species within the next planting season. Recommendations for ongoing or remedial management required will be specified within a Monitoring Report (see Section 2.3.3.15).*

2.3.3.12 Vegetation Removal and Replanting

As part of the Proposed Project, no commercial forestry felling will occur. However, the felling of immature woodland (WS2) (hereafter referred to as vegetation removal) will be required within and around development footprint to allow for the construction of the site entrances, access roads, underground cabling, and other ancillary infrastructure.

A total of 1.02 hectares of WS2 felling will occur as part of the Proposed Project. The 1.26ha of WS2 being felled to accommodate the Proposed Project will be replanted within the site as part of the proposed enhancement and mitigation. Please see EIAR Chapter 6 Biodiversity and Appendix 6-5 Biodiversity Management and Enhancement Plan (BMEP) for details.

While no forestry felling requiring the provision of a Limited Felling License (LFL) from the Department of Agriculture, Food and the Marine (DAFM) Forest Service will occur as part of the Proposed Project, in the event that there are commercial forestry felling activities these will be subject to the provision of a LFL application to the Forest Service in accordance with the Forestry Act 2014 and the Forestry Regulations 2017 (SI 191/2017) and as per the Forest Service's policy on granting felling licenses for wind farm developments. The policy requires that a copy of the planning permission for the Proposed Project be submitted with the felling licence application; therefore, the felling licence cannot be applied for until such time as planning permission is obtained for the Proposed Project.

Further details on tree felling required within and around development footprint on the Proposed Project site is detailed in Chapter 6 of the EIAR.

2.3.3.12.1 *Replanting*

In line with the Forest Service's published policy on granting felling licences for wind farm developments, areas cleared of forestry for access roads, and any other wind farm-related uses will have to be replaced by replanting at an alternative site or sites. The Forest Service policy requires replacement or replanting on a hectare-for-hectare basis for the footprint of the infrastructure developments.

The estimated 1.02 hectares of immature woodland (WS2) that will be felled within and around the Proposed Wind Farm along with existing treeline boundaries is not subject to a LFL from the Forestry Service and will be replanted within the site as detailed above.

2.3.3.13 Amenity Track and Carparks

The amenity pathways and additional connections are discussed and shown in the Lemanaghan Amenity Plan which is contained in Appendix 4-3 to Chapter 4 of the EIAR and are illustrated in Figure 4-1 of Chapter 4 of the EIAR. The additional connections will be 3m in width and will be constructed using a similar methodology as the proposed internal roads as outlined in Section 2.3.3.4 above.

Upon completion of the construction phase of Proposed Project, the concrete foundations at Temporary Construction Compound 1, Temporary Construction Compound 3 and Temporary Construction

Compound 4 will be utilised for amenity car parks during the operational phase (please see Section 4.4.1.9 below for further details). The concrete foundations associated with Temporary Construction Compound 2 and Temporary Construction Compound 5, and the areas associated with Temporary Construction Compound 1, Temporary Construction Compound 3 and Temporary Construction Compound 4 that will not be used for amenity car parks, will be reinstated with previously excavated peat, and either be reseeded or left to revegetate naturally.

2.3.3.14 Site Drainage System

Drainage management within the site will be risk based, and will employ various methods, building on the existing drainage systems within the site. Drainage of the Proposed Project site is currently operating under licence from the EPA (P0500-01). The drainage system has been operating in accordance with this existing Integrated Pollution Control (IPC) licence, with all drainage water from the bogs being discharged via an appropriately designed silt pond treatment arrangement. During the construction phase, operations will adopt best working practices, and the development of the site will be phased accordingly.

The EIAR (and appended drawings) includes a drainage design required for the purposes of assessing the potential effects of the Proposed Project. The drainage design will be developed further with a level of construction detail necessary to implement the measures onsite. The detailed (construction phase) drainage design will form part of the updated Main Contractor's CEMP, and the effective implementation of the detailed drainage design will be audited by the ECoW. Surface water management and drainage design principles are outlined in Section 3.2 below and Section 4.9 of Chapter 4 the EIAR.

2.3.3.15 Watercourse/Culvert Crossings

The site is extensively drained by a network of manmade land drains and traversed by the Lemanaghan Stream (EPA Code 25_3841).

To facilitate the construction of Proposed Wind Farm roads, it is required to cross the Lemanaghan Stream at 2 no. locations. Watercourse Crossing no. 1 is located at ITM X615354, Y728152 and will comprise of a new proposed watercourse crossing via a clear-span watercourse crossing. Watercourse Crossing no. 2 is located at ITM X616121, Y728023 and an existing crossing is in place that will be decommissioned prior to the construction of a new clear-span watercourse crossing. The locations of these crossings are shown on the layout drawings included in Appendix 4-1 of the EIAR.

Please see below for detail on the 2 no. watercourse crossings to be used at the Proposed Wind Farm and associated construction methodologies.

2.3.3.15.1 *Clear-Span Crossing*

It is proposed to construct a clear-span watercourse crossing along the site access roads at the 2 no. locations mentioned above using a clear-span bridge. The locations of these crossings are shown on the layout drawings included in Appendix 4-1 to Chapter 4 of the EIAR.

Clear-Span Watercourse Crossing 1 is located at ITM X615354, Y728152 and Clear-Span Watercourse Crossing 2 is located at ITM X616121, Y728023. Both watercourse crossings will be installed using the methodology outlined below. Please note, an existing clear span bridge is present at Clear-Span Watercourse Crossing 2, this will be decommissioned prior to the construction of the new proposed clear span crossing. The decommissioning methodology is the same as that for the decommissioning of culverts and is outlined in Section 2.3.3.15.3 below.

The standard construction methodology for the installation of a clear-span bridge watercourse crossing is as follows:

1. *Silt fencing is to be erected at run-off areas adjacent to the works area.*
2. *Oil booms are to be established both upstream and downstream of the works. Spill kits are required on both banks of the stream and are to include oil-only absorbent booms.*
3. *Area to be Cable-Avoidance Tool (CAT) scanned for any potential existing services. Any possible services are to be marked and identified.*
4. *The culvert location will be set out by the Site Engineer.*
5. *Life Buoys and spill kits will be positioned at prominent locations adjacent the works.*
6. *Excavation will commence using an excavator, reducing ground levels at the existing crossing to expose the existing pipe. Spoil arising from the works will be sidecast and/or transported to the peat deposition area.*
7. *Flows will be plugged temporarily to allow installation of clay bunds and removal and replacement of the pipe. Dependent on flows, over-pumping may be necessary for a time to allow temporary bunding of the works area both upstream and downstream and directing of flows towards the pipe.*
8. *Where over-pumping is necessary, a 4" pump will be utilized using a shallow sump to discharge downstream. The downstream end is to discharge on a plywood sheet or similar placed at an angle on the embankment to prevent scour to the river bed and utilize the vegetation to dissipate flows.*
9. *Clay bunds will be formed across the stream, both upstream and downstream beyond the extent of the required foundations. Channels will be excavated across the stream with any river bed gravels set aside for future reinstatement of the culvert bed. Clay bunds will then be constructed, integrating the pipe both upstream and downstream.*
10. *The pipe will extend beyond the bund and graded out to both inlet and outlet utilizing any available gravel as a temporary bed in proximity to the pipe.*
11. *The bunds both upstream and downstream will extend to the embankments on either side enclosing the works area. Rock armour will be installed if necessary both upstream and downstream to protect the pipe from undermining.*
12. *Excavation will proceed adjacent to the existing pipe benching down to formation whilst maintaining the existing pipe in place. Inspections and testing if required will be carried out to confirm suitable bearing capacity.*
13. *Sumps consisting of vertical pipes surrounded with clean stone will be installed within the excavations to direct any water ingress and allow dewatering of the works area.*
14. *Water will be pumped through hoses to a settlement tank to discharge through a silt sock prior to reaching the existing field drainage system.*
15. *Over-pumping arrangements will be put in place with flows directed downstream.*
16. *The existing pipes will be removed whilst maintaining the bunds.*
17. *Existing stream bed will be maintained.*
18. *New drainage pipes will be laid at the existing fall. New drainage stone Cl. 505 or similar will be used as a surround around the new pipes.*
19. *Excavation will be backed filled and compacted in layers up to the required level.*
20. *All areas adjacent to the works will be reinstated.*

A standard design drawing of a pre-cast concrete, clear-span crossing is shown in Figure 4-46 of Chapter 4 of the EIAR.

The clear-span watercourse crossing methodologies presented will ensure that no instream works are necessary.

The watercourse crossing will be constructed to the specifications of the OPW bridge design guidelines '*Construction, Replacement or Alteration of Bridges and Culverts - A Guide to Applying for Consent under Section 50 of the Arterial Drainage Act, 1945*', and in consultation with Inland Fisheries Ireland. Abutments will be constructed from precast units combined with in situ foundations, placed within an acceptable backfill material.

Confirmatory inspections of the proposed watercourse crossing location will be carried out by the Project Civil/Structural Engineer and the Project Hydrologist prior to the construction of the crossing.

2.3.3.15.2 Culvert Crossing

All new proposed culverts and proposed culvert upgrades at field drain crossings required for the Proposed Wind Farm will be suitably sized for the expected peak flows in the watercourse. Some culverts may be installed to manage drainage waters from works areas of the Proposed Wind Farm, particularly where the waters must be taken from one side of an existing roadway to the other for discharge. The size of culverts will be influenced by the depth of the track or road sub-base but will have a minimum 900mm diameter. In all cases, culverts will be oversized to allow mammals to pass through the culvert.

Culverts will be installed with a minimum internal gradient of 1% (1 in 100). Smaller culverts will have a smooth internal surface. Larger culverts may have corrugated surfaces which will trap silt and contribute to the stream ecosystem. Depending on the management of water on the downstream side of the culvert, large stone may be used to interrupt the flow of water. This will help dissipate its energy and help prevent problems of erosion. Smaller water crossings will simply consist of an appropriately sized pipe buried in the sub-base of the road at the necessary invert level to ensure ponding or pooling does not occur above or below the culvert and water can continue to flow as necessary.

All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance. Please see Figure 4-47 of Chapter 4 of the EIAR for details.

2.3.3.15.3 Decommissioning of Culvert Crossing

A proposed temporary culvert (constructed in line with the methodology in Section 2.3.3.15.2) will be removed after the construction phase is completed. The temporary culvert to be removed is located at ITM X614742, Y731224. Please note, an existing crossing is also in place at Watercourse Crossing 2 (detailed above). This existing crossing will be removed in line with the below.

The standard construction methodology for the removal of a temporary culvert is as follows:

1. *Prior to any works commencing, Inland Fisheries Ireland (IFI) will be consulted to inform detailed design of the temporary culvert removal.*
2. *These works will only be carried out during the period permitted by IFI for in-stream works according to the IFI (2016) guidance document 'Guidelines on protection of fisheries during construction works in and adjacent to waters', i.e., July to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI).*
3. *Timing of these works will be planned based on expected weather within the optimum period of July to September, ground conditions and current flow in the drainage ditch, to minimise construction period and disturbance to any potential downstream aquatic environment. It was noted during site work carried out in February 2025 that the identified drainage channel was dry, this would indicate that the channel is dry throughout the year but to ensure no downstream impacts, works will be carried out in the identified optimum period by the IFI Guidance.*
4. *The Project Engineer will set out the works area and silt fencing will be erected at run-off areas adjacent to the works area.*
5. *The works area will be fenced off with post and rope to demarcate the works area. Prior to any works taking place, the area will be CAT scanned to identify any potential unknown underground services.*
6. *Oil booms will be established both upstream and downstream of the works and spill kits, inclusive of oil-only absorbent booms, will be required on both banks of the stream*
7. *The centre line of the new culvert will be set out by the engineer on both upstream and downstream sides.*

8. *The topography and ground conditions will be reviewed at the location. Safe access will be provided for all operatives. This may involve the creation of ramps, temporary walkways etc.*
9. *Pumping equipment will be set up at the upstream end of the works area. The hose will have a suction head fitted which will reduce the possibility of any aquatic species that may be present being sucked into the pump. Additionally, the hose will be positioned to one side of the channel and surrounded by clean stone offering further protection. The delivery hose shall be laid out across the road, which shall discharge, re-entering the watercourse downstream of the works area on the opposite side of the road.*
10. *The delivery line may need to be undergrounded across the access track to allow site traffic to access the works area.*
11. *A dam will be constructed at the upstream end by an excavator placing impermeable 1m^3 sandbags within the drainage channel. These can be supplemented with smaller sandbags to plug any gaps.*
12. *Water will be allowed to partially self-empty from the isolated section. If the drainage channel is deemed to be fisheries sensitive, a smaller dam will then be placed at the downstream end before the section completely empties out and further consultation with IFI in relation to electrofishing and determining the presence of fish will be carried out. Once the presence of fish has been ruled out, the section can be fully dewatered. A pump may be used to aid this if necessary.*
13. *Water will be over pumped and discharged to an approved location downstream.*
14. *Clean stone may be used at the discharge point to protect the drainage channel against scouring. It will also act to filter silty water arising from dam installation and removal afterwards.*
15. *A suitable sized excavator will then commence the initial excavation down to the top of the temporary 225/300mm pipe.*
16. *The excavation of the temporary culvert works will continue by excavating out the temporary 225/300mm piped culvert to the existing formation.*
17. *The excavated culvert and associated structure will be loaded into a dumper and transported to a suitable disposal area.*
18. *Any suitable materials from the drainage channel bed will be removed and stockpiled for reinstatement in the new bed upon completion of the construction works.*
19. *The new bed will be reinstated with stone backfill; backfill will be placed and compacted up to the required level above the bottom of the watercourse and the proposed temporary access roads will be reinstated as per agreed design.*

2.3.3.16 Peat and Spoil Management

It is proposed to manage any excess overburden generated through construction activities within the Proposed Project site, in 2 no. peat deposition areas, as shown in Figure 2-4 above, in linear berms along access roads where appropriate, and landscaping. A detailed breakdown of the capacity of the peat deposition areas within the Proposed Project site is shown in Table 4-4 of Chapter 4 of the EIAR and is further detailed in the Peat and Spoil Management Plan (Appendix 4-3 of the EIAR).

The total volume of peat requiring management on site is estimated at 824,310m^3. Peat material will be excavated and deposited in the peat deposition areas, with a total capacity volume of 175,00m^3. Peat and spoil material will also be placed within the 4 no. proposed borrow pits (608,600m^3 storage capacity), sidecast along access roads with gentle gradients, and landscaped. As such, there is enough capacity within the site for the total volumes of peat requiring management for the Proposed Wind Farm as detailed in Table 4-5 of Chapter 4 of the EIAR.

The following, outlined in the Peat and Spoil Management Plan in Appendix 4-3, particular recommendations/best practice guidelines for the placement of peat and spoil with respect to specific aspects of the Proposed Wind Farm will be considered and taken into account during construction.

2.3.3.16.1 Temporary Management

As identified in the Peat and Spoil Management Plan (Appendix 4-3 of the EIAR), the following recommendations/best practice guidelines for the placement of peat alongside the proposed infrastructure elements should be considered and taken into account during construction:

1. *All excavated peat will be placed/spread alongside the proposed infrastructure elements on site, where possible.*
2. *The peat placed adjacent to the proposed infrastructure elements should be restricted to a maximum height of 1.5m over a 10m wide corridor on both sides of the proposed infrastructure elements. It should be noted that the designer should define/confirm the maximum restricted height for the placed peat.*
3. *The placement of excavated peat and spoil is to be avoided without first establishing the adequacy of the ground to support the load. The placement of peat within the placement areas will likely require the use of long reach excavators, low ground pressure machinery and possibly bog mats in particular for drainage works.*
4. *Where there is any doubt as to the stability of the peat surface then no material shall be placed on to the peat surface. The risk of peat instability is reduced by not placing any loading onto the peat surface.*
5. *The surface of the placed peat will be shaped to allow efficient run-off of surface water. Where possible, shaping of the surface of the peat should be carried out as placement of peat within the placement area progresses. This will reduce the likelihood of debris run-off and ensure stability of the placed peat.*
6. *Finished/shaped side slopes in the placed peat shall be not greater than 1 (v): 3 (h). This slope inclination will be reviewed during construction, as appropriate. Where areas of weaker peat and spoil are encountered then slacker slopes will be required.*
7. *The acrotelm (if encountered) shall be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the placed peat within the placement areas.*
8. *Movement monitoring instrumentation may be required adjacent to the internal road where peat has been placed. The locations where monitoring is required will be identified by the designer onsite.*
9. *An interceptor drain will be installed upslope of the designated peat deposition areas to divert any surface water away from these areas. This will reduce the likelihood of debris run-off.*
10. *All the above-mentioned general guidelines and requirements should be confirmed by the designer prior to construction.*

2.3.3.17 Borrow Pit

The estimated volume of peat and spoil to be extracted from the 4 no. proposed borrow pits for the construction of the Proposed Project is 15,587m^3 of peat and 159.522m^3 of spoil. The figures presented are the anticipated maximum volumes; however, the actual volumes to be removed from the 4 no. borrow pits will be confirmed at the time of construction and following detailed pre-construction site investigation works.

The 4 no. borrow pits will be excavated and backfilled as follows:

1. *The rock within the proposed borrow pit footprints will be removed by breaking based on assessment of its excavatability, which has been determined from a ground investigation carried out at the proposed borrow pits.*
2. *It may be possible to excavate the rock from the borrow pits whilst leaving in place upstands/segments of intact rock which will retain the placed peat and spoil in individual cells. The upstands/segments of intact rock will essentially act as engineered*

rock buttresses within the borrow pits, forming a series of cells (up to 4 no.). The cells will be opened in sequence and filled as needed.

3. *Slopes within the excavated rock formed around the perimeter of the borrow pits will be formed at stable inclinations to suit local in-situ rock conditions. Exposed sections of the rock slopes will be left with irregular faces and declivities to promote re-vegetation and provide a naturalistic appearance.*
4. *Where it is not possible to leave upstands/segments of intact rock in place it will be necessary to construct rock buttresses founded on in-situ rock within the borrow pits to create individual cells.*
5. *The rock buttresses will be constructed in stages to allow infilling of peat and spoil within cells.*
6. *Infilling of the peat and spoil will commence at the back edge of the borrow pit and progress towards the borrow pit entrance/rock buttress, leaving in place upstands/segments of intact rock which will help to retain the placed peat spoil and will allow the borrow pit to be developed and infilled in cells. The contractor excavating the rock will be required to develop the borrow pits in a way which will allow the excavated peat and spoil to be reinstated safely.*
7. *The rock buttresses shall be wide enough (up to 4m) to allow construction traffic access for tipping and grading during the placement of the excavated peat and spoil. The permanent side slopes of the rock buttress shall be constructed between 40 to 60 degrees.*
8. *A rock buttress will be required on the downslope side of the borrow pits to safely retain the infilled peat and spoil. The height of the berm constructed will be greater than the height of the reinstated peat and spoil to prevent any surface peat and spoil run-off. A berm up to 8m (max.) in height will be required.*
9. *A level surface in the underlying mineral soil or Weathered Bedrock will be prepared before placing and compacting the rock fill used to construct the berms.*
10. *The surface of the placed peat and spoil shall be shaped to allow efficient run-off of surface water from the placed arisings.*
11. *As the berms are slightly higher than the retained peat, drains will be provided at regular intervals through the berms, at the same level as the top of the peat surface, to prevent ponding of water around the edges of the repositories. These drains will be 150mm diameter flexible plastic drainage pipe or equivalent.*
12. *A layer of geogrid to strengthen the surface of the placed peat and spoil within the borrow pits may be required.*
13. *The acrotelm shall be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the peat and spoil within the borrow pits.*

2.3.3.17.1 Rock Breaking

Weathered or brittle rock can be extracted by means of a hydraulic excavator and a ripper attachment. This is a common extraction methodology where fragmented rock is encountered as it can be carefully excavated in layers. In areas where stronger rock is encountered and cannot be removed by means of excavating then a rock breaking methodology may be used. Rock breaking equipment comprises a large hydraulic 360-degree excavator with a rock breaker attachment. Given the power required to break out tight and compact stone at depth, the machines are generally large and in the 40-60 tonne weight range. Even where rock might appear weathered or brittle at the surface, the extent of weathering can quickly diminish with depth resulting in strong rock requiring significant force to extract it at depths of only a few metres.

A large rock breaking excavator progressively breaks out the solid rock from the ground in the borrow pit area. A smaller rock breaker, in the 30-40 tonne weight range, then breaks the rocks down to a size that can then be fed into a crusher.

The extracted, broken rock is loaded into a mobile crusher using a wheeled loading shovel and crushed down to the necessary size of graded stone required for the on-site civil works. The same wheeled loader takes the stone from the crusher conveyor stockpile and stockpiles it elsewhere within the borrow pit, away from the immediate area of the crusher, until it is required elsewhere within the site.

2.3.3.18 Cable Trenching

The transformer in each proposed turbine will be connected to the proposed onsite 220kV substation through a network of buried electrical cables. The ground is trenched using a mechanical excavator. The top layer of soil (or road surface) is removed and saved so that it is replaced on completion. The cables will be bedded with previously excavated suitable material. The cables will be laid at a depth of 1.2m below ground level; a suitable marking tape is installed between the cables and the surface (see Plate 4-11 in Chapter 4 of the EIAR illustrating an example of a single cable trench). On completion, the ground will be reinstated as previously described above. The route of the cable ducts will follow the access tracks as illustrated on the Proposed Project site layout drawings included as Appendix 4-1 of the EIAR. The cabling may be located on either side of the road and/or within the road footprint.

Any underground services encountered along the internal cabling trench where it is located within the public road corridor (i.e., the L7002 crossing) will be surveyed for level and the ducting will pass over the service provided adequate cover is available. A minimum clearance of 300 mm will be required between the bottom of the ducts and the service in question. If the clearance cannot be achieved the ducting will pass under the service and again 300 mm clearance between the top of the communications duct and bottom of the service will be achieved. In deeper excavations an additional layer of marker tape will be installed between the communications duct and top-level yellow marker tape. If the required separation distances cannot be achieved then a number of alternative options are available such as using steel plates laid across the width of the trench and using 35N concrete surrounding the proposed ducting, with marker tape on the side of the trench. Back fill around any utility services will be with dead sand/pea shingle where appropriate.

2.3.4 Proposed Grid Connection

2.3.4.1 Substation and Control Buildings

It is proposed to construct a 220kV electricity substation within the Proposed Project site, as shown in Figure 4-1 in Chapter 4 of the EIAR and within the detailed planning drawings provided in Appendix 4-1. The proposed onsite 220kV substation is located in the northern section of the site, in the townland of Cooldorragh, Co. Offaly, within close proximity to the existing Shannonbridge-Maynooth 220kV OHL located 0.4km north of the proposed onsite 220kV substation at its closest point. The construction and detailed design of electrical equipment in the proposed onsite 220kV substation will be to ESB/EirGrid networks specifications and will be under the ownership of ESB or EirGrid Networks.

The substation control building will be located within the proposed onsite 220kV substation compound and will accommodate both Independent Power Producer (IPP) control building infrastructure and Transmission System Operator (TSO) control building infrastructure.

Once ground preparation per the methodology for site roads as described previously is completed, the onsite substation will be constructed by the following methodology:

1. *The 220kV Gas-Insulated Substation (GIS) shall be in a compound of c. 119.2m by 66.75m, surrounded by a 2.6m-high palisade fence with a total area c. 7,956.6m^2. See Plate 4-18 in Chapter 4 of the EIAR for a typical 220kV GIS switching substation.*
2. *The IPP portion shall be in a compound of c. 19m by 12m. surrounded by 2.6m high palisade fence with a total area c. 3,099m^2. The IPP compound will have a shared fence line with the 220kV substation.*

3. *The substation and IPP compound drainage shall be marked by a qualified engineer.*
4. *A drainage system shall be installed around the compound area.*
5. *Topsoil and subsoil shall be removed from the footprint of the compound using an excavator. The excavated material shall be temporally stored in adjacent berms for layer use during reinstatement works.*
6. *A layer of geotextile material shall be laid over the footprint of the compound (please see Plate 4-19 in Chapter 4).*
7. *Using an excavator, a base of clause 804 material shall be laid followed by a 6F2 layer which will provide a finished surface. Clause 804 material is a specific type of material used in road construction and sub-base layers consisted of crushed stone, crushed concrete, or a mixture of both, 6F2 material is a granular fill material consisting of crushed concrete, crushed brick, or reclaimed construction aggregate.*
8. *Each layer shall be compacted using a vibrating roller.*
9. *Earthing cable shall be laid underground around the vicinity of the substation for connection to various electrical components during the electrical fit-out phase.*
10. *The construction of the substation compounds consists of a 220kV two-storey switching GIS building, two 220kV gantries, and associated outdoor electrical equipment.*
11. *Adequate lighting shall be installed around on the compound on lighting masts.*
12. *Lighting protection mats with an approximate hight of 18m shall be installed to provide lighting protection to the substation compound.*
13. *Two 220kV gantries and associated line equipment shall be required to connect the 220kV overhead lines into the substation. Support structures shall be located outdoors.*

2.3.4.2 Overhead Line Grid Connection Electrical Cabling Route

The Proposed Grid Connection will connect to the national electricity grid via a proposed 220kV substation which will be sited in the northern part of the Proposed Project site. The Proposed Grid Connection will consist of 0.8km of overhead line in total (comprising 0.4km of OHL from the proposed steel masts for the double loop-in/loop-out from the proposed onsite 220kV substation to the existing OHL), 4 no. new steel masts, and the removal of 1 no. existing steel mast. The proposed new 4 no. lattice masts will be located within the site.

Of the 4 no. proposed new steel masts, 2 no. new steel masts will be constructed at the proposed onsite 220kV substation and 2 no. new steel masts will be constructed along the existing Shannonbridge-Maynooth 220kV OHL. The existing Shannonbridge-Maynooth 220kV OHL conductor will be terminated at 2 no. towers in order to facilitate a new OHL loop from the proposed onsite 220kV substation into the Shannonbridge-Maynooth 220kV OHL. The existing conductor will be removed between the steel masts; the new steel mast locations have been selected based on ground surveys, ground profiles, allowable angles and ruling span checks.

2.3.4.2.1 *Steel Mast Structures*

The following section outlines the methodology to be followed during construction works of the new steel masts which will be constructed north of the proposed onsite 220kV substation and underneath the existing Shannonbridge-Maynooth 220kV OHL:

1. *A foundation c.4.4m x 4.4m x 3.6m is excavated and the formation levels (depths) will be checked by the onsite foreman. See Plates 4-12 and 4-13 in Chapter 4 of the EIAR. The excavated material will be temporarily stored close to the excavation and excess material will be used as berms along the site access roads.*
2. *The frame of the reinforcing bars will be prepared and strapped to a concrete pipe with spacers as required. The base and body section of each tower will then be assembled next to excavation.*
3. *Concrete trucks will pour concrete directly into each excavation in distinct stages. A final pour for the mast is the encasing of the mast leg which shall be finished 300mm*

over finished ground level. The leg of the mast is required to be shuttered with metal panels to form its required shape (see Plate 4-14 in Chapter 4 of the EIAR).

