NIS APPENDIX 6

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

Planning and Environmental Consultants

Construction and Environmental Management Plan

Proposed Clonberne Wind Farm

DOCUMENT DETAILS

Client:	**Clonberne Wind Farm Ltd**
Project Title:	**Proposed Clonberne Wind Farm**
Project Number:	**180740**
Document Title:	**Construction and Environmental Management Plan**
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Planning and Environmental Consultants

Rev	Status	Date	Author(s)	Approved By
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1. INTRODUCTION

This Construction and Environmental Management Plan (CEMP) has been developed by MKO on behalf of Clonberne Wind Farm Ltd who intend to apply to An Bord Pleanála for planning permission for the construction of a wind energy development and the grid connection to the national grid, comprising 11 no. wind turbines, 220kV substation and associated infrastructure in Clonbern and adjacent townlands near, Clonbern village, Co. Galway (the "Proposed Project"). The Proposed Project, as outlined in Section 1.4.3 of Chapter 1 Introduction, encompasses both the Proposed Wind Farm and Proposed Grid Connection which are detailed in Sections 1.4.1 and 1.4.2 of Chapter 1 Introduction, respectively.

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 be submitted to the competent authorities. 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 will be read in conjunction with the EIAR 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 comprise:

- 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 and operation. The Contractor, as appointed by the Project Developer, 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 to be prepared by the appointed contractor 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 Environmental Clerk of Works (ECoW).

1.1 Scope of the Construction and Environmental Plan

This report is presented as a guidance document for the pre-commencement and construction phases of the Proposed Project. Where the term 'Site' is used in the CEMP it refers to all works associated with the Proposed Project (refer to Section 1.4.3 in Chapter 1 of the EIAR). The CEMP outlines clearly the mitigation measures and monitoring proposals that are required to be adhered to in order to complete the works in an appropriate manner.

The report is divided into nine 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 project.
- Section 3 sets out details of the environmental controls that will be implemented on site. Site drainage measures, peat stability monitoring measures 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 project outlining the roles and responsibilities of the project team.
- Section 5 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 6 consists of a summary table of all mitigation proposals to be adhered to during the Proposed Project, categorised into three separate headings, 1) pre-commencement measures; 2) construction-phase measures and 3) operational-phase measures.
- Section 7 consists of a summary table of all monitoring requirements and proposals to be adhered to during the Proposed Project, categorised into three separate headings, 1) pre-commencement measures; 2) construction-phase measures and 3) operational-phase measures.
- Section 8 sets out a programme for the timing of the works.
- Section 9 outlines the proposals for reviewing compliance with the provisions of this report.

1.2 Targets and Objectives

In so far as the designs that have been completed to date, or are to be further completed in future, the construction phase works are designed to approved standards, which include specified materials, standards, specifications, and codes of practice. The design of the project has considered environmental issues and this is enhanced by the works proposals.

The key site targets are as follows;

- 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 are completed in accordance with all planning documents for the development;
- 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,
- Provide adequate environmental training and awareness for all project personnel.

The key site objectives are as follows;

- Using recycled materials if possible, e.g. excavated stone, overburden and peat material;
- 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;
- Keeping 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 PROJECT DESCRIPTION

2.1 Site Location

The core of the Proposed Project site is located approximately 1.3 kilometres (km) west of the village of Clonbern, Co. Galway.

Access to the Proposed Project site, for Light Goods Vehicles (LGV), Heavy Goods Vehicles (HGV) and abnormal loads (e.g. turbine components) will be via a new proposed entrance road, in the northeast of the site, off the R328 Regional Road.

It is intended to connect the Proposed Project to the national electricity grid via a 220kV underground cable which will connect the proposed Clonberne Wind Farm 220kV substation to the existing Cashla – Flagford 220kV Overhead Line in the townland of Laughil. The grid connection cabling route will measure approximately 2.8km in length.

Works required along the intended turbine delivery route, between Galway Port and the proposed main site entrance form part of the planning application, and they are assessed as part of the EIAR.

A full and detailed description of the Proposed Project 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. For the purposes of the EIAR, the wind farm, substation, grid connection and turbine delivery route accommodation works are collectively referred to as the "Proposed Project".

The townlands within which the project (i.e. the main proposed wind farm site, the on-site substation, the grid connection cabling route and turbine delivery route accommodation works) is located are listed in Table 2-1. All townlands are located in Co. Galway.

Table 2-1 Townlands within which the Proposed Project is located.

Development Works	Townland
Proposed Wind Farm Site	
Proposed Wind Turbines, Hardstands, Site Access Roads, New Site Entrance off the R328 Regional Road, Borrow pit, Temporary Construction Compounds, Underground 33kV cabling, Underground 38kV cabling, 38kV Line to Cable Interface End Masts, Peat and Spoil Repository Areas, Turbine Delivery Accommodation works, Tree Felling, Site Drainage, Peatland Enhancement Area, Operational Site Signage, all associated infrastructure.	Killavoher, Gortagarraun, Cloonarkan, Lomaunaghroe, Clonbern, Ballagh West, Carrowntryla and Lissybroder.
Proposed Grid Connection	
On-site 220kV Substation, Underground 220kV Cabling Route, 2 no. new loop-in towers, 2no. steel gantries, 2 no. cable compounds, Tree Felling, Site Drainage, Access Track, Telecommunications Mast, Operational Access Road, Operational Site Signage, Cable Compounds, Joint Bays, all associated infrastructure.	Cloonarkan, Clonbern, Laughil.

2.2 Description of the Proposed Wind Farm

The proposed wind farm development comprises the construction of 11 No. wind turbines and all associated works. The proposed turbines will have a total tip height of 180 metres above the top of the foundation. The applicant is seeking a ten-year planning permission.

The proposed development comprises:

i. *11 no. wind turbines with an overall turbine tip height of up to 180 metres; a rotor blade diameter of 162 metres; and hub height of 99 metres, and associated foundations, hard-standing and assembly areas;*
ii. *Underground electrical cabling (33kV) and communications cabling;*
iii. *Provision for the undergrounding of a section of proposed 38kV overhead electrical cabling and the provision of 2 no. 38kV Line to Cable Interface End Masts to facilitate the undergrounding of the proposed 38kV cabling.*
iv. *Upgrade of existing tracks/roads and provision of new site access roads, junctions and hardstand areas;*
v. *Construction of 1 no. new gated site entrance off the R328 Regional Road to facilitate the delivery of the construction materials and turbine components to site;*
vi. *Construction of 2 no. temporary construction compounds and associated ancillary infrastructure including temporary site offices, staff facilities and car-parking areas for staff and visitors, all to be removed at end of construction phase;*
vii. *Development of 1 no. borrow pit;*
viii. *Provision of 3 no. passing bays adjacent to the L22321 Local Road and an existing access track to facilitate the transport of stone material to the site;*
ix. *Peat and spoil management including the provision of 4 no. peat repository areas and 1 no. spoil repository area;*
x. *Junction accommodation works including temporary accommodation areas adjacent to the N83 National Secondary Road, R328 Regional Road and L6466 Local Road to facilitate the delivery of turbine components to site;*
xi. *Site Drainage;*
xii. *Peatland Enhancement Area;*
xiii. *Biodiversity Enhancement Measures (including the planting of woodland, linear habitat, grassland management and invasive species removal);*
xiv. *Tree felling and hedgerow removal to facilitate construction and operation of the proposed development;*
xv. *Operational stage site signage; and*
xvi. *All ancillary works and apparatus.*

A thirty five-year operational life from the date of full commissioning of the entire wind farm is being sought and the subsequent decommissioning.

The application is seeking a ten-year planning permission. A concurrent planning application in relation to a proposed substation which will comprise of a 220kV Gas Insulated Switchgear (GIS) building, an Independent Power Producer (IPP) compound, a Battery Energy Storage System (BESS) compound, underground grid connection and associated cabling to connect the proposed Clonberne Wind Farm to the national grid via the existing Flagford to Cashla 220kV overhead line in the townland of Laughil is also being lodged to An Bord Pleanála.

2.3 Description of the Proposed Grid Connection

The proposed development comprises:

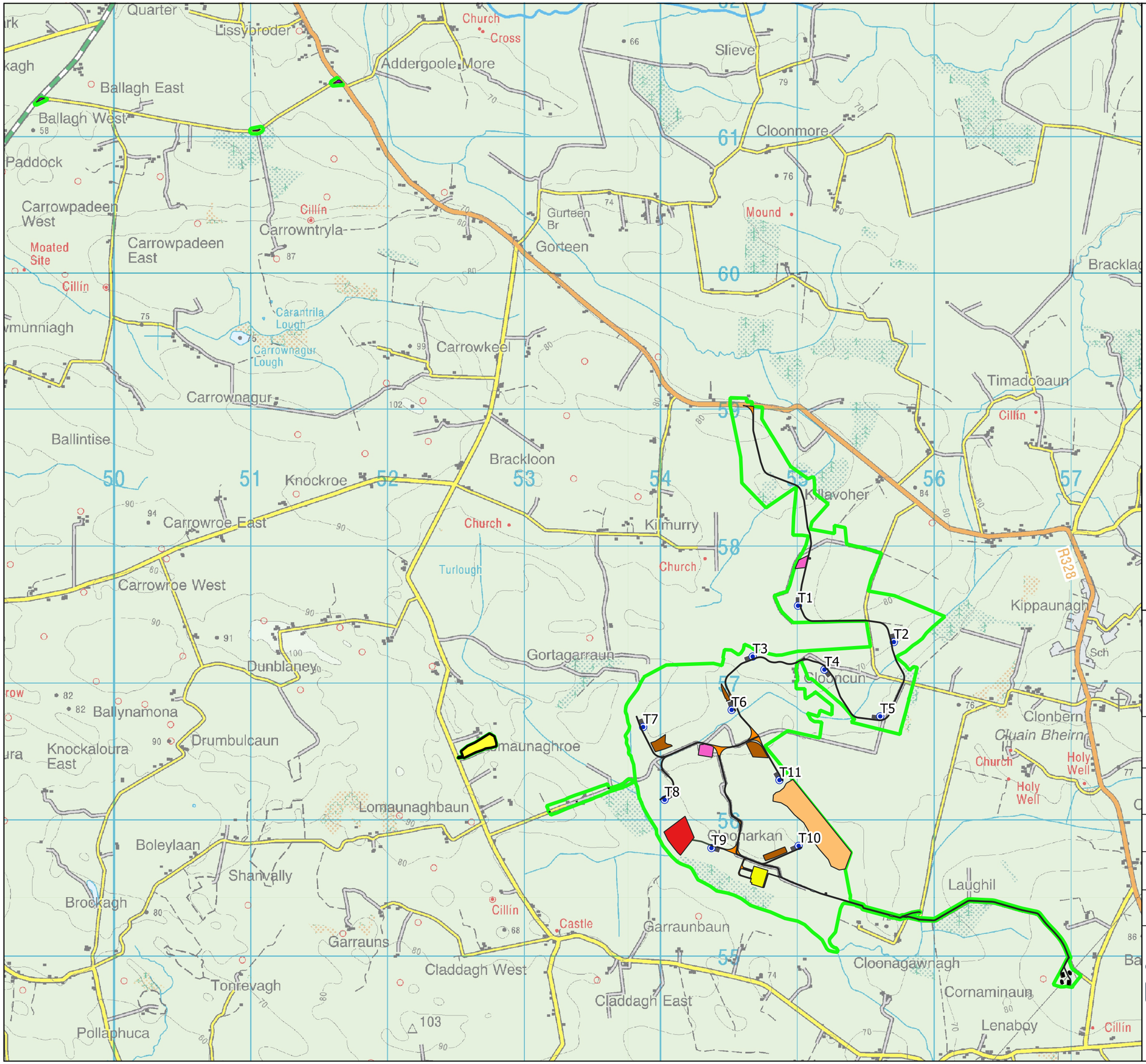
i. *Construction of a permanent substation which will comprise of a 220kV Gas Insulated Switchgear (GIS) building, an Independent Power Producer (IPP) compound, a Battery Energy Storage System (BESS) compound, including 4 no. 18-metre high Lightning Monopoles, welfare facilities, car parking, wastewater holding tank, 36-metre-high Telecommunications Mast, 2.6-metre high palisade fencing, external lighting, underground cabling, and all associated infrastructure and apparatus;*
ii. *All works associated with the connection of the proposed Clonberne Wind Farm to the national electricity grid, including the provision of underground electrical cabling (220kV) to the existing Flagford to Cashla 220kV overhead line, in the townland of Laughil;*
iii. *The provision of 2 no. loop-in towers, 2 no. gantries within 2 no. cable compounds to facilitate the connection of the proposed substation to the existing Flagford to Cashla 220kV overhead line;*
iv. *Construction of 2 no. gated permanent site entrances off the L6501 Local Road to facilitate access to the proposed development and the proposed Clonberne Wind Farm;*
v. *Provision of 4 no. joint bays, communication chambers and earth sheath links along the underground electrical cabling route and temporary accommodation areas to facilitate underground cabling works;*
vi. *Provision of a cable access track to facilitate the installation and maintenance of cabling and provide access to the proposed substation;*
vii. *Reinstatement of the road or track surface above the proposed cabling trench along existing roads and tracks;*
viii. *Operational access road to the proposed development and the proposed Clonberne Wind Farm;*
ix. *Site Drainage;*
x. *Tree felling and hedgerow removal to facilitate construction and operation of the proposed development;*
xi. *Operational stage site signage; and*
xii. *All ancillary works and apparatus.*