4. *The mast foundations will be backfilled one leg at a time with the material already excavated at the location. The backfill will be placed and compacted in layers. All surplus excavated material and removed from the mast locations and stored in berms for use across the construction site.*
5. *An earth mat consisting of copper wire will be laid c. 400mm below ground around the mast.*
6. *A hardstand area for the crane shall be created by laying geogrid material on the ground surface and overlaying this geogrid with a suitable grade of aggregate.*
7. *A physical barrier (Heras Fence Site Boundary) will be put in place to restrict plant from coming too close to the OHL.*
8. *A temporary hardstand area shall be constructed to allow the assembly and laydown of the towers.*
9. *As the masts are located under the existing 220kV line, the line will be de-energised by ESB Networks so work can commence on the construction of the masts.*
10. *The mast section will be lifted into place using the crane and guide ropes and the body sections will be bolted into position (see Plate 4-14 in Chapter 4 of the EIAR).*

2.3.4.2.2 Gantry Structures

The following section outlines the methodology to be followed during construction works of the gantry tower structures which will be constructed underneath the existing Shannonbridge-Maynooth 220kV OHL:

1. *A foundation of c. 5m x 4m x 2.35m deep will be constructed.*
2. *Reinforced bars shall be lifted into each excavated foundation using the excavator and chains/slings. The base and body section of each gantry will be assembled next to the excavation*
3. *A setting template is sued to set and hold the gantry J-bolts in position while the concrete is being poured and cured.*
4. *Concrete trucks shall pour concrete directly into each excavation in distinct stages. A final pour for the base is the encasing of the gantry leg which shall be finished 300mm over finished ground level.*
5. *The gantry foundations shall be backfilled on leg at a time with a 200mm layer of deep compacted T.0 graded granular fill material. A finishing 100mm layer of compound stone is layered on top of a geotextile to finish the compound ground level. The backfill shall be placed and compacted in layers.*
6. *A hardstand area for the crane shall be created by laying geogrid material on the ground surface and overlaying this geogrid with a suitable grade of aggregate.*
7. *A physical barrier (Heras Fence Site Boundary) shall be put in place to restrict plant from coming too close to the OHL.*
8. *A temporary access road shall be constructed to allow access to the tower locations.*
9. *A temporary hardstand area shall be constructed to allow the assembly and laydown of the gantries.*
10. *The gantries shall be constructed lying flat on the ground beside the recently installed cable compound on the temporary hardstand.*
11. *The gantry section will be lifted into place using the crane and guide ropes and the body section will be bolted into place (see Plate 4-16 in Chapter 4 of the EIAR).*

2.3.4.2.3 Stringing of Conductors

Stringing of OHLs on the supporting lattice structures will be kept clear of all obstacles along the straight by applying sufficient tension. This method requires the pulling of a light pilot line (nylon rope) which is normally carried by hand into the stringing wheels. This in turn is used to pull a heavier pilot line (steel rope) which is subsequently used to pull the conductors from the drum stands using

specifically designed "puller – tensioner" machines (Refer to Plate 4-17 in Chapter 4 of the EIAR). The main advantages with this method are:

- The line is protected from surface damage.
- Major obstacles can be completed without any significant disruption.

Once the conductors have been pulled into position, one end of the straight is terminated on the appropriate tension fittings and insulator assemblies. The free end of the straight is then placed in temporary clamps which take the conductor tension. The conductor is then cut from the puller-tensioner and the conductor is sagged using a chain hoist. Bird flight diverters or warning spheres can be added following the sagging procedure if required.

2.3.4.3 Bored Well

It is proposed to install a bored well adjacent to the proposed onsite 220kV substation in accordance with the Institute of Geologists Ireland, *Guide for Drilling Wells for Private Water Supplies* (IGI, 2007). The bored well will be constructed in line with a common domestic borehole using a drilling rig. The rig will be reversed to the target drill site using every care to get to the exact proposed well location. Final plumbing and centralising will be completed utilising hydraulic jacks and packing plates to ensure a secure base for the rig.

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

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

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

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

2.3.4.4 Telecommunications Tower

A telecommunications tower is proposed next to the proposed onsite 220kV substation and serve to provide as a communication link during the operational stage and to relay data between the Proposed Project and external monitoring/management stations. The tower will be free-standing structure of up to 36m in height and will be constructed on a hard-standing area measuring 13m by 13m to accommodate the crane that will be used to erect the mast, adjacent to proposed roads. The typical design of the proposed telecoms tower masts is shown in Figure 4-27 in Chapter 4 of the EIAR. The telecommunications tower will be built in a similar manner as the propose met mast, detailed in Section 2.3.3.7 above.

2.3.5 Turbine Delivery Route Accommodation Works

During the construction of the Proposed Wind Farm, a number of road and junction temporary works will be completed to provide access to the Proposed Wind Farm during turbine delivery. The proposed transport route for the Proposed Project has been the subject of a route assessment to determine if any works are required along its length. Full details of the assessment are included as part of the traffic

impact assessment set out in Section 15.1.9 of this EIAR and summarised below. There are sections on the route where the vertical alignment may require specialist transport vehicles. These sections will be further considered by the appointed transport company following turbine procurement process. Accommodation works will be required at various locations on the national and regional road network between the port of arrival in Galway and the Proposed Wind Farm. These will be limited to temporary measures including temporary local road widening, overruns of roundabout island and temporary relocation of some signs and street furniture; please note, a temporary bypass road will be required at Kennedys Cross junction in Co. Offaly. Please see further detail on turbine accommodation works at Kennedys Cross, as well as detail on the extension of the underpass at Site Entrance 1 (detailed in Section 2.3.3.5.5 above) is outlined below, in Section 4.7.4 of Chapter 4 and Section 15.1.9 of Chapter 15.

N62/N52 Junction Accommodation Works (Kennedys Cross)

A temporary access road for the facilitation of abnormal load deliveries will be required at Kennedys Cross, located in the townland of Ballindown, Co. Offaly (junction of the N52 and N62 National Secondary Roads). These works will comprise the re-establishment of a temporary junction bypass road to facilitate the delivery of turbine components and other abnormal loads. The proposed temporary road will measure approximately 160 metres in length and have a 6-metre running width.

The locations of these works and an overview of the proposed accommodation works are shown in Figure 4-43 in Chapter 4 of the EIAR and on the layout drawings in Appendix 4-1 of the EIAR. An existing roadway, installed during the construction phase of Derrinlough Wind Farm (Pl Ref. PA19.306706), at Kennedys Cross will be utilised for the delivery of turbine components to the Proposed Wind Farm. The road utilised for the construction phase of Derrinlough Wind Farm has been covered with topsoil and reseeded after the successful delivery of abnormal loads and completion of the project's construction phase. As part of the Proposed Wind Farm, clearance works will be carried out to remove the topsoil and any reseeded vegetation and re-establish the road for turbine delivery for the Proposed Project. It is noted that the standard road markings and visibility splays are not required at Kennedys Cross as the temporary access road will only be used for the transportation of abnormally sized loads, which will be delivered with a Garda escort and transient traffic management vehicles operated by the haulage company. This road will not be available for any other traffic and will be closed off and opened only for the delivery of the abnormally sized loads; i.e., gates will be locked between scheduled turbine deliveries.

Following the completion of the construction phase of the Proposed Project the gates will be removed and the boundary will be reinstated to its original condition with hedgerow. The temporary turbine delivery access road will be closed, covered with a layer of topsoil and reseeded. It would only be used again in the event that an oversized delivery was required for wind turbine maintenance purposes; appropriate planning would be secured prior to the commencement of these works should they be required.

Underpass Extension at Site Entrance 1

Site Entrance 1 (as defined in Table 4-9 in Chapter 4 of the EIAR) will serve as the entry point for turbine delivery into the Proposed Wind Farm. To facilitate turbine delivery, the existing construction access will be widened to the south and an extension of the existing underpass will be constructed (please see Figure 4-42 in Chapter 4 of the EIAR).

The majority of construction works on the proposed underpass extension will be expected to take place beneath the existing underpass, from the existing BnM railway line east of the existing underpass, or from areas to the north and south of the proposed underpass extension off the public road. Please see Section 2.3.3.4.5 above for further information on the construction methodology of this proposed underpass extension. Upon the completion of the construction phase the existing underpass will be permanently upgraded and will facilitate access to the amenity track proposed.

Following the completion of the construction phase of the Proposed Project the boundaries of the N62 will be reinstated and the widened area over the extended underpass will be covered with a layer of topsoil and reseeded. It would only be used again in the event that an oversized delivery was required for wind turbine maintenance purposes; appropriate planning would be secured prior to the commencement of these works should they be required.

Please see Section 4.7.4 in Chapter 4 and Section 15.1.9 in Chapter 15 for further detail on traffic effects and management proposals associated with turbine delivery.

3. ENVIRONMENTAL MANAGEMENT

3.1 Introduction

This CEMP includes all best practice measures required to construct the Proposed Project. The drainage proposals will be developed further prior to the commencement of construction however, any such improvements will be in line with the principles set out here and will also be in full compliance with the planning consent and mitigation measures as presented in the EIAR, Natura Impact Statement (NIS) and all other relevant planning documents.

The following sections give an overview of the drainage design principles, archaeological management, traffic management, dust and noise control measures, invasive species management and a resource & waste management plan for the site.

3.2 Protecting Water Quality

3.2.1 Good Environmental Management During Construction

Timing of works can strongly influence the potential for damaging the freshwater environment. Operations during wetter periods of the year pose a significantly greater risk of causing erosion and siltation, which can be particularly severe following major rainfall or snowmelt events. Traditionally, wind farm construction undertaken during the drier summer months would result in significantly less erosion and siltation. Construction activities in the hydrological buffer zones shall be avoided during or after prolonged rainfall or an intense rainfall event and work will cease entirely near watercourses when it is evident that water quality is being impacted.

3.2.2 Site Drainage Principles

The site drainage features have been outlined in Section 4.9 of the EIAR for the Proposed Project and in the Surface Water Management Plan, submitted as Appendix 4-6, in addition to the drainage design and management for the Proposed Project. The protection of the watercourses within and surrounding the site, and downstream catchments that they feed is of utmost importance in considering the most appropriate drainage proposals for the site of the Proposed Project. No routes of any natural drainage features will be altered as part of the Proposed Project. Turbine locations and associated new roadways were originally selected to avoid natural watercourses, and existing roads are to be used wherever possible. The Proposed Project has where possible, been kept a minimum of 50 metres from natural watercourses. There will be no direct discharges to natural watercourses. All discharges from the proposed works areas or from interceptor drains will be made over vegetated ground at an appropriate distance from natural watercourse and lakes. Buffer zones around the existing natural drainage features have informed the layout of the Proposed Project and are indicated on the drainage design drawings (Appendix 4-5).

Where artificial drains are currently in place in the vicinity of proposed works areas, these drains will be diverted around the proposed works areas to minimise the amount of water in the vicinity of works areas. Where it may not be possible to divert artificial drains around proposed work areas, the drains will be blocked to ensure sediment laden water from the works areas has no direct route to watercourses. Where drains have to be blocked, the blocking will only take place after an alternative drainage system to handle the same water has been put in place.

Existing artificial drains in the vicinity of existing Proposed Wind Farm roads will be maintained in their present location where possible. If it is expected that these artificial drains will receive drainage

water from works areas post treatment, check dams will be added (as specified below) to control flows and sediment loads in these existing artificial drains. If road widening or improvement works are necessary along the existing roads, where possible, the works will take place on the opposite side of the road to the drain.

A detailed drainage design for the Proposed Project will be prepared prior to the commencement of construction to incorporate these site drainage principles and carry forward into the construction phase of the Proposed Project.

3.2.3 Legislation and Best Practice Guidance

The drainage design presented in the EIAR and planning application documents has been prepared based on experience of the project team of other renewable energy sites in similar environments, and the number of best practice guidance documents.

There is no one guidance document that deals with drainage management and water quality controls for wind farms and other renewable energy developments. However, a selection of good practice approaches have been adopted in preparation of this CEMP, and these are taken from the various best practice guidance documents listed below. These relate to infrastructure and operational works on sites, road design, water quality controls for linear projects, road drainage and management of geotechnical risks. To achieve best practice in terms of water protection through construction management, the detailed drainage design and all drainage management proposals shall be prepared in accordance with guidance contained in the following:

- Circular Letter PL 1/2017: Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive);
- Environmental Protection Agency (2022): Guidelines on the information to be contained in Environmental Impact Assessment Reports;
- Institute of Geologists Ireland (2013) Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- DoE/NIEA (2015): Wind farms and groundwater impacts - A guide to EIA and Planning considerations";
- OPW (2009) The Planning System and Flood Risk Management;
- National Roads Authority (2008) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Wind Energy Development Guidelines for Planning Authorities, 2006 (the DoEHLG 2006 Guidelines) and the Draft Revised Wind Energy Development Guidelines (Draft DoHLGH 2019 Guidelines);
- Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Watercourses;
- Good Practice During Wind Farm Construction (Scottish Natural Heritage, 2010);
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);
- PPG5 – Works or Maintenance in or Near Water Courses (UK Guidance Note);
- CIRIA (Construction Industry Research and Information Association) Guidance on 'Control of Water Pollution from Linear Construction Projects' (CIRIA Report No. C648, 2006);
- Wind Farms and Groundwater Impacts: A guide to EIA and Planning considerations (DoE/NIEA, April 2015);
- Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2001;
- Land Types for Afforestation (Forest Service, 2016b):
- Forest Protection Guidelines (Forest Service, 2002);
- Forest Operations and Water Protection Guidelines (Coillte, 2013);
- Forestry and Water Quality Guidelines (Forest Service, 2000b); and,

- Forests and Water, Achieving Objectives under Ireland's River Basin Management Plant 2018-2021 (DAFM, 2018).

3.2.4 Site Drainage Design and Management

The proposed site drainage features for this site are outlined in Section 4.9 of the EIAR as well as the accompanying Surface Water Management Plan (Appendix 4-6) and Drainage Drawings (Appendix 4-5). The following sections give an outline of drainage management arrangements in terms of pre-construction and construction phases of the Proposed Project however, the dedicated Surface Water Management Plan (Appendix 4-6) should be consulted for additional information on the proposed drainage design and management principles.

3.2.4.1 Pre-Construction Drainage

Prior to commencement of works in sub-catchments across the site, main drain inspections will be completed to ensure ditches and streams are free from debris and blockages that may impede drainage. It is proposed to complete these inspections on a catchment-by-catchment basis as the construction works develop across the site, as works in all areas will not commence simultaneously.

The routes of any natural drainage features will not be altered as part of the Proposed Project. The proposed turbine locations have been selected to avoid natural watercourses. It is proposed that 2 no. watercourse crossings (2 no. clear span crossings) are required at the Proposed Wind Farm site, while an additional temporary culvert is required along the temporary construction access road to the Proposed Grid Connection.

There will be no direct discharges to natural watercourses, with all drainage waters being dispersed as overland flows. All discharges from the proposed works areas will be made over vegetated filters at an appropriate distance from natural watercourses. Buffer zones around the existing natural drainage features have informed the layout of the Proposed Project and are indicated on the drainage design drawings.

Where field drains are currently in place in the vicinity of proposed works areas, these drains may have to be diverted around the proposed works areas to minimise the amount of water in the vicinity of works areas. Where it may not be possible to divert field drains around proposed work areas, the drains will be blocked to ensure sediment laden water from the works areas has no direct route to other watercourses. Where drains have to be blocked, the blocking will only take place after an alternative drainage system to handle the same water has been put in place. Please see Appendix 4-5 for detailed drainage drawings.

Existing field drains and main drains will be routed under/around access tracks using culverts as required.

3.2.4.2 Construction Phase Drainage

Runoff control and drainage management are key elements in terms of mitigation against effects on surface water bodies. Two distinct methods will be employed to manage drainage water within the site. The first method involves 'keeping clean water clean' by avoiding disturbance to natural drainage features, minimising any works in or around artificial drainage features, and diverting clean surface water flow around excavations and construction areas. The second method involves collecting any drainage waters from works areas within the site that might carry silt or sediment, to allow attenuation and settlement prior to controlled diffuse release via recharge. These measures are outlined in additional detail in Appendix 4-6 to this EIAR.

There will be no direct discharges to the existing hydrological features (forestry and agricultural drains or natural watercourses).

The drainage design is intended to maximise erosion control, which is more effective than having to control sediment during high rainfall. Such a system also requires less maintenance. The area of exposed ground will be minimised. The drainage measures will prevent runoff from entering the works areas of the site from adjacent ground, to minimise the volume of sediment-laden water that must be managed. Discoloured run-off from any construction area will be isolated from natural clean run-off.

A preliminary drainage design for the Proposed Project, incorporating all principles and measures outlined in this drainage design description, has been prepared, and is included in the drainage figures included in Appendix 4-5 to this EIAR.

In relation to decisions that are made on site it is important to stress that these will be implemented in line with the associated drainage controls and mitigation measures outlined in Appendix 4-6 of the EIAR, and to ensure protection of all watercourses

The Project Hydrologist will complete a detailed drainage design and maintenance plan before construction commences and will attend the site to set out and assist with micro-siting of proposed drainage controls as outlined in Section 4.9 in Chapter 4 of the EIAR and in Appendix 4-6, Surface Water Management Plan.

3.2.4.3 Operational Phase Drainage

The Project Hydrologist will inspect and review the drainage system after construction has been completed to provide guidance on the requirements of an operational phase drainage system. This operational phase drainage system will have been installed during the construction phase in conjunction with the road and hardstanding construction work as described above and in Section 4.11 in Chapter 4 of the EIAR.

The drainage system will be monitored in the operational phase until such a time that all areas that have been reinstated become re-vegetated and the natural drainage regime has been restored.

The drainage system will not be altered upon decommissioning. Measures which will be implemented to ensure no impacts upon the drainage system during decommissioning will be outlined within the Decommissioning Plan (Appendix 4-8 of the EIAR) and fully agreed with the local authority prior to any decommissioning works.

3.2.5 Preparative Site Drainage Management

All materials and equipment necessary to implement the drainage measures detailed above, will be brought onsite in phases as they are required during the construction phase in advance of any work commencing. A sufficient number of straw bales, clean drainage stone, terram, stakes, etc., will be kept on site at all times to implement the drainage design measures as necessary. The drainage measures detailed in the above will be installed prior to, or at the same time as the works they are intended to drain.

3.2.5.1 Pre-emptive Site Drainage Management

The works programme for the groundworks part of the construction phase of the Proposed Project will also take account of weather forecasts, and predicted rainfall in particular, working under a schedule of works operation system (SOWOR) system as proposed in the planning application; further detail is provided in Appendix 4-6 Surface Water Management Plan (SWMP). Large excavations, large movements of overburden or large-scale overburden or soil stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast.

3.2.5.2 Reactive Site Drainage Management

The final drainage design prepared for the Proposed Project prior to commencement of construction will provide for reactive management of drainage measures. The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat silt-laden water from the works areas, will be monitored continuously by the ECoW and Contractor's Environmental Manager on-site. The ECoW and/or Environmental Manager will respond to changing weather, ground or drainage conditions on the ground as the Proposed Project proceeds, to ensure the effectiveness of the drainage design is maintained in so far as is possible. This may require the installation of additional check dams, interceptor drains or swales as deemed necessary on-site. The drainage design may have to be modified on the ground as necessary, and the modifications will draw on the various features outlined above in whatever combinations are deemed to be most appropriate to situation on the ground as a particular time.

In the event that works are giving rise to siltation of watercourses, the ECoW or supervising hydrologist will stop all works in the immediate area around where the siltation is evident. The source of the siltation will be identified and additional drainage measures such as those outlined above will be installed in advance of works recommencing.

3.2.6 Cable Trench Drainage

Cable trenches are typically constructed in short, controlled sections, thereby minimising the amount of ground disturbed at any one time and minimising the potential for drainage runoff to pick up silt or suspended solids. Each short section of trench is excavated, ducting installed and bedded, and backfilled with the appropriate materials, before work on the next section commences. This operation normally occurs over a period of 2-4 hours.

To efficiently control drainage runoff from cable trench works areas, excavated material is stored on the up-gradient side of the trench and is temporarily sealed/smoothed over, using the back of the excavator bucket. Should any rainfall cause runoff from the excavated material, the material is therefore collected and contained in the downgradient cable trench. Excess subsoil is removed from the cable trench works area immediately upon excavation, and in the case of the Proposed Project, would be transported to one of the on-site borrow pit storage areas or used for landscaping and reinstatements of other areas elsewhere onsite.

On steeper slopes, silt fences, as detailed in Section 4.9.4.7 of Chapter 4 of the EIAR, will be installed temporarily downgradient of the cable trench works area, or on the downhill slope below where excavated material is being temporarily stored to control run-off.

3.2.7 Rainfall Forecasting and Monitoring

Accurate forecasting and monitoring of rainfall is critical to the successful pre-emptive and reactive site drainage management as outlined in the subsections above.

Rainfall forecasts will be obtained for the nearest forecast reference point available via the www.yr.no weather forecasting website. The reference location will be that of Lemanaghan, Co. Offaly.

https://www.yr.no/en/forecast/daily-table/2-3313920/Ireland/Leinster/County%20Offaly/Lemanaghan

Construction personnel will be required to check the forecasted rainfall for the days ahead and plan for or suspend planned works accordingly. The forecasted rainfall should be recorded for reference and comparison with the rainfall levels to be recorded on-site.

Actual rainfall will be monitored on site, ideally via an automated rain gauge or weather station with regular recording intervals recommended by the Project Hydrologist and a means of alerting the

construction personnel of rainfall trigger levels. Any recorded rainfall data should be available on site at all times for review by the ECoW, Project Hydrologist or any regulatory authorities. The appointed contractor will be required to outline their proposed means of recording rainfall on site to the satisfaction of the ECoW and the Project Hydrologist prior to commencement of works.

3.2.8 Refuelling, Fuel and Hazardous Materials Storage

Wherever possible, vehicles will be refuelled off-site. This will be the case for regular, road-going vehicles. However, for construction machinery that will be based on-site continuously during construction, a limited amount of fuel will have to be stored on site in appropriately bunded containers within dedicated fuel storage areas.

On-site refuelling of machinery will be carried out at dedicated refuelling locations using a mobile double skinned fuel bowser. The fuel bowser, a double-axle, custom-built refuelling trailer, will be re-filled off site and will be towed around the Proposed Project site by a 4x4 jeep to where machinery is located. It is not practical for all vehicles to travel back to a single refuelling point, given the size of the cranes, excavators, etc. that will be used during the construction of the Proposed Project. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use.

Only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays, spill kits and fuel absorbent mats will be available if necessary, during all refuelling operations.

The following mitigation measures are proposed to avoid release of hydrocarbons at the site:

- All plant will be inspected and certified to ensure they are leak free and in good working order prior to use on site;
- On-site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer or truck will be re-filled off site and will be towed/driven around the site to where machinery are located. The 4x4 jeep/fuel truck will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations;
- Fuels stored on site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume during the construction phase;
- The electrical control building will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals and to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;
- The plant used will be regularly inspected for leaks and fitness for purpose;
- An emergency plan for the construction phase to deal with accidental spillages will be developed (refer to Section 6 of this CEMP). Spill kits will be available to deal with accidental spillages.

3.2.9 Cement Based Products Control Measures

Concrete and other cement-based products are highly alkaline and corrosive and can have significant negative impacts on water quality. They generate very fine, highly alkaline silt (pH 11.5) that can physically damage fish by burning their skin and blocking their gills.

Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water possible. The small volume of water that will be generated from washing of the concrete truck's chute

will be directed into a temporary, lined, impermeable containment area for concrete washout. Where temporary lined impermeable containment areas are used, such containment areas are typically built using straw bales and lined with an impermeable membrane. Two examples are shown in Plate 1 and Plate 2 below.

Plate 1 Concrete washout area

Plate 2 Concrete washout area

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

Alternatively, a Siltbuster-type concrete wash unit or equivalent[2] may be used. This type of Siltbuster unit catches the solid concrete and filters and holds wash liquid for pH adjustment and further solids separation. The residual liquids and solids can be disposed of off-site at an appropriate waste facility.

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

- Concrete trucks will not be washed out on the site, only the chute will be cleaned as outlined above. The trucks will be directed back to their batching plant for washout.
    - Please note, where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water possible
- Site roads will be constructed to the required standard to allow transport of the turbine components around the site, and hence, concrete delivery trucks will be able

[2] https://www.siltbuster.co.uk/sb_prod/siltbuster-roadside-concrete-washout-rcw/

to access all areas where the concrete will be needed. No concrete will be transported around the site in open trailers or dumpers to avoid spillage while in transport. All concrete used in the construction of turbine bases will be pumped directly into the shuttered formwork from the delivery truck. If this is not practical, the concrete will be pumped from the delivery truck into a hydraulic concrete pump or into the bucket of an excavator, which will transfer the concrete to the location where it is needed.

- The arrangements for concrete deliveries to the site will be agreed with suppliers before work starts, agreeing routes, prohibiting on-site washout and to agree emergency procedures.
- Clearly visible signage will be placed in prominent locations close to concrete pour areas specifically stating that the washout of concrete trucks is not permitted on the site.

Due to the volume of concrete required for each turbine foundation, and the requirement for the concrete pours to be continuous, deliveries may be required outside normal working hours to limit the traffic impact on other road users, particularly peak period school and work commuter traffic. Such activities are limited to the day of turbine foundation concrete pours, which are normally completed in a single day per turbine.

Given the scale of the turbine base concrete pours which form part of the Proposed Wind Farm, the pours will be planned approximately 1 week in advance. Special procedures will be adopted in advance of and during all concrete pours to minimise the risk of pollution. These will 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 (including drains and ditches) while placing concrete.
- Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets.
- Ensuring that covers are available, and used, when necessary, for freshly placed concrete to avoid the surface washing away in heavy rain.
- The small volume of water that will be generated from washing of the concrete truck's chute will be directed into a temporary, lined, impermeable containment area, or a Siltbuster-type concrete wash unit or equivalent.
- Surplus concrete after completion of a pour will be taken off-site and disposed of at an appropriately authorised facility.

3.2.10 Vegetation Removal Drainage Measures

As discussed in Section 2.3.3.12 above, vegetation removal will be required within the site to allow for the the site entrances, access roads, underground cabling, and other ancillary infrastructure. No forestry felling requiring the provision of a Limited Felling License (LFL) from the Department of Agriculture, Food and the Marine (DAFM) Forest Service will occur as part of the Proposed Project.

Mitigation measures will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses. These measures are derived from best practice guidance documents as outlined below and in Section 9.5.2 of Chapter 9 Water of the EIAR.

During vegetation removal there is a potential to generate silts and sediments in surface water runoff due to tracking of machinery and disturbance of the ground surface etc, however mitigation is provided in Section 9.5.2.1 of Chapter 9 Water with regard surface water quality protection for this activity which is summarised below. Also, prior to the commencement of subsequent road construction the following key temporary drainage measures will be installed:

- Interceptor drains will convey clean runoff water around works areas to the existing downstream drainage system (field drains and main drains).
- Silt traps and check dams will be installed in field drains downstream of over the edge (OTE) drainage areas, and these will provide attenuation and treatment of dirty water.
- Silt fences will be emplaced within drains down-gradient of all construction areas.

Before the commencement of any vegetation removal works, an Environmental Clerk of Works (EnvCoW) shall be appointed to oversee the works. The EnvCoW shall be experienced and competent, and shall have the following functions as proposed in the planning application:

- Attend the site for the setup period when drainage protection works are being installed and be present on site during the remainder of the works.
- Prior to the commencement of works, review and agree the positioning by the Operator of the required Aquatic Buffer Zones (ABZs), silt traps, silt fencing (see below), water crossings and onsite storage facilities for fuel, oil and chemicals (see further below).
- Be responsible for preparing and delivering the Environmental Toolbox Talk (TBT) to all relevant parties involved in site operations, prior to the commencement of the works.
- Conduct daily and weekly inspections of all water protection measures and visually assess their integrity and effectiveness in accordance with the proposals outlined in Section 4.2 of this CEMP.
- Take representative photographs showing the progress of operation onsite, and the integrity and effectiveness of the water protection measures.
    - Collect water samples for analysis by a 3rd party accredited laboratory, adhering to the following requirements:
    - Sampling shall be taken from the stream/riverbank, with no in-stream access permitted.
    - The following analytical suite of parameters shall be tested by an independent and INAB accredited laboratory at a minimum: pH, Electrical Conductivity (EC), Total Suspended Solids (TSS), Biochemical Oxygen Demand (BOD), Total Phosphorus, Ortho-Phosphate, Total Nitrogen, and Ammonia.
    - Review of operator's records for plant inspections, evidence of contamination and leaks, and drainage checks made after extreme weather conditions.
    - Prepare and maintain a contingency plan.
    - Suspend work where potential risk to water from siltation and pollution is identified, or where operational methods and mitigation measures are not specified or agreed.
    - Prepare and maintain a Water Protection Measure Register. This document is to be updated weekly by the ECoW.

Mitigation measures which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses as a result of vegetation removal are as follows:

- The felling will be completed primarily by hand in order to limit disturbance;
- If machinery is required, works will be undertaken using machinery which are most suitable for the ground conditions and which will minimise soil disturbance;
- Where possible, trees will be felled away from drains to prevent the unnecessary deposition of peat or brash into the bog drains;
- Where machinery is required, brash/bog mats will be used to protect the peat surface and reduce erosion;
- Silt fences will be installed downgradient of the works to intercept potentially silt laden runoff; and,

- Works will be completed during periods of low rainfall.

Table 3-1 Minimum Buffer Zone Widths (Forest Service, 2000)

Average slope leading to the aquatic zone		Buffer zone width on either side of the aquatic zone	Buffer zone width for highly erodible soils
Moderate	(0 – 15%)	10 m	15 m
Steep	(15 – 30%)	15 m	20 m
Very steep	(>30%)	20 m	25 m

3.3 Archaeological Management

This section of the CEMP provides an outline of the Cultural Heritage mitigation measures for the construction phase of the Proposed Project.

There are no UNESCO World Heritage Sites or National Monuments located within or along the proposed footprint of the Proposed Project.

No National Monuments are located within or adjacent to the Proposed Project site. Six National Monuments in State Care and eight monuments subject to a Preservation Order are located within 15km of the nearest proposed turbine The nearest National Monument comprises Gallen Abbey which is located c. 4.1km south-west of the nearest proposed turbine, T3 while the nearest monument subject to a Preservation Order is Cool Castle at Coole c. 4km south-west of T3.

Four hundred and ninety-one (491) recorded monuments are located within the Proposed Project site. The majority of these monuments were identified as a result of a peatland survey carried out within the site by the Irish Archaeological Wetland Unit (IAWU) in 1993-4 as part of the Archaeological Survey of Ireland Peatland Survey. During that survey a total of 470 sightings of archaeological material were made that were subsequently included in the Sites and Monuments Record (SMR). The majority of recorded monuments within the Proposed Project site have been avoided by design, meaning that the Proposed Project layout was designed to avoid the known locations of these monuments. There are a number of instances, however, where Proposed Project infrastructure interacts with the location of recorded monuments as detailed in Section 13.4.3.3 in Chapter 13 of the EIAR.

The following pre-construction measures will be adhered to:

1. *Pre-development testing, under licence from the NMS, will be carried out in areas where peat depths allow a meaningful investigation. Testing will only be undertaken in areas where ground disturbance will take place as part of the Proposed Project. Where peat depths become a limitation to testing, monitoring at the construction stage will be undertaken. The areas to be tested will be chosen by the appointed archaeologist and the number of test trenches agreed between the archaeologist and the NMS through the licensing system. Peat depth data and local ground conditions may dictate the number and location of test trenches to be excavated. A report on the testing will be compiled on completion of the work. Should archaeological finds, structures or deposits be uncovered as a result of the testing further mitigation measures such as preservation in situ or preservation by record (excavation) may be required and will be decided in consultation with the NMS. Such mitigation measures will be implemented, where relevant, following consultation with the NMS.*

Interactions of the Proposed Project infrastructure and enhancement/mitigation measures with cultural heritage have been a priority element for consideration within the associated construction methodology.

The construction of the new floated road over a togher at 2 no. locations (Section 2.3.3.4.1 above) and the proposed enhancement and mitigation measures for breeding lapwing (Section 2.3.3.11 above) have been designed to avoid and mitigate all potential effects on cultural heritage. Please see the above referenced sections for further detail.

Archaeological monitoring will be ongoing during the construction phase of the Proposed Project which is outlined below:

1. *Archaeological monitoring of ground works, particularly in relation to the proposed enhancement area for breeding lapwing and the proposed floating road crossing over archegonial features (i.e. togher), during the construction stage of the Proposed Project under licence from the NMS will be carried out by a suitably qualified archaeologist. Should archaeological finds, structures or deposits be uncovered as a result of the monitoring further mitigation measures such as preservation in situ or preservation by record (excavation) may be required and will be decided in consultation with the NMS. Such mitigation measures will be implemented where relevant following consultation with the NMS. A report detailing the results of the monitoring and/or any further necessary mitigation as referred to above will be compiled on completion of the work and submitted to the NMS and Planning Authority/Body.*

3.4 Traffic Management

This section of the CEMP provides an outline of the traffic management proposals for the construction phase of the Proposed Project. In the event planning permission is granted the final Traffic Management Plan will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned.

3.4.1 Turbine and Materials Transport Route

3.4.1.1 Proposed Project

The Port of Galway has been selected and assessed to facilitate turbine delivery to the site. It is proposed that all turbine infrastructure will be imported to Galway Port. Please see Section 4.7.3 in Chapter 4 of the EIAR.

Turbine infrastructure being imported to Galway Port will be delivered to site via north from the Galway Port through Galway City via the Lough Atalia Road, the R339 Wellpark Road, northwest onto the R336 Tuam Road, before turning west onto the N6 National Road for approximately 3.7km where the N6 joins the M6. The transport vehicles will merge onto the M6 and head east towards to the Proposed Wind Farm.

It is proposed that the large wind turbine plant will be delivered via the M6 before turning south onto the N52 at Junction 5 (Tullamore/Kilbeggan). The route follows the N52 south, bypassing Tullamore to the east and passing through the settlements of Blue Ball, Kilcormac and Five Alley. Deliveries will turn right onto the N62 (at the junction known as Kennedys Cross) and will proceed northwards towards Ferbane for approximately 22km to Site Entrance 1. The proposed route is shown on Figure 4-41 and Figure 4-42 in Chapter 4 of the EIAR. All deliveries of turbine components to the site will only be by way of the proposed transport route outlined in the aforementioned figures.

All other construction materials will be delivered to the site via the proposed haul routes shown on Figure 4-40 in Chapter 4 of the EIAR and will access the site using the appropriate site access location based on the source of the construction material which will be included in the TMP for the Proposed Project, included as Appendix 15-2 to the EIAR. Traffic movements generated by the Proposed Project are discussed in in Section 15.1 of Chapter 15: Material Assets of the EIAR.

3.4.2 Deliveries of Stone and Ready-Mix Concrete from Quarries

In addition to the gravel, cobbles and boulder material to be extracted from the proposed borrow pits, it is anticipated that engineering fill and higher quality, surfacing granular fill and sand will be sourced from local, authorised quarries. Please see Section 4.4.3.3 and Section 4.4.3.4 in Chapter 4 of the EIAR for further details on material to be sourced from the 4 no. proposed onsite borrow pits for the construction of the Proposed Project.

For the purposes of assessment within the EIAR, 3 no. existing, authorised quarries, located within 30km of the Proposed Project site have been selected and are shown in Figure 4-41 in Chapter 4 of the EIAR.

It is envisaged that general construction traffic (including materials and staff) will travel to the site via the public road network to the relevant construction site access points, detailed above. Please note, delivery of stone and ready-mix concrete to the Proposed Project site will utilise the local roads, regional roads, and national roads. The delivery of stone and read mix concrete from quarries will primarily utilise Site Entrance 1 and Site Entrance 2 to access the site during the construction phase. The general construction traffic will also utilise Site Entrance 3 and 5 to access the northern section of the site via internal site roads only. Site Entrance 3 will facilitate access to the proposed onsite 220kV substation, and associated roads and peat deposition area, via the L7002 local road. Site Entrance 5 will facilitate access for the specific Proposed Grid Connection infrastructure located under the existing OHL only via the L7001 local road. Please refer to Section 2.3.3.6 and Table 4-9 in Chapter 4 of the EIAR for further information on site entrances.

The proposed route for HGVs from each identified quarry to the closest relevant site entrance location is provided below. Deliveries of stone and ready-mix concrete for use in construction of the Proposed Project, are discussed in further detail in Chapter 15 of this EIAR.

Kilsaran Quarry, Tullamore Co. Offaly

HGVs will depart from Kilsaran Quarry in the townland of Bunaterin, Co. Offaly and turn right onto the N52 national road. They will travel for approximately 650m before turning right onto the R357 regional road. The HGVs will travel in a northwest direction for 5.9km before turning right onto L6027 for 1.9km then left onto the L6051 local road. After travelling north along the L6051 local road for 6.5km the HGVs will turn right onto the R436 regional road and travel 1.1km to Site Entrance 2 where they will turn left to enter the Proposed Wind Farm.

McKeon's Sand and Gravel, Culliaghbeg, Co, Roscommon

HGVs will depart from McKeon's Sand and Gravel in the townland of Culliaghbeg, Co. Roscommon and turn right onto the R357 regional road. After travelling southeast for 15.7km, the HGVs will turn left onto the L3004 local road and travel east for approximately 8.3km. The HGVs will than turn left onto the N62 national road and travel north for 3.1km to Site Entrance 1 where they will turn right to enter the Proposed Wind Farm.

John Gannon Concrete, Kilbeggan Co. Westmeath

HGVs will depart from John Gannon Concrete in the townland of Toorlisnamore, Co. Westmeath and, to access the site via Site Entrance 2, they will turn right on the R389 regional road and travel south for approximately 3.4km before turning right on the R446 regional road. They will continue in a northeast direction for 500m and then turn left onto the R436 regional road. After travelling southeast for 18km the HGVs will reach Site Entrance 2 and turn right into the Proposed Wind Farm.

To access the site via Site Entrance 3, HGVs will depart John Gannon Concrete in the townland of Toorlisnamore, Co. Westmeath and turn right on the R389 regional road and travel south for approximately 3.4km before turning right on the R446 regional road. They will continue in a northeast direction for 500m and then turn left onto the R436 regional road. After travelling southeast for 14.5km on the R436 the HGVs will travel turn right and travel northwest for 3.9km on the L7001 local road before turning left onto the L7002 local road. After travelling southeast for 1.3km on the L7002 the HGVs will reach Site Entrance 3 and turn right into the site.

To access the site via Site Entrance 5, HGVs will depart John Gannon Concrete in the townland of Toorlisnamore, Co. Westmeath and turn right on the R389 regional road and travel south for approximately 3.4km before turning right on the R446 regional road. They will continue in a northeast direction for 500m and then turn left onto the R436 regional road. After travelling southeast for 14.5km on the R436 the HGVs will turn right and travel northwest for 5.6km on the L7001 local road until they reach Site Entrance 5 and turn left into the site.

3.4.3 Traffic Mitigation Measures During the Construction Phase

The successful completion of the Proposed Project will require significant coordination and planning and a comprehensive set of mitigation measures will be put in place before and during the construction stage of the Proposed Project in order to minimise the effects of the additional traffic generated by the Proposed Project. The range of measures will include the following which are also set out in Chapter 15 of the EIAR.

A detailed Traffic Management Plan (TMP), incorporating all the mitigation measures set out within this CEMP along with Chapter 15 of the EIAR, will be finalised and detailed provisions in respect of traffic management agreed with the local authority and An Garda Síochána prior to construction works commencing on site. The detailed TMP will include the following:

Traffic Management Coordinator – a competent Traffic Management Co-ordinator will be appointed for the duration of the construction of the Proposed 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 Offaly County Council in advance of deliveries of turbine components to the Proposed Wind Farm. Liaison with the relevant local authorities, Transport Infrastructure Ireland (TII) and Motorways Maintenance and Renewals Contract (MmaRC), will be carried out where required regarding requirements such as delivery timetabling. The programme will ensure that deliveries are scheduled in order to minimise the demand on the local network and minimise the pressure on the access to the Proposed Wind Farm.

Information to locals – Locals in the area will be informed of any upcoming traffic related matters e.g. the delivery of turbine components at night via letter drops and posters in public places. Information will include the contact details of the 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.

A Pre and Post Construction Condition Survey – Where required by the local authority, a pre-condition survey of roads associated with the Proposed Project will be carried out immediately prior to construction commencement to record an accurate condition of the road at the time. A post construction survey will be carried out after works are completed to ensure that any remediation works are carried out to a satisfactory standard. Where required the timing of these surveys will be agreed with the local authority. All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.

Liaison with the relevant local authorities – Liaison with Offaly County Council and An Garda Síochána, will be carried out during the delivery phase of the large turbine vehicles, when an escort for all convoys will be required. Once the surveys have been carried out and "prior to commencement" status of the relevant roads established, (in compliance with the provisions of the CEMP), the Roads Section of Offaly County Council will be informed of the relevant names and contact numbers for the Project Developer/Contractor Site Manager as well as the Site Environmental Manager.

Implementation of temporary alterations to road network at critical junctions – at locations highlighted in Section 15.1.9 in Chapter 15 of the EIAR.

Identification of delivery routes – These routes will be agreed with Offaly County Council and adhered to by all contractors.

Delivery times of large turbine components – The TMP 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.

Travel plan for construction workers – While the assessment above has assumed the worst case in that construction workers will drive to the Site, the construction company will be required to provide a travel plan for construction staff, which will include the identification of routes to / from the Site and identification of an area for parking.

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. These are set out in Section 3.5 and 3.6 of this CEMP.

Re-instatement works - All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.

3.5 Dust Control

Construction dust can be generated from many on-site activities such as excavation and backfilling. The extent of dust generation will depend on the type of activity undertaken, the location, the nature of the dust, i.e., soil, sand, peat, etc. and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Construction traffic movements also have the potential to generate dust as they travel along the haul route.

In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. If necessary, water will be taken from stilling/settlement ponds in the Proposed Project site's drainage system and will be pumped into a bowser or water spreader to dampen down haul roads and temporary construction compounds to prevent the generation of dust. Silty or oily water will not be used for dust suppression, because this would transfer the pollutants to the haul roads and generate polluted runoff or more dust. Water bowser movements will be carefully monitored, as the application of too much water may lead to increased runoff.

- A wheel wash facility will be installed on the Proposed Wind Farm at all proposed construction site entrance and will be used by vehicles before leaving the site.
- Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads, site roads, grid route, road widening sections, substation, and construction compounds and around the borrow pit area to ensure dust does not cause a nuisance.

- If necessary, such as during periods of dry weather, de-silted water will be taken from stilling ponds in the site's drainage system and will be pumped into a bowser or water spreader to dampen down haul roads, turbine bases, borrow pit and site compounds to prevent the generation of dust where required.
- Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff.

- Areas of excavation will be kept to a minimum and stockpiling of excavated material will be minimised by coordinating excavation, placement of material in peat placement areas and restoration of borrow pits.
- Turbines components, construction materials and grid connection infrastructure will be transported to the site on specified haul routes only, as agreed with the local authority.
  - The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as deemed necessary by the construction Site Supervisor/Site Manager.
- The transport of construction materials may have the potential to generate dust in dry weather conditions. Roads will be watered down to suppress dust particles in the air as deemed necessary by the Site Supervisor/Manager.
- The transport of dry excavated material from the on-site borrow pits, which may have potential to generate dust will be minimised. If necessary, such as in periods of dry weather, excavated material will be dampened prior to transport from the borrow pits.
- Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal.
  - The MRF facility will be local to the site to reduce dust emissions associated with vehicle movements. The nearest licensed waste facility is located approximately 15km southeast of the Proposed Project site.

Wheels or vehicle underbodies are often washed before leaving sites to prevent the build-up of mud on public (and site) roads. Internal access roads will already be constructed before other road-going trucks begin to make regular or frequent deliveries to the site (e.g., with steel or concrete). The internal access roads will comprise granular fill, and so the public road-going vehicles will not be travelling over soft or muddy ground where they might pick up mud or dirt.

However, in the interest of best practice, wheel wash facilities will be provided. Figure 4-32 of the EIAR includes typical details of a proposed self-contained wheel wash system for use during the construction phase of works. A wheel wash will be located at each of the construction and delivery entrances as shown on the site layout drawings included as Appendix 4-1 to Chapter 4 of the EIAR.

The contractor will be responsible for ensuring that all vehicles egressing the site have used the wheel wash facilities. However, a road sweeper will be made available by the contractor for the cleaning of public roads in the event that they are dirtied by trucks associated with the Proposed Project.

3.6 Noise Control

The operation of plant and machinery, including construction vehicles, is a source of potential impact that will require mitigation at all locations within the site.

The following proposed measures to control noise will be implemented in full include:

- 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 residents;

- Monitoring typical levels of noise and vibration during critical periods and at sensitive locations;
- Selection of plant with low inherent potential for generation of noise and/ or vibration where practical;
- Placing of noise generating / vibratory plant as far away from sensitive properties as practical within the site constraints, and;
- The hours of construction activity will be limited to avoid unsociable hours where possible. Works operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Friday and Saturday between 7:00hrs and 13:00hrs.

And more specifically:

- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations.
- 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 outside of general construction hours will be surrounded by an acoustic enclosure or portable screen as appropriate.

Where rock breaking is employed in relation to the Proposed Project, the following are examples of measures that will be employed, 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 noise sensitive area;
- When possible, line of sight between top of machine and reception point needs to be obscured;
- 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 BS5228: Part 1 and the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1988 in relation to blasting operations.

An assessment of the operation noise levels has been undertaken in accordance with best practice guidelines and procedures as outlined in Section 12.3.2.4 of Chapter 12 of the EIAR. The findings of the assessment, presented in Section 12.5.3.1 of Chapter 12 of the EIAR has confirmed that the predicted operational noise levels will be within the relevant best practice noise criteria curves for wind farms at all locations.

In the event that a complaint which indicates potential excessive amplitude modulation (AM) associated with the Proposed Project, the operator will employ a qualified acoustic consultant to assess the level of AM in accordance with the methods outlined in the Institute of Acoustics IOA Noise Working Group

(Wind Turbine Noise) *Amplitude Modulation Working Group Final Report: A Method for Rating Amplitude Modulation in Wind Turbine Noise* (9 August 2016) (IOA AMWG) or subsequent revisions. Please see Section 12.6.2.2 of Chapter 12 of the EIAR for further details.

3.7 Invasive Species Management

A baseline invasive species survey was carried out at the Site to identify the presence and location of any invasive species (listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) by a suitably qualified ecologist. As outlined in Chapter 6 of the EIAR, no invasive species were recorded within the Proposed Project site. The only non-native invasive species recorded within the Proposed Project site include butterfly bush (*Buddleja davidii*) and bearberry (*Cotoneaster dammeri*). Although invasive species, these are not listed on the Third Schedule.

3.7.1 Site Management

Careful preparation and planning of the works is crucial to successful treatment of invasive species. The following list of guidelines, which is not exhaustive, shall be followed by all on-site personnel. Only those who have been inducted into biosecurity measures on-site may enter the contaminated zones within the works areas. Should any risk of contaminated material escaping be observed by the site supervisor, the management plan for the Site must be amended by an appropriately qualified person to mitigate against the risk.

3.7.2 Establish Good Site Hygiene

The following best practice biosecurity measures will be in place during construction of the Proposed Project to avoid the introduction of invasive species to the site:

- Good construction site hygiene will be employed to prevent introduction of problematic invasive alien plant species (e.g., Japanese knotweed, Rhododendron, Giant Rhubarb, etc.) to the site by thoroughly washing vehicles at designated off-site wheel-wash facilities prior to entering the site.
- Any soil and topsoil required on the site will be sourced from a stock that has been screened for the presence of any invasive species and where it is confirmed that none are present.
- A pre-commencement invasive species survey of the construction footprint will be undertaken by a qualified ecologist to determine if any invasive species have established on the site since the undertaking of the previous surveys. The treatment and control of invasive alien species if recorded will follow guidelines issued by the National Roads Authority – The Management of The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020).

3.8 Resource and Waste Management Plan

This section of the CEMP provides a resource and waste management plan (RWMP) which outlines the best practice procedures during the excavation and construction phases of the project. The RWMP will outline the methods of waste prevention and minimisation by recycling, recovery, and reuse at each stage of construction of the Proposed Project. Disposal of waste will be seen as a last resort.

3.8.1 Legislation

The Waste Management Act 1996 and its subsequent amendments provide for measures to improve performance in relation to waste management, recycling and recovery. The Act also provides a

regulatory framework for meeting higher environmental standards set out by other national and EU legislation.

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

The RWMP has been produced in line with the following guidance '*Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction & Demolition Projects*' (EPA, 2021)[3].

3.8.2 Waste Management Hierarchy

The waste management hierarchy sets out the most efficient way of managing waste in the following order:

Prevention and Minimisation:

The primary aim of the RWMP will be to prevent and thereby reduce the amount of waste generated at each stage of the project.

Reuse of Waste:

Reusing as much of the waste generated on site as possible will reduce the quantities of waste that will have to be transported off site to recovery facilities or landfill.

Recycling of Waste:

There are a number of established markets available for the beneficial use of construction waste such as using waste concrete as fill for new roads.

At all times during the implementation of the RWMP, disposal of waste to landfill will be considered only as a last resort.

3.8.3 Construction Phase Waste Management

3.8.3.1 Description of the Works

The construction of the Proposed Project will involve the construction of:

- Proposed Wind Farm: this refers to turbines and associated foundations and hard-standing areas, meteorological mast, access roads, temporary construction compounds, underground cabling, peat and spoil management, borrow pits, site drainage, biodiversity mitigation and enhancement, amenity, turbine delivery route and associated junction accommodation works, and all ancillary works and apparatus. The Proposed Wind Farm is described in detail in Chapter 4 of the EIAR.
- Proposed Grid Connection: this refers to the onsite 220kV substation wind farm control building, associated temporary construction compound, 2 no. gantry

[3] *EPA, 2021. Best practice guidelines for the preparation of resource & waste management plans for construction and demolition projects. Available at: https://www.epa.ie/publications/circular-economy/resources/CDWasteGuidelines.pdf*

structures, 2 no. crane pad, 2 no. tower pad, 4 no. steel masts, temporary access track, and overhead line (OHL) connecting to the existing Shannonbridge-Maynooth 220kV OHL, and all ancillary works and apparatus. The Proposed Grid Connection is described in detail in Chapter 4 of the EIAR.

The turbines and meteorological mast will be manufactured off-site and delivered to the site where on site erection will occur.

The turbine and meteorological mast foundations will consist of stone from the onsite borrow pit and a concrete base which will contain reinforcing steel. These concrete foundations will be shuttered with steel formwork specifically designed for the works and re-usable off site on similar projects.

The new site roads and existing roads for upgrade will be constructed with rock sourced predominantly from the onsite borrow pit, with some material sourced from local quarries.

The proposed onsite 220kV electrical substation and control buildings will be constructed on a concrete foundation with the buildings constructed with concrete masonry blocks with a timber roof structure and roof tile or slate covering. The roof structure will be made up of prefabricated roof trusses manufactured off site to minimise timber cutting on site. The construction of the underground electrical cabling will consist of excavating sections of a trench, laying the ducting and cabling and backfilling.

The waste types arising from the construction phase of the Proposed Project are outlined in Table 3-2 below.

Table 3-2 Expected waste types arising during the Construction Phase

Material Type	Example	EWC Code
Cables	Electrical wiring	17 04 11
Cardboard	Boxes, cartons	15 01 01
Composite packaging	Containers	15 01 05
Metals	Copper, aluminium, lead, iron and steel	17 04 07
Inert materials	Sand, stones, plaster, rock, blocks	17 01 07
Mixed municipal waste	Daily canteen waste from construction workers, miscellaneous	20 03 01
Plastic	PVC frames, electrical fittings	17 02 03
Plastic packaging	Packaging with new materials	15 01 02
Tiles and ceramics	Slates and tiles	17 01 03
Wooden packaging	Boxes, pallets	15 01 03
Tarmac/Bitumen	Road surfacing along internal underground cabling at the L7002	17 03 02

Hazardous wastes that may occur on site during the construction phase of the development may include oil, diesel fuel, chemicals, paints, preservatives etc. All hazardous wastes will be stored in bunded containers/areas before being collected by an authorised waste contractor and brought to an

EPA licensed waste facility. As mentioned above, hazardous wastes will be kept separate from non-hazardous wastes so that contamination does not occur.

3.8.3.2 Waste Arising and Proposals for Minimisation, Refuse and Recycling of Construction Waste

Construction waste will arise on the project mainly from excavation and unavoidable construction waste including material surpluses and damaged materials and packaging waste. The decommissioning of the existing anemometry mast and the removal of 1 no. existing steel mast under the existing Shannonbridge-Maynooth 220kV OHL will also give rise to construction waste.

Appropriate measures will be taken to ensure excess waste is not generated during construction, including:

- Ordering of materials will be on an 'as needed' basis to prevent over supply to site. Co-ordination is required with suppliers enabling them to take/buy back surplus stock;
- Purchase of materials pre-cut to length to avoid excess scrap waste generated on site;
- Request that suppliers use least amount of packaging possible on materials delivered to the site;
- Ensuring correct storage and handling of goods to avoid unnecessary damage that would result in their disposal;
- Ensuring correct sequencing of operations;
- Use reclaimed materials in the construction works.

Hazardous waste will be kept separate from all other construction waste to prevent contamination and removed appropriately.

3.8.3.3 Waste Arising from Construction Activities

All waste generated on site will be contained in waste skips at a waste storage area on site. This waste storage area will be kept tidy with skips clearly labelled to indicate the allowable material to be disposed of therein.

The expected waste volumes generated on site are unlikely to be large enough to warrant source segregation at the wind farm site. Therefore, all wastes streams generated on site will be deposited into a single waste skip. This waste material will be transferred to a MRF by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal.

The waste generated from the turbine erection, existing anemometry mast decommissioning, and existing steel mast decommissioning will be limited to the associated protective covers which are generally reusable. Considering the specialist nature of this packaging material the majority will be taken back by suppliers for their own reuse. Any other packaging waste generated from the turbine supply will be deposited into the on-site skips and subsequently transferred to the MRF.

It is not envisaged that there will be any waste material arising from the materials used to construct the site roads as only the quantity of stone necessary will be sourced from the on-site borrow pit and local quarries and brought on site on an 'as needed' basis.

Site personnel will be instructed at induction that under no circumstances can waste be brought to site for disposal in the on-site waste skip. It will also be made clear that the burning of waste material on site is forbidden.

3.8.3.4 Reuse

Many construction materials can be reused a number of times before they must be disposed of:

- Concrete can be reused as aggregate for roads cable trench backfilling material.
- Plastic packaging etc. can be used to cover materials on site or reused for the delivery of other materials.

3.8.3.5 Recycling

If a certain type of construction material cannot be reused onsite, then recycling is the most suitable option. The opportunity for recycling on site will be restricted to the associated packaging from the wind turbines.

All waste that is produced during the construction phase including dry recyclables will be deposited in the on-site skip initially and sent for subsequent segregation at a remote facility. The anticipated volume of all waste material to be generated at the development is low which provides the justification for adopting this method of waste management.

3.8.3.6 Implementation

3.8.3.6.1 *Roles and Responsibilities for Waste Management*

Prior to the commencement of the development a Construction Waste Manager will be appointed by the Contractor. The Construction Waste Manager will be in charge of the implementation of the objectives of the plan, ensuring that all hired waste contractors have the necessary authorisations and that the waste management hierarchy is adhered to. The person nominated must have sufficient authority so that they can ensure everyone working on the development adheres to the management plan.

3.8.3.6.2 *Training*

It is important for the Construction Waste Manager to communicate effectively with colleagues in relation to the aims and objectives of the waste management plan. All employees working on site during the construction phase of the project will be trained in materials management and thereby, should be able to:

- Distinguish reusable materials from those suitable for recycling;
- Ensure maximum segregation at source;
- Co-operate with site manager on the best locations for stockpiling reusable materials;
- Separate materials for recovery; and
- Identify and liaise with waste contractors and waste facility operators.

3.8.3.6.3 *Record Keeping*

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

The fully licensed waste contractor employed to remove waste from the site will be required to provide documented records for all waste dispatches leaving the site. Each record will contain the following:

- Consignment Reference Number Material Type(s) and EWC Code(s)

- Company Name and Address of Site of Origin
- Trade Name and Collection Permit Ref. of Waste Carrier
- Trade Name and Licence Ref. of Destination Facility
- Date and Time of Waste Dispatch
- Registration no. of Waste Carrier vehicle
- Weight of Material
- Signature of Confirmation of Dispatch detail
- Date and Time of Waste Arrival at Destination
- Site Address of Destination Facility

3.8.3.7 Resource and Waste Management Plan Conclusion

The RWMP will be properly adhered to by all staff involved in the Proposed Project which will be outlined within the induction process for all site personnel. The waste hierarchy will always be employed when designing the plan to ensure that the least possible amount of waste is produced during the construction phase. Reuse of certain types of construction wastes will cut down on the cost and requirement of raw materials therefore further minimising waste levels.

This preliminary RWMP has been prepared to outline the main objectives that are to be adhered to for the preparation of a more detailed RWMP to be completed after the planning phase of the Proposed Project.

4. ENVIRONMENTAL MANAGEMENT IMPLEMENTATION

4.1 Roles and Responsibilities

The Project Developer will appoint a design team to prepare the detailed design for the Proposed Project prior to the commencement of construction and ensure all planning and environmental obligations are met. The developer will appoint a Project Contractor who will be responsible for the construction of the Proposed Project in accordance with this CEMP which will be updated by the contractor as required during the construction phase of the Proposed Project. Any updated CEMP must meet or exceed the standards and requirements set out in this document.

The Environmental Clerk of Works (EnvCoW) will be nominated by the Project Developer to oversee the Project Contractor's effective implementation of the Proposed Project's environmental requirements and obligations, as captured in the CEMP. The EnvCoW will be responsible for monitoring the works of the Project Contractor from an environmental perspective on behalf of the Project Developer. For the sake of expediency, the EnvCoW will report their ongoing audit findings, monitoring results and site observations to both the Project Developer and the Project Contractor, having been nominated by the developer to fulfil the role.

The EnvCoW will have the power to halt the works, should the need arise and will be supported by the developer to ensure the contractor adheres to such an instruction.