The application is seeking a ten-year planning permission. The development subject of this application will facilitate the connection of the proposed 11 no. wind turbine Clonberne Wind Farm to the national electricity grid. A concurrent application in relation to proposed Clonberne Wind Farm is also being lodged to An Bord Pleanála.

2.4 Proposed Project

All elements of the Proposed Project i.e., the Proposed Wind Farm and the Proposed Grid Connection, have been assessed in the EIAR and are described in detail in Chapter 4 of the EIAR.

The layout of the Proposed Project is shown on Figure 2-1 and 2-2.



Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Proposed Turbine Foundations
- Proposed Crane Platform Hardstanding
- Proposed New Roads
- Proposed Existing Roads to be Upgraded
- Proposed Turbine Delivery Accommodation Areas
- Proposed Passing Bays
- Proposed Peat Repository Areas
- Proposed Spoil Storage Area
- Proposed Spoil Repository Access Road
- Proposed Peatland Enhancement Area
- Proposed 38kV Line to Cable Interface End Masts
- Proposed Construction Compounds
- Proposed Borrow Pit
- Proposed Substation
- Proposed Grid Connection Masts
- Proposed Grid Connection Compounds
- Proposed Cable Route and Cable Access Track
- Proposed Cable in the Public Road
- Proposed Operational Access Road

Drawing Title

Proposed Project

Project Title

Clonberne WF

Drawn By	Checked By
JF	OC
Project No.	**Drawing No.**
180740	Fig. 2-1
Scale	**Date**
1:27,000	2024-06-20

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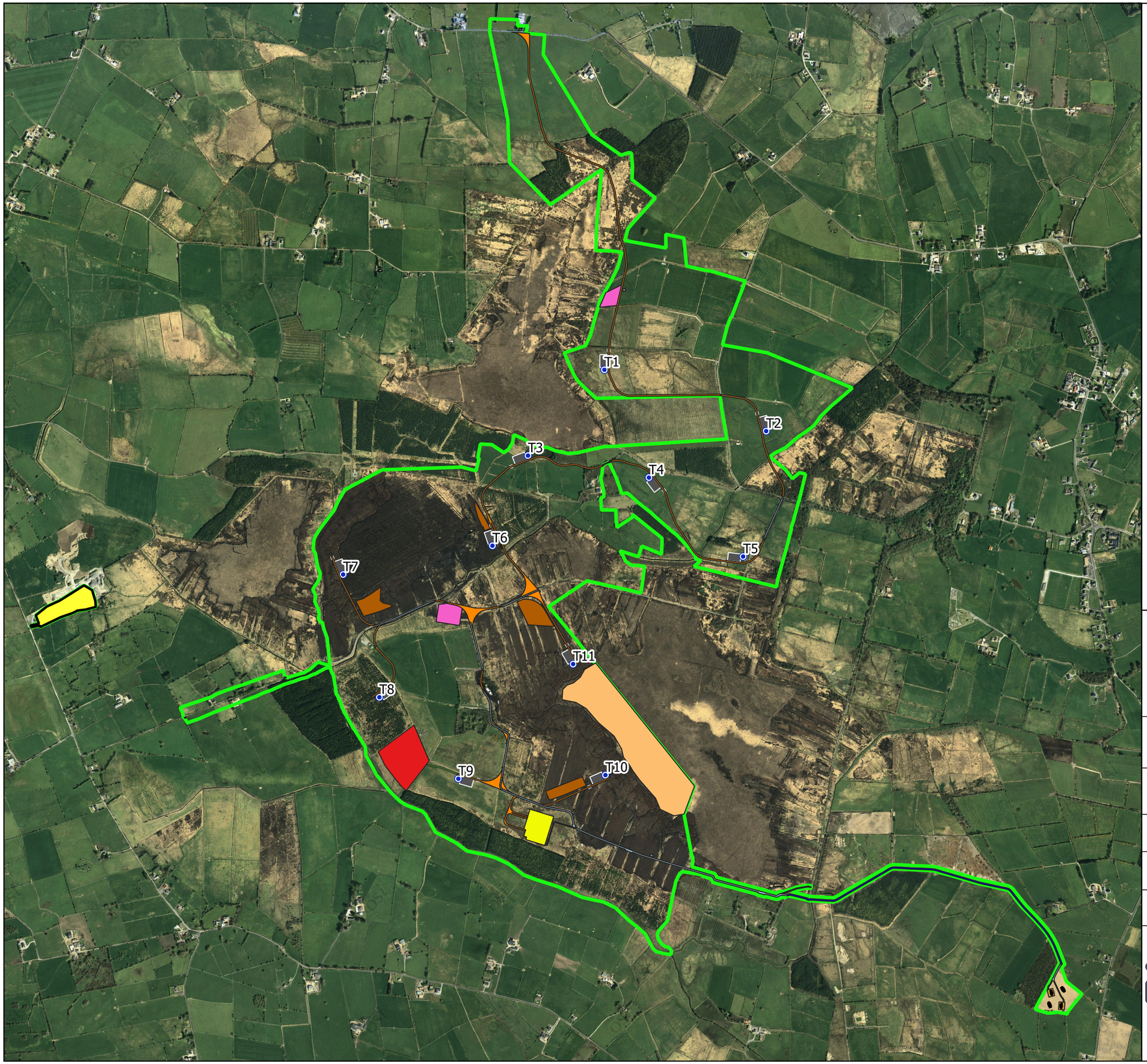

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- Proposed Spoil Storage Area
- Proposed Spoil Repository Access Road
- Proposed Peatland Enhancement Area
- Proposed 38kV Line to Cable Interface End Masts
- Proposed Construction Compounds
- Proposed Borrow Pit
- Proposed Substation
- Proposed Grid Connection Masts
- Proposed Grid Connection Compounds
- Proposed Cable Route and Cable Access Track
- Proposed Cable in the Public Road
- Proposed Operational Access Road

N

Drawing Title

Core of the Proposed Project

Project Title

Clonberne WF

Drawn By	Checked By
JF	OC
Project No.	Drawing No.
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2.5 Construction Methodology Overview

2.5.1 Introduction

An experienced main 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 and Demolition Methodologies is provided below.

2.5.2 Overview of Proposed Construction Methodology

The proposed anticipated construction methodology is summarised under the following main headings:

Proposed Wind Farm

- Temporary Construction Compounds;
- Site Access Roads
- Borrow Pit;
- Peat and Spoil Repository Areas
- Turbine Foundations;
- Crane Hardstands;
- Site Underground Cabling
- Peatland Enhancement Area;
- Culvert Crossings on the Proposed Wind Farm site
- Commercial Forestry, Woodland and Hedgerow Felling
- Woodland and Hedgerow Replanting;

Proposed Grid Connection

- Electricity Substation and Control Building;
- Telecommunications Mast;
- Site Underground Cabling
- Grid Connection Construction Methodology
    - Existing Underground Services
    - Joint Bays
    - Steel Mast Structures
    - Gantry Structures
    - Cable Compounds
- Grid Connection Watercourse/Culvert Crossing;
- Site Drainage Systems

2.5.3 Proposed Wind Farm

2.5.3.1 Temporary Construction Compounds

There are 2 no. temporary construction compounds proposed for the Site. Two temporary construction compounds are measuring approximately 4,971 and 8,755 square metres respectively. One will be located in the northern section of the Proposed Wind Farm, adjacent to the proposed new road north of Turbine No. 1. The second temporary construction compound will be located adjacent to a proposed new road junction, located east of Turbines no. 7 and 8. The location of the proposed construction compounds are shown in Figure 2-2.

The southern construction compound will consist of a bunded refuelling and containment area for the storage of lubricants, oils and site generators etc, and full retention oil interceptor, waste storage area, temporary site offices, staff facilities and car-parking areas for staff and visitors. Temporary port-a-loo toilets and toilets located within a staff portacabin will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. There will also be a water supply on site for hygiene purposes, by way of a temporary storage tank.

Construction materials and turbine components will be brought directly to the proposed turbine locations following their delivery to the Proposed Wind Farm. The location of the compounds are shown in Figure 2-2.

The temporary construction compounds will be constructed as follows:

- 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 compound platform will be established using a similar technique as the construction of the substation platform discussed above;
- A layer of geo-grid 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;
- Areas within the compound will be constructed as site roads and used as vehicle hardstandings during deliveries and for parking;
- The compound will be fenced and secured with locked gates if necessary; and,
- Upon completion of the Proposed Project the temporary construction compounds will be decommissioned and allowed to vegetate naturally.

2.5.3.2 Site Access Roads

Existing roads will need to be upgraded and new access roads will need to be constructed as part of the Proposed Project. The following factors are considered in the preliminary proposals for road construction types:

- *Constructability;*
- *Serviceability requirements for construction and wind turbine delivery and maintenance vehicles;*
- *Peat depth;*
- *Horizontal longitudinal and cross-fall gradient of the roads;*
- *Minimisation of excavation arisings; and*
- *The requirement to minimise disruption to peat hydrology.*

The above key principles are used to determine the road type and will be finalised with regard to the prevailing ground conditions encountered during the confirmatory site investigation stages.

As stated in Peat and Spoil Management Plan in Appendix 4-3 of the EIAR, the design criteria for the suitability of floated access roads used for the Proposed Project Site align with the Scottish Executives Best Practice guidelines document. Some sections of the proposed access track are considered suitable for floated construction when the following criteria are met:

- *Maximum slope in any direction is less than 5%,*
- *Peat depths are greater than 1m,*
- *The resulting drained and undrained slope stability assessment factor of safety results are greater than 1.3, without and with a 10kPa surcharge.*

Construction Methodology for New Roads

The general methodology to construct new founded roads (i.e. see Detail A of the road construction detail drawings in Appendix C of the Peat and Spoil Management Plan Appendix 4-3 in the EIAR) is presented below.