The EnvCoW will also have to call upon the Project Ecologist, Project Hydrologist, Project Archaeologist or other members of the Project Developer's design team, as required, to oversee the contractor's works on-site. An organogram structure for the construction stage roles is as outlined below.

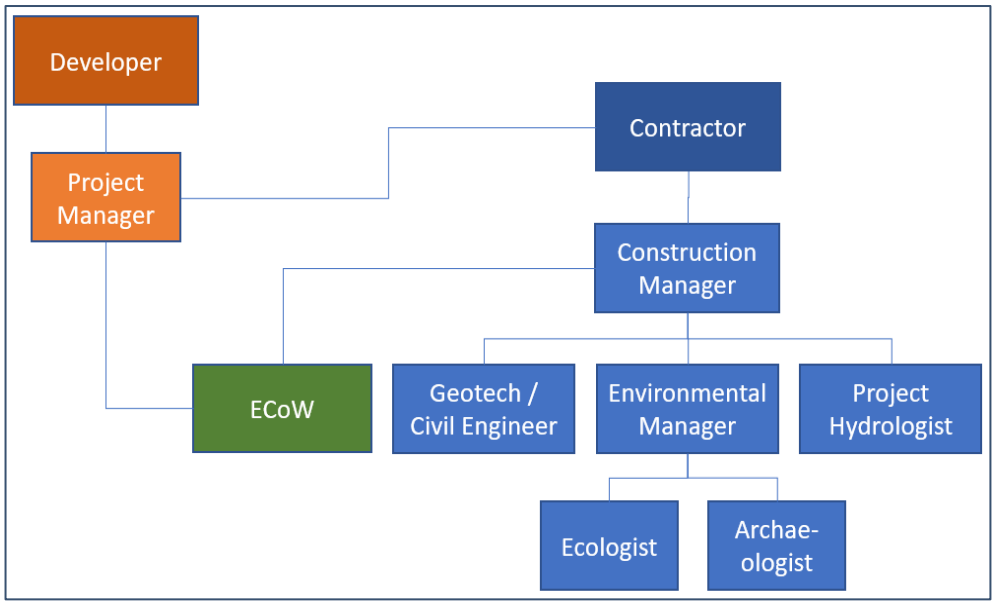

Figure 4-1 Proposed Project Organogram

Any requirement of the granted permission, for the works to be supervised by an engineer with professional indemnity insurance, who upon completion of the works, shall certify the said works, will be adhered to. Such an engineer will be appointed to oversee and supervise the construction phase of the Proposed Project.

4.1.1 Construction Manager

The Project Contractor will be required to nominate a Construction Manager who will have responsibility for the organisation and execution of environmental requirements outlined in this CEMP or any further versions thereof. The Construction Manager will have an assigned deputy who will fulfil the role of Environmental Manager. To implement the CEMP, the Construction Manager with the assistance of the Environmental Manager will be required to:

- Implement all Proposed Project design requirements to minimise environmental risk;
- Implement all CEMP requirements and measures to minimise environmental risk;
- Ensure any site personnel responsible for directing works on site are familiar with all requirements of the CEMP;
- Propose revisions to the Proposed Project's CEMP for approval of the Project Developer, project design team and ECoW, only where any such revisions meet or exceed the standards and requirements set out in this document;
- Ensure that all environmental standards are achieved during the construction phase of the Proposed Project;
- Promptly implement any remedial action required to rectify and close-out any non-compliant items identified by the ECoW;
- Ensure immediate notification of environmental incidents are issued to the ECoW, the Project Developer and the relevant authorities, initially by phone and as soon as is practicable by e-mail;
- Identify environmental training requirements and arrange relevant training for all levels of site-based staff/workers.
- Ensure that all construction activities are planned and performed such that minimal risk to the environment is introduced.

4.1.2 Site Environmental Clerk of Works

The Project Developer will be required to engage an independent and suitably qualified Environmental Engineer, Environmental Scientist, or equivalent, with experience in wind farm construction to fulfil the role of Environmental Clerk of Works (EnvCoW) to oversee the construction works and audit the implementation of the CEMP. The EnvCoW will report to the Project Developer and Project Contractor but will liaise closely with the Construction Manager in relation to the Project Contractor's day-to-day implementation of the CEMP on site. The responsibilities and duties of the EnvCoW will include the following:

- Review/approval of the CEMP and supporting environmental documentation and review/approval of contractor method statements;
- Undertake environmental monitoring, inspections and reviews to ensure the works are carried out in compliance with the CEMP by the Project Contractor;
- Manage the water quality monitoring programme and turbidity monitors;
- Maintain a live Actions List and accompanying map outlining any corrective actions across the site requiring attention or action by the contractor;
- Confirm for the Project Contractor that pre-commencement requirements have been met to allow construction activities to commence;
- Highlight for the contractor, any abandonment triggers that are occurring and inform the contractor that works are to cease;
- Generate environmental reports as required to show environmental data trends and ensure environmental records are maintained throughout the construction period;
- Advise site management/contractor/sub-contractors on:
    - Prevention of environmental pollution and improvement to existing working methods;
    - Changes in legislation and legal requirements affecting the environment;
    - Suitability and use of plant, equipment and materials to prevent pollution;

    - Environmentally sound methods of working and systems to identify environmental hazards;
- Assist the contractor in coordinating the required inputs and site visits from the Project Ecologist or Project Hydrologist to support the EnvCoW role;
- Ensure immediate notification of any environmental incidents are issued to the Construction Manager and Project Developer;
- Support the investigation of incidents of significant, potential or actual environmental damage and ensure corrective actions are carried out, recommend means to prevent recurrence and communicate incident findings to relevant parties.
- Liaise with the Project Design Team and attend meetings to report on audit findings
- Support the contractor who will be responsible for providing toolbox talks and site induction content to ensure the requirements of the CEMP are delivered on site.
- The geotechnical design requirements of the Proposed Project are not within the remit of the EnvCoW.

The level, detail and frequency of reporting expected from the EnvCoW for the Construction Manager, Developer's Project Manager, and any Authorities or other Agencies, will be agreed by all parties prior to commencement of construction, and may be further adjusted as required during the course of the Proposed Project.

4.1.3 Project Ecologist/Ornithologist

The Project Ecologist will be available to support the ECoW on matters relating to the protection of sensitive habitats and species encountered prior to or during the construction phase of the Proposed Project. The Project Ecologist will not be on site full time but will undertake pre-commencement surveys and visit the site as required. The responsibilities and duties of the Project Ecologist/Ornithologist will include the following:

- Undertake a pre-construction transect/walkover bird survey to ensure that significant effects on breeding birds will be avoided.
- Inform and educate on-site personnel of the ornithological and ecological sensitivities within the site.
- Oversee management of ornithological and ecological issues during the construction period and advise on ornithological and ecological issues as they arise.
- Provide guidance to contractors to ensure legal compliance with respect to protected species onsite.
- Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress.

4.1.4 Project Hydrologist

The Project Hydrologist is part of the design team that will prepare the detailed drainage design for the construction phase of the Proposed Project, but will also support the ECoW in monitoring, overseeing and auditing the effective implementation of the detailed drainage design by the Project Contractor. The Project Hydrologist will not be on site full time but will be required to visit as necessary to oversee the implementation of their drainage design.

The responsibilities and duties of the Project Hydrologist will include the following:

- Preparation of detailed drainage design before construction commences;
- Input to the CEMP in respect of drainage design and water quality management;
- Attend site to support ECoW and oversee and audit the effective implementation of the detailed drainage design;

- Complete ongoing inspection and monitoring of the development, particularly in areas of drainage control in support of the ECoW in monitoring the effectiveness of the drainage design as it is implemented on-site.

4.1.5 Project Archaeologist

The Project Archaeologist will report to the Environmental Manager/ EnvCoW and is responsible for archaeological monitoring of the site during the construction phase. This will include monitoring of site investigations and excavation works as well as the monitoring and metal detection of spoil during construction.

If new archaeological material is detected during the pre-construction re-inspection, testing or monitoring, the project archaeologist will be responsible for ensuring they are preserved by record (archaeologically excavated) and therefore permanently removed with a full record made.

The responsibilities and duties of the Project Archaeologist will include the following:

- Confirm designated buffers surrounding sensitive archaeological features to be implemented and maintained within the Proposed Wind Farm site throughout construction.
- Inform and educate on-site personnel of the archaeological sensitivities within the site.
- Oversee management of archaeological issues during the construction period and advise on archaeological issues as they arise.
- Attend site to support EnvCoW and oversee and audit the effective implementation of construction of new road over archaeological feature;
- Ongoing inspection and monitoring of the Proposed Project and ensure construction is carried out as specified in the EIAR and in relevant planning conditions.

4.1.6 Project Geotechnical Engineer/Civil Engineer

The Geotechnical Engineer will report to the Construction Manager and is responsible for inspection and review of geotechnical aspects associated with construction of the Proposed Project. The Geotechnical Engineer will not be on site full time but will visit site at least once a month during the construction phase civil works and on a weekly basis during site preparation/groundworks.

The responsibilities and duties of the Geotechnical Engineer will include the following:

- Visit site regularly, or at least once a month during the construction phase, to complete geotechnical audits and reviews and report any issues to the Construction Manager;
- Ensuring that identified hazards are listed in the Geotechnical Risk Register and that these are subject to ongoing monitoring; and,
- Ongoing inspection and monitoring of the Proposed Project, particularly in temporary stockpile areas, through all phases of construction (including pre, during and post construction) and ensure construction is carried out as specified in the EIAR, NIS and in relevant planning conditions.

4.2 Water Quality and Monitoring

4.2.1 Pre-Construction Baseline Monitoring

The methodology for water quality monitoring before, during and after the construction phase of the Proposed Project is outlined in detail in Section 4 of the Surface Water Management Plan (SWMP) which is included as Appendix 4-6 of the EIAR.

This document includes details in relation to baseline monitoring, daily visual inspections, continuous monitoring, monthly laboratory analysis, field monitoring and reporting.

4.2.2 Construction Phase Monitoring

4.2.2.1 Daily Visual Inspections

An inspection and maintenance plan for the on-site drainage system will be prepared in advance of commencement of any works. Daily visual inspections of drains and outfalls will also be performed during the construction period to ensure suspended solids are not entering streams and rivers on site, to identify any obstructions to channels and to allow appropriate maintenance of the drainage regime. Should the suspended solids levels measured during construction be higher than the existing levels, the source will be identified, and additional mitigation measures implemented. Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed.

During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and Environmental Quality Standards (EQS) should be undertaken for each primary watercourse along the Proposed Grid Connection underground cable route and specifically following heavy rainfall events (i.e. weekly, monthly and event based).

Inspection sheets and photographic records will be kept on site. Inspection points will include the in-situ field monitoring point locations and the laboratory analysis sampling points. Inspection points will depend on works being completed within the catchment upstream of the identified monitoring locations. Visual inspections will also be completed after major rainfall events, i.e. after events of >25mm rainfall in any 24-hour period and data including photographs will be collected by visual inspections and independently assessed by the Project Hydrologist who will monitor and advise on the records being received.

The following periodic inspection regime will be implemented:

- Daily general visual inspections of site operations and inspections of all drainage infrastructure within the site and in the surrounding area by the ECoW or a suitably qualified and competent person as delegated by the ECoW;
- Inspections to include all elements of drainage infrastructure to ensure the system is operating correctly and to identify and maintenance that is required. Any changes, such as discolouration, odour, oily sheen or litter will be noted and corrective action will be implemented. High risk locations such as settlement ponds will be inspected daily. Daily inspections checks will be completed on plant and equipment, and whether materials such as straw bales or oil absorbent materials need replacement;
- Event based inspections by the ECoW as follows:
    - >10 mm/hr (i.e. high intensity localised rainfall event);
    - >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or,
    - Rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week).
- Monthly site inspections by the Project Hydrologist/ ECoW during construction phase;
- Quarterly site inspections by the Project Hydrologist/ ECoW after construction for a period of one year following the construction phase; and,
- A written record will be maintained or available on-site within this CEMP which will be maintained on-site during the construction phase.

4.2.2.2 Laboratory Analysis

Baseline laboratory analysis of a range of parameters with relevant regulatory limits and EQSs will be undertaken as per water monitoring programme for the Proposed Project. This will not be restricted to just these locations around the Proposed Project site with further sampling points added as deemed necessary by the ECoW in consultation with the Project Hydrologist and Site Manager.

4.2.2.3 Field Monitoring

Field chemistry measurements of unstable parameters, (pH, conductivity, temperature) will be taken at the surface water monitoring locations, as per monthly surface water monitoring programme for the Proposed Project. The ECoW or the Project Hydrologist will undertake monthly surface water monitoring programme (which includes baseline pre-construction monitoring, construction phase monitoring and post-construction monitoring). In-situ field monitoring will also be completed after major rainfall events, i.e. after events of >25mm rainfall in any 24-hour period. The Project Hydrologist will monitor and advise on the readings collected by in-situ field monitoring.

4.2.2.4 Monitoring Parameters

The analytical determinants of the monitoring programme (including limits of detection and frequency of analysis) will be as per S.I. No. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulations and European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. The likely suite of determinants will include:

- pH (field measured)
- Electrical Conductivity (field measured)
- Temperature (field measured)
- Dissolved Oxygen (field measured)
- Alkalinity (pH measured)
- Total Phosphorus
- Chloride
- Nitrate
- Nitrite
- Total Nitrogen
- Ortho-Phosphate
- Total Ammonia N
- Biochemical Oxygen Demand
- Total Suspended Solids
- True Colour
- Dissolved organic carbon

4.2.3 Construction Phase Drainage Inspections & Maintenance

Drainage performance will form part of the civil works contract requirements. During the construction phase, the Project Contractor will be responsible for the effectiveness of drainage measures. This responsibility extends to drainage maintenance, to ensure that the installed drainage measures continue to perform as intended by the detailed drainage design. Silt fences, check dams, level spreaders and other drainage measures likely to form part of the detailed drainage design, require regular maintenance to ensure they continue to function effectively, and the Project Contractor is entirely responsible for this maintenance.

Regular inspections of all existing and installed drainage measures should be undertaken by the Project Contractor, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of

standing water within the system. The contractor will devise a system of recording the findings of these inspections. Any excess build-up of silt levels at check dams, the settlement ponds, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. For this reason, the drainage measures installed on-site should be inspected at least weekly by the contractor and maintained as required during the construction phase of the Proposed Project to ensure good performance.

The ECoW will monitor the effectiveness of the on-site drainage during changing weather, ground or drainage conditions encountered on site, through their regular visual inspections of on-site watercourses and water monitoring programme. Where it appears that additional drainage measures will be required to ensure the drainage system remains effective, the ECoW will notify the contractor, the developer and project design team including the Project Hydrologist. The ECoW's role in this regard does not replace the need for the weekly (at least) inspections of the drainage system's measures by the Project Contractor.

4.2.4 Surface Water Monitoring Reporting

Visual inspection and laboratory analysis results of monthly surface water quality monitoring shall assist in determining requirements for any necessary improvements in drainage controls and pollution prevention measures implemented on site.

It will be the responsibility of the ECoW to present the ongoing results of water quality and weather monitoring at or in advance of regular site meetings.

Reports on water quality will consider all field monitoring and visual inspections, and results of laboratory analysis completed for that period. Reports will describe how the results compare with baseline data as well as previous reports on water quality. The reports will also describe whether any deterioration or improvement in water quality has been observed, whether any effects are attributable to construction activities and what remedial measures, or corrective actions have been implemented. Any proposed alteration to sampling frequency will be agreed with the Planning Authority in advance.

4.3 Environmental Awareness and Training

4.3.1 Environmental Induction

The Environmental Induction will be integrated into the general site induction on a case-by-case basis for each member of staff employed on-site depending on their assigned roles and responsibilities on site.

Where necessary, the Environmental Induction will as a minimum include:

- A copy of the Environmental Management Site Plans and discussion of the key environmental risks and constraints;
- An outline of the CEMP structure;
- A discussion of the applicable Works Method Statement;
- The roles and responsibilities of staff, including contractors, in relation to environmental management; and,
- An outline of the environmental Incident Management Procedure.

4.3.2 Toolbox Talks

Toolbox talks will be held by the EnvCoW or Construction Manager at the commencement of each day, or at the commencement of new activities. The aims of the toolbox talks are to identify the specific work activities that are scheduled for that day or phase of work. In addition, the necessary work method

statements and sub plans would be identified and discussed prior to the commencement of the day's activities. The toolbox talks will include training and awareness on topics including:

- On-site Archaeological and Ecological Sensitivities;
- Buffers to be upheld – provided by the Project Hydrologist, Project Archaeologist, and Project Ecologist;
- Sediment and Erosion Control;
- Good site practice;
- Planned/ongoing Works;
- Keeping to tracks – vehicle rules;
- Strictly adhering to the development footprint;
- Fuel Storage;
- Materials and waste procedures.

Site meetings would be held on a regular basis involving all site personnel. The objectives of site meetings are to discuss the coming weeks activities and identify the relevant work method statements and sub plans that will be relevant to that week's activities. Additionally, any non-compliance identified during the previous week would also be discussed with the aim to reduce the potential of the same noncompliance reoccurring.

During construction of the Proposed Project, all staff will be made aware of and adhere to the Health & Safety Authority's *'Guidelines on the Procurement, Design and Management requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013 (Updated 2017)'*. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan.

5. HEALTH AND SAFETY

Construction of the Proposed Project will necessitate the presence of a construction site and travel on the local public road network to and from the site. Construction sites and the machinery used on them pose a potential health and safety hazard to construction workers if site rules are not properly implemented. The Proposed Project will be constructed in accordance with all relevant Health and Safety Legislation, including:

- Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005);
- Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2016 (S.I. No. 36 of 2016);
- S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021 and
- Part 4 of the Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. No. 299 of 2007).

The following measures below are also detailed in Chapter 18: Schedule of Monitoring and Mitigation Measures of the EIAR.

- 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 contractor will be obliged under the construction contract and current health and safety legislation to adequately provide for all hazards and risks associated with the construction phase of the project. SafePass registration cards are required for all construction, delivery and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme card where required. The developer is required to ensure a competent contractor is appointed to carry out the construction works. The contractor will be responsible for the implementation of procedures outlined in the Safety and Health Plan. Public safety will be addressed by restricting site access during construction. Fencing will be erected in areas of the site where uncontrolled access is not permitted.
- Goal posts will be established, where necessary, under overhead electricity lines for the entirety of the construction phase of the Proposed Project.
- The suitability of machinery and equipment for use near power lines will be risk assessed.
- All staff will be trained on operating voltages of overhead electricity lines running the site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the sites are made aware of the location of lines before they come on to site.
- Barriers will run parallel to the overhead line at a minimum horizontal distance of 6 metres on plan from the nearest overhead line conductor wire.
- When activities must be carried out beneath overhead lines, e.g., component delivery or substation construction, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are required.
- Information on safe clearances will be provided to all staff and visitors.
- Signage indicating locations and health and safety measures regarding overhead lines will be erected in canteens and on site.
- All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the

Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the Site Health and Safety Plan.

The scale and scope of the project necessitates that a Project Supervisor Design Process (PSDP) and Project Supervisor Construction Stage (PSCS) are required to be appointed in accordance with the provisions of the Health & Safety Authority's *'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013 (Updated 2017)'*. The PSDP appointed for the construction stage shall be required to perform his/her duties as prescribed in the Safety, Health and Welfare at Work (Construction) Regulations. These duties include (but are not limited to):

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

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

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

6. EMERGENCY RESPONSE PLAN

6.1 Overview

The Emergency Response Plan (ERP) is presented in this section of the CEMP. It provides details of procedures to be adopted in the event of an emergency. The site ERP includes details on the response required and the responsibilities of all personnel in the event of an emergency. The ERP will require updating and submissions from the contractor/PSCS and suppliers as the project progresses. Where sub-contractors that are contracted on site are governed by their own emergency response procedure a bridging arrangement will be adopted to allow for inclusion of the sub-contractor's ERP within this within this document.

This is a working document that requires updating throughout the various stages of the Proposed Project.

6.1.1 Roles and Responsibilities

The chain of command during an emergency response sets out who is responsible for coordinating the response. The Site Supervisor/Construction Manager will lead the emergency response which makes him responsible for activating and coordinating the emergency response procedure. The other site personnel who can be identified at this time who will be delegated responsibilities during the emergency response are presented in Figure 6-1. In a situation where the Site Supervisor/ Construction Manager is unavailable or incapable of coordinating the emergency response, the responsibility will be transferred to the next person in the chain of command outlined in Figure 6-1. This will be updated throughout the various stages of the Proposed Project.

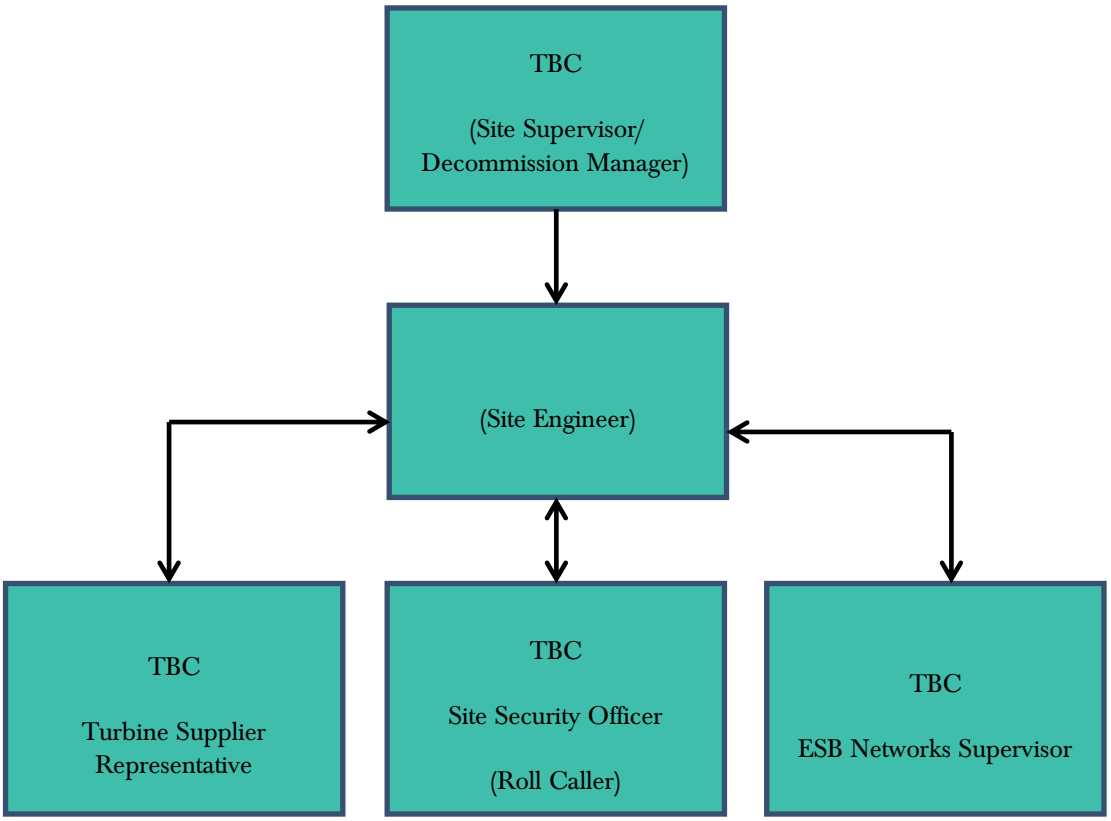

Figure 6-1 Emergency Response Procedure Chain of Command

6.1.2 Hazard Identification

In order to establish the type and scale of potential emergencies that may occur, the following hazards have been identified as being potential situations that may require an emergency response in the event of an occurrence.

Table 6-1 Hazards associated with potential emergency situations

Hazard	Emergency Situation
Construction Vehicles: Dump trucks, tractors, excavators, cranes etc.	Collision or overturn which has resulted in operator or third-party injury.
Abrasive wheels/Portable Tools	Entanglement, amputation or electrical shock associated with portable tools.
Contact with services	Electrical shock or gas leak associated with an accidental breach of underground services.
Fire	Injury to operative through exposure to fire.
Falls from heights including falls from scaffold towers, scissor lifts, ladders, roofs and turbines.	Injury to operative after a fall from a height.
Sickness	Illness unrelated to site activities of an operative e.g., heart attack, loss of consciousness, seizure.
Turbine Specific Incident	This will be included when the upon agreement and section of the final turbine type.
Siltation of watercourses, Fuel Management and Spill Control	Run-off to watercourses casing pollution.

In the event of an emergency situation associated with, but not restricted to, the hazards outlined in Table 6-1 the Site Supervisor/Construction Manager will carry out the following:

- Establish the scale of the emergency situation and identify the number of personnel, if any, have been injured or are at risk of injury.
- Where necessary, sound the emergency siren/foghorn that activates an emergency evacuation on the site. The Site Supervisor/Construction Manager must proceed to the assembly point if the emergency poses any significant threat to their welfare and if there are no injured personnel at the scene that require assistance. The Site Supervisor/Construction Manager will be required to use their own discretion at that point. In the case of fire, the emergency evacuation of the site should proceed, without exception. The site evacuation procedure is outlined in Section 6.1.3.
- Make safe the area if possible and ensure that there is no identifiable risk exists with regard to dealing with the situation e.g., if a machine has turned over, ensure that it is in a safe position so as not to endanger others before assisting the injured.
- Contact the required emergency services or delegate the task to someone. If delegating the task, ensure that the procedures for contacting the emergency services as set out in Section 6.3 is followed.
- Take any further steps that are deemed necessary to make safe or contain the emergency incident e.g., cordon off an area where an incident associated with electrical issues has occurred.

- Contact any regulatory body or service provider as required, e.g., ESB Networks, the numbers for which are provided in Section 6.3.
- Contact the next of kin of any injured personnel where appropriate.

6.1.3 Site Evacuation/Fire Drill

A site evacuation/fire drill procedure will provide basis for carrying out the immediate evacuation of all site personnel in the event of an emergency. The following steps will be taken:

- Notification of the emergency situation. Provision of a siren or foghorn to notify all personnel of an emergency situation.
- An assembly point will be designated in the construction compound area and will be marked with a sign. All site personnel will assemble at this point.
- A roll call will be carried out by the Site Security Officer to account for all personnel on site.
- The Site Security Officer will inform the Site Supervisor/Construction Manager when all personnel have been accounted for. The Site Supervisor/Construction Manager will decide the next course of action, which be determined by the situation that exists at that time and will advise all personnel accordingly.

All personnel will be made aware of the evacuation procedure during site induction. The Fire Services Acts of 1981 and 2003 require the holding of fire safety evacuation drills at specified intervals and the keeping of records of such drills.

6.1.4 Spill Control Measures

Every effort will be made to prevent an environmental incident during the construction phase of the Proposed Project. Oil/fuel spillages are one of the main environmental risks that will exist on the site which will require an emergency response procedure. The importance of a swift and effective response in the event of such an incident occurring cannot be over emphasised. The following steps provide the procedure to be followed in the event of such an incident:

- Stop the source of the spill and raise the alarm to alert people working in the vicinity of any potential dangers.
- If applicable, eliminate any sources of ignition in the immediate vicinity of the incident.
- Contain the spill using the spill control materials, track mats or other material as required. Do not spread or flush away the spill.
- If possible, cover or bund off any vulnerable areas where appropriate such as drains, watercourses or sensitive habitats.
- If possible, clean up as much as possible using the spill control materials.
- Contain any used spill control material and dispose of used materials appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited.
- Notify the ECoW immediately giving information on the location, type and extent of the spill so that they can take appropriate action.
- The ECoW will inspect the site and will assist by providing any advice possible to ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.
- The Construction Manager will notify the appropriate regulatory body such as Offaly County Council, Inland Fisheries Ireland (IFI), National Parks and Wildlife Service (NPWS), etc. if deemed necessary.

The importance of a swift and effective response in the event of such an incident occurring cannot be over emphasised. Environmental incidents are not limited to just fuel spillages. Therefore, any environmental incident must be investigated in accordance with the following steps.

- The ECoW must be immediately notified.
- If necessary, the Construction Manager will inform the appropriate regulatory authority. The appropriate regulatory authority will depend on the nature of the incident.
- The details of the incident will be recorded on an Environmental Incident Form which will provide information such as the cause, extent, actions and remedial measures used following the incident. The form will also include any recommendations made to avoid reoccurrence of the incident.
- If the incident has impacted on an ecologically sensitive receptor, such as a sensitive habitat, protected species or designated conservation site (pSPA or cSAC), the ECoW will liaise with the Project Ecologist.
- If the incident has impacted on a sensitive receptor such as an archaeological feature the ECoW will liaise with the Project Archaeologist.

A record of all environmental incidents will be kept on file by the ECoW and the Project Contractor. These records will be made available to the relevant authorities such as Offaly County Council, IFI, NPWS, etc. if required. The ECoW will be responsible for any corrective actions required as a result of the incident e.g. an investigative report, formulation of alternative construction methods or environmental sampling, and will advise the Main Contractor as appropriate.

6.2 Contacting the Emergency Services

6.2.1 Emergency Communications Procedure

In the event of requiring the assistance of the emergency services the following steps will be taken:

Stay calm. It is important to take a deep breath and not get excited. Any situation that requires 999/112 is, by definition, an emergency. The dispatcher or call-taker knows that and will try to move things along quickly, but under control.

Know the location of the emergency and the number you are calling from. This may be asked and answered a couple of times but do not get frustrated. Even though many emergency call centres have enhanced capabilities meaning they are able to see your location on the computer screen they are still required to confirm the information. If for some reason you are disconnected, at least emergency crews will know where to go and how to call you back.

Wait for the call-taker to ask questions, then answer clearly and calmly. If you are in danger of assault, the dispatcher or call-taker will still need you to answer quietly, mostly "yes" and "no" questions.

If you reach a recording, listen to what it says. If the recording says your call cannot be completed, hang up and try again. If the recording says all call takers are busy, WAIT. When the next call-taker or dispatcher is available to take the call, it will transfer you.

Let the call-taker guide the conversation. He or she is typing the information into a computer and may seem to be taking forever. There is a good chance, however, that emergency services are already being sent while you are still on the line.

Follow all directions. In some cases, the call-taker will give you directions. Listen carefully, follow each step exactly, and ask for clarification if you do not understand.

Keep your eyes open. You may be asked to describe victims, suspects, vehicles, or other parts of the scene.

Do not hang up the call until directed to do so by the call taker.

In the event of an emergency, it may be necessary to liaise with the emergency services to assist them in locating the site if required. This may involve directing them to a designated meeting point that can be easily identified or accessed. This should form part of the site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable.

6.3 Contact Details

A list of emergency contacts is presented in Table 6-2. A copy of these contacts will be included in the Site Safety Manual and in the site offices and the various site welfare facilities.

Table 6-2 Emergency Contacts

Contact	Telephone no.
Emergency Services – Ambulance, Fire, Gardaí	999/112
Doctor – Ferbane Health Centre	090 645 4916
Hospital – Midland Regional Hospital Tullamore	057 932 1501
ESB Emergency Services	1850 372 999
Garda Síochána – Ferbane Garda Station	090 645 4302
Health and Safety Co-ordinator - Health & Safety Services	TBC
Health and Safety Authority	1890 289 389
Inland Fisheries Ireland (IFI)	1890 347 424
Project Supervisor Construction Stage (PSCS): TBC	TBC
Project Supervisor Design Stage (PSDS): TBC	TBC
Client: Lemanaghan Wind Farm DAC	TBC

6.4 Procedure for Personnel Tracking

All operatives on site without any exception will have to undergo a site induction where they will be required to provide personal contact details which will include contact information for the next of kin.

In the event of a site operative becoming in an emergency situation where serious injury has occurred and hospitalisation has taken place, it will be the responsibility of the Site Manager or next in command if unavailable to contact the next of kin to inform them of the situation that exists.

6.5 Induction Checklist

Table 6-3 provides a list of items highlighted in this ERP which must be included or obtained during the mandatory site induction of all personnel that will work on the site. This will be updated throughout the various stages of the Proposed Project.

Table 6-3 Emergency Response Plan Items Applicable to the Site Induction Process

ERP Items to be included in Site Induction	Status
All personnel will be made aware of the evacuation procedure during site induction	
It may be necessary to liaise with and assist the emergency services on the ground in terms of locating the site. This may involve providing an escort from a designated meeting point that may be located more easily by the emergency services. This should form part of the site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable.	
All operatives on site without any exception will have undergo a site induction where they will be required to provide personal contact details which will include contact information for the next of kin.	

7. MITIGATION PROPOSALS

All mitigation measures relating to the pre-commencement and construction phases of the Proposed Project are set out in the various sections of the Environmental Impact Assessment Report (EIAR), NIS prepared as part of the planning application to An Coimisiún Pleanála.

This section of the CEMP groups together all of the mitigation measures presented in the above documents. The Mitigation Measures are presented in the following pages and are also outlined within Chapter 18: Schedule of Mitigation and Monitoring Measures. Operational and Decommissioning Phase mitigation measures are not included in the table below, however, can be viewed in Chapter 18 of the EIAR and Appendix 4-8 (Decommissioning Plan).

By presenting the mitigation proposals in the below format, it is intended to provide an easy to audit list that can be reviewed and reported on during the future phases of the Proposed Project. The tabular format in which the below information is presented, can be further expanded upon during the course of future project phases to provide a reporting template for site compliance audits.

Table 7-1 Proposed Mitigation Measures

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
EIAR Chapter 4 – Description of the Proposed Project					
Pre-Construction Phase					
MM1	Environmental Management	EIAR Chapter 4	› All proposed activities on the site will be provided for in a Construction and Environmental Management Plan (CEMP). A CEMP has been prepared for the Proposed Project and is included in Appendix 4-4 of this EIAR. › The CEMP includes details of drainage, peat and spoil management, waste management, and clearly outlines the mitigation measures and monitoring proposals that are required to be adhered to in order to comply with the environmental commitments outlined in the EIAR. In the event that planning permission is granted for the Proposed Project, the CEMP will be updated prior to the commencement of the development, to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned, and will be submitted to the Planning Authority for approval.		
MM2	Environmental Management	Appendix 4-4	› The Project Developer will be required to engage an independently and suitably qualified Environmental Engineer, Environmental Scientist, or equivalent, with experience in wind farm construction to fulfil the role of Environmental Clerk of Works (EnvCoW) to oversee the construction works and audit the implementation of the CEMP. The EnvCoW will report to the Project Developer and Project Contractor but will liaise closely with the Construction Manager in relation to the Project Contractor's day-to-day implementation of the CEMP on site. › The EnvCoW will be nominated by the Project Developer to oversee the Project Contractor's effective implementation of the Proposed Project's environmental requirements and obligations, as captured in the CEMP. The EnvCoW will be responsible for monitoring the works of the Project Contractor from an environmental perspective on behalf of the Project Developer. For the sake of expediency, the EnvCoW will report their		

			ongoing audit findings, monitoring results and site observations to both the Project Developer and the Proposed Contractor, having been nominated by the developer to fulfil the role. › The level, detail and frequency of reporting expected from the EnvCoW for the Construction Manager, Developer's Project Manager, and any Authorities or other Agencies, will be agreed by all parties prior to commencement of construction, and may be further adjusted as required during the course of the Proposed Project.		
MM3	Surface Water Quality	Appendix 4-6	› Water quality field testing and laboratory analysis will be undertaken prior to commencement of vegetation removal and construction at the site. › Analysis will be for a range of parameters with relevant regulatory limits along with Environmental Quality Standards (EQSs) and sampling will be undertaken at designated locations as outlined in **Error! Reference source not found.** in Appendix 4-6. › Baseline sampling will be completed on at least two occasions, and these should ideally coincide with low flow and high flow stream conditions. The high flow sampling event will be undertaken after a period of sustained rainfall, and the low flow event will be undertaken after a dry spell.		
MM4	Site Drainage Plan	EIAR Chapter 4 Appendix 4-4 Appendix 4-5 Appendix 4-6	The Project Hydrologist will complete a detailed drainage design and maintenance plan before construction commences and will attend the site to set out and assist with micro-siting of proposed drainage controls as outlined in Section 4.9 in Chapter 4 of the EIAR. The drainage system will be excavated and constructed in conjunction with the road and hard standing construction. The key principles of drainage design that will be implemented and adhered to as part of the Proposed Project are as follows: › Keep clean water clean by intercepting it where possible, upgradient of works areas, and divert it around the works areas for discharge/recharge to ground; › Collect potentially silt-laden runoff from works areas via downgradient collector drains and manage via series of avoidance, source, in-line treatment and discharge to ground via infiltration drains and infiltration areas;		

			› There is no direct hydraulic connectivity from proposed construction areas to natural watercourses or drains connecting to downstream watercourses; › Maintain the existing hydrology/hydrogeology of the site; › Re-routing existing local drainage pathways as required; › Daily inspection and recording of surface water management system by on-site EnvCoW and mediate remedial measures to be carried out as required and works temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the site. Pollution Prevention from Water Discharge will encompass the following: › Water containing silt will not be discharged or pumped directly to any natural watercourse. All discharges will be made over open ground or into existing field drains with silt trap at a minimum of 20m from nearest watercourse unless otherwise stated. › No excavated material will be stored within any surface water buffer zone. › Pumped water will be directed into track side ditches and treated in settlement ponds and vegetation swales prior to overland discharge. › Pumping of clean water from excavations / or over-pumping in drains/ditches/streams will be completed in a manner that will not cause scour or erosion at the point of release/discharge. This will be done by reducing the flow velocities or by use of suitable splash plates, and/or other similar discharge controls		
MM5	Preparative Site Drainage Management	Chapter 4 Appendix 4-4 Appendix 4-6	› All materials and equipment necessary to implement the drainage measures detailed above, will be brought onsite in phases as they are required during the construction phase › A sufficient number of straw bales, clean drainage stone, terram, stakes, etc., will be kept on site at all times to implement the drainage design measures as necessary. The drainage measures detailed in the above will be installed prior to, or at the same time as the works they are intended to drain.		
MM6	Drainage Inspection	Appendix 4-4	› Prior to commencement of works in sub-catchments across the site, main drain inspections will be completed to ensure ditches and streams are free from debris and blockages that		

		Appendix 4-6	may impede drainage. It is proposed to complete these inspections on a catchment-by-catchment basis as the construction works develop across the site, as works in all areas will not commence simultaneously.		
MM7	Watercourse Inspection	EIAR Chapter 4 Appendix 4-4	› Confirmatory inspections of the proposed watercourse crossing locations will be carried out by the Project Civil/Structural Engineer and the Project Hydrologist prior to the construction of the crossing.		
MM8	Drainage Maintenance	Chapter 4 Appendix 4-4 Appendix 4-6	› An inspection and maintenance plan for the on-site drainage system will be prepared in advance of commencement of any works. Daily visual inspections of drains and outfalls will also be performed during the construction period to ensure suspended solids are not entering streams and rivers on site, to identify any obstructions to channels and to allow appropriate maintenance of the drainage regime. Should the suspended solids levels measured during construction be higher than the existing levels, the source will be identified, and additional mitigation measures implemented. › Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. › For this reason, the drainage measures installed on-site should be inspected at least weekly by the contractor and maintained as required during the construction phase of the Proposed Project to ensure good performance. › During the construction phase, all runoff from works areas (i.e., dirty water) will be attenuated and treated prior to being released within the Proposed Project site. All drainage outfall from the Proposed Project site is routed through existing settlement ponds that remain in situ from the previous site use.		
MM9	Earthworks	Appendix 4-6	› Avoid physical damage (river/stream banks and river/stream beds) to watercourses and associated release of sediment; › Avoid excavations within close proximity to surface watercourses; › Avoid the entry of suspended sediment from earthworks into watercourses; and,		

			› Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone.		
MM11	Vegetation Removal	Chapter 4, 9 Appendix 4-4 Appendix 4-6	› The felling will be completed primarily by hand in order to limit disturbance; › If machinery is required, works will be undertaken using machinery which are most suitable for the ground conditions and which will minimise soil disturbance; › Where possible, trees will be felled away from drains to prevent the unnecessary deposition of peat or brash into the bog drains; › Where machinery is required, brash/bog mats will be used to protect the peat surface and reduce erosion; › Silt fences will be installed downgradient of the works to intercept potentially silt laden runoff; and, › Works will be completed during periods of low rainfall. Before the commencement of any vegetation removal works, an EnvCoW shall be appointed to oversee the keyhole and extraction works. The EnvCoW shall be experienced and competent, and shall have the following functions as proposed in the planning application: › Attend the site for the setup period when drainage protection works are being installed and be present on site during the remainder of the forestry keyhole felling works; › Prior to the commencement of works, review and agree the positioning by the Operator of the required Aquatic Buffer Zones (ABZs), silt traps, silt fencing (see below), water crossings and onsite storage facilities for fuel, oil and chemicals (see further below); › Be responsible for preparing and delivering the Environmental Toolbox Talk (TBT) to all relevant parties involved in site operations, prior to the commencement of the works. › Conduct daily and weekly inspections of all water protection measures and visually assess their integrity and effectiveness in accordance with the proposals outlined in Section 4.2 of the CEMP (Appendix 4-4);		

			› Take representative photographs showing the progress of operation onsite, and the integrity and effectiveness of the water protection measures; › Collect water samples for analysis by a 3rd party accredited laboratory, adhering to the following requirements: › Surface water samples shall be collected upstream and downstream of the keyhole felling site at suitable sampling locations; › Sampling shall be taken from the stream/riverbank, with no in-stream access permitted; › The following minimum analytical suite shall be used: potential of Hydrogen (pH), Emulsifiable Concentrate (EC), Total Suspended Solids (TSS), Biochemical Oxygen Demand (BOD), Total Phosphorus (Total P), Orthophosphate (Ortho-P), Total Nitrogen (Total N), and Ammonia; › Review of operator's records for plant inspections, evidence of contamination and leaks, and drainage checks made after extreme weather conditions; › Prepare and maintain a contingency plan; › Suspend work where potential risk to water from siltation and pollution is identified, or where operational methods and mitigation measures are not specified or agreed; and › Prepare and maintain a Water Protection Measure Register. This document is to be updated weekly by the EnvCoW.		
MM12	Traffic Management	EIAR Chapter 4, 15 Appendix 4-4 Appendix 15-2	› A detailed Traffic Management Plan (TMP), incorporating all the mitigation measures set out within the CEMP along with Chapter 15 of the EIAR, will be finalised and detailed provisions in respect of traffic management agreed with the roads authority and An Garda Síochána prior to construction works commencing on-site. › Prior to the TMP being finalised, a full dry run of the transport operation along the potential routes will be completed using vehicles with attachments to simulate the dimensions of the wind turbine transportation vehicles. This dry run will inform the TMP for agreement with the relevant Authorities.		

MM13	Peat and Spoil Management	EIAR Chapter 4, 8 Appendix 4-3 Appendix 4-4 Appendix 4-6	› An interceptor drain will be installed upslope of the designated peat deposition areas to divert any surface water away from these areas. This will reduce the likelihood of debris run-off. › An interceptor drain shall also be installed upslope of the borrow pit. This drain will divert any surface water away from the borrow pit and hence prevent water from ponding and lodging during construction and also when reinstated. › The surface of the placed peat and spoil shall be shaped to allow efficient run-off of surface water from the placed arisings. All the recommendations/best practice guidelines for the placement of peat and spoil in identified peat deposition areas, the proposed onsite borrow pits and alongside access roads will be confirmed by the Geotechnical Engineer prior to construction.		
MM14	Proposed Internal Cabling Works	EIAR Chapter 4 Appendix 4-4 Appendix 4-6	› To efficiently control drainage runoff from cable trench works areas, excavated material is stored on the up-gradient side of the trench and is temporarily sealed/smoothed over, using the back of the excavator bucket. › Should any rainfall cause runoff from the excavated material, the material is therefore collected and contained in the downgradient cable trench. Excess subsoil is removed from the cable trench works area immediately upon excavation, and in the case of the Proposed Project, would be transported to one of the on-site borrow pit storage areas or used for landscaping and reinstatements of other areas elsewhere onsite.		
MM15	Waste Management	EIAR Chapter 4 Appendix 4-4	› Prior to the commencement of the development, a Construction Waste Manager will be appointed by the Contractor. The Construction Waste Manager will be in charge of the implementation of the objectives of the Resource Waste Management Plan (RWMP), ensuring that all hired waste contractors have the necessary authorisations and that the waste management hierarchy is adhered to. The person nominated must have sufficient authority so that they can ensure everyone working on the development adheres to the management plan.		
Construction Phase					

MM16	Refuelling	EIAR Chapter 4, 8, 9 Appendix 4-4 Appendix 4-5 Appendix 4-6	› Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Where possible, off-site refuelling will occur at a controlled fuelling station; › On-site re-fuelling will be undertaken using a double skinned bowser or a refuelling truck with spill kits kept onboard; › Only designated trained operatives will be authorised to refuel plant on-site; › Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system; › All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area; › Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage; › The proposed onsite 220kV will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; › The plant used during construction will be regularly inspected for leaks and fitness for purpose; and, › An emergency response plan for the construction phase to deal with accidental spillages is contained within the Section 6.1.4 of this CEMP.		
MM17	Concrete Based Products Deliveries and Management	EIAR Chapter 4, 9 Appendix 4-4	› No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place; › Where possible pre-cast elements for culverts and concrete works will be used; › No washing out of any plant used in concrete transport or concreting operations will be allowed on-site; › Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be isolated in temporary lined wash-out pits located near		

			proposed site compounds. These temporary lined wash-out pits will be removed from the site at the end of the construction phase; › Any washing out of concrete pumping plant will also be into the temporary lined wash-out pits; › Will use weather forecasting to plan dry days for pouring concrete; and, › Will ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.		
MM18	Concrete Pouring	EIAR Chapter 4, 9 Appendix 4-6 Appendix 4-4 Appendix 4-5	› 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 (including drains and ditches) while placing concrete. › Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets. › Ensuring that covers are available, and used, when necessary, for freshly placed concrete to avoid the surface washing away in heavy rain. › The small volume of water that will be generated from washing of the concrete truck's chute will be directed into a temporary, lined, impermeable containment area, or a Siltbuster-type concrete wash unit or equivalent. › Surplus concrete after completion of a pour will be taken off-site and disposed of at an appropriately authorised facility. › Concrete pours will be managed and supervised to ensure there will be no leakage/seepage/discharge of concrete or concrete water during the construction phase. › Concrete wash water, and waste concrete will be managed appropriately on site at a lined concrete wash out pit(s).		
MM19	Road Cleanliness	EIAR Chapter 4 Appendix 4-4	› Internal access roads will already be constructed before other road-going trucks begin to make regular or frequent deliveries to the site (e.g., with steel or concrete). The internal access roads will comprise granular fill, and so the public road-going vehicles will not be travelling over soft or muddy ground where they might pick up mud or dirt. › The contractor will be responsible for ensuring that all vehicles egressing the site have used the wheel wash facilities. However, a road sweeper will be made available by the		

			contractor for the cleaning of public roads in the event that they are dirtied by trucks associated with the Proposed Project site		
MM20	Watercourse Buffers	EIAR Chapter 4, 9 Appendix 4-4 Appendix 4-6	› Buffer zones around the existing natural drainage features have been used to inform the layout of the Proposed Project.		
MM21	Water Discharge	EIAR Chapter 4 Appendix 4-4 Appendix 4-5 Appendix 4-6	› There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flows. All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses. › All discharges will be made over open ground or into existing field drains with silt trap at a minimum of 20m from nearest watercourse unless otherwise stated. › Dewatering silt bags are also used where water is pumped temporarily from excavations (e.g., turbine bases). Water is pumped into the silt bags, and then arising discharge is filtered through the silt bag fabric and flows into local collector drains. › No excavated material will be stored within any surface water buffer zone. › Pumped water will be directed into track side ditches and treated in settlement ponds and vegetation swales prior to overland discharge. › Pumping of clean water from excavations / or over-pumping in drains/ditches/streams will be completed in a manner that will not cause scour or erosion at the point of release/discharge. This will be done by reducing the flow velocities or by use of suitable splash plates, and/or other similar discharge controls. › Collect potentially silt-laden runoff from works areas via downgradient collector drains and manage via series of avoidance, source, in-line treatment and discharge to ground via infiltration drains and infiltration areas.		

			› Pumping of clean water from excavations / or over-pumping in drains/ditches/streams will be completed in a manner that will not cause scour or erosion at the point of release/discharge. This will be done by reducing the flow velocities or by use of suitable splash plates, and/or other similar discharge controls.		
MM22	Wastewater Management	EIAR Chapter 4	› During the construction phase, a temporary toilet block unit will be located within the temporary construction compound for use during the construction phase. Elsewhere on site, self-contained port-a-loo with an integrated waste holding tank will be used on site for toilet facilities. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by an appropriately consented waste collector to wastewater treatment plants, and; › The water supply to the site will be from a temporary water storage tank which will be filled using a mobile water tank which will source water locally as required.		
MM23	Collector Drains	EIAR Chapter 4 Appendix 4-4	› Collector drains will be installed downgradient of the main works areas to collect surface flow runoff where it might have come into contact with exposed surfaces and collected silt and sediment. Swales will intercept the potentially silt-laden water from the excavations and construction areas of the site and prevent it reaching natural watercourses. › Collector drains will be installed in advance of any main construction works commencing. The material excavated to make the swale will be compacted on the downslope edge of the drain to form a diversion dike.		
MM24	Interceptor Drains	EIAR Chapter 4, 9 Appendix 4-6	› Interceptor drains will be installed upgradient of any works areas to collect surface flow runoff and prevent it reaching excavations and construction areas of the site where it might otherwise have come into contact with exposed surfaces and collected silt and sediment. The drains will be used to divert upslope runoff around the works area to a location where it can be redistributed over the ground surface as sheet flow. › Where required, interceptor drains will be installed in advance of any construction works commencing.		
MM25	Check Dams	EIAR Chapter 4	› The velocity of flow in the interceptor will be controlled by check dams, which will be installed at regular intervals along the drains to ensure flow in the channel is non-erosive.		

		Appendix 4-5 Appendix 4-6	On steeper sections where erosion risks are greater, a geotextile membrane will be added to the channel. › Use of existing field drains or track side swales with check dams, and/or filtration check dams will reduce silt in runoff water as required › Check damns to be inspected and cleaned regularly clean stone flow control check dams to be made of locally won / geologically similar well graded stone. Aggregate size for stone check dams to be typically 20- 40mm clean stone. On sloping sections of the access tracks, 40mm check dams to be protected from washing away through the placement of 100m stone on the downhill face of the check dam and by wrapping in geotextile. › Build up of silt levels at check dams to be removed and disposed of appropriately. Silt levels at check dams to be visually inspected as part of an ongoing drainage maintenance programme during the construction phase. Where check dams become clogged with silt or vegetation, stone check dam to be removed and replaced subsequent to the removal of silt. › Spacing and frequency of check dams / silt traps will be dependent upon longitudinal gradient of swale. › Location of filtration check dams /silt traps to be agreed on site with Engineer. Settlement ponds to be constructed in a manner where they may be easily infilled at a later date (post completion of the turbine base and hardstand construction). Only suitable materials excavated from the pond to be used to form part of the embankment around the pond		
MM26	Peat Ditch Silt Traps	EIAR Chapter 4 Appendix 4-6	› Silt traps will be installed in field drains downstream of drainage outfalls from works areas. › The peat ditch silt traps will be constructed using stacked timber logs, or marine plywood. These can also be covered in geotextile to enhance filtration.		
MM27	Vegetation Filters	EIAR Chapter 4 Appendix 4-6	› All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses.		

MM28	Settlement Ponds	EIAR Chapter 4 Appendix 4-6	› Settlement ponds will be used to attenuate runoff from main works areas (i.e., from turbine base/hardstand areas, construction compounds, and the substation) of the site during the construction phase. › Settlement ponds will be located towards the end of collector drains, close to where the treated water will be discharged to field drains/main drains. › During the construction phase, a water level indicator such as a staff gauge will be installed in each settlement ponds with marks to identify when sediment is at 10% of the settlement ponds capacity. Sediment will be cleaned out of the still pond if it exceeds 10% of pond capacity. Settlement ponds will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and other issues that might interfere with flows.		
MM29	Silt Bags	EIAR Chapter 4 Appendix 4-6	› Dewatering silt bags allow the flow of water through them while trapping any silt or sediment suspended in the water. The silt bags provide a passive non-mechanical method of removing any remaining silt contained in the potentially silt-laden water collected from works areas within the site. › Dewatering silt bags can also be used as an additional filtration measure downgradient of settlement ponds, wherever it is deemed appropriate, throughout the site. The water will flow, via a pipe, from the settlement ponds into the silt bag. The silt bag will allow the water to flow through the geotextile fabric and will trap any of the finer silt and sediment remaining in the water after it has gone through the previous drainage measures. The dewatering silt bags will ensure that there will be no loss of peaty silt into any field drain/main drain.		
MM30	Siltbuster	Chapter 4 Appendix 4-6	› A “siltbuster” or similar equivalent piece of equipment will be available to filter any water pumped out of excavation areas, if necessary, prior to its discharge to settlement ponds or swales. › The unit stills the incoming water/solids mix and routes it upwards between a set of inclined plates for separation. Fine particles settle onto the plates and slide down to the base for collection, whilst treated water flows to an outlet weir after passing below a scum board to retain any floating material. The inclined plates dramatically increase the effective settling area of the unit giving it a very small footprint on site and making it highly mobile.		

MM31	Over-The-Edge Drainage	Chapter 4 Appendix 4-6	› OTE drainage allows runoff from access tracks to flow into local field drains and be managed via the existing site drainage system. OTE drainage will only occur where topography allows, and it is only proposed in areas of low risk and remote from outfall locations (at least 150m from bog outfall locations). › Silt traps and check dams will be installed in field drains downstream of OTE drainage areas, and these measures will provide attenuation and treatment of any arising dirty water.		
MM32	Clear Span Watercourse Crossings	EIAR Chapter 4 Appendix 4-4 Appendix 4-6	It is proposed to construct a clear-span watercourse crossing along the site access roads at 2 no. locations using a clear-span bridge. The locations of these crossings are shown on the layout drawings included in Appendix 4-1 to Chapter 4 of the EIAR. The standard construction methodology for the installation of a clear-span bridge watercourse crossing is as follows: 1. *Silt fencing is to be erected at run-off areas adjacent to the works area.* 2. *Oil booms are to be established both upstream and downstream of the works. Spill kits are required on both banks of the stream and are to include oil-only absorbent booms.* 3. *Area to be Cable-Avoidance Tool (CAT) scanned for any potential existing services. Any possible services are to be marked and identified.* 4. *The culvert location will be set out by the Site Engineer.* 5. *Life Buoys and spill kits will be positioned at prominent locations adjacent the works.* 6. *Excavation will commence using an excavator, reducing ground levels at the existing crossing to expose the existing pipe. Spoil arising from the works will be sidecast and/or transported to the peat deposition area.* 7. *Flows will be plugged temporarily to allow installation of clay bunds and removal and replacement of the pipe. Dependent on flows, over-pumping may be necessary for a time to allow temporary bunding of the works area both upstream and downstream and directing of flows towards the pipe.* 8. *Where over-pumping is necessary, a 4" pump will be utilized using a shallow sump to discharge downstream. The downstream end is to discharge on a*		

			plywood sheet or similar placed at an angle on the embankment to prevent scour to the river bed and utilize the vegetation to dissipate flows. 9. *Clay bunds will be formed across the stream, both upstream and downstream beyond the extent of the required foundations. Channels will be excavated across the stream with any river bed gravels set aside for future reinstatement of the culvert bed. Clay bunds will then be constructed, integrating the pipe both upstream and downstream.* 10. *The pipe will extend beyond the bund and graded out to both inlet and outlet utilizing any available gravel as a temporary bed in proximity to the pipe.* 11. *The bunds both upstream and downstream will extend to the embankments on either side enclosing the works area. Rock armour will be installed if necessary both upstream and downstream to protect the pipe from undermining.* 12. *Excavation will proceed adjacent to the existing pipe benching down to formation whilst maintaining the existing pipe in place. Inspections and testing if required will be carried out to confirm suitable bearing capacity.* 13. *Sumps consisting of vertical pipes surrounded with clean stone will be installed within the excavations to direct any water ingress and allow dewatering of the works area.* 14. *Water will be pumped through hoses to a settlement tank to discharge through a silt sock prior to reaching the existing field drainage system.* 15. *Over-pumping arrangements will be put in place with flows directed downstream.* 16. *The existing pipes will be removed whilst maintaining the bunds.* 17. *Existing stream bed will be maintained.* 18. *New drainage pipes will be laid at the existing fall. New drainage stone Cl. 505 or similar will be used as a surround around the new pipes.* 19. *Excavation will be backed filled and compacted in layers up to the required level.* 20. *All areas adjacent to the works will be reinstated.* A constraint/buffer zone will be maintained for all crossing locations where possible. In addition, measures which are outlined below will be implemented to ensure that silt laden or		

			contaminated surface water runoff from the excavation work does not discharge directly to the watercourse.		
MM33	Culvert Crossing	EIAR Chapter 4, 9. Appendix 4-4	› All new proposed culverts and proposed culvert upgrades at field drain crossings required for the Proposed Wind Farm will be suitably sized for the expected peak flows in the watercourse. Some culverts may be installed to manage drainage waters from works areas of the Proposed Wind Farm, particularly where the waters must be taken from one side of an existing roadway to the other for discharge. The size of culverts will be influenced by the depth of the track or road sub-base but will have a minimum 900mm diameter. In all cases, culverts will be oversized to allow mammals to pass through the culvert. › Culverts will be installed with a minimum internal gradient of 1% (1 in 100). Smaller culverts will have a smooth internal surface. Larger culverts may have corrugated surfaces which will trap silt and contribute to the stream ecosystem. Depending on the management of water on the downstream side of the culvert, large stone may be used to interrupt the flow of water. This will help dissipate its energy and help prevent problems of erosion. Smaller water crossings will simply consist of an appropriately sized pipe buried in the sub-base of the road at the necessary invert level to ensure ponding or pooling does not occur above or below the culvert and water can continue to flow as necessary. › All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance.		
MM34	Silt Fences	EIAR Chapter 4 Appendix 4-4	› Silt fences will be installed as an additional water protection measure around existing watercourses in certain locations, particularly where works are proposed within the 50m buffer zone of a stream. Installation locations will be confirmed during the finalisation of detailed drainage design following a pre-construction survey by the appointed contractor. › Silt fences will be installed as single, double or a series of triple-silt fences, depending on the space available and the anticipated sediment loading. The silt fence designs follow the technical guidance document *'Control of Water Pollution from Linear Construction Projects'* published by CIRIA (No. C648, 2006).Silt fence material will comprise Terrastop™ Premium material, and silt fences will be installed per the manufacturer's guidelines. Silt fences will be inspected on a regular basis to ensure that they are operating effectively.		