- *Excavation of the new access road to competent strata (see Section 3 of Appendix 4-3 of the EIAR for guidance on correctly handling and storing the different peat layers). Maximum excavation side slopes will be 1:1.5.*
    - *Drainage shall be installed to divert surface and groundwater from the construction areas.*
- *A layer of geogrid/geotextile may be required at the base of the excavation. To be confirmed at detailed design.*
- *Placement of granular fill-in layers following the designer's specification. The fill thickness is 200mm above the existing ground level, which is required to backfill the excavation to a suitable competent strata below the existing ground level.*
- *Access roads are to be finished with a granular running surface across the full width of the road.*

The general methodology to construct new floating roads (i.e. see Detail B of the road construction detail drawings presented in Appendix C in the Peat and Spoil Management Plan Appendix 4-3 in the EIAR) is presented below.

- *A geotextile-geogrid composite layer is placed directly onto the peat surface following the designer's specification.*
- *Placement of granular fill up to 800mm and reinforcing geogrids in layers following the designer's specification, with due regard to any settlement and deformation of peat anticipated at the access track.*
    - *Cross-drains shall be installed within the road to divert surface and groundwater from upslope to downslope.*
    - *Stone delivered to the floating road construction area shall be end-tipped onto the constructed floating road to avoid excessive impact loading on the peat due to concentrated end-tipping. Direct tipping of stone onto the peat shall not be carried out.*
    - *Stone will be spread and placed from the constructed floating road onto the peat surface using a bulldozer.*
- *Access roads are to be finished with a granular running surface across the full width of the road.*

No excavations (e.g., drainage or peat cuttings) shall be carried out within 5m of a completed floated access road edge or at a distance determined following a site inspection by the Contractor's Geotechnical Engineer.

The presence of excavations can destabilise the road. Where required, for example, for the installation of internal cabling offset from the footprint of the floated road, temporary excavations will be excavated in short lengths and backfilled as soon as practicable. These works will be designed and supervised by the Contractor's Geotechnical Engineer.

Spoil materials can be used for landscaping along the edge of access road sections to aid with the restoration of the peatland areas and embed the access roads into the surrounding environment where slope and ground conditions allow, limiting their ecological and environmental impact. Consideration must be given to the placement of excavated materials in areas of potential instability or additional mitigation requirements, as highlighted in the Peat Stability Risk Assessment (PSRA) (GDG, 2024) in Appendix 8-1 in the EIAR. Where permissible, excavated materials will be placed to a maximum height of 1m and stockpile widths of a minimum of 2 to 3m unless site-specific detail designs allow

larger volumes to be placed. Large stockpiles of materials shall not be placed on or adjacent to floated access roads to avoid bearing failure of the underlying peat.

Peat placement or landscaping will be carried out only in areas where it is topographically contained and does not create a propagated landslide risk – see Appendix 8-1 PSRA (GDG, 2024) in the EIAR.

For this development, particular buffer areas, including construction buffers, have been highlighted in the Appendix 8-1 PSRA (GDG, 2024) and are presented in Appendix A in the Peat and Spoil Management Plan Appendix 4-3, both included in the EIAR.

Construction Methodology to Upgrade Existing Roads.

An indicative methodology to upgrade existing founded roads (i.e. see Detail C of the road construction detail drawings presented in Appendix C in the Peat and Spoil Management Plan Appendix 4-3 in the EIAR) is presented below.

- *Excavation on one or both sides of the existing access road to competent strata.*
- *Placement of granular fill up to 200m above existing ground level and reinforcing geogrids in layers following the designer's specification, with due regard to any settlement and deformation of peat anticipated at the access track.*
- *Overlay of the existing access road with selected granular fill following the designer's specification.*
    - *Where coarse granular fill has been used in the existing floated access road make-up, a layer of geogrid will be placed on top of the existing floated access road.*
- *Access roads will be finished with a granular running surface across the full width of the road.*
    - *A layer of geogrid/geotextile may be required at the surface of the existing access road following the designer's specification.*

An indicative methodology to upgrade existing floating roads (i.e. See Detail D of the road construction detail drawings presented in Appendix C in the Peat and Spoil Management Plan Appendix 4-3 in the EIAR) is presented below.

- *A geotextile is placed on one or both sides of the existing access road directly onto the peat surface, following the designer's specification.*
- *Benching of existing road and placement of granular fill and reinforcing geogrids in layers following the designer's specification, with due regard to any settlement of peat anticipated for the widened area.*
    - *It may be necessary to stage the widening to maintain peat stability – i.e., to reduce the fill placement rate to allow the peat layers to consolidate and increase in strength.*
    - *It may be necessary to anchor the geogrids into the existing roads, requiring significant benching of existing roads.*
- *Overlay of the existing access road with selected granular fill following the designer's specification.*
    - *Where coarse granular fill has been used in the existing floated access road make-up, a layer of geogrid will be placed on top of the existing floated access road.*
    - *The surface of the existing access road will be graded/levelled before the placement of any geogrid/geotextile, where necessary (to prevent damaging the geogrid/geotextile).*
- *Access roads are to be finished with a layer of capping across the full width of the road.*
    - *A layer of geogrid/geotextile may be required at the surface of the existing access road following the designer's specification.*

Where there are cross slopes, any road widening works required will be carried out on the upslope side of the existing access road, where possible. Particular design details will be required at the detailed design stage at the transitions between floating and founded roads to reduce differential settlements between the two construction types.

General Construction Guidelines for Access Roads

The following general construction guidelines will be implemented for the access roads on site.

- Where an open ditch is present alongside an existing/proposed floating access track, the ditch will need to be filled prior to upgrading/constructing the access track. The ditch will be filled with suitable drainage stone. As applicable, a perforated pipe will be laid into a ditch prior to filling so as to maintain water flow within the ditch.
- Where existing drainage crosses the road then it will be necessary to ensure that this drainage is not affected by settlement of the upgraded access road. Cross drains comprising flexible perforated pipes within a permeable stone fill surround will be used to maintain the existing drainage.
- No excavations (e.g., drainage, peat cuttings) will be carried out within 5m distance of a completed floated access road edge, or at a distance determined following site inspection. The presence of excavations can destabilise the road. Temporary excavations will be excavated in short lengths and backfilled as soon as practicable.
- Floating roads will not be constructed on areas of sidelong ground.
- No stockpiling of materials will take place on or adjacent to floated access roads so as to avoid bearing failure of the underlying peat.
- End-tipping of stone onto the road during the construction/upgrading of the access road will be carefully monitored to ensure that excessive impact loading, which may adversely affect the underlying peat, is limited.
- Due to the nature of floating road construction, it will be necessary to monitor the settlement/movement of the road. Survey points will be located along the road at 10m intervals in areas of deep peat (greater than 2m). These surveys points will be surveyed on a weekly basis, and more frequently when construction activities are ongoing in the area.
- The construction and upgrading of access roads in areas of deep peat (greater than 2m) will be inspected on a routine basis during the works, particularly before/following trafficking by heavy vehicular loads.
- In the event of excessive vertical displacement of the road during/following construction then mitigation measures will be required to ensure the stability of the road. This will include:
    - Introduction of pressure berms either side of the road (that are 2m to 5m wide by 0.5m deep stone layer).
    - Where peat is relatively willow then excavate peat and replace with suitable fill.
    - Slowing the rate of construction.
- Settlement of a floated access road is expected and will likely be in order of several 100mm in the deeper peat area; as such it will be necessary to re-level the road at convenient intervals during the works. The magnitude and extent of the settlement is likely to be greater in areas of deeper peat with the rate of settlement reducing over time. Prior to completion of the works, the road will be re-levelled using crushed stone.

2.5.3.3 Borrow Pit

It is proposed to develop 1 no. on-site borrow pit as part of the Proposed Project which is located in the western region of the Site. The borrow pit will provide the majority of all rock and hardcore material required during construction of the wind farm development with a quantity of material being imported from local quarries and suppliers. The estimated volume of crushed stone to be extracted from the borrow pit and for the construction of the Proposed Project is 106,770m^3.

The proposed borrow pit will be constructed following the construction methodology that is outlined in Peat and Spoil Management Plan in Appendix 4-3 in the EIAR. Slopes within the excavated rock formed around the perimeter of the pit borrow pit will be formed at stable inclinations to suit local in-situ rock conditions. It is proposed to excavate the borrow pit to 67m Ordnance Datum. Where necessary, an interceptor drain will also be installed upslope of the borrow pit. This drain will divert any surface water away from the borrow pit, preventing water from ponding and lodging in the borrow pit area. Groundwater management at the proposed borrow pit will be necessary to avoid ponding, and pumping will likely be required. The detailed design will need a drainage and groundwater management plan for the borrow pit area.

Upon removal of the overburden and rock from the proposed borrow pit, it is not proposed to reinstate the borrow pit using surplus excavated peat and spoil generated onsite during the construction of the Proposed Project. The final profile will vary across the base of the borrow pit. The volume assessment at the borrow pit suggests that the available stone fill capacity is lower than the stone requirements at the site, meaning that the import of stone from external sources will be required to complete the development.

An indicative layout of the proposed borrow pit is presented in the Peat and Spoil Management Plan in Appendix 4-3 in the EIAR.

2.5.3.4 Peat and Spoil Repository Areas

A number of areas within the site have been identified as suitable for the placement of peat and spoil are shown in Figure 2-2. The proposed peat repository areas are located in proximity to the hardstands and foundations of T6, T7, T10 and T11 turbine bases and hardstands (4 no. individual peat repository areas proposed). These areas have been selected based on a combination of the depth of peat, the recorded peat strength in the area and the slope angle and these results are included in Gavin Doherty Geosolutions (GDG) Appendix 8-1 Peat Stability Assessment Report (GDG, 2024) in the EIAR.

Peat Repository Areas

The placement of peat within the peat repository areas will be undertaken as follows:

- Peat repository areas have been identified at locations where the topography (slope angle <5°), peat depth, resulting stability assessment (FoS of >1.3 for 1m peat surcharge) and other environmental constraints (including 50m buffer from all watercourses) have allowed. These areas are designated for the permanent placement of up to 1m of peat material.
- A cell berm will be constructed similarly to the peat repository area detail outlined in Appendix B of Appendix 4-3 Peat and Spoil Management Plan in the EIAR. This cell berm will help to prevent the flow of saturated peat material. The stone berm will be constructed with a sufficiently coarse granular material or rock to enable the drainage of the placed peat material and prevent any instabilities within the repository area.
- The stone cell berm will require a geotextile separator. The stone cell berm will be constructed using low-ground pressure machinery working from bog mats where necessary.

- The height of the cell berm constructed will be greater than the height of the placed peat & spoil to prevent any surface peat runoff. Berms up to 1.25m in height will be required, subject to detailed design.
- The cell berm is subject to the detail designer's specification; however, some peat excavation or installation of a shear key may be required to prevent global instabilities within the stored material. The shear key will comprise an excavation below the existing ground level beneath the cell berm to provide resistance against lateral forces.
- Where possible, the placed peat and spoil surface will be shaped to allow efficient runoff of surface water from the peat and spoil repository areas.
- Silting ponds will be required at the repository area's lower side/outfall location.
- Intermediate berms or buttresses of spoil material may be installed within the peat repository area to aid in the placement and stability of the peat material. These berms will be shaped to align with the contours of the repository area.
- The Contractor shall make every reasonable effort to promote growth in the peat repository areas following the placement of peat and completion of construction stage activities. Upper acrotelm layers shall be placed on the surface the right way up to promote vegetation growth.