MM35	Sedimats	EIAR Chapter 4	› Sediment entrapment mats, consisting of coir or jute matting, will be placed at the outlet of the silt bag to provide further treatment of the water outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure.		
MM36	Internal Cabling Trench	EIAR Chapter 4 Appendix 4-4	› Cable trenches are proposed to be constructed in short, controlled sections, thereby minimising the amount of ground disturbed at any one time and minimising the potential for drainage runoff to pick up silt or suspended solids. Each short section of trench is excavated, ducting installed and bedded, and backfilled with the appropriate materials, before work on the next section commences. This operation normally occurs over a period of 2-4 hours. › To efficiently control drainage runoff from cable trench works areas, excavated material is stored on the up-gradient side of the trench and is temporarily sealed/smoothed over, using the back of the excavator bucket. Should any rainfall cause runoff from the excavated material, the material is therefore collected and contained in the downgradient cable trench. › Excess subsoil is removed from the cable trench works area immediately upon excavation, and in the case of the Proposed Project, would be transported to one of the on-site borrow pit storage areas or used for landscaping and reinstatements of other areas elsewhere onsite. › Any underground services encountered along the internal cabling trench where it is located within the public road corridor (i.e., the L7002 crossing) will be surveyed for level and the ducting will pass over the service provided adequate cover is available. › A minimum clearance of 300 mm will be required between the bottom of the ducts and the service in question. If the clearance cannot be achieved the ducting will pass under the service and again 300 mm clearance between the top of the communications duct and bottom of the service will be achieved. In deeper excavations an additional layer of marker tape will be installed between the communications duct and top-level yellow marker tape. › If the required separation distances cannot be achieved then a number of alternative options are available such as using steel plates laid across the width of the trench and using 35N concrete surrounding the proposed ducting, with marker tape on the side of the		

			trench. Back fill around any utility services will be with dead sand/pea shingle where appropriate.		
MM37	Turbine/Met Mast Foundation Excavations	EIAR Chapter 4 Appendix 4-4	› The extent of the excavation will be marked out and will include an allowance for trimming the sides of the excavation to provide a safe working area and slope batter; › Where practical, the soil will be stripped over the area of the excavation and stored locally for reuse, the subsoil will be excavated and stored to one side for reuse during the landscaping around the finished turbine; › No material will be removed from the Proposed Wind Farm with excavated peat and spoil being transported to the identified peat and spoil management areas within the site. › All groundwater and surface water arising from turbine base excavation will be pumped to the dirty water system prior to discharge from the works area; › Soil excavation shall be observed by a qualified archaeologist in accordance with a scheme of archaeological monitoring to identify any significant remains as they come to light; › The foundations excavation will be raised to formation level by compacted layers of well graded granular material will be spread and compacted to provide a hard area for the turbine foundation.		
MM38	Peat and Spoil Management	Appendix 4-3 Appendix 4-4 Appendix 8-1	As identified in the Peat and Spoil Management Plan (Appendix 4-3), the following recommendations/best practice guidelines for the placement of peat alongside the proposed infrastructure elements should be considered and taken into account during construction: › All excavated peat will be placed/spread alongside the proposed infrastructure elements on site, where possible. › The peat placed adjacent to the proposed infrastructure elements should be restricted to a maximum height of 1.5m over a 10m wide corridor on both sides of the proposed infrastructure elements. It should be noted that the designer should define/confirm the maximum restricted height for the placed peat. › The placement of excavated peat and spoil is to be avoided without first establishing the adequacy of the ground to support the load. The placement of peat within the placement areas will likely require the use of long reach excavators, low ground pressure machinery and possibly bog mats in particular for drainage works.		

			› Where there is any doubt as to the stability of the peat surface then no material shall be placed on to the peat surface. The risk of peat instability is reduced by not placing any loading onto the peat surface. › The surface of the placed peat will be shaped to allow efficient run-off of surface water. Where possible, shaping of the surface of the peat should be carried out as placement of peat within the placement area progresses. This will reduce the likelihood of debris run-off and ensure stability of the placed peat. › Finished/shaped side slopes in the placed peat shall be not greater than 1 (v): 3 (h). This slope inclination will be reviewed during construction, as appropriate. Where areas of weaker peat and spoil are encountered then slacker slopes will be required. › The acrotelm (if encountered) shall be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the placed peat within the placement areas. › Movement monitoring instrumentation may be required adjacent to the internal road where peat has been placed. The locations where monitoring is required will be identified by the designer onsite. › An interceptor drain will be installed upslope of the designated peat placement areas to divert any surface water away from these areas. This will reduce the likelihood of debris run-off. › All the above-mentioned general guidelines and requirements should be confirmed by the designer prior to construction. › To minimise the risk of construction activity causing potential peat instability the Construction Method Statements (CMSs) for the project will take into account, but not be limited, to the recommendations above. This will ensure that best practice guidance regarding the management of peat stability will be inherent in the construction phase.		
MM39	Temporary Construction Compound	EIAR Chapter 4 Appendix 4-4	› Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by an appropriately consented waste collector to wastewater treatment plants site. The water supply to the site will be from a temporary water storage tank which will be filled using a mobile water tank which will source water locally as required.		

			› The area to be used as the compound will be marked out at the corners using ranging rods or timber posts. Drainage runs, and associated settlement ponds will be installed around the perimeter; › The proposed 5 no. temporary construction compounds will consist of: bunded refuelling and containment area for the storage of lubricants, oils, and site generators, etc., full retention oil interceptor, storage area (including waste and recycling areas), temporary site offices, staff facilities, and car-parking areas for staff and visitors. › If necessary, the compound will be fenced and secured with locked gates, although fencing would only be utilised where significant risk of danger to third parties or vandalism is envisaged.		
EIAR Chapter 5: Population and Human Health					
Pre-construction Phase					
MM45	Human Health	EIAR Chapter 5	› Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made known. Local access to properties will also be maintained throughout any construction works and local residents will be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum.		
MM46	Traffic and Transport	EIAR Chapter 5	A Traffic Management Plan (TMP) has been developed in order to minimise any potential effect on the local population during the construction phase of the Proposed Project due to traffic.		
Construction Phase					
MM47	Human Health	EIAR Chapter 5 Appendix 4-4	The Proposed Project will be constructed in accordance with all relevant Health and Safety Legislation, including: › Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005); › Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2016 (S.I. No. 36 of 2016);		

			› S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021 and › Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2023. The following mitigation measures are detailed below: › 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 contractor will be obliged under the construction contract and current health and safety legislation to adequately provide for all hazards and risks associated with the construction phase of the project. SafePass registration cards are required for all construction, delivery and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme card where required. The developer is required to ensure a competent contractor is appointed to carry out the construction works. The contractor will be responsible for the implementation of procedures outlined in the Safety and Health Plan. Public safety will be addressed by restricting site access during construction. Fencing will be erected in areas of the site where uncontrolled access is not permitted. › Appropriate warning signs will be posted, directing all visitors to the site manager. Appropriate warning measures including 'goalposts' will be used as appropriate to prevent contact with any overheads lines that traverse the site. › Goal posts will be established, where necessary, under overhead electricity lines for the entirety of the construction phase of the Proposed Project. › The suitability of machinery and equipment for use near power lines will be risk assessed. › All staff will be trained on operating voltages of overhead electricity lines running over the site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the site are made aware of the location of lines before they come on to site. › Barriers will run parallel to the overhead line at a minimum horizontal distance of 6 metres on plan from the nearest overhead line conductor wire.		

			› When activities must be carried out beneath overhead lines, e.g., component delivery or substation construction, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are required. › Information on safe clearances will be provided to all staff and visitors. › Signage indicating locations and health and safety measures regarding overhead lines will be erected in canteens and onsite. › All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2013 to 2021"' This will encompass the use of all necessary Personal Protective Equipment and adherence to the Site Health and Safety Plan. The scale and scope of the project necessitates that a Project Supervisor Design Process (PSDP) and Project Supervisor Construction Stage (PSCS) are required to be appointed in accordance with the provisions of the Health & Safety Authority's *'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013'*. The PSDP appointed for the construction stage shall be required to perform his/her duties as prescribed in the Safety, Health and Welfare at Work (Construction) Regulations. These duties include (but are not limited to): › Identify hazards arising from the design or from the technical, organisational, planning or time related aspects of the project; › Where possible, eliminate the hazards or reduce the risks; › Communicate necessary control measures, design assumptions or remaining risks to the PSCS so they can be dealt with in the Safety and Health Plan; › Ensure that the work of designers is coordinated to ensure safety; › Organise co-operation between designers; › Prepare a written Safety and Health Plan; › Prepare a safety file for the completed structure and give it to the client; and		

			› Notify the Authority and the client of non-compliance with any written directions issued. The PSCS appointed for the construction stage shall be required to perform his/her duties as prescribed in the Safety, Health and Welfare at Work (Construction) Regulations. These duties include (but are not limited to): › Development of the Safety and Health Plan for the construction stage, with updating where required as work progresses; › Compile and develop safety file information. › Reporting of accidents / incidents; › Weekly Site meeting with PSCS; › Coordinate arrangements for checking the implementation of safe working procedures. › Ensure that the following are being carried out: › Induction of all site staff including any new staff enlisted for the project from time to time; › Toolbox talks as necessary; › Maintenance of a file which lists personnel on site, their name, nationality, current Safe Pass number, current Construction Skills Certification Scheme (CSCS) card (where relevant) and induction date; › Report on site activities to include but not limited to information on accidents and incidents, disciplinary action taken and PPE compliance; › Monitor the compliance of contractors and others and take corrective action where necessary; and › Notify the Authority and the client of non-compliance with any written directions issued.		
MM48	Air Quality: Dust Emissions	EIAR Chapter 5, 10 Appendix 4-4	› A wheel wash facility will be installed on the Proposed Wind Farm at all proposed construction site entrance and will be used by vehicles before leaving the site. › Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads, site roads, grid route, road widening sections, substation, and construction compounds and around the borrow pit area to ensure dust does not cause a nuisance. › If necessary, such as during periods of dry weather, de-silted water will be taken from settlement ponds in the site's drainage system and will be pumped into a bowser or water		

			spreader to dampen down haul roads, turbine bases, borrow pit and site compounds to prevent the generation of dust where required. › Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff as outlined in the CEMP. › Areas of excavation will be kept to a minimum and stockpiling of excavated material will be minimised by coordinating excavation, placement of material in peat placement areas and restoration of borrow pits. › Turbines components, construction materials and grid connection infrastructure will be transported to the site on specified haul routes only, as agreed with the local authority. › The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as deemed necessary by the construction Site Supervisor/Site Manager. › The transport of construction materials may have the potential to generate dust in dry weather conditions. Roads will be watered down to suppress dust particles in the air as deemed necessary by the Site Supervisor/Manager. › The transport of dry excavated material from the on-site borrow pits, which may have potential to generate dust will be minimised. If necessary, such as in periods of dry weather, excavated material will be dampened prior to transport from the borrow pits. › Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. › The MRF facility will be local to the site to reduce dust emissions associated with vehicle movements. The nearest licensed waste facility is located approximately 19.4km southeast of the Proposed Project site › A CEMP will be in place throughout the construction phase (see Appendix 4-4). The CEMP includes dust suppression measures.		
MM49	Air Quality: Exhaust Emissions	EIAR Chapter 5, 10	› All construction vehicles and plant used during construction will be maintained in good operational order while onsite. If any vehicle requires repair, this work will be carried out, thereby minimising any emissions that arise. › Turbines components will be transported to the site on specified routes only, unless otherwise agreed with the Planning Authority. › All machinery will be switched off when not in use.		

			› Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required. › The majority of aggregate materials for the construction of the Proposed Project will be obtained from the borrow pits on site. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the amount of emissions associated with vehicle movements. › The expected waste volumes generated onsite are unlikely to be large enough to warrant source segregation at the site. Therefore, all wastes streams generated onsite will be deposited into a single waste skip which will be covered. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The Materials Recovery Facility (MRF) will be local to the Proposed Project site to reduce the amount of exhaust emissions associated with vehicle movements. The nearest licensed waste facility is located approximately 19.4km southeast of the Proposed Project site. › A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-4). The CEMP includes measures to reduce exhaust emissions.		
MM50	Climate	Chapter 5, 11	› Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required. › All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise. › When stationary, delivery and on-site vehicles will be required to turn off engines. › Turbines and construction materials will be transported to the site on specified routes only unless otherwise agreed with the Planning Authority. Please see Section 15.1.6 of Chapter 15 Material Assets for details. › It is intended to obtain the majority of materials for the construction of the Proposed Project from the proposed onsite borrow pits, with some material being imported from		

			local licenced quarries as needed. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the emissions associated with vehicle movements. › A CEMP (Appendix 4-4) will be in place throughout the construction phase. › The CEMP (Appendix 4-4) includes a Resource Waste Management Plant (RWMP) which outlines the best practice procedures that will occur during the construction phase relating to waste material. › The RWMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Project. Disposal of waste will be seen as a last resort. › Section 4.5.7 of Chapter 4 for this EIAR refers to the methodology that will be utilised to manage onsite waste. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor. › The MRF facility will be local to the Proposed Project site to reduce the amount of emissions associated with vehicle movements. Derryclure Civic Amenity Site is the closest MRF to the Proposed Project and is approximately 19.4km southeast of the Proposed Wind Farm. › Where applicable, low carbon intensive construction materials will be sourced and utilised onsite.		
MM51	Noise and Vibration	Chapter 5, 12 Appendix 4-4	The contract documents will specify that the Contractor undertaking the construction works will be obliged to adopt best practice noise abatement measures contained in British Standard BS 5228-1:2009+A1:2014 '*Code of practice for noise and vibration control on construction and open sites – Noise*' and BS 5228-2:2009+A1:2014 '*Code of practice for noise and vibration control on construction and open sites – Vibration'* The following proposed measures to control noise will be implemented in full: › 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 residents;		

			› Monitoring typical levels of noise and vibration during critical periods and at sensitive locations; › Selection of plant with low inherent potential for generation of noise and/ or vibration where practical; › Placing of noise generating / vibratory plant as far away from sensitive properties as practical within the site constraints, and; › The hours of construction activity will be limited to avoid unsociable hours where possible. Works operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Friday and Saturday between 7:00hrs and 13:00hrs. And more specifically: › The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. › 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 outside of general construction hours will be surrounded by an acoustic enclosure or portable screen as appropriate. Where rock breaking is employed in relation to the Proposed Project, the following are examples of measures that will be employed, 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 noise sensitive area; › When possible, line of sight between top of machine and reception point needs to be obscured;		

			› 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 BS5228: Part 1 and the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1988 in relation to blasting operations.		
MM52	Major Accidents and Natural Disasters	EIAR Chapter 5, 8, 9, 16 Appendix 4-4	› The Proposed Project is designed and will be constructed in line with current best practice and, as such, mitigation against the risk of major accidents and/or disasters will be embedded through the design. In accordance with the provision of the European Commission '*Guidance on the preparation of Environmental Impact Assessment Reports*' 2017, a Risk Management Plan will be prepared and implemented on site to ensure an effective response to disasters or the risk of accidents. The plan will include sufficient preparedness and emergency planning measures. › Potential effects associated with contamination during construction are addressed fully in Chapter 8: Land, Soils and Geology and Chapter 9: Water of this EIAR. Potential effects associated with bog fires during construction are addressed within Chapter 16: Major Accidents and Natural Disasters, Additionally, potential effects associated with peat instability is detailed in Chapter 8: Land, Soils and Geology. The mitigation measures outlined therein to protect environmental receptors as well as the procedures and measures described in the CEMP will ensure that the risk from these sources is low. › Upon a grant of planning permission for the Proposed Project, the CEMP will be updated prior to the commencement of the development. The CEMP will be a live document maintained by the contractor that will work to ensure that potential risks of major accident and/or disaster are identified, avoided, and mitigated, as necessary.		

EIAR Chapter 6 Biodiversity					
Pre-construction					
MM61	Invasive Species Management	EIAR Chapter 6 Appendix 4-4	A pre-commencement invasive species survey of the construction footprint will be undertaken by a qualified ecologist to determine if any invasive species have established on the site since the undertaking of the previous surveys. The treatment and control of invasive alien species if recorded will follow guidelines issued by the National Roads Authority – The Management of The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020). No invasive species, listed on the Third Schedule of the S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011, were recorded within the Proposed Project site.		

MM62	Flora and Fauna	EIAR Chapter 6	**Otter** No otter holts were recorded within 150m of any Proposed Project infrastructure within the Proposed Project site. However, it is noted that this is a mobile species and could potentially migrate within the site. As such, prior to the commencement of construction works associated with the installation of watercourse crossings, a pre-commencement otter survey will be undertaken to ensure that no otter holts/breeding sites have been established since the original surveys undertaken (TII, 2008). This will be undertaken by a suitably qualified ecologist in accordance with standard best practice guidance. **Badger** As the usage of the site by badgers can change over time, a pre-construction badger survey of the Proposed Project footprint and adjacent areas will be undertaken and will include the location of the identified sett. This will be undertaken by a qualified ecologist prior to the commencement of any works to determine if the sett is in use and to identify any additional setts or sett entrances that may have been excavated in the intervening period. Any new badger setts will be afforded protection in line with the requirements set out in the TII (2005a) guidance document. An exclusion zone around the identified sett will be maintained for the duration of the construction works. No works will be undertaken within 30m of the sett.		
Construction Phase					
MM63	Surface Watercourses and Sensitive Aquatic Faunal Species	EIAR Chapter 6, 9	A drainage design for the Proposed Project is provided in Section 4.9 of Chapter 4 of this EIAR. This plan provides details of how water quality will be protected during the construction of the Proposed Project. In addition to this, specific mitigation is provided in relation to protection of surface water quality is provided in Chapter 9: Water of this EIAR, see Section 9.5. These mitigations relate to earthworks, vegetation removal, potential release of hydrocarbons during construction and storage, contamination from wastewater disposal, groundwater impacts, flooding impacts, and release of cement-based products.		

MM64	Bats	EIAR Chapter 6 Appendix 6-1 Appendix 6-5	The below describes the best practice and site-specific mitigation measures that are in place to avoid and reduce the potential for significant effects on local bat populations. <u>Noise Restriction</u> During the construction phase, plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001, as amended). <u>Lighting Restriction</u> Where lighting is required, directional lighting will be used to prevent overspill on to woodland/forestry edges. Exterior lighting, during construction and post construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the Proposed Wind Farm, and consequently on bats i.e. Lighting will be directed away from mature trees/treelines around the periphery of the site to minimize disturbance to bats. Directional accessories can be used to direct light away from these features, e.g. through the use of light shields (Stone, 2013). The luminaries will be of the type that prevent upward spillage of light and minimize horizontal spillage away from the intended lands. The proposed lighting around the Proposed Project shall be designed with consideration of the Institute of Lighting Professionals Guidance Note 08/23 Bats and Artificial Lighting at Night (ILP, 2023). In addition, the applicant commits to the use of lights during construction, operation and decommissioning (such that they are necessary) having consideration of the following guidance that is provided in the Dark Sky Ireland Lighting Principles: › All lighting will be justified and used only when required. › Warm colour temperatures will be used to minimise impacts on wildlife and the night sky. › Glare and brightness will be minimised to protect visual comfort. › Luminaires will be angled downward with appropriate beam control to avoid over-lighting. › Lower mounting heights will be used where possible to better contain light.		

			› Lighting will incorporate timers, dimmers, or PIR sensors to reduce energy use and emissions. › Natural areas such as trees, waterbodies, and nesting habitats will not be illuminated. <u>Bat Buffers</u> › In accordance with NatureScot and NIEA Guidance, a minimum 50m buffer to all habitat features used by bats (e.g., hedgerows, tree lines etc.) should be applied to the siting of all wind turbines (See example provided in Plate 7-1 in Appendix 6-1). However, Eurobats No. 6 guidance and NIEA recommends increased buffers of 100m and 200m around woodland/forestry areas, however, there is no scientific evidence to support these increased buffer distances in Ireland or the UK. › NatureScot recommends that a distance of 50m between turbine blade tip and nearest woodland (or other key habitat features) is adequate mitigation. This 50m buffer will be implemented from the outset and monitored as per the post-construction monitoring. The success of the buffer mitigation will be assessed as part of post construction monitoring and updated where necessary.		
MM65	Habitats	EIAR Chapter 6, 9 Appendix 6-5	**Aquatic Habitats** The pathways that would allow potential impacts to occur due to deterioration of water quality were considered in the design of the Proposed Project. The environmental management framework to be adhered to during the construction phase of the Proposed Project includes comprehensive detail regarding site set up, pollution prevention and hydrocarbon management and incorporates mitigating measures as detailed in Chapter 9 Water of the EIAR and in the CEMP in Appendix 4-4 of the EIAR to ensure that there are is no significant effect on water quality or aquatic receptors within or downstream of the Proposed Project. The measures include the use of interceptor drains and collector drains to collect and intercept run-off from construction areas, temporary settlement ponds to attenuate and treat run-off, the use of silt fences between works and watercourses and dewatering silt bags to remove silts from pumped waters. The existing drainage system at the proposed site, which is operating in accordance with IPC licence requirements, with environmental monitoring and silt control		

			measures being implemented, will be maintained and expanded locally as required for use within the Proposed Project drainage system. The measures are outlined in full in Chapter 9. While there will be no requirement for instream works (with the exception of artificial drains), all works adjacent to watercourses, will adhere to Inland Fisheries Ireland (IFI) Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (2016). **Uncut Raised Bog** While the Proposed Project has been deliberately designed to minimise the loss of uncut raised bog within the site, there will be some loss of small areas of highly degraded remnants of this habitat. Construction works associated with the amenity track upgrade will be confined to the defined works footprint, with appropriate controls in place to prevent encroachment into adjoining habitats. Prior to construction activities within or adjacent to this habitat, the works area will be demarcated and fenced off. No drainage works will be undertaken in proximity to raised bog habitat, and construction activities will be implemented in accordance with standard best-practice measures to prevent accidental disturbance or indirect impacts.		
MM66	Flora and Fauna	EIAR Chapter 6	**Otter** The pathways that would allow potential impacts to occur due to deterioration of water quality were considered in the design of the Proposed Project. A detailed drainage maintenance plan for the Proposed Project is provided in Section 4.9 of this EIAR. This plan provides details of how water quality will be protected during the construction of the Proposed Project. In addition to this, specific mitigation is provided in relation to water quality in Chapter 9: Hydrology and Hydrogeology of this EIAR. Section 3.2 of this CEMP provides the details of how the measures will be implemented during construction. **Badger**		

			› During the breeding season (December to June inclusive) no works will be undertaken within 50m of active setts or pile driving within 150m of active setts. If such works are required, exclusion measures will be put in place (as outlined above) prior to construction in line with TII Guidelines to ensure that the sett is evacuated. › To protect individual badgers during the construction phase of the Proposed Project, all open excavations on site will be covered when not in use and backfilled as soon as possible. Excavations will also be covered at night and any deep excavations left open will have appropriate egress ramps in place to allow mammals to safely exit excavations should they fall in. All of the above works will be undertaken or supervised by an appropriately qualified ecologist.		
MM67	Invasive Species	EIAR Chapter 4, 6 Appendix 4-4	The following best practice biosecurity measures will be in place during construction of the Proposed Project to avoid the introduction of invasive species to the site: › Good construction site hygiene will be employed to prevent introduction of problematic invasive alien plant species (e.g., Japanese knotweed, Rhododendron, Giant Rhubarb, etc.) to the site by thoroughly washing vehicles at designated wheel-wash facilities prior to entering the site. › Any soil and topsoil required on the site will be sourced from a stock that has been screened for the presence of any invasive species and where it is confirmed that none are present. › A pre-commencement invasive species survey of the construction footprint will be undertaken by a qualified ecologist to determine if any invasive species have established on the site since the undertaking of the previous surveys. The treatment and control of invasive alien species if recorded will follow guidelines issued by the National Roads Authority – The Management of The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020).		
EIAR Chapter 7 Birds					

Pre-Construction Phase					
MM70	Birds	EIAR Chapter 7	Taking a precautionary approach, it is proposed that construction works will commence outside the bird nesting season (1st of March to 31st of August inclusive). Pre-commencement surveys will be undertaken prior to the initiation of works at the site. Any requirement for construction works to run into the subsequent breeding season following commencement will be subject to a repeat of the pre-commencement bird surveys to confirm the absence of breeding birds of conservation concern. The survey will aim to identify sensitive sites e.g. nests or roosts depending on the season in question.		
MM71	Design of the Proposed Project	EIAR Chapter 7	› Hard standing areas have been designed to the minimum size necessary to accommodate the turbine model that is selected. › Following best practice, the 0.8km of OHL will include line markers to increase their visibility to birds in flight.		
Construction Phase					
MM72	Birds	EIAR Chapter 4, 6, 7, 9, 12 Appendix 4-4	› A CEMP will be in place prior to the start of the construction phase. Best practice measures which form part of the design of the project are included in Chapter 4 of the EIAR. Note that these measures are proposed as industry best practice rather than to mitigate any identified significant effect and will be updated as required to address any conditions of a permission or findings of any pre-construction survey results. › Works will commence outside the bird nesting season (1st of March to 31st of August inclusive). Any requirement for construction works to run into the subsequent breeding season following commencement will be informed by pre-construction bird surveys. Please see Appendix 7-7 for details. › Where sections of woody vegetation are removed for the purposes of the junction and road upgrades, these will be replaced with suitable hedge/tree species which are common in the local context. › During the construction phase, noise limits, noise control measures, hours of operation (i.e. dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds. All plant and equipment for use will comply with the		

			European Communities (Noise Emission By Equipment For Use Outdoors) Regulations, 2001, as amended (SI 632/2001). Plant machinery will also be turned off when not in use. › Silt fences will be installed as an additional water protection measure around existing watercourses. › If winter roosting or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and no works shall be undertaken within a species-specific disturbance buffer in line with industry best practice (e.g. Goodship and Furness, 2022). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied. › An Ecological Clerk of Works (ECoW) and Project Ecologist will be appointed. Duties will include: › Organise the undertaking of a pre-construction walkover bird survey to ensure that significant effects on birds will be avoided. › Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Project site. › Oversee management of ornithological issues during the construction period and advise on ornithological issues as they arise. › Provide guidance to contractors to ensure legal compliance with respect to protected species onsite. › Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress as necessary.		
EIAR Chapter 8 Land, Soils & Geology					
Construction Phase					
MM77	Peat and Subsoil Excavation	EIAR Chapter 4, 8	› Placement of turbines and associated infrastructure in areas with shallower peat where constraints allow; › Use of floating roads, where appropriate, to reduce peat excavation volumes; › The peat and subsoil which will be removed during the construction phase will be localised to the wind farm infrastructure turbine location, substation and temporary compounds and access roads;		

			› The Proposed Project has been designed to avoid sensitive habitats within the site; › A minimal volume of peat and subsoil will be removed to allow for infrastructural work to take place in comparison to the total volume present on the site due to optimisation of the layout by mitigation by design; › Excavated peat will only be moved short distances from the point of excavation and will be used locally for landscaping; › Excavated peat that is not used locally for landscaping will be stored in the 4 no. borrow pits or in the designated peat deposition areas; and, › Construction of settlement ponds will be volume neutral, and all excess material will be used locally to form pond bunds and surrounding landscaping.		
MM78	Leakages and Spillages	EIAR Chapter 4, 8 Appendix 4-4 Appendix 4-5	› Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Where possible, off-site refuelling will occur at a controlled fuelling station; › On-site re-fuelling will be undertaken using a double skinned bowser or a refuelling truck with spill kits kept onboard; › Only designated trained operatives will be authorised to refuel plant on-site; › Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system; › All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area; › Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage; › The proposed onsite 220kV substation will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; › The plant used during construction will be regularly inspected for leaks and fitness for purpose; and, › An emergency response plan for the construction phase to deal with accidental spillages is contained within Section 6.14 of this CEMP.		

MM79	Erosion of Exposed Subsoils and Peat	Chapter 8 Appendix 4-3	› All works will be completed in accordance with the Peat and Spoil Management Plan, Appendix 4-3. › All excavated peat and spoil shall be transported immediately on excavation to designated peat storage areas along the access roads and will be used on site for landscaping close to the extraction area; › Where peat/spoil is not used to landscaping it will be transported immediately to one of the proposed borrow pits or PDAs; › Peat and spoil will not be transported significant distances upon excavation; › Upon excavation, the upper vegetative layer (where still present) will be stored with the vegetation part of the sod facing the right way up to keep the plants and vegetation alive to aid construction reinstatement of disturbed ground; and, › Re-seeding and spreading/planting will also be carried out in areas where ground will be disturbed.		
MM80	Excavation of Proposed Borrow Pits		› The rock within the proposed borrow pit footprints will be removed by breaking based on assessment of its excavatability, which has been determined from a ground investigation carried out at the proposed borrow pits. › It is proposed to construct the borrow pits so that the base of the borrow pits are below the level of the adjacent section of internal road. As excavation progresses into the back edge of the borrow pits, localised deepening of the borrow pit floors may be required depending on extraction operations. › It may be possible to excavate the rock from the borrow pits whilst leaving in place upstands/segments of intact rock which will retain the placed peat and spoil in individual cells. The upstands/segments of intact rock will essentially act as engineered rock buttresses within the borrow pits, forming a series of cells (up to 4 no.). The cells will be opened in sequence and filled as needed. › Slopes within the excavated rock formed around the perimeter of the borrow pits will be formed at stable inclinations to suit local in-situ rock conditions. Exposed sections of the rock slopes will be left with irregular faces and declivities to promote re-vegetation and provide a naturalistic appearance. › Where it is not possible to leave upstands/segments of intact rock in place it will be necessary to construct rock buttresses founded on in-situ rock within the borrow pits to		

			create individual cells. The rock buttresses will be constructed of rock fill from the borrow pit excavation, placed and compacted in layers. The founding stratum for each rock buttress will be inspected and approved by The Project Geotechnical Engineer. › The rock buttresses will be constructed in stages to allow infilling of peat and spoil within cells. The buttress shall be constructed of selected rock fill and placed and compacted in suitable layers to form a buttress of sufficient stability to retain the placed peat and spoil. › Infilling of the peat and spoil will commence at the back edge of the borrow pit and progress towards the borrow pit entrance/rock buttress, leaving in place upstands/segments of intact rock which will help to retain the placed peat spoil and will allow the borrow pit to be developed and infilled in cells. The contractor excavating the rock will be required to develop the borrow pits in a way which will allow the excavated peat and spoil to be reinstated safely. › A number of rock buttresses to form cells within the borrow pits will be required to ensure access for trucks and excavators can be achieved. › The rock buttresses shall be wide enough (up to 4m) to allow construction traffic access for tipping and grading during the placement of the excavated peat and spoil. The permanent side slopes of the rock buttress shall be constructed between 40 to 60 degrees. › A rock buttress will be required on the downslope side of the borrow pits to safely retain the infilled peat and spoil. The height of the berm constructed will be greater than the height of the reinstated peat and spoil to prevent any surface peat and spoil run-off. A berm up to 8m (max.) in height will be required. › The rock buttress will be founded on mineral soil or bedrock i.e. competent strata. The founding stratum for the rock buttress will be inspected and approved by the Project Geotechnical Engineer. › A level surface in the underlying mineral soil or Weathered Bedrock will be prepared before placing and compacting the rock fill used to construct the berms. › The use of temporary access ramps and long reach excavators during the placement of the excavated peat and spoil is likely to be required. › The surface of the placed peat and spoil shall be shaped to allow efficient run-off of surface water from the placed arisings. › As the berms are slightly higher than the retained peat, drains will be provided at regular intervals through the berms, at the same level as the top of the peat surface, to prevent		

			ponding of water around the edges of the repositories. These drains will be 150mm diameter flexible plastic drainage pipe or equivalent. › A layer of geogrid to strengthen the surface of the placed peat and spoil within the borrow pits may be required. › The acrotelm shall be placed with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the peat and spoil within the borrow pits. › Supervision by the Project Geotechnical Engineer is required for the development of the borrow pits. › All the above-mentioned general guidelines and requirements will be implemented by the Contractor during construction.		
MM81	Peat Instability and Failure	EIAR Chapter 8 Appendix 8-1	The following general control measures incorporated into the construction phase of the Proposed Project will assist in the management of the risks for this site: › Appointment of experienced and competent contractors; › The site should be supervised by experienced and qualified personnel; › Allocate sufficient time for the construction of the Proposed Project (be aware that decreasing the construction time has the potential to increase the risk of initiating a localised peat movement); › Prevent undercutting of slopes and unsupported excavations; › Maintain a manage a robust drainage system; › Prevent placement of loads/overburden on marginal ground; › Set up, maintain and report findings from monitoring systems (as outlined in the Geotechnical and Peat Stability Assessment); › Ensure construction method statements are developed and agreed before commencement of construction and are followed by the contractor; and, › Revise and amend the Construction Risk Register as construction progresses to ensure that risks are managed and controlled for the duration of construction.		
MM82	Proposed Onsite 220kV Substation	EIAR Chapter 9	› Mitigation measures in respect of peat and subsoil excavation are detailed in Line Item MM77 above		

			› Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in in Line Item MM78 above; and, › Mitigation measures dealing with soil erosion are dealt with in in Line Item MM79 above Other than surface level and minor excavation works, any driven piles will not produce significant volumes of spoil, these will displace soil/subsoil within the ground.		
MM83	Proposed Amenity Track	EIAR Chapter 4	› Mitigation measures in respect of peat and subsoil excavation are detailed in Line Item MM77 above › Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in in Line Item MM78 above; and, › Mitigation measures dealing with soil erosion are dealt with in in Line Item MM79 above Other than surface level and minor excavation works, any driven piles will not produce significant volumes of spoil, these will displace soil/subsoil within the ground.		
MM84	TDR Accommodation Areas	EIAR Chapter 15	› Mitigation measures in respect of peat and subsoil excavation are detailed in Line Item MM77 above › Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in in Line Item MM78 above; and, › Mitigation measures dealing with soil erosion are dealt with in in Line Item MM79 above Other than surface level and minor excavation works, any driven piles will not produce significant volumes of spoil, these will displace soil/subsoil within the ground.		
MM85	Biodiversity Management Enhancement Plan (BMEP)	EIAR Chapter 6, 8 Appendix 6-5	› Mitigation measures in respect of peat and subsoil excavation are detailed in Line Item MM77 above › Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in in Line Item MM78 above; and, › Mitigation measures dealing with soil erosion are dealt with in in Line Item MM79 above		

MM86	Proposed Grid Connection	EIAR Chapter 8	› Mitigation measures in respect of peat and subsoil excavation are detailed in Line Item MM77 above › Mitigation measures to prevent soil / subsoil contamination (leaks / spills) are dealt with in in Line Item MM78 above; and, › Mitigation measures dealing with soil erosion are dealt with in in Line Item MM79 above Other than surface level and minor excavation works, any driven piles will not produce significant volumes of spoil, these will displace soil/subsoil within the ground.		
EIAR Chapter 9 Water					
Pre-Construction Phase					
MM91	Temporary Drainage Works	EIAR Chapter 4, 9 Appendix 4-4	All new proposed culverts and proposed culvert upgrades at field drain crossings required for the Proposed Wind Farm will be suitably sized for the expected peak flows in the watercourse. › Culverts will be required where site roads and proposed hardstands cross the main bog drainage networks. These will be installed with a minimum gradient to reduce the entrainment of suspended solids. All culverts will be inspected regularly and maintained where appropriate. Culverts will remain in-situ during the operational phase of the Proposed Project.		
Construction Phase					
MM92	Earthworks Resulting in Suspended Solids Entrainment in Surface Waters	EIAR Chapter 4, 9 Appendix 4-3	**Proposed Mitigation by Avoidance:** The key mitigation measure during the construction phase is the avoidance of sensitive hydrological features where possible, by application of suitable buffer zones (i.e. 50m to main watercourses, and 10m to main drains). All key Proposed Project areas (i.e., Proposed Project elements which have deep excavations and a potential to affect the regional groundwater system below the peat basin) are located significantly away from the delineated 50m watercourse buffer zones with the exception of the upgrading of the existing watercourse		

		Appendix 4-5 Appendix 4-4 Appendix 4-5	crossing, new drain crossing and upgrades to existing site access tracks. Additional control measures, which are outlined further on in this section, will be undertaken at these locations. The large setback distance from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures (discussed below) to be properly installed and operate effectively. The proposed buffer zone will: › Avoid physical damage (river/stream banks and river/stream beds) to watercourses and associated release of sediment; › Avoid excavations within close proximity to surface watercourses; › Avoid the entry of suspended sediment from earthworks into watercourses; and, › Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone. In addition, and as outlined above the Proposed Project drainage system will link into the existing bog drainage system, and discharge from the bog via existing large settlement ponds, which are some distance from the Proposed Project footprint. As such, there is significant distance for wind farm related surface water to travel before it actually reaches the edge of the bogs and joins any receiving waters outside of the overall bog boundaries. **Proposed Mitigation by Design:** There is an extensive network of drains already existing at the Proposed Project site. The existing drainage infrastructure is operating in accordance with IPC licence requirements, with environmental monitoring and silt control measures being implemented. The existing drainage system at the Proposed Project site will be maintained and expanded locally as required for use within the Proposed Project drainage system. The key elements are the upgrading and improvements to water treatment elements, such as in-line controls and treatment systems, including wind farm related silt traps and settlement ponds. The elements of interaction with existing drains will be as follows:		

			› Interceptor drains will convey clean runoff water around works areas to the existing downstream drainage system (field drains and main drains). Where required, interceptor drains will be installed in advance of any construction works commencing. This will ensure that clean water is kept clean by diverting surface water flow around excavations, construction areas and temporary storage areas. Where possible (depending on orientation), existing field drains can be used as interceptors drains; › Collector drains will be used to intercept and collect runoff from construction areas (from turbine base/hardstand areas, construction compounds, and the substation). During the construction phase temporary settlement ponds will be used to attenuate and treat runoff from the construction areas (from turbine base/hardstand areas, construction compounds, and the substation) and treated water will then discharge into existing field drains and main drains. Temporary settlement ponds will be removed at the end of the construction phase (end of high risk period), and wind farm runoff will discharge into existing field drains and main drains; › During the construction phase, temporary silt traps (silt fences) will be used as an additional water protection measure around the existing bog drainage network, particularly where works are proposed within 50m of a natural watercourse. The silt fences will be placed in the existing drains downstream of construction works, and the associated construction area run-off water will be diverted into proposed interceptor drains, or culverted under/across the works area; › During the construction phase, dewatering silt bags will also be used as required. They can be used downgradient of turbine bases, where temporary pumping is required. Discharge from dewatering silt bags will flow into settlement ponds and treated water from settlement ponds will outfall to existing field drains and main drains; › Within the proposed site layout there are section of proposed floating road between turbine infrastructure. In these sections, and depending on intermediate topography, a collector drain (dirty water system as described above) may be used during construction stage, or over the edge (OTE) drainage will occur. Over the edge drainage allows runoff from access tracks to flow into local field drains and be managed via the existing site drainage system. OTE drainage will only occur where topography allows, and it is only proposed in areas of low risk and remote from outfall locations (at least 150m from bog		

			outfall locations. Silt traps and check dams will be installed in field drains downstream of OTE drainage areas, and these will provide attenuation and treatment of dirty water; and, › Culverts will be required where site roads and proposed hardstands cross the main bog drainage networks. These will be installed with a minimum gradient to reduce the entrainment of suspended solids. All culverts will be inspected regularly and maintained where appropriate. Culverts will remain in-situ during the operational phase of the Proposed Project. **Water Treatment Train** If the discharge water from construction areas fails to be of a high quality, then a filtration treatment system (such as a 'siltbuster' or similar equivalent treatment train (sequence of water treatment processes)) will be used to filter and treat all surface discharge water collected in the dirty water drainage system. This will apply throughout the construction phase. **Silt Fences:** Silt fences will be emplaced within drains down-gradient of all construction areas. Silt fences are effective at removing heavy settleable solids. This will act to prevent entry to the existing drainage network of sand and gravel-sized sediment, released from excavation of mineral sub-soils of glacial and glacio-fluvial origin and entrained in surface water runoff. Regular inspection and maintenance of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase. **Silt Bags:** Silt bags will be used where small to medium volumes of water need to be pumped from excavations (e.g. the proposed underpass locations). As water is pumped through the bag, most of the sediment is retained by the geotextile fabric allowing filtered water to pass through. **Pre-emptive Site Drainage Management:**		

			The works programme for the construction stage of the development will also take account of weather forecasts and predicted rainfall in particular. Large excavations and movements of peat/subsoil or peat stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast. The following forecasting systems are available and will be used on a daily/weekly basis, as required, to allow site staff to direct proposed and planned construction activities: › General Forecasts: Available on a national, regional and county level from the Met Éireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates; › MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale; › 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events; › Rainfall Radar Images: Images covering the entire country are freely available from the Met Éireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and, › Consultancy Service: Met Éireann provide a 24-hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest. Using the safe threshold rainfall values will allow planned works to be safely executed (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event. Earthworks should be suspended if forecasting suggests any of the following is likely to occur:		

			• >10 mm/hr (i.e. high intensity local rainfall events); • >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or, • >half monthly average rainfall in any 7 days. Prior to earthworks being suspended the following control measures should be completed: • Secure all open peat/spoil excavations; • Provide temporary or emergency drainage to prevent back-up of surface runoff; and, • Avoid working during heavy rainfall and for up to 24 hours after heavy events to ensure drainage systems are not overloaded. **Management of Runoff from Peat and Subsoil Storage Areas**: It is proposed that excavated peat and spoil will be used for landscaping close to its original extraction point. Peat will also be stored in the designated Peat Deposition Areas, whilst excess peat and spoil will be placed in the proposed onsite borrow pits. During the initial placement of peat and spoil, silt fences, straw bales and biodegradable geogrids will be used to control surface water runoff from the storage areas as required. Interceptor and collector drains will be used at storage areas. 'Siltbuster' treatment trains will be employed if previous treatment is not to a high quality. **Timing of Site Construction Works:** Construction of the site drainage system will only be carried out during periods of low rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses. Construction of the drainage system during this period will also ensure that attenuation features associated with the drainage system will be in place and operational for all subsequent construction works. **Proposed Drainage and Water Quality Monitoring**		

			An inspection and maintenance plan for the on-site drainage system will be prepared in advance of commencement of any works and will be included in the CEMP. Regular inspections of all installed drainage systems will be undertaken, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water in parts of the systems where it is not intended. Any excess build-up of silt levels at dams, the settlement ponds, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. During the construction phase field testing (visual, supplemented with pH, electrical conductivity, temperature, dissolved oxygen and turbidity monitoring), sampling and laboratory analysis of a range of parameters[4] with relevant regulatory limits and EQSs will be undertaken for each primary watercourse, and specifically following heavy rainfall events (i.e. weekly, monthly and event-based). The data will be processed and analysed and works will cease if elevated turbidity concentrations are recorded. In this event, all upstream silt traps and drainage routes will be inspected to identify the cause of the elevated turbidity levels. Works will not recommence until any issues have been resolved and the turbidity concentrations have returned to background concentrations. Where (temporary) deep excavations are proposed, cut-off drains or existing field drains will be used to reduce the amount of surface water entering the excavation. This will be the case around turbine base excavations.		
MM93	Groundwater Levels during Excavation Works	EIAR Chapter 9	› A key mitigation is the design of the proposed borrow pits. The scheduled depths of the proposed borrow pits are relatively shallow (7.0mbgl) which will limit the requirement for dewatering and significant effects on groundwater levels; › There are large separation distances between proposed borrow pits and local houses, and any potential associated groundwater wells. All local houses are remote from the proposed borrow pit locations and in excess of 1km from the proposed borrow pit locations;		

[4] *example suite: pH (field measured), Electrical Conductivity (field measured), temperature (field measured), Dissolved Oxygen (field measured), Turbidity (NTU) (sonde measured), Flow (m/s), Total Suspended Solids (mg/l), Ammonia, Nitrite (NO_2) (mg/l), Ortho-Phosphate (P) (mg/l), Nitrate (NO_3) (mg/l), Phosphorus (unfiltered) (mg/l), Chloride (mg/l), and BOD (mg/l).*

			› There are large separation distances between the proposed turbine locations and local houses. All local houses are remote, and in excess of 880m, from the proposed turbine locations; › Similarly, main streams and rivers are at least 150-500m away from any turbine and mast bases, and at these distances potential effects will be imperceptible; › The proposed underground cable trench is designed to be shallow and will only be approximately 1.2m in depth. At this depth, it will only potentially interact with shallow perched water within the peat profile. No interaction with deeper regional groundwater will occur. Therefore, no effects on the local groundwater table or flows will occur from this element of the Proposed Project; › The construction of the Proposed Grid Connection (i.e., proposed onsite 220kV substation, 4 no. steel masts, 2 no. gantry structure, telecommunications tower, and temporary access road) and amenity carparks will be relatively shallow and will only have the potential to interact with the shallow perched water table within the peat bog. No interaction with the deeper regional groundwater regime will occur. Therefore, no impacts on the local groundwater table or flows will occur; and, › The potential effect of the proposed piling works on groundwater is assessed separately in Section 9.5.2.7 of Chapter 9.		
MM94	Leakages or Spillages of Hydrocarbons		› All plant will be inspected and certified to ensure they are leak free and in good working order prior to use on site; › On-site re-fuelling of machinery will be carried out using a mobile double skinned fuel bowser. The fuel bowser, a double-axel custom-built refuelling trailer or truck will be re-filled off site and will be towed/driven around the site to where machinery are located. The 4x4 jeep/fuel truck will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use and only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations; › Fuels stored on site will be minimised. Any storage areas will be bunded appropriately for the fuel storage volume during the construction phase; › The electrical control building will be bunded appropriately to the volume of oils likely to be stored and to prevent leakage of any associated chemicals and to groundwater or		

			surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; › The plant used will be regularly inspected for leaks and fitness for purpose; › An emergency plan for the construction phase to deal with accidental spillages will be contained within Section 6.1.4 of this CEMP. Spill kits will be available to deal with accidental spillages		
MM95	Release of Cement Based Products	EIAR Chapter 4, 9 Appendix 4-4	› No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place; › Where possible pre-cast elements for culverts and concrete works will be used; › No washing out of any plant used in concrete transport or concreting operations will be allowed on-site; › Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water possible. No discharge of cement contaminated waters to the construction phase drainage system or directly to any artificial drain or watercourse will be allowed. Chute cleaning water is to be isolated in temporary lined wash-out pits located near proposed site compounds. These temporary lined wash-out pits will be removed from the site at the end of the construction phase; › Any washing out of concrete pumping plant will also be into the temporary lined wash-out pits; › Will use weather forecasting to plan dry days for pouring concrete; and, › Will ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event.		
MM96	Wastewater Disposal	EIAR Chapter 9	› There are a total of 5 no. proposed construction compounds associated with the Proposed Project; › During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at each of the site compounds, maintained by the providing contractor, and removed from site on completion of the construction works; › Water supply for the site office and other sanitation will be brought to site and removed after use from the site to be discharged at a suitable off-site treatment location; › No water or wastewater will be sourced on the site, nor discharged to the site; and,		

			› There will be no discharge of wastewater to ground at the site, and therefore there is no potential to impact groundwater or surface water quality.		
MM97	Piled Foundations	EIAR Chapter 9	The proposed mitigation measures designed for the protection of downstream surface water quality and groundwater quality within the peat bog will be implemented at all construction work areas. › Mitigation measures for sediment control are detailed in Line Item MM92 above. › Mitigation measures for the control of hydrocarbons during construction works are detailed in Line Item MM94 above. › Mitigation measures for the control of cement-based products during construction works are detailed in Line Item MM95 above. › Mitigation measures in relation to wastewater are detailed in Line Item MM96 above. Proposed mitigation measures relative to piling works will comprise: › Where driven piles are used, they will have a cross section without re-entrant angles; › Strict QA/QC procedures for piling works will be followed; › Piles will be kept vertical during piling works; › Good workmanship will be employed during all piling works; and, › Where required use bentonite seal to prevent upward/downward movement of surface water/groundwater.		
MM98	Hydrologically Connected Designated Sites	EIAR Chapter 9	Mitigation measures in relation to the protection of downstream surface water quality detailed in the preceding sections as follows: › Mitigation measures for sediment control are detailed in Line Item MM92 above. › Mitigation measures for the control of hydrocarbons during construction works are detailed in Line Item MM94 above. › Mitigation measures for the control of cement-based products during construction works are detailed in Line Item MM95 above. › Mitigation measures in relation to wastewater are detailed in Line Item MM96 above.		

			Implementation of these mitigation measures will ensure the protection of water quality in receiving waters. Furthermore, groundwater from below the Proposed Project site may also discharge as baseflow to the Boor and Brosna rivers or their tributaries, thus entering the downstream designated sites. Groundwater quality and quantity will not be affected by the Proposed Project. Mitigation measures with respect to groundwater quality are prescribed in the preceding sections as follows: › Mitigation measures for the control of hydrocarbons during construction works are detailed in Line Item MM94 above. › Mitigation measures for the control of cement-based products during construction works are detailed in Line Item MM95 above. › Mitigation measures in relation to wastewater are detailed in Line Item MM96 above. › Mitigation measures in relation to piling works are detailed in Line Item MM97 above.		
MM99	Groundwater Abstractions (Public and Private)	EIAR Chapter 9	› Mitigation measures for the control of hydrocarbons during construction works are detailed in Line Item MM94 above. › Mitigation measures for the control of cement-based products during construction works are detailed in Line Item MM95 above. › Mitigation measures in relation to wastewater are detailed in Line Item MM96 above. › Mitigation measures in relation to piling works are detailed in Line Item MM97 above.		
MM100	Surface Water Drinking Supplies	EIAR Chapter 9	› Mitigation measures for sediment control are detailed in Line Item MM92 above. › Mitigation measures for the control of hydrocarbons during construction works are detailed in Line Item MM94 above. › Mitigation measures for the control of cement-based products during construction works are detailed in Line Item MM95 above. › Mitigation measures in relation to wastewater are detailed in Line Item MM96 above		
MM101	WFD Status and Objectives	EIAR Chapter 9	› Mitigation measures for sediment control are detailed in Line Item MM92 above. › Mitigation measures for the control of hydrocarbons during construction works are detailed in Line Item MM94 above.		

		Appendix 9-3	› Mitigation measures for the control of cement-based products during construction works are detailed in Line Item MM95 above. Implementation of these mitigation measures will ensure the protection of water quality in receiving waters. Furthermore, the mitigation measures previously outlined for the protection of groundwater quality and groundwater quantity are detailed above: › Mitigation measures for the control of hydrocarbons during construction works are detailed in Line Item MM94 above. › Mitigation measures for the control of cement-based products during construction works are detailed in Line Item MM95 above. › Mitigation measures in relation to wastewater are detailed in Line Item MM96 above. › Mitigation measures in relation to piling works are detailed in Line Item MM97 above.		
MM102	Biodiversity Management and Enhancement Plan	EIAR Chapter 9	All works undertaken will be completed in accordance with 'best practice' procedures and the mitigation measures in relation to the protection of surface and groundwater quality are detailed in the preceding sections.		
MM103	Amenity Track	EIAR Chapter 9	Detailed mitigation measures for sediment control are outlined in Line Item MM92 above and detailed mitigation measures for control of hydrocarbons during construction works are outlined in Line Item MM94 above.		
MM104	TDR Accommodation Works	EIAR Chapter 9	**Mitigation by Avoidance:** A constraint/buffer zone will be maintained for all upgrade works locations where possible. In addition, measures which are outlined below will be implemented to ensure that silt laden or contaminated surface water runoff from the excavation work does not discharge directly to the watercourse. The purpose of the constraint zone is to:		

			› Avoid physical damage to surface water channels; › Provide a buffer against hydraulic loading by additional surface water run-off; › Avoid the entry of suspended sediment and associated nutrients into surface waters from excavation and earthworks; › Provide a buffer against direct pollution of surface waters by pollutants such as hydrocarbons; and, › Provide a buffer against construction plant and materials entering any watercourse. General Best Practice Pollution Prevention Measures will also include: › No stock-piling of construction materials will take place within the constraints zone. No refuelling of machinery or overnight parking of machinery is permitted in this area; › No concrete truck chute cleaning is permitted in this area; › Works shall not take place at periods of high rainfall, and shall be scaled back or suspended if heavy rain is forecast; › Plant will travel slowly across bare ground at a maximum of 5km/hr. › Machinery deliveries shall be arranged using existing structures along the public road; › All machinery operations shall take place away from the stream and ditch banks, although no instream works are proposed or will occur; › Any excess construction material shall be immediately removed from the area and taken to a licensed waste facility or the on-site spoil management areas; › No stockpiling of materials will be permitted in the constraint zones; › Spill kits shall be available in each item of plant required; and, › Silt fencing will be erected on ground sloping towards watercourses at the stream crossings if required. Mitigation Measures relating to the use and storage of fuels and chemicals in terms of groundwater protection: › No maintenance of construction vehicles or plant will take place along the temporary junction works areas; › The plant used will be regularly inspected for leaks and fitness for purpose; and,		

			› Spill kits will be available to deal with accidental spillage.		
MM105	Vegetation Removal	EIAR Chapter 9	› The felling will be completed primarily by hand in order to limit disturbance; › If machinery is required, works will be undertaken using machinery which are most suitable for the ground conditions and which will minimise soil disturbance; › Where possible, trees will be felled away from drains to prevent the unnecessary deposition of peat or brash into the bog drains; › Where machinery is required, brash/bog mats will be used to protect the peat surface and reduce erosion; › Silt fences will be installed downgradient of the works to intercept potentially silt laden runoff; and, › Works will be completed during periods of low rainfall.		
EIAR Chapter 10 Air Quality					
Construction Phase					
MM112	Exhaust Emissions	EIAR Chapter 10 Appendix 4-4	› All machinery will be switched off when not in use. › Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required. › The majority of aggregate materials for the construction of the Proposed Project will be obtained from the borrow pits on site. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the amount of emissions associated with vehicle movements. › The expected waste volumes generated onsite are unlikely to be large enough to warrant source segregation at the site. Therefore, all wastes streams generated onsite will be deposited into a single waste skip which will be covered. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The Materials Recovery Facility (MRF) will be local to the Proposed Project site to reduce the amount of exhaust emissions associated with vehicle movements.		

			The nearest licensed waste facility is located approximately 19.4km southeast of the Proposed Project site.		
MM113	Dust Emissions	EIAR Chapter 10 Appendix 4-4	› A wheel wash facility will be installed on the Proposed Wind Farm at all proposed construction site entrance and will be used by vehicles before leaving the site. › Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads, site roads, grid route, road widening sections, substation, and construction compounds and around the borrow pit area to ensure dust does not cause a nuisance. ○ If necessary, such as during periods of dry weather, de-silted water will be taken from settlement ponds in the site's drainage system and will be pumped into a bowser or water spreader to dampen down haul roads, turbine bases, borrow pit and site compounds to prevent the generation of dust where required. ○ Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff. › Areas of excavation will be kept to a minimum and stockpiling of excavated material will be minimised by coordinating excavation, placement of material in peat placement areas and restoration of borrow pits. › Turbines components, construction materials and grid connection infrastructure will be transported to the site on specified haul routes only, as agreed with the local authority. ○ The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as deemed necessary by the construction Site Supervisor/Site Manager. › The transport of construction materials may have the potential to generate dust in dry weather conditions. Roads will be watered down to suppress dust particles in the air as deemed necessary by the Site Supervisor/Manager. › The transport of dry excavated material from the on-site borrow pits, which may have potential to generate dust will be minimised. If necessary, such as in periods of dry weather, excavated material will be dampened prior to transport from the borrow pits. › Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal.		