Spoil Repository Area

The proposed spoil repository area is located in an agricultural field situated between T8 and T9 turbines. The proposed spoil repository area will be accessed via a proposed spoil repository access road which travel west past the turbine foundation and hardstand of T9 turbine. The placement of spoil within the spoil repository area will be undertaken as follows:

- Cohesive glacial tills considered unsuitable for reuse in the Proposed Project will require placement in a separate spoil repository area.
- The spoil repository area has been identified in a location where the topography (slope angle <5°), peat depth, resulting stability assessment (Factor of Safety of >1.3 for 1m peat surcharge) and other environmental constraints (including 50m buffer from all watercourses) have allowed. This area is designated for permanently placing up to 1m of non-peat spoil material.
- Side slopes of placed spoil material are to be no greater than 1(V):2(H).
- Where possible, the surface of the placed spoil will be shaped to allow efficient surface water runoff from the peat placement areas.
- Silting ponds may be required at the repository area's lower side/outfall location.
- Intermediate berms or buttresses of granular material may be installed within the spoil repository area to aid in the placement and stability of the spoil material. These berms will be shaped to align with the contours of the repository area.

The Contractor shall make every reasonable effort to promote growth in the spoil repository areas following the placement of spoil and completion of construction stage activities.

2.5.3.5 Turbine Foundations

Turbines T1-T4 will either be a gravity foundation or pre-cast piling due to the presence of these proposed turbines within the Zone of Contribution. The following construction methodology, as outlined in Section 9.3.9 of the EIAR, describes the proposed design measures that will be utilised:

- The gravity foundation option will seek a suitable founding in the glacial tills at a maximum of 3 - 3.5mblg and therefore excavations will only require the removal of overburden to the final base level which will be within the overburden layer.
- A protective layer of overburden will be left in place above the bedrock.

- Gravity foundation is the preferred option unless further site investigations deem it unsuitable. If gravity foundation is not suitable at a depth of 3 - 3.5m or above, precast piling will be the approach.
- Pre-cast piling will involve driving imported concrete piles down onto the top of bedrock below the glacial tills. The piles will not be drilled into the underlying bedrock aquifer nor will they be grouted in place.
- The gravity foundation or pre-cast piling approach will not require excavations or grouting down into the bedrock aquifer and therefore there will be no risk of intercepting potential underlying bedrock conduits/fractures that transmit groundwater to the spring.
- Short term pumping/dewatering of turbine base excavations is likely to be required in the gravity base scenario, but this will only be seepage from the overlying glacial overburden and therefore, with both approaches there will be no potential whatsoever to disrupt underlying groundwater flow paths (conduits/fractures) in the bedrock aquifer that feeds the Gurteen/Cloonmore GWS spring.
- Therefore, with both approaches there will be no potential whatsoever to disrupt underlying groundwater flowpaths (conduits/fractures) in the bedrock aquifer that feeds the Gurteen/Cloonmore GWS Spring.

Outside of Turbines T1-T4, all other proposed turbines will be constructed using gravity based foundations. If these are deemed unsuitable, the standard bored piling will be an option at these turbine locations due to the presence outside of the Gurteen/Cloonmore GWS refined ZoC.

2.5.3.6 Crane Hardstands

All crane pads 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 (refer to Section 2.5.3.2 above) and will measure approximately to the turbine manufacturer's requirements. The position of the crane pads varies between turbine locations depending on topography, position of the site access road, and the turbine position.

2.5.3.7 Clear-Span Bridge Crossing

It is proposed to construct clear-span bridges at watercourse crossing along the Proposed Project site access roads at 6 no. locations – 5 no. new watercourse crossing locations and 1 no. existing watercourse crossings for upgrading. The location of the crossings is shown on the layout drawings included in Appendix 4-1 of the EIAR. The clear-span watercourse crossing methodologies presented below will ensure that no instream works are necessary.

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

- The access road on the approach either side of the watercourse will be completed to a formation level which is suitable for the passing of plant and equipment required for the installation of the watercourse crossing.
- All drainage measures along the proposed road will be installed in advance of the works.
- A foundation base will be excavated to rock or competent ground with a mechanical excavator with the foundation formed in-situ using a semi-dry concrete lean mix. The base will be excavated along the stream bank with no instream works required.
- Access to the opposite side of the watercourse for excavation and foundation installation will require the installation of a temporary pre-cast concrete or metal bridge across the watercourse to provide temporary access for the excavator. Plant and equipment will not be permitted to track across the watercourse.

- Concrete abutments will be installed on either side of the watercourse and will be cast in-situ
- Once the foundation base has been completed, the pre-cast concrete elements will be installed using a crane which will be set up on the bank of the watercourse and will be lifted into place from the bank with no contact with the watercourse.
- Where the crossing is completed using a box culvert this will be installed in sections on a similar a concrete foundation, the joints will be sealed to prevent granular material entering the watercourse,
- Once the crossing is in position stone backfill will be placed and compacted against the structure up to the required level above the foundations.

A standard design drawing of a pre-cast concrete, clear-span crossing is shown in Figure 4-34 in Chapter 4 of the EIAR.

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

2.5.3.8 Culvert Crossings

All new proposed culverts and proposed culvert upgrades 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 Project, particularly where the waters have to 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. In some cases, two or more smaller diameter culverts may be used where this depth is limited, though this will be avoided as they will have a higher associated risk of blockage than a single, larger pipe. 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.

2.5.3.9 Site Underground 33kV and Communication Cabling

The underground electrical (33kV) and communication cabling will be laid beneath the surface of the site, proposed new road or existing road using the following typical methodology:

- Before works commence, surveying will take place along the proposed cable route, with all existing culverts identified. All relevant bodies i.e. ESB, Galway County Council etc. will be contacted and all drawings for all existing services sought.

- When the cable is located on public roads, a traffic management plan will be set up prior to any works commencing.
- A road opening licence will be obtained where required and all plant operators and general operatives will be inducted and informed as to the location of any services.
- A tracked 360-degree excavator will then proceed to dig out the proposed trench, typically to a depth of 1200mm, within which the ducts will be laid.
- Trench supports will be installed, or the trench sides will be benched or battered back where appropriate and any ingress of ground water will be removed from the trench using submersible pumps, fitted with appropriate silt filtration systems, to prevent contamination of any watercourse.
- Once the trench has been excavated, a base-layer will be laid and compacted, comprising Clause 804, or 15 Newton CBM4 concrete as required.
- The ducting will be installed as per specification, with couplers fitted and capped to prevent any dirt etc. entering the duct. In poor ground conditions, the ends of the ducts will be shimmed up off of the bed of the trench, to prevent any possible ingress of water dirt. The shims will be removed again once the next length has been connected. Extreme care will be taken to ensure that all duct collars (both ends) are clean and in good condition prior to ducts being joined.
- As the works progress, the as-built location of the ducting will be recorded using a total station or GPS.
- As per the associated base-layer (Clause 804 material or 15 Newton CBM4 concrete) will be installed and compacted as per approved detail, with care not to displace the ducting.
- Spacers will be used to ensure that the correct cover is achieved at both sides of the ducting.
- The remainder of the trench will be backfilled in two compacted layers with approved engineer's specified material.
- Yellow marker warning tape will be installed across the width of the trench, at 300mm depth, before the finished surface is reinstated, as per original specification. Although the typical cross section of the off-road cabling trench shows a finished surface level of reinstated topsoil, these revised sections of off-road cabling may be finished with granular fill to facilitate access to the trench for any potential maintenance that is required during the operational phase of the Proposed Project.
- Marker posts will then be placed at regular intervals (generally at joint bays and any change in direction) to denote the location of the underground power cables.

2.5.3.10 Site Underground Electrical (38kV) Cabling and End Masts

38kV Underground Cabling and Cable Trench

The cabling will be routed through the proposed internal access roads and will consist of 3 no. 110mm diameter HDPE power cable ducts and 1 no. 110mm diameter HDPE communications duct to be installed in an excavated trench, typically 600mm wide by 1,220mm deep.

The underground electrical cabling will be laid using the following methodology:

- Before works commence, updated surveying will take place along the proposed cable route, with all existing culverts identified. All relevant bodies i.e. ESB, will be contacted and all up to date drawings for all existing services sought.
- A tracked 360-degree excavator will then proceed to dig out the proposed trench, typically to a depth of 1200mm, within which the ducts will be laid.
- The cable ducts will be concrete surrounded where they pass under the public road and under drains or culverts.
- Trench supports will be installed, or the trench sides will be benched or battered back where appropriate and any ingress of ground water will be removed from the trench

using submersible pumps, fitted with appropriate silt filtration systems, to prevent contamination of any watercourse.

- Once the trench has been excavated, a base-layer will be laid and compacted, comprising Clause 804, or 15 Newton CBM4 concrete as required.
- The ducting will be installed as per specification, with couplers fitted and capped to prevent any dirt etc. entering the duct. In poor ground conditions, the ends of the ducts will be shimmed up off of the bed of the trench, to prevent any possible ingress of water dirt. The shims will be removed again once the next length has been connected. Extreme care will be taken to ensure that all duct collars (both ends) are clean and in good condition prior to ducts being joined.
- As the works progress, the as-built location of the ducting will be recorded using a total station or GPS.
- As per the associated base-layer (Clause 804 material or 15 Newton CBM4 concrete) will be installed and compacted as per approved detail, with care not to displace the ducting.
- Spacers will be used to ensure that the correct cover is achieved at both sides of the ducting.
- The remainder of the trench will be backfilled in two compacted layers with approved engineer's specified material.
- Yellow marker warning tape will be installed across the width of the trench, at 300mm depth.
- The finished surface is to be reinstated, as per original specification. Off-road cabling may be finished with granular fill to facilitate access to the trench for any potential maintenance that is required during the operational phases of the Proposed Project and the proposed 38kV overhead line.
- Marker posts will then be placed at regular intervals to denote the location of the underground power cables.

38kV Line to Cable Interface End Masts

The working area for construction surrounding both end masts will extend 10m around the footprint of the structures. Excavations for the foundations of each leg for the end masts will typically be 1.85m x 1.85m and 2.5m deep.

- Prior to any construction activities, the proposed end mast sites will be scanned for underground services such as cables, water pipes etc. Consultations with landowners will help to identify hazards and ensure there are no unidentified services in the works area.
- Excavations for the foundations of each leg for the end masts will typically be 1.85m x 1.85m and 2.5m deep. The formation levels (depths) shall be checked by the onsite engineer.
- In areas of poor ground/high water table, it may be necessary to use sheet piles supported by hydraulic frame(s) to prevent collapse of the sides and prevent the excavation becoming too large. In this scenario, the requirement of a concrete pipe (which is typically used in tower foundations) is removed. During any dewatering activities, a standard water filtration system shall be utilised to control the amount of sediment in surface ware runoff.
- Once excavations are completed, the legs of the end masts are placed within the excavated areas and concrete shall be poured into each area. The legs of the end masts will require to be shuttered with metal panels to form its required shape. Once concrete is set, the shuttering is removed along with sheet piles (if required).
- The mast foundations shall be backfilled one leg at a time with excavated material. The backfilled material shall be compacted and placed in layers.

- An earth mat consisting of copper wire will be laid circa 600mm below ground around the end mast. This earth mat is a requirement for the electrical connection of the equipment on the end mast structure.
- A temporary hardstand area shall be constructed and used for the assembly of the end mast structures.
- The upper components of the end mast will be lifted into place on top of the legs using a crane and the body sections will be bolted into position.

2.5.3.11 Peatland Enhancement Area

As part of the Proposed Project, an area of 11.6ha of uncut raised bog is proposed for enhancement by installing a number of drain blocks using peat plugs in existing drains which are intended to encourage rewetting of the peatland area. The purpose of this measure is to raise the water table in the drain, and in adjacent areas in order to reduce run-off rates, carbon losses and the potential for subsidence. Drain blocking will be subject to approval and carried out under the supervision of the project geotechnical engineer, project hydrologist and project ecologist. The area proposed as the Peatland Enhancement Area is shown in Figure 2-2. The peat stability at this location is discussed in Appendix 8-1 - Peat Stability Risk Assessment report in the EIAR produced by GDG. The methodology for peatland restoration is outlined in Section 6.1 of Appendix 4-3 Peat and Spoil Management Plan in the EIAR. It is proposed that the drains within this area will be blocked with peat dams every 20m intervals to reduce the drainage of water from the water and to rise the water table. The rising of the water table will enable the accumulation of peat to occur.

As outlined in the Biodiversity Management and Enhancement Plan in Appendix 6-6 in the EIAR, in order to facilitate the re-establishment of peatland vegetation within these areas, and maintain an effective hydrological regime, the following measures are proposed in these areas:

- Prior to drain blocking works taking place, the proposed enhancement area will be surveyed by a suitably qualified ecologist and hydrologist to identify drains to be blocked. A dam should be placed every 10cm drop in elevation with a minimum of three and maximum of ten dams per 100m. A topographic survey should be carried out in advance of drain blocking to identify and mark locations for dams.
- Drain blocking will be undertaken on a local scale, within the proposed enhancement area. Where machine access is possible and significant erosion by water flow in the existing drains is not anticipated, this will be achieved by installing peat dams within the existing drainage ditches. This will maintain, enhance and restore the favourable baseline hydrological and ecological conditions within the enhancement area. Installation methodology as outlined in Appendix 6-6 in the EIAR, are as follows:
    - Appropriate machine tracking routes should be identified prior to commencement of works, with the use of off-road vehicles restricted to the proposed new site access track as much as possible. The number of machine passes should also be minimised.
    - A suitable location for machine checks, refuelling and storage should be identified in advance of undertaking works.
    - Scraw is removed from the area of the dam (placed close-by for replacement later) and peat is cleared from both sides of the drain. Scraw is also removed from an area behind machine to be used as a borrow pit.
    - A key is cut in the drain, ensuring that this is wider than the actual drain (c. 50cm either side).
    - Peat is dug from the borrow pit and placed into the drain, compacting as additional layers are added. Only deeper, more compacted peat should be used to build the dam. The dam should be built at least 30-50cm above the surface of the bog to allow for subsequent shrinkage of the peat as it dries and extend the sides at least 50cm into the bog.
    - The scraw should then be replace and compacted on the top and sides of the dam to stabilise the dam and prevent erosion.

- The borrow pit should then be re-profiled and backfilled with the peat removed from sides of drain to form the key and any loose peat from the borrow pit. Any remaining scraw should then be replaced and compacted into the borrow pit.
- An example of peat dams proposed is shown in the Biodiversity Management and Enhancement Plan in Appendix 6-6 of the EIAR. The methodology for peat dam construction is provided in Appendix 6-6 in the EIAR. A graphic of the desired completed peat dam is shown in in Appendix 6-6 in the EIAR.
- Peat damming has been proven very effective at many bogs. Success in restoring active raised bog will depend on surface slope, flow patterns and extent of vertical losses of water through the peat to depth. The build quality of the dam will also have a significant influence on the success in restoring active raised bog. Poorly constructed dams may fail completely or fail to maintain a high water level. If there is significant water flows in the drain this can cause erosion of the dams. In cases such of this consideration should be given to using plastic pile to reinforce and protect the peat dams.

Where peat dam construction is not possible, plastic dams may be installed by hand, especially in areas where peat dams may erode (as outlined above), or where machine access is not possible. Installation methodology as outlined in Appendix 6-6 in the EIAR are as follows:

- Plastic dams are typically installed by hand using lengths of inter-locking plastic piles. These can be supplied in varying lengths and if necessary, cut to size depending on the depth of the drain. It is important that the piles are long enough to extend sufficiently below the base of the drain in order to be secure and minimise water flow under the base of the dam. This may vary depending on the characteristics of the drain.
- The first plastic pile is pushed into the centre of the drain, ensuring it remains vertical. This should then be driven further into the peat until it is held firm using a large rubber mallet (if necessary, protect the top of the plastic using a timber batten).
- Once the centre pile is in a secure position, adjacent piles are guided into position, being pushed into the peat and using the rubber mallet to drive into a firm position.
- The dam should extend beyond the width of the drain into the bog, typically by a minimum of 50cm to prevent water flowing around the dam and eroding the sides of the drain.
- Once all piles have been positioned and are secure, they should be driven to a final position, starting from the centre until all piles are approximately 30cm above the level of the surface.
- This plastic should extend at least 50cm below the base of the drain if the peat is very firm. If the peat is weak the plastic should be driven in further until the plastic is held secure.
- If significant flow is expected which could cause erosion around the dam, a notch for water to overflow should be created by driving the centre pile(s) slightly further until it is below the level of the adjacent bog surface.
- An example of a plastic dam is shown in the Biodiversity Management and Enhancement Plan in Appendix 6-6 in the EIAR. The methodology for plastic dam installation is provided in Appendix 6-6 in the EIAR.
- Plastic damming has been proven very effective at many bogs where it has been used and installed correctly, however it is very ineffective if plastic is not installed deep enough into the drain or does not extend far enough laterally into the bog. In some areas where significant water level fluctuations occur a gap may open up between the peat and plastic allowing increasing water losses over time.

In addition, the following measures will be adhered to during the enhancement process:

- Maintenance requirements are low providing dams are installed correctly. Most damage will typically occur within the first year of installation during times of high flow. This may require a survey to check dam integrity and identify locations where dams require replacement or where enforcement is required.
- No additional drainage will be installed in proximity to these habitat areas during the lifetime of the development.

- All works will be preceded by a toolbox talk to the enhancement team by the project ecologist to ensure all measures are implemented in full.
- Peat extraction within the proposed peatland reinstatement area will not be permitted.
- Burning and dumping will not be permitted.
- The rehabilitation area will be monitored (as described below) to assess the success of the rehabilitation plan.

Monitoring and Reporting

Prior to the commencement of the habitat enhancement measures described in this Biodiversity Management and Enhancement Plan in Appendix 6-6 in the EIAR, permanent vegetation monitoring plots will be established within the management areas. The monitoring plot locations will be selected using stratified random sampling. This will allow the monitoring plots to be representative of microtopography and vegetation cover, sampling areas from the wettest, intermediate and driest parts of the management areas. It is proposed that a minimum of ten 2m x 2m monitoring plots will be established across the enhanced areas. Monitoring plots will be surveyed once annually during the first five years of the windfarm and at 5 year intervals for the lifespan of the windfarm (35 years) by a suitably qualified ecologist.

Hydrological monitoring will also be required to assess the effectiveness of the enhancement works. Water levels within areas where drains are blocked will be recorded bi-annually during the first five years of the windfarm and at 5-year intervals for the lifespan of the windfarm (35 years). A number of dipwells or piezometers will be inserted on the peatland to monitor the height of the water table. These will be constructed from 52mm internal diameter PVC. To stop peat filling the tube from the base, the pipe will be covered with gauze affixed with tape. This will be done prior to restoration to allow monitoring of water levels within both the restoration and enhancement areas.

Monitoring results will be reported by a suitably experienced ecologist within an Environmental and Ecological Report with any criteria failures identified and corrective actions implemented.

2.5.3.12 Commercial Forestry, Woodland and Hedgerow Felling

The site currently comprises a mixture of peatland, agricultural fields and commercial coniferous forestry plantation. As part of the Proposed Project, tree felling will be required within and around the development footprint to allow the construction of turbine bases, access roads and the other ancillary infrastructure.

A total of 10.3 hectares will be permanently felled within and around the footprint of the Proposed Project in order to facilitate infrastructure construction and turbine erection.

The tree felling activities required as part of the Proposed Project will be the subject of a Limited Felling Licence (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 estimated 10.3 hectares that will be permanently felled for the footprint of the turbines and the other infrastructure and turbine erection will be replaced or replanted on a hectare for hectare basis as a condition of any felling licence that might be issued in respect of the proposed wind farm development. Replanting is a requirement of the Forestry Act and is primarily a matter for the statutory licensing processes that are under the control of the Forest service.

Felling works will conform to current best practice Forest Service policies and strategic guidance documents as well as Coillte produced guidance documents, including the specific guidelines listed below, to ensure that the felling works provides minimal potential impacts to the receiving environment.

- 'Standards for Felling and Reforestation' (Department of Agriculture, Food and the Marine, 2019)
- 'Forest Operations & Water Protection Guidelines' (Coillte, 2009)
- 'Methodology for Clear Felling Harvesting Operations' (Coillte, 2009)
- 'Forestry and Water Quality Guidelines' (Forest Service, 2000)
- 'Forestry Biodiversity Guidelines' (Forest Service, 2000)
- 'Forestry Protection Guidelines' (Forest Service, 2002)
- 'Forestry Harvesting and Environmental Guidelines' (Forest Service, 2000)

The proposed methodology that will be implemented for the forestry felling activities is as follows:

- The extent of all necessary forestry felling areas will be identified and demarcated with markings on the ground in advance of any felling commencing.
- All roads and culverts will be inspected by the Environmental Clerk of Works (ECoW) and contractor prior to any machinery being brought on site to commence the felling operation.
- Existing drains that drain an area to be felled towards surface watercourses will be blocked, and temporary silt/sediment traps (i.e., check dam / silt fence) will be constructed to ensure collection of all silt within felling areas. These temporary silt traps will be cleaned out and backfilled once felling works are complete. This ensures there is no residual collected silt remaining in blocked drains after felling works are completed.
- New collector drains and sediment traps will be installed during ground preparation to intercept water upgradient of felling areas and divert it away. Collector drains will be excavated at an acute angle to the contour (0.3%-3% gradient), to minimise flow velocities.
- Sediment traps will be sited in drains downstream of felling areas. Machine access will be maintained to enable the accumulated sediment to be excavated.
- Sediment removed from traps will be carefully disposed of in the peat repository areas.
- Machine combinations (i.e., hand-held or mechanical) will be chosen which are most suitable for ground conditions at the time of felling, and which will minimise soils disturbance; however, the general proposed machine combination will comprise a harvester and a low-ground pressure harvester with a 14-tonne bunk capacity.
- Trees will be cut manually inside the 50m construction watercourse buffer and using machinery to extract whole trees only;
- Brash mats will be put in place to support vehicles on soft ground, reducing peat and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur.
- Brash mat renewal will take place when they become heavily used and worn. Provision will be made for brash mats along all off-road routes, to protect the soil from compaction and rutting.
- No tracking of vehicles through watercourses will occur. Vehicles will only use existing road infrastructure and established watercourse crossings.
- Brash which has not been pushed into the soil may be moved within the site to facilitate the creation of mats in more demanding locations.
- Extraction routes, and hence brash mats, will be aligned parallel to the ground contours where possible.
- Harvested timber will be stacked in dry areas, and outside any 50-metre watercourse buffer zone prior to removal off site.

As part of the Proposed Project, 2.14ha of woodland and scrub felling will be required to accommodate the proposed turbines and the associated bat setback buffers, wind farm roads and other key infrastructure. Section 2.1 in the Biodiversity Management and Enhancement Plan in Appendix 6-6 in the EIAR provides further detail on the felling areas, species and associated infrastructure.

In Section 3.1 in the Biodiversity Management and Enhancement Plan in Appendix 6-6 in the EIAR, detail is provided on the proposed hedgerow/treeline felling. The majority of hedgerow/tree habitat loss is associated with habitat buffering measures required to avoid impact on bats as per NatureScot recommendations. The proposed vegetation removal to prevent impacts on bats is summarised in Table 3-1 in the Biodiversity Management and Enhancement Plan in Appendix 6-6 in the EIAR. Linear vegetation loss associated with construction of the Proposed Project infrastructure measures 1,061m in total. All vegetation clearance will be conducted in accordance with the provisions of the Wildlife Acts (as amended).

In order to prevent impacts on roosting bats in areas of woodland, the following procedures, as outlined in Appendix 6-6 in the EIAR, are proposed prior to felling trees:

- A pre-commencement survey will be carried out by a suitably qualified ecologist for trees with Potential Roosting Features (PRFs) proposed for felling.
- A bat derogation licence will be obtained from the NPWS for the loss of any confirmed roost resource, prior to felling, and the felling activity will be supervised by a qualified ecologist.
- Tree-felling of mature deciduous trees will be carried out according to the following standard mitigating procedures:
    - Trees with suitable potential roost features proposed for felling will be checked for bats by a suitably qualified arborist at the time of felling.
    - Trees will be nudged two or three times prior to limb removal, with a pause of 30 seconds in between, to allow bats to wake and move.
    - Rigged felling shall be used to lower the limbs and trunk carefully to ground level and cavities searched by a qualified ecologist.
    - Felled trees will be left in-situ for a minimum of 24 hours prior to sawing or mulching, to allow any bats present to escape.
    - Any tree felling will be undertaken outside the bat maternity season (May-August) and the hibernation period (December-February).

2.5.3.13 Woodland and Hedgerow Replanting

2.5.3.13.1 *Woodland*

Woodland Replanting

In Section 2.3 of the Biodiversity Management and Enhancement Plan in Appendix 6-6 in the EIAR outlines the proposed woodland replanting regime. The loss of 2.14ha of woodland and scrub will be offset through the planting of native woodland within the Site. It is proposed to plant approximately 2.89 hectares of native woodland to offset that loss as well as achieving biodiversity net gain, as such this habitat would constitute a high local biodiversity value. The planting of 2.89ha of native tree species will result in an increase of approx. 0.75ha of woodland within the Site, accounting for the felling of wet willow-alder-ash woodland, bog woodland, immature woodland and scrub during the construction phase.

It is proposed to plant by hand, approximately 2.89ha of native tree species within the Site in this area north of Turbine 9. Tree species and plant community to be planted will include those which have the potential to develop a habitat in-keeping with the existing adjacent woodland.

The proposed woodland replanting area is shown in Figure 1-3 in the Biodiversity Management and Enhancement Plan in Appendix 6-6 in the EIAR. It is proposed that the woodland replanting regime will include the following species composition as stated in the Biodiversity Management and Enhancement Plan in Appendix 6-6 in the EIAR:

- Pure groups (30-40 trees) of alder (50%), grey willow (10%) & downy birch (10%).

- Groups interspersed alternately (to improve stability & robustness, & to prevent the development of an alder monoculture).
- Pedunculate oak (10%) on drier areas.
- Hawthorn (5%) scattered throughout.
- Minor species (15%) to comprise at least two of the following, positioned between the above pure groups: holly, hazel, guelder rose.

Maintenance of the Newly Planted Woodland Habitat

Maintenance of the proposed woodland planting will be follow the measures outlined in the Biodiversity Enhancement and Management Plan in Appendix 6-6 in the EIAR.

Monitoring and Reporting

As outlined in the Biodiversity Management and Enhancement Plan in Appendix 6-6 in the EIAR, the woodland replanting scheme will be monitored by a qualified ecologist.

At the end of the 5-year monitoring plan as outlined above, the Project Ecologist will assess the need for and frequency of further monitoring of the woodland replanting area in agreement with the wind farm operator. In order to carry out monitoring, a qualified ecologist will conduct inspections and relevés of the planting area following the main growing season. These inspections and relevés will be recorded and entered into a monitoring report. The collected information will inform the success of the proposal allow for adaptive intervention if it is deemed necessary.

Monitoring results will be reported by a suitably experienced ecologist within an Environmental and Ecological Report with any criteria failures identified and corrective actions implemented as outlined in the Biodiversity Management and Enhancement Plan in Appendix 6-6 in the EIAR.

2.5.3.13.2 *Hedgerow*

Hedgerow Replanting

In Section 3.3 in the Biodiversity Management and Enhancement Plan in Appendix 6-6, it is outlined the proposed hedgerow planting regime to be undertaken. The proposed planting of 2,419m of hedgerow habitat will result in the creation of an additional 1,358m of linear vegetation habitat within the Site. Of the proposed 2,419m of hedgerow planting, 544m will be planted along the northern, western and southern perimeter of the proposed borrow pit during the operational phase of the Proposed Project.

There is an extensive network of existing linear landscape features in the wider area that will be retained, and the proposed replanting will enhance connectivity across the Site and wider landscape. Planting will be of semi-mature specimens to ensure connectivity gains are immediate and will be indigenous to the local area. Such species include hawthorn (*Crataegus monogyna)* which should make up approx. 75% of the hedgerow mix. The ideal native hedge is made up of 75% hawthorn and 25% of at least four other species[1]. Other species which will be included are:

- Spindle (*Euonymus europaeus*)
- Dog rose (*Rosa canina*)
- Hazel (*Corylus avellana*)

[1] *NBDC – Pollinator-friendly Management of Wind Farms – National Biodiversity Data Series No. 25*

- Elder (*Sambucus nigra*)
- Blackthorn (*Prunus spinosa*)

When planting new hedgerow, plants will be closely spaced (a maximum of 50cm apart) and planted in a staggered row. The new hedgerow will need to be protected from browsing by livestock, through the erection of new stockproof fencing where required, which should be at least 1m away from the hedge, and on each side if required.

Maintenance of Newly Planted Hedgerow

As outlined in the Biodiversity Management and Enhancement Plan in Appendix 6-6, in order to facilitate the successful establishment of the new hedgerow and trees to be planted within the Site, and to promote biodiversity value of the new hedgerow the following measures are proposed:

- New hedgerow shrub 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.
- 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 stakes and ties are no longer required these will be removed to avoid damage to the tree.
- 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.
- New hedgerows should be cut annually, with the cutting height raised by 10-15cm each year. This will allow the plants to flower and produce berries whilst preventing the height of the hedgerow from increasing too rapidly.
- Any tree, hedge or shrub that is removed, uprooted, destroyed or that becomes seriously damaged, defective diseased or dead shall be replaced in the same location with another plant of the same species and size as those that were originally planted. All such replacements shall be carried out within the first planting season following the loss.

Monitoring and Reporting

Hedgerows and replanted 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 shrubs 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 an Environmental and Ecological Report. Monitoring results will be reported by a suitably experienced ecologist within an Environmental and Ecological Report with any criteria failures identified and corrective actions implemented.

2.5.4 Proposed Grid Connection

2.5.4.1 Electricity Substation and Control Building

The proposed onsite substation will be constructed by the following methodology as outlined in the Construction Methodology report in Appendix 4-7, produced by TLI, for the EIAR:

- The overall substation and battery compound is circa 107.41m by 131.16m, with a total area of 13,598m^2. This made up of a EirGrid 220kV GIS Compound, an IPP compound and a BESS compound.
- The EirGrid 220kV GIS compound is circa 40.5m by 99m (the footprint is irregularly shaped), surrounded by a 2.6m high palisade fence and post and rail property boundary fence with a total area of circa 3,860m^2.
- The IPP compound shall be circa 52.1m x 107.4m, with an area of 5,594m^2.
- A battery storage compound shall be circa 38.6m x 107.4m, with an area of 4,143m^2.
- The substation compound and drainage shall be marked by a qualified engineer.
- A drainage system shall be installed around the compound area.
- Topsoil and subsoil shall be removed from the footprint of the compound using an excavator. The excavated material shall be temporarily stored in adjacent berms for later use during reinstatement works.
- A layer of geotextile material shall be laid over the footprint of the compound as outlined in Figure 22 of the Construction Methodology Report (Appendix 4-7 in the EIAR).
- 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 granular material used in road construction and sub-base layers consisting 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.
- Each layer shall be compacted using a vibrating roller.
- Earthing cable shall be laid underground around the vicinity of the substation for connection to various electrical components during the electrical fit out phase.
- The construction of the substation compounds consists of a 220kV two-storey switching GIS building and associated outdoor electrical equipment.
- Adequate lighting shall be installed around the compound on the lighting masts.
- Lighting protection masts with an approximate height of 18m shall be installed to provide lighting protection to the substation compound.
- The electrical installation is estimated to last 24 weeks and includes the following:
    - Delivery and installation of all High voltage equipment
    - Wiring and cabling of High Voltage/Low voltage equipment, protection, and control circuits
    - Commissioning of all newly installed equipment.

2.5.4.2 Telecommunications Mast

One telecommunications mast is proposed as part of the Proposed Project. The telecommunications mast will be equipped with wind monitoring equipment at various heights. The proposed telecommunications mast is shown in Appendix 4-2 of the EIAR. The telecommunications mast is a free-standing structure which will be constructed on a hardstanding area sufficiently large enough to accommodate the equipment that will be used to erect the mast. They will be formed at a suitable level directed by the Geotechnical Engineer/Designer. The foundations will be constructed as outlined in Appendix 4-7 Construction Methodology Report, in the EIAR, produced by TLI, as follows:

- 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 telecommunications mast;
- No material will be removed from site with excavated spoil being transported and stored in the identified spoil repository areas within the Proposed Wind Farm site;
- All groundwater and surface water arising from telecommunications mast 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 telecommunications mast foundation;

2.5.4.3 Underground Cable Trench

An indicative methodology to construct cable trenches within new founded roads, as presented in Section 4.3 of the Peat and Spoil Management Plan in Appendix 4-3 in the EIAR, is outlined below:

- Excavation of the new access road to competent strata. Maximum excavation side slopes will be 1V:1.5H (subject to temporary works design).
    - Drainage shall be installed to divert surface and groundwater from the construction areas.
- Cabel trenches are to be dug within the road footprint into the underlying bearing stratum to a suitable depth to allow installation of the ducting (as per cable design requirements).
- No more than a 50m section of trench is recommended to be opened at any one time. The subsequent 50m will only be excavated once most of the reinstatement has been completed on the preceding section.
- Grade, smooth and trim the cable trench floor when the required excavation depth and width have been obtained.
- A layer of geotextile is to be installed at the base of the trench excavation, overlapping with the geotextile layer (if required) at the interface between the access track's granular fill and the natural subgrade. The technical specification of the geotextile is to be confirmed at the detailed design stage.
- The cable ducts shall be installed to the designer's specification and carefully surrounded and covered by rapid hardening wet concrete (grade C25/30) to specified depths. If the top of the concrete is to be installed above the formation level of the access track, suitable formwork may be required to allow the proposed concrete cross-section to be formed.
- A layer of geogrid may be required at the base of the access track's granular fill. To be confirmed at detailed design.
- Placement and compaction of access track fill shall be completed in layers following the designer's specification. The top of the access track is proposed to be 200mm above the existing ground level, with the remainder of the access track's fill thickness to backfill the excavation to a suitable competent strata below the existing ground level. The fill above the cable trench shall be upfilled with Clause 804 material (UGM-A as per Series 600 Specification, TII 2013), while the general fill either side of the Clause 804 is to be a Class 1 material.
- Access roads are to be finished with a granular running surface across the full width of the road.

An indicative methodology to construct cable trenches within new floating roads, as presented in Section 4.3 of the Peat and Spoil Management Plan in Appendix 4-3, is outlined below:

- Bog matts or other temporary access solutions shall be placed on the in-situ material as required.
- Cable trenches are to be dug within the peat to a suitable depth to allow installation of the ducting (as per the cable design requirements). Peat will be excavated to the required depth and removed for placement in designated peat repository areas elsewhere on site.
- No more than a 50m section of trench will be opened at any one time. The subsequent 50m will only be excavated once most of the reinstatement has been completed on the preceding section.
- Grade, smooth and trim the cable trench floor when the required excavation depth and width have been obtained.
- A geotextile-geogrid composite layer is to be installed at the base and around the sides of the trench excavation, directly onto the peat, as shown in Detail 02 in Appendix D overlapping with the existing geotextile-geogrid composite layer at the base of the granular fill. The technical specification of the geotextile-geogrid composite layer is to be confirmed at the detailed design stage.
- Ducts are to be installed to the designer's specification and carefully surrounded and covered by rapid hardening wet concrete (grade C25/30) to specified depths.
- Placement and compaction of granular fill up to 800mm and installation of the reinforcing geogrids in layers following the designer's specification, with due regard to any settlement and deformation of peat anticipated at the access track.
    - The fill above the cable trench shall be upfilled with Clause 804 material (UGM-A as per Series 600 Specification, TII 2013).
    - The general fill either side of the Clause 804 is to be a Class 1 material.
    - Cross-drains shall be installed within the road to divert surface and groundwater from upslope to downslope.
    - Stone delivered to the floating road construction area shall be end-tipped onto the constructed floating road in a manner that will avoid excessive impact loading on the peat due to concentrated end-tipping. Direct tipping of stone onto the peat shall not be carried out.
    - Stone will be spread and placed from the constructed floating road onto the peat surface using a bulldozer.
- Access roads are to be finished with a granular running surface across the full width of the road.

In Section 4 of Appendix 4-7 Construction Methodology document produced by TLI and included in the EIAR, greater detail is provided regarding the construction methodology for the proposed underground grid connection route. The construction methodology is also discussed in the Construction Environment Management Plan in Appendix 4-4 of the EIAR.

2.5.4.4 Grid Connection Construction Methodology

The underground cabling (UGC) works will consist of the installation of ducts in an excavated trench to accommodate power cables, and a fibre communications cable to allow communications between the proposed 220kV Clonberne Wind Farm substation and the existing 220kV Overhead Line at Laughil.

The proposed UGC, as outlined in Appendix 4-7 Construction Methodology Report in the EIAR, will consist of 2 no. ducts to accommodate 3 No. 200mm diameter HDPE power cable ducts and 2 No. 125mm diameter HDPE communications duct to be installed in an excavated trench (see Plate 2-1 below), typically 1,957mm wide by 1,250mm deep, with variations on this design to adapt to service crossings and watercourse crossings, etc. The power cable ducts will accommodate 3 No. power cables per duct. The communications duct will accommodate a fibre cable to allow communications in the existing Cashla – Flagford Overhead Line to the Clonberne substation. The ducts will be installed, the trench reinstated

in accordance with Galway County Council specification, and then the electrical cabling/fibre cable pulled through the installation ducts in approximately 550 – 750m sections. Construction methodologies to be implemented and materials to be used will ensure that the UGC is installed in accordance with the requirements and specifications of Eirgrid and ESB.

Plate 2-1 Cable Trench View

2.5.4.4.1 Existing Underground Services

In order to facilitate the installation of the proposed UGC, it may be necessary to relocate existing underground services such as water mains or existing cables. In advance of any construction activity, the contractor will undertake additional surveys of the proposed route to confirm the presence or otherwise of any services. If found to be present, the relevant service provider will be consulted with in order to determine the requirement for specific excavation or relocation methods and to schedule a suitable time to carry out works.

If existing low voltage underground cables are found be present, a trench will be excavated, and new ducting and cabling will be installed along the new alignment and connected to the network on either end. The trench will be backfilled with suitable material to the required specification. Warning strip and marking tape will be laid at various depths over the cables as required. Marker posts and plates will be installed at surface level to identify the new alignment of the underground cable, the underground cables will then be re-energised.

In the event that water mains are encountered the water supply will be turned off by the utility so work can commence on diverting the service. The section of existing pipe will be removed and will be replaced with a new pipe along the new alignment of the service. The works will be carried out in accordance with the utility standards.

2.5.4.4.2 Joint Bays

Joints Bays are to be installed approximately every 550 - 750m along the underground grid cable (UGC) route to facilitate the joining of UGC. Joint Bays for 220kV are typically 2.5m x 8m x 1.75m pre-cast concrete structures installed below finished ground level. In association with Joint Bays, Communication Chambers are required at every joint bay location to facilitate communication links between substations. Earth Sheath Link Chambers are also required at every joint bay along the cable route. Earth Sheath Links are used for earthing and bonding cable sheaths of underground power

cables, so that the circulating currents and induced voltages are eliminated or reduced. Earth Sheath Link Chambers and Communication Chambers are located in close proximity to Joint Bays. Earth Sheath Link Chambers and Communication Chambers will typically be pre-cast concrete structures with an access cover at finished surface level. The precise siting of all Joint Bays, Earth Sheath Link Chambers and Communication Chambers is subject to approval by ESBN. Marker posts will be used on non-roadway routes to delineate the duct route and joint bay positions.

The following, as outlined in Section 4.3 of Construction Methodology in Appendix 4-7 in the EIAR, states the construction methodology for the proposed steel mast structures which form part of the proposed grid connection infrastructure:

- *The contractor will excavate a pit for joint bay construction, including for a sump in one corner.*
- *Grade and smooth floor; then lay a 75 mm depth of blinding concrete (for in situ construction) or 50 mm thick sand (for pre-cast concrete construction) on 200 mm thick Clause 804 granular material.*
- *In situ construction. Construct 200 mm thick reinforced concrete floor slab with sump and starter bars placed for walls as detailed on the drawings in Appendix 4-2 in the EIAR.*
- *In situ construction. Construct 200 mm thick reinforced concrete sidewalls as detailed on the drawings included in Appendix 4-7 in the EIAR.*
- *In situ construction. Remove formwork and backfill with suitable backfill material in grassed areas or Clause 804 material once ducting has been placed in the bay. Backfill externally with granular material to Co. Council/TII Specification for Roadworks.*
- *Where joint bays are located under the road surface the joint bay will be backfilled with compacted layers of Clause 804 and the road surface temporarily reinstated as specified by the local authority.*
- *Precast concrete covers may be used as temporary reinstatement of joint bays at off road locations. These covers are placed over the constructed joint bay and are then removed at the cable installation stage of the project.*
- *At a later date to facilitate cable installation and jointing, reinstate traffic management signage, secure individual sites, re-excavate three consecutive joint bays and store excavated material for reuse.*
- *The cable is supplied in pre-ordered lengths on large cable drums (Figure 13) (as shown in Appendix 4-7 in the EIAR). Installing "one section" of cable normally involves pulling three individual conductors into three separate ducts. The cable pulling winch must be set at a predetermined cut off pulling tension as specified by the designer. The cable will be connected to the winch rope using approved suitably sized and rated cable pulling stocking and swivel or the pulling head fitted by the cable manufacturer. A sponge may also be secured to the winch rope to disperse lubricant through the duct. Lubrication is also applied to the cable in the joint bay before it enters the duct.*
- *Once the "two sections" of cable (total of 6 conductors) are pulled into the joint bay, a jointing container is positioned over the joint bay and the cable jointing procedure is carried out in this controlled environment. (Figure 14) (as shown in Appendix 4-7 in the EIAR).*
- *Following the completion of jointing and duct sealing works in the joint bay, place, and thoroughly compact cement-bound sand in approximately 200 mm layers to the level of the cable joint base to provide vertical support. Install additional layers of cement-bound sand and compact each layer until the cement-bound sand is level with the top of the joint. Install an additional 100 mm cement bound sand layer. Install cable protection strip. Backfill with cement-bound sand to a depth of 250mm below surface and carry out permanent reinstatement including placement of warning tape at 400 mm depth below finished surface.*

2.5.4.4.3 *Steel Mast Structures*

The following, as outlined in Section 3.3 of Construction Methodology in Appendix 4-7 in the EIAR states the construction methodology for the proposed steel mast structures which form part of the proposed grid connection infrastructure:

- *Mast sites are scanned for underground services such as cables, water pipes etc. Consultations with landowners shall help to identify hazards and ensure that there are no unidentified services within the area.*
- *For leg of the 2 masts (8 legs in total) a foundation of circa 4.4m by 4.4m by 3.6m deep are required. To allow for safe construction where ground conditions are good, the excavation shall be stepped back which requires additional area to be excavated as outlined in Figure 4 (as shown in Appendix 4-7 in the EIAR). The formation levels (depths) shall be checked by the onsite engineer. The excavated material shall be temporarily stored close to the excavation and excess material shall be used as berms along the site access roads.*
- *To aid construction, a concrete pipe shall be placed into each excavation to allow operatives level the mast at the bottom of the excavation. The frame of the reinforcing bars shall be prepared and strapped to a concrete pipe with spacers as required. The reinforcing bars shall be lifted into each excavated foundation using the excavator and chains/slings. The base and body section of each mast shall then be assembled next to the excavation.*
- *In areas of insufficient ground and high-water table, it may be necessary to use sheet piles supported by hydraulic frame(s) to prevent collapse of the sides and prevent the excavation becoming too large. In this scenario, the requirement of a concrete pipe (which is typically used in tower foundations) is removed. During any dewatering activities, a standard water filtration system shall be utilised to control the amount of sediment in surface ware runoff.*
- *A setting template is used to set and hold the tower stubs in position while the concrete is being poured and cured. And water in the excavation shall be poured out prior to any concrete being poured into the foundation.*
- *Concrete trucks shall pour concrete directly into each excavation in distinct stages.*
- *A final pour for the mase is the encasing of the mast leg which shall be finished 300mm over finished ground level. The leg of the mast required to be shuttered with metal panels to form its required shape.*
- *Once concrete is set after five days, the shuttering is removed along with sheet piles (if required).*
- *The mast foundations shall be backfilled one leg at a time with the material already excavated at the location. The backfill shall be placed and compacted in layers. All dimensions shall be checked following the backfilling processes. All surplus excavated material shall be removed from the mast locations and stored in berms for use across the construction site.*
- *An earth mat consisting of copper wire will be laid circa 600mm below ground around the mast. This earth mat is a requirement for the electrical connection of the equipment on the mast structure.*
- *Once the base section of each mast is completed and its concrete is sufficiently cured, it is ready to receive the mast body.*
- *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.*
- *A physical barrier (Heras Fence Site Boundary) shall be put in place to restrict plant from coming too close to the overhead line.*
- *A temporary access road shall be constructed to allow access to the tower locations.*

- *A temporary hardstand area shall be constructed to allow the assembly and laydown of the towers.*
- *The masts shall be constructed lying flat on the ground beside the recently installed mast base on the temporary hardstand.*
- *The mast section will be lifted into place using the crane and guide ropes.*
- *The body sections will be bolted into position.*

2.5.4.4.4 Gantry Structures

The following, as outlined in Section 3.4 of Construction Methodology in Appendix 4-7 in the EIAR, states the construction methodology for the proposed gantry structures which form part of the proposed grid connection infrastructure:

- *Gantry sites are scanned for underground services such as cables, water pipes etc. consultations with landowners shall help to identify hazards and ensure that there are no unidentified services within the area.*
- *For leg of the 2 gantries (4 legs in total) a foundation of circa 5m by 4m by 2.35m deep are required. To allow for safe construction where ground conditions are good, the excavation shall be stepped back which requires additional area to be excavated as seen in Figure 5 (as shown in Appendix 4-7 in the EIAR). The formation levels (depths) shall be checked by the onsite engineer. The excavated material shall be temporarily stored close to the excavation and excess material shall be used as berms along the site access roads.*
- *The reinforcing bars shall be lifted into each excavated foundation using the excavator and chains/slings. The base and body section of each gantry shall then be assembled next to the excavation.*
- *A setting template is used to set and hold the gantry J-bolts in position while the concrete is being poured and cured. And water in the excavation shall be poured out prior to any concrete being poured into the foundation.*
- *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. The leg of the mast required to be shuttered with metal panels to form its required shape.*
- *The mast foundations shall be backfilled one leg at a time with a 200mm layer 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. All dimensions shall be checked following the backfilling processes.*
- *Once the base section of each gantry is completed and its concrete is sufficiently cured, it is ready to receive the gantry body.*
- *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.*
- *A physical barrier (Heras Fence Site Boundary) shall be put in place to restrict plant from coming too close to the overhead line.*
- *A temporary access road shall be constructed to allow access to the tower locations.*
- *A temporary hardstand area shall be constructed to allow the assembly and laydown of the gantries.*
- *The gantries shall be constructed lying flat on the ground beside the recently installed cable compound on the temporary hardstand.*
- *The gantry section will be lifted into place using the crane and guide ropes.*
- *The body section will be bolted into position.*

2.5.4.4.5 *Cable Compounds*

The following, as outlined in Section 3.5 of Construction Methodology in Appendix 4-7 in the EIAR, states the construction methodology for the proposed cable compounds which form part of the proposed grid connection infrastructure:

- *The 220kV cable compounds shall be in a compound of circa 25.8m by 33.00m, surrounded by a 2.6m high palisade fence with a total area of circa 851.40m^2.*
- *Topsoil and subsoil shall be removed from the footprint of the compound using an excavator. The excavated material shall be temporarily stored in adjacent berms for later use during reinstatement works.*
- *A Layer of geotextile material shall be laid over the footprint of the compound as outlined in Figure 17 (as shown in Appendix 4-7 in the EIAR).*
- *Using an excavator, a base of 6F2 material shall be laid followed by a geotextile layer. Clause 804 material is a specific type of granular material used in road construction and sub-base layers consisting 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.*
- *Each layer shall be compacted using a vibrating roller.*
- *Earthing cable shall be laid underground around the vicinity of the compound for connection to various electrical components during the electrical fit out phase.*
- *The construction of the cable compounds consists of a 220kV steel gantry and associated outdoor electrical equipment.*
- *The electrical installation is estimated to last 22 weeks and includes the following:*
- *Construction of gantry masts.*
- *Wiring and cabling of High Voltage equipment and protection.*
- *Commissioning of all newly installed equipment.*

2.5.4.5 Grid Connection Watercourse/Culvert Crossings

There is a total of 1 bridge crossing along the proposed cable route including 1 No. Horizontal Directional Drilling (HDD) crossing. The proposed underground cable will also encounter 1 no. culvert crossings along the proposed cable route. Where the cable route intersects with existing watercourses, a detailed construction method statement will be prepared by the Contractor prior to the commencement of construction and is to be approved by the Local Authority and relevant environmental agencies. The cable will be located within the bridge deck where there is sufficient depth and width available on the bridge, where there is insufficient depth and width available HDD may be employed as an alternative.

It is proposed to cross existing culverts using open trenching with either an undercrossing or an overcrossing, depending on the depth of the culvert. A confirmatory site survey of all culverts will be completed as part of the next phase of the project prior to construction to confirm the findings of the design phase surveys.

Inland Fisheries Ireland have published guidelines relating to construction works along water bodies entitled "*Requirements for the Protection of Fisheries Habitats during Construction and Development Works at River Sites*", and these guidelines will be adhered to during the construction of the Proposed Project.

2.5.4.5.1 *Horizontal Directional Drilling*

It is proposed to implement HDD for 1 no. crossings. However, following confirmatory site investigations prior to construction it may be necessary to utilise HDD for additional crossings.

HDD is a method of drilling under obstacles such as bridges, culverts, railways, water courses, etc. in order to install cable ducts under the obstacle. This method is employed where installing the ducts using standard installation methods is not possible. The proposed HDD methodology, as outlined in Appendix 4-7 Construction Methodology Report in the EIAR produced by TLI, is as follows: -

- A works area of circa 500m^2 on the launch area and circa 1100m^2 on the receive area will be fenced.
- The drilling rig and fluid handling units will be located on one side of the bridge and will be stored on double bunded 0.5mm PVC bunds which will contain any fluid spills and storm water run-off.
- Entry and exit pits (1m x 1m x 2m) will be excavated using an excavator, the excavated material will be temporarily stored within the works area and used for reinstatement or disposed of to a licensed facility.
- A 1m x 1m x 2m steel box will be placed in each pit. This box will contain any drilling fluid returns from the borehole.
- The drill bit will be set up by a surveyor, and the driller will push the drill string into the ground and will steer the bore path under the watercourse.
- A surveyor will monitor drilling works to ensure that the modelled stresses and collapse pressures are not exceeded.
- The drilled cuttings will be flushed back by drilling fluid to the steel box in the entry pit.
- Once the first pilot hole has been completed a hole-opener or back reamer will be fitted in the exit pit and will pull a drill pipe back through the bore to the entry side.
- Once all bore holes have been completed, a towing assembly will be set up on the drill and this will pull the ducting into the bore.
- The steel boxes will be removed, with the drilling fluid disposed of to a licensed facility.
- The ducts will be cleaned and proven and their installed location surveyed.
- The entry and exit pits will be reinstated to the specification of ESB Networks, EirGrid and Galway County Council.
- A transition coupler will be installed at either side of the bridge/following the horizontal directional drilling as per ESBN and EirGrid requirements, this will join the HDD ducts to the standard ducts.

A joint bay or transition chamber will be installed on either side of the bridge following the HDD as per ESB/Eirgrid requirements.

2.5.5 Site Drainage Systems

The early establishment of temporary drainage facilities will manage the risk of impacts on watercourses on and adjacent to the site during construction. In addition, construction operations will adopt best working practices which are outlined in Section 3.2.3 below. The development of the site will be phased accordingly. The construction of the drainage will start from the downstream sections and progress upstream, connecting conveyance systems with other drainage features as each development phase progresses. They will be designed with sufficient flexibility to respond to an early phase incoming flow during the construction phase.

Detailed measures to address surface water management based upon the design criteria and philosophy will be implemented. The drainage system will be excavated and constructed in conjunction with the road and hard standing construction. Drains will be excavated, and settlement ponds constructed to eliminate any suspended solids within surface water running off the site. Surface water management and drainage design is dealt with in Section 3.2 below and Chapters 4 and 8 of the EIAR and in the Surface Water Management Plan (included as Appendix 4-5 of the EIAR).

2.5.6 Decommissioning

The wind turbines proposed as part of the Proposed Project are expected to have a lifespan of 35 years. Following the end of their useful life, the wind turbines may be replaced with a new set of turbines, subject to planning permission being obtained, or the Proposed Project will be decommissioned fully. The onsite substation will remain in place as it will be under the ownership of the ESB and will form a permanent part of the national electricity grid.

Upon decommissioning of the Proposed Project, the wind turbines would be disassembled in reverse order to how they were erected. All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and will be covered with earth and reseeded as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in significant environment nuisances such as noise, dust and/or vibration. Site roadways will be left in situ. Underground cables, including grid connection, will be removed and the ducting left in place.

A Decommissioning Plan has been prepared and included as Appendix 4-6 of the EIAR, which will be agreed with the local authority prior to any decommissioning. The plan provides details of the methodologies that will be adopted, throughout decommissioning, the environmental controls that will be implemented, the Emergency Response Procedure to be adopted, methods for reviewing compliance and an indicative programme of decommissioning works.

The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will be agreed with the competent authority at that time. The potential for effects during the decommissioning phase of the proposed renewable energy development have been assessed in the EIAR.

As noted in the Scottish Natural Heritage report (SNH) Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the wind farm, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is therefore:

> *"best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm".*

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, NIS and all other relevant planning documents. The following sections give an overview of the drainage design, dust and noise control measures and a waste management plan for the site.

While the drainage design measures are presented in Chapter 4 of the EIAR and the drainage management measures and water quality and monitoring measures are included in this CEMP, the Surface Water Management Plan (SWMP) compiles all of these into a single document. The SWMP is an accompanying document for this CEMP and is included as Appendix 4-5 of the EIAR.

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 will result in significantly less erosion and siltation. Construction activities in the hydrological buffer zones will 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 could potentially be impacted. Given that this site has an established drainage network and existing watercourse crossing points, there will be no adverse impacts on watercourses.

3.2.2 Site Drainage Principles

The site drainage features have been outlined in Chapter 4, Section 4.5 of the EIAR 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. The Proposed Project's drainage design has therefore been proposed specifically with the intention of having no negative impact on the water quality of the site and its associated rivers and lakes, and consequently no impact on downstream catchments and ecological ecosystems.

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. 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. Buffer zones around the existing natural drainage features have been used to inform the layout of the Proposed Project.

Existing artificial drains in the vicinity of existing site 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,

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.

3.2.3 Best Practice Guidance

The drainage design has been prepared based on experience of the project team of other renewable energy sites in peat-dominated environments, and in accordance with a 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 drainage design, and these are taken from the various best practice guidance documents listed below. These relate to infrastructure and operational works on forested sites, forest road design, water quality controls for linear projects, forestry road drainage and management of geotechnical risks. To achieve best practice in terms of water protection through construction management all drainage management is prepared in accordance with guidance contained in the following:

- Forestry Commission (2004): Forests and Water Guidelines, Fourth Edition. Publ. Forestry Commission, Edinburgh;
- Coillte (2009): Forest Operations & Water Protection Guidelines;
- Forest Service (Draft): Forestry and Freshwater Pearl Mussel Requirements – Site Assessment and Mitigation Measures;
- Forest Service (2000): Forestry and Water Quality Guidelines. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford;
- Forest Service, (2000): Code of Best Forest Practice – Ireland. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford;
- COFORD (2004): Forest Road Manual – Guidelines for the design, construction and management of forest roads;
- MacCulloch (2006): Guidelines for risk management of peat slips on the construction of low volume low cost roads over peat (Frank MacCulloch Forestry Civil Engineering Forestry Commission, Scotland);
- National Roads Authority (2005): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Wind Farm Development Guidelines for Planning Authorities (September 1996);
- Eastern Regional Fisheries Board: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;
- Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries During Construction Works Adjacent to Waters;
- Scottish Natural Heritage, 2010: Good Practice During Wind Farm Construction;
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);
- PPG5 – Works or Maintenance in or Near Water Courses (UK Guidance Note);
- CIRIA Report No. C648 (2006): CIRIA (Construction Industry Research and Information Association) guidance on 'Control of Water Pollution from Linear Construction Projects';
- CIRIA Report Number C532 (2001): Control of water pollution from construction sites - Guidance for consultants and contractors.; and,
- Control of water pollution from linear construction projects -Technical guidance. CIRIA C648 London, 2006.

3.2.4 Site Drainage