			○ The MRF facility will be local to the site to reduce dust emissions associated with vehicle movements. The nearest licensed waste facility is located approximately 19.4km southeast of the Proposed Project site.		
EIAR Chapter 11 Climate					
Construction Phase					
MM117	Greenhouse Gas Emissions	EIAR Chapter 11	› Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required. › All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise. › When stationary, delivery and on-site vehicles will be required to turn off engines. › Turbines and construction materials will be transported to the site on specified routes only unless otherwise agreed with the Planning Authority. Please see Section 15.1.6 of Chapter 15 Material Assets for details. › It is intended to obtain the majority of materials for the construction of the Proposed Project from the proposed onsite borrow pits, with some material being imported from local licenced quarries as needed. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the emissions associated with vehicle movements. › A CEMP will be in place throughout the construction phase. › The CEMP includes a Resource Waste Management Plant (RWMP) which outlines the best practice procedures that will occur during the construction phase relating to waste material. ○ The RWMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Project. Disposal of waste will be seen as a last resort. ○ Section 4.5.7 of Chapter 4 for this EIAR refers to the methodology that will be utilised to manage onsite waste. This waste material will be transferred to a		

			licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor. ○ The MRF facility will be local to the Proposed Project site to reduce the amount of emissions associated with vehicle movements. The closest MRF to the Proposed Project and is approximately 19.4km southeast of the Proposed Wind Farm. › Where applicable, low carbon intensive construction materials will be sourced and utilised onsite.		
EIAR Chapter 12 Noise					
Construction Phase					
MM120	Noise Control	EIAR Chapter 12 Appendix 4-4	The operation of plant and machinery, including construction vehicles, is a source of potential impact that will require mitigation at all locations within the site. The following proposed measures to control noise will be implemented in full, include: › 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 residents; › Monitoring typical levels of noise and vibration during critical periods and at sensitive locations; › Selection of plant with low inherent potential for generation of noise and/ or vibration where practical; › Placing of noise generating / vibratory plant as far away from sensitive properties as practical within the site constraints, and; › The hours of construction activity will be limited to avoid unsociable hours where possible. Works operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Friday and Saturday between 7:00hrs and 13:00hrs. And more specifically:		

			›› The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. ›› 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 outside of general construction hours will be surrounded by an acoustic enclosure or portable screen as appropriate. Where rock breaking is employed in relation to the Proposed Project, the following are examples of measures that will be employed, 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 noise sensitive area; ›› When possible, line of sight between top of machine and reception point needs to be obscured; ›› 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 BS5228: Part 1 and the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1988 in relation to blasting operations.		
EIAR Chapter 13 Cultural Heritage					
Pre-Construction/ Construction Phase					
MM123	Recorded Monuments (Direct Effects)	EIAR Chapter 13	› Preservation in situ of the extant gravel/stone trackway OF007-350—. The proposed road to T10 and T11 and the associated cabling where it crosses the trackway will be floated in order to avoid direct effects to this recorded monument. A horizontal buffer of 0.5m of material (sand) will be made above a layer of geotextile placed directly over the trackway. The top of the clean sand layer will be dead rolled, without vibration. Base geogrid will be laid on top of the sand layer along the line of the road above which the floating road will be constructed. The road will comprise a depth of up to 1,000mm of selected granular fill amounting to up to 1.5m between the top of the trackway and the floating road surface. › Archaeological monitoring of ground works associated with the proposed new roads where such works interact with the recorded monuments discussed above will be undertaken. The monitoring will be carried out under licence from the National Monuments Service (NMS). A report on the monitoring will be compiled on completion of the work and submitted to the NMS and the Planning Authority/Body. Should archaeological finds, features or deposits be uncovered during the monitoring further mitigation such as preservation in situ or preservation by record (excavation) may be required and will be carried out in consultation with the NMS.		
MM124	Sub-Surface Archaeological Potential	EIAR Chapter 13	› Pre-development testing, under licence from the NMS, will be carried out in areas where peat depths allow a meaningful investigation. Testing will only be undertaken in areas where ground disturbance will take place as part of the Proposed Project. Where peat depths become a limitation to testing, monitoring at the construction stage will be undertaken. The areas to be tested will be chosen by the appointed archaeologist and the number of test trenches agreed between the archaeologist and the NMS through the licensing system. Peat depth data and local ground conditions may dictate the number and location of test trenches to be excavated. A report on the testing will be compiled on		

			completion of the work. Should archaeological finds, structures or deposits be uncovered as a result of the testing further mitigation measures such as preservation in situ or preservation by record (excavation) may be required and will be decided in consultation with the NMS. Such mitigation measures will be implemented, where relevant, following consultation with the NMS. › Archaeological monitoring of ground works during the construction stage of the Proposed Project under licence from the NMS will be carried out by a suitably qualified archaeologist. Should archaeological finds, structures or deposits be uncovered as a result of the monitoring further mitigation measures such as preservation in situ or preservation by record (excavation) may be required and will be decided in consultation with the NMS. Such mitigation measures will be implemented where relevant following consultation with the NMS. A report detailing the results of the monitoring and/or any further necessary mitigation as referred to above will be compiled on completion of the work and submitted to the NMS and Planning Authority/Body		
EIAR Chapter 14 Landscape and Visual					
Construction Phase					
MM125	Visual Effects	EIAR Chapter 14 Appendix 14-6	The following measures will be implemented to mitigate landscape and visual effects during the construction phase of the Proposed Grid Connection: › In all circumstances, excavation depths and volumes will be minimised, and excavated material will be re-used where possible. › Any areas of bare soil remaining after the landscaping phase will be seeded as soon as possible with a grass seed mix.		
EIAR Chapter 15 Material Assets					
Material Assets - Traffic					
Construction Phase					

MM128	Delivery of Abnormal Loads	Chapter 15	The following are the main points to note for these deliveries which will take place after peak evening traffic: › The delivery of turbine components is a specialist transport operation with the transportation of components carried out at night when traffic is at its lightest and the impact minimised. › The deliveries will be made in consultation with the Local Authority and An Garda Síochána. › It is estimated that 120 abnormal sized loads will be delivered to the site, comprising 40 convoys of 3 vehicles, undertaken over 40 separate nights. › These nights will be spread out over an approximate period of 8 weeks and will be agreed in advance with the relevant authorities, › In order to manage each of the travelling convoys, for each there will be two Garda escort vehicles that will stop traffic when required at the front and rear of the convoy of 3 vehicles. › There will also be two escort vehicles provided by the haulage company for each convoy. › Deliveries of abnormal loads will be delivered to the Proposed Project site during nighttime.		
MM129	General Traffic Management	EIAR Chapter 15 Appendix 15-2	A detailed Traffic Management Plan (TMP) (Appendix 15-2) will be provided specifying details relating to traffic management and included in the CEMP (Appendix 4-4) prior to the commencement of the construction phase of the Proposed Project. The TMP will be agreed with the local authority and An Garda Síochána prior to construction works commencing onsite. The detailed TMP will include the following: › **Traffic Management Coordinator** – a competent Traffic Management Co-ordinator will be appointed for the duration of the development, 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 Offaly County Council in advance of deliveries of turbine components to the Proposed Wind Farm. Liaison with the relevant local authorities, TII and MMaRC and will be carried out where required regarding requirements such as delivery timetabling. The programme will ensure		

			that deliveries are scheduled in order to minimise the demand on the local network and minimise the pressure on the access to the Proposed Wind Farm. › **Information to locals** – Locals in the area will be informed of any upcoming traffic related matters e.g. the delivery of turbine components at night via letter drops and posters in public places. Information will include the contact details of the 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. › **A Pre and Post Construction Condition Survey** – Where required by the local authority, a pre-condition survey of roads associated with the Proposed Project will be carried out immediately prior to construction commencement to record an accurate condition of the road at the time. A post construction survey will be carried out after works are completed to ensure that any remediation works are carried out to a satisfactory standard. Where required the timing of these surveys will be agreed with the local authority. All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers. › **Liaison with the relevant local authority** - Liaison with Offaly County Council and An Garda Síochána, will be carried out during the delivery phase of the large turbine vehicles, when an escort for all convoys will be required. Once the surveys have been carried out and "prior to commencement" status of the relevant roads established, (in compliance with the provisions of the CEMP), the Roads Section of Offaly County Council will be informed of the relevant names and contact numbers for the Project Developer/Contractor Site Manager as well as the Site Environmental Manager. › Implementation of temporary alterations to road network at critical junctions – at locations highlighted in Section 15.1.9. › **Identification of delivery routes** – These routes will be agreed with Offaly County Council and adhered to by all contractors. › **Delivery times of large turbine components** - The TMP 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. › **Travel plan for construction workers –** While the assessment above has assumed the worst case in that construction workers will drive to the Site, the construction company will be required to provide a travel plan for construction staff, which will include the identification of routes to / from the Site and identification of an area for parking.		

			› **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. These are set out in the CEMP which is contained in Appendix 4-4. › **Re-instatement works** - All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.		
Material Assets - Other					
Pre-Construction/Construction Phase					
MM131	Electricity	EIAR Chapter 4, 5, 15 Appendix 4-4	› Prior to construction, the Applicant will engage with ESB via the 'Dial Before You Dig' procedure online. ESB will be contacted via dig@esb.ie **before** excavating near any overhead lines. › The suitability of machinery and equipment for use near power lines will be risk assessed. › All staff will be trained on operating voltages of overhead electricity lines running the site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the sites are made aware of the location of lines before they come on to site. › Barriers will run parallel to the overhead line at a minimum horizontal distance of 6 metres on plan from the nearest overhead line conductor wire. › When activities must be carried out beneath overhead lines, e.g. component delivery or substation construction, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are required. › Information on safe clearances will be provided to all staff and visitors. › Signage indicating locations and health and safety measures regarding overhead lines will be erected in canteens and on site. › All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021'. This will encompass the		

			use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan. › All health and safety measures as detailed in the CEMP and Chapter 5: Population and Human Health will be adhered to during the construction, operation and decommissioning phases.		
MM132	Water	EIAR Chapter 9, 15	› Chapter 9: Water assesses the potential for impact on public water supply and private wells during the construction, operation and decommissioning phases. While no significant effects are identified, best practice mitigation measures have been prescribed to in the chapter to minimise impacts on groundwater during the construction stage from the potential release of hydrocarbons, wastewater and cement-based products.		
MM133	Waste Management	EIAR Chapter 15 Appendix 4-4	› All waste generated on site during the construction phase will be contained in waste skip at a waste storage area on site. This waste storage area will be kept tidy with skips clearly labelled to indicate the allowable material to be disposed of therein. The expected waste volumes generated on site are unlikely to be large enough to warrant source segregation at the Proposed Project site. Therefore, all waste streams generated on site will be deposited into a single waste skip. The waste material will be transferred to a Materials Recovery Facility (MRF) by a fully licenced waste contractor where the waste will be sorted into individual waste stream for recycling, recovery or disposal. › Site personnel will be instructed at induction that under no circumstances can personal waste be brought on site for disposal in the onsite waste skip. It will also be made clear that the burning of waste material on site is forbidden. › Further details on waste management are presented in Section 3.8 of this CEMP.		

8. MONITORING PROPOSALS

All monitoring proposals relating to the pre-commencement and construction phases of the Proposed Project are set out in various sections of the EIAR, NIS and BMEP prepared as part of the planning application to An Coimisiún Pleanála.

This section of the Construction and Environment Management Plan groups together all of the monitoring proposals presented in the EIAR. The monitoring proposals are presented in the following pages. The monitoring proposals are also outlined within Chapter 18: Schedule of Mitigation and Monitoring Measures. Operational and Decommissioning Phase monitoring measures are not included in the table below, however, can be viewed in Chapter 18 of this EIAR and Appendix 4-8 (Decommissioning Plan).

By presenting the monitoring proposals in the below format, it is intended to provide an easy to audit list that can be reviewed and reported on during the future phases of the Proposed Project. The tabular format in which the below information is presented, can be further expanded upon during the course of future project phases to provide a reporting template for site compliance audits.

Table 8-1 Proposed Monitoring Measures

Ref No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
Pre-Construction Phase						
MX1	Drainage Maintenance	EIAR Chapter 4, 9 Appendix 4-4	An inspection and maintenance plan for the drainage system onsite will be prepared in advance of commencement of any works on the Proposed Project. Regular inspections of all installed drainage features will be carried out, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water at parts of the systems where it is not intended. The inspection of the drainage system will be the responsibility of the EnvCoW or the Project Hydrologist. Please see Section 9.4.1 of Chapter 9 Water and Section 3.2 of the CEMP for further information.	On going	Monthly	Project Hydrologist
MX2	Invasive Species	EIAR Chapter 6 Appendix 4-4	A pre-commencement invasive species survey of the construction footprint will be undertaken by a qualified ecologist to determine if any invasive species have established on the site since the undertaking of the previous surveys. The treatment and control of invasive alien species if recorded will follow guidelines issued by the National Roads Authority – The Management of The Management of Invasive Alien Plant Species on National Roads – Technical Guidance (TII, 2020).	Once	As required	Project Ecologist
MX3	Birds	EIAR Chapter 7 Appendix 7-7	It is proposed that construction works will commence outside the bird nesting season (1st of March to 31st of August inclusive) to avoid the most sensitive time of the year for most bird species with the potential to use the site and its environs. Works are defined as the clearing of woody vegetation, any building or engineering works. Pre-commencement surveys will be undertaken within one month prior to the initiation of works. The purpose of these surveys is to identify sensitive roosting sites.	Once	As required	Project Ornithologist

			If works run into the subsequent breeding season(s) (April-September), surveys will be conducted to identify sensitive nesting sites. Breeding season surveys will be conducted once per month from April to July inclusive when works are taking place. If works run into the subsequent winter season(s) (October to March), surveys will be repeated to identify sensitive roost sites. These surveys will be conducted at the beginning of each winter season (e.g., October) and continue if evidence of roosting of birds of conservation concern is observed. Surveys will be undertaken by a suitably qualified ornithologist. The survey will comprise a thorough walkover survey of the Proposed Project footprint and/or all works areas to a 500m radius, where access allows. If winter roosts or nests of birds of high conservation concern are identified, the roost/nest will be earmarked for continued monitoring during works. If the roost/nest is found to be active during works, works will cease within a species-specific buffer of its location in line with best practice guidance (Forestry Commission Scotland, 2006; Goodship and Furness 2022; Ruddock and Whitfield, 2007) to avoid disturbance. No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied. Aerial surveys using a drone may be used to confirm the presence or absence of roosting/nesting birds, where conditions are suitable. All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the 'no-work zone' will be made available to all construction staff. The restricted area will also be marked to alert all personnel on site to the suspension of works within that area.			
Construction Phase						
MX4	Health and Safety	EIAR Chapter 4, 5	The PSCS appointed for the construction stage shall be required to perform his/her duties as prescribed in the Safety, Health and Welfare at Work (Construction) Regulations. These duties include (but are not limited to):	Daily	Daily	PSCS

		Appendix 4-4	› Development of the Safety and Health Plan for the construction stage with updating where required as work progresses; › Compile and develop safety file information. › Reporting of accidents / incidents; › Weekly site meeting with PSCS; › Coordinate arrangements for checking the implementation of safe working procedures. Ensure that the following are being carried out: ○ Induction of all site staff including any new staff enlisted for the project from time to time; ○ Toolbox talks as necessary; ○ Maintenance of a file which lists personnel on site, their name, nationality, current SafePass number, current Construction Skills Certification Scheme (CSCS) card (where relevant) and induction date; ○ Report on site activities to include but not limited to information on accidents and incidents, disciplinary action taken and PPE compliance; ○ Monitor the compliance of contractors and others and take corrective action where necessary; and ○ Notify the Authority and the client of non-compliance with any written directions issued.			
MX5	Reactive Site Drainage Management	EIAR Chapter 4, 9	The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat potentially silt-laden water from the works areas, will be monitored continuously by the EnvCoW on-site. The EnvCoW or project hydrologist will respond to changing weather, ground or drainage conditions on the ground as the project proceeds, to ensure the effectiveness of the drainage design is maintained. The EnvCoW or Project Hydrologist will respond to changing weather, ground or drainage conditions on the ground as the Proposed Project proceeds, to ensure the effectiveness of the drainage design is maintained in so far as is	As required	As Necessary	EnvCoW

			possible. This may require the installation of additional check dams, interceptor drains or swales as deemed necessary on-site. The drainage design may have to be modified on the ground as necessary, and the modifications will draw on the various features outlined above in whatever combinations are deemed to be most appropriate to situation on the ground as a particular time.			
MX6	Water Quality and Monitoring	EIAR Chapter 9	Daily inspection and recording of surface water management system by on-site EnvCoW and immediate remedial measures to be carried out as required and works temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the site. The following periodic inspection regime will be implemented: › Daily general visual inspections of site operations and inspections of all drainage infrastructure within the site and in the surrounding area by the EnvCoW or a suitably qualified and competent person as delegated by the EnvCoW; › Inspections to include all elements of drainage infrastructure to ensure the system is operating correctly and to identify and maintenance that is required. Any changes, such as discolouration, odour, oily sheen or litter will be noted and corrective action will be implemented. High risk locations such as settlement ponds will be inspected daily. Daily inspections checks will be completed on plant and equipment, and whether materials such as straw bales or oil absorbent materials need replacement; › Event based inspections by the EnvCoW as follows: ○ >10 mm/hr (i.e. high intensity localised rainfall event); ○ >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or, ○ Rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week). › Monthly site inspections by the Project Hydrologist/ EnvCoW during construction phase; › Quarterly site inspections by the Project Hydrologist/ EnvCoW after construction for a period of one year following the construction phase; and,	Daily	As Necessary	EnvCoW / Project Hydrologist

			› A written record will be maintained or available on-site within this Construction Environmental Management Plan (CEMP) which will be maintained on-site during the construction phase. › Daily inspection and recording of surface water management system by on-sit EnvCoW and immediate remedial measures to be carried out as required and works temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the site. Complete ongoing inspection and monitoring of the development, particularly in areas of drainage control in support of the EnvCoW in monitoring the effectiveness of the drainage design as it is implemented on-site.			
MX7	Water Discharge	EIAR Chapter 4 Appendix 4-4 Appendix 4-5	› There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flows. All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses. › Dewatering silt bags are also used where water is pumped temporarily from excavations (e.g., turbine bases). Water is pumped into the silt bags, and then arising discharge is filtered through the silt bag fabric and flows into local collector drains. Collect potentially silt-laden runoff from works areas via downgradient collector drains and manage via series of avoidance, source, in-line treatment and discharge to ground via infiltration drains and infiltration areas.			
MX8	Surface Water Quality	EIAR Chapter 9	› During the construction phase field testing (visual, supplemented with pH, electrical conductivity, temperature, dissolved oxygen and turbidity monitoring), sampling and laboratory analysis of a range of parameters[5] with relevant regulatory limits and EQSs will be undertaken for each	As Required	Monthly	EnvCoW

[5] *example suite: pH (field measured), Electrical Conductivity (field measured), temperature (field measured), Dissolved Oxygen (field measured), Turbidity (NTU) (sonde measured), Flow (m/s), Total Suspended Solids (mg/l), Ammonia, Nitrite (NO_2) (mg/l), Ortho-Phosphate (P) (mg/l), Nitrate (NO_3) (mg/l), Phosphorus (unfiltered) (mg/l), Chloride (mg/l), and BOD (mg/l).*

			primary watercourse, and specifically following heavy rainfall events (i.e. weekly, monthly and event-based). › The data will be processed and analysed and works will cease if elevated turbidity concentrations are recorded. In this event, all upstream silt traps and drainage routes will be inspected to identify the cause of the elevated turbidity levels. Works will not recommence until any issues have been resolved and the turbidity concentrations have returned to background concentrations.			
MX9	Plant and Equipment Inspections	EIAR Chapter 9	The plant used will be regularly inspected for leaks and fitness for purpose.	As Required	Monthly	EnvCoW
MX10	Traffic and Transport	Appendix 4-4	The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as deemed necessary by the construction Site Supervisor/Site Manager.	As required	Monthly	EnvCoW
MX11	Biodiversity	Appendix 4-4	The Project Ecologist will be available to support the EnvCoW on matters relating to the protection of sensitive habitats and species encountered prior to or during the construction phase of the Proposed Project. The Project Ecologist will not be full time on site but will undertake pre-commencement surveys and visit the site as required. The responsibilities and duties of the Project Ecologist/Ornithologist will include the following: › Undertake a pre-construction transect/walkover bird survey to ensure that significant effects on breeding birds will be avoided. › Inform and educate on-site personnel of the ornithological and ecological sensitivities within the site. › Oversee management of ornithological and ecological issues during the construction period and advise on ornithological and ecological issues as they arise. › Provide guidance to contractors to ensure legal compliance with respect to protected species onsite.	As required	As required	Project Ecologist

			Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress.			
MX12	Birds	EIAR Chapter 7	A CEMP will be in place prior to the start of the construction phase. Best practice measures which form part of the design of the project are included in Chapter 4 of the EIAR. Note that these measures are proposed as industry best practice rather than to mitigate any identified significant effect and will be updated as required to address any conditions of a permission or findings of any pre-construction survey results.	As Required	As required	Project Ornithologist
MX13	Peat and Spoil Management / Instability	Appendix 4-3 Appendix 8-1	To monitor possible peat movements following the construction of the Proposed Wind Farm, it is recommended that the site is inspected by a suitably qualified engineer once every six months for the first three years following commissioning of the Proposed Wind Farm. Particular attention should be given to the peat deposition areas and the proposed borrow pits, as well to any areas where the site drainage is not functioning as intended. Should any signs of instability be noted, a site visit by a suitably qualified geotechnical engineer should be arranged and suitable remediation measures enacted and the site inspections should continue on an annual basis for a further three years.	As required	Every 6 Months	Geotechnical Engineer
MX14	Archaeological Monitoring	EIAR Chapter 13	Archaeological monitoring of ground works during the construction stage of the Proposed Project under licence from the NMS will be carried out by a suitably qualified archaeologist. Should archaeological finds, structures or deposits be uncovered as a result of the monitoring further mitigation measures such as preservation in situ or preservation by record (excavation) may be required and will be decided in consultation with the NMS. Such mitigation measures will be implemented where relevant following consultation with the NMS. A report detailing the results of the monitoring and/or any further necessary mitigation as referred to above will be compiled on completion of the work and submitted to the NMS and Planning Authority/Body.	As Required	As Required	Project Archaeologist

9. PROGRAMME OF WORKS

9.1 Construction Schedule

It is estimated that the construction phase will take approximately 24 to 30 months from the commencement of works to the commissioning of the wind farm. The commencement of works where the removal of vegetation is required, or where works take place in sensitive breeding habitats (such as birch scrub and emergent wetland vegetation), will be scheduled to occur outside the bird breeding season (1st of March to 31st of August) to avoid any potentially significant effects on nesting birds. Construction may commence from September to March so that construction activities are ongoing by the time the next bird breeding season comes around and can continue throughout that bird breeding season.

Construction activities will be carried out during normal daytime working hours (i.e., weekdays 0700 – 1900hrs and Saturdays 0700 – 1400hrs). However, to ensure that optimal use is made of good weather period or at critical periods within the programme (i.e., concrete pours) or to accommodate delivery of large turbine component along public routes it could be necessary on occasion to work outside of these hours. Any such out of hours working will be agreed in advance with the Local Authorities.

The phasing and scheduling main construction task items are outlined in Table 9-1 below.

Table 9-1 Indicative Construction Schedule

ID	Task Name	Task Description	Month 1-3	Month 3-6	Month 6-9	Month 9-12	Month 12-15	Month 15-18	Month 18-24	Month 24-30
1	Site Health and Safety									
2	Grid Connection	Construct Proposed Grid Connection to Shannonbridge-Maynooth 220kV overhead line								
3	Site Compounds	Site compounds, site access, fencing, gates								
4.	Borrow Pits	Access/site roads to borrow pits, borrow pit excavation, landscaping, fencing								
5	Site Roads	Construction/upgrade of roads, construct underpasses, install drainage measures, install water protection measures								
6	Turbine Hardstands	Excavate/pile for turbine bases where required								
7	Turbine Foundations	Fix reinforcing steel and anchorage systems, erect shuttering, concrete pour								
8	Substation and Electrical Works	Construct substation, and underground cabling between turbines								
9	Backfilling and Landscaping									
10	Turbine Delivery and Erection									
11	Substation Commissioning									
12	Turbine Commissioning									

10. COMPLIANCE AND REVIEW

10.1 Site Inspections and Environmental Audits

Routine inspections of construction activities will be carried out on a daily and weekly basis by the ECoW and the Site Supervisor/Construction Manager to ensure all controls to prevent environmental impact, relevant to the construction activities taking place at the time, are in place.

Environmental inspections will ensure that the works are undertaken in compliance with this CEMP and all other planning application documents. Only suitably trained staff will undertake environmental site inspections.

10.2 Auditing

An Environmental audit will first be carried out prior to the construction phase of the Proposed Project to ensure the implementation of pre-construction mitigation measures, completion of baseline studies and implementation of any pre-construction felling mitigation measures. Further environmental audits will be carried on a monthly basis during the construction phase of the Proposed Project and again after the commissioning of the wind turbines and substation.

In contrast to monitoring and inspection activities, audits are designed to shed light on the underlying causes of non-compliance, and not merely detect the non-compliance itself. In addition, audits are the main means by which system and performance improvement opportunities may be identified. Environmental audits will be carried out by the EnvCoW on behalf of the Project Developer, in an objective manner. Environmental audits will be conducted at planned intervals to determine whether the CEMP is being properly implemented and maintained. The results of environmental audits will be provided to the Project Developer and Project Contractor.

An audit of compliance with the pre-commencement mitigation measures will be completed by the EnvCoW prior to the commencement of the construction phase of the Proposed Project. An audit of compliance with the construction phase mitigation measures will be completed monthly during the construction phase. The findings of each audit will be documented by the EnvCoW within the EMP for the site. The findings of each audit will be made available to An Coimisiún Pleanála on request.

Once the Proposed Project is operational and turbines have been commissioned, a report of compliance with operational phase mitigation measures will be prepared.

10.3 Environmental Compliance

The following definitions shall apply in relation to the classification of Environmental Occurrences during construction of the wind farm:

Environmental Near Miss: An occurrence which if not controlled or due to its nature could lead to an Environmental Incident.

Environmental Incident: Any occurrence which has potential, due to its scale and nature, to migrate from source and have an environmental impact beyond the site boundary.

Environmental Exceedance Event: An environmental exceedance event occurs when monitoring results indicate that limits for a particular environmental parameter (as indicated in the Environmental Monitoring Programme) has been exceeded.

An exceedance will immediately trigger an investigation into the reason for the exceedance occurring and the application of suitable mitigation where necessary.

Exceedance events can be closed out on achieving a monitoring result below the assigned limit for a particular environmental parameter.

Environmental Non-Compliance: Non-fulfilment of a requirement and includes any deviations from established procedures, programs and other arrangements related to the EMP.

10.4 Corrective Action Procedure

A corrective action is implemented to rectify an environmental problem on-site. Corrective actions will be implemented by the Site Supervisor/Construction Manager, as advised by the Site Environmental Clerk of Works. Corrective actions may be required as a result of the following:

- Environmental Audits;
- Environmental Inspections and Reviews;
- Environmental Monitoring;
- Environmental Incidents; and,
- Environmental Complaints.

A Corrective Action Notice will be used to communicate the details of the action required to the main contractor. A Corrective Action Notice is a form that describes the cause and effect of an environmental problem on site and the recommended corrective action that is required. The Corrective Action Notice, when completed, will include details of close out and follow up actions.

If an environmental problem occurs on site that requires immediate attention, direct communications between the Site Supervisor/Construction Manager and the Site Environmental Clerk of Works will be conducted. This in turn will be passed down to the site staff involved. A Corrective Action Notice will be completed at a later date.

10.5 Construction Phase Review

The Project Contractor's CEMP will be the subject of review by the EnvCoW on behalf of the Project Developer whenever a revised version of the CEMP is presented for approval.

References

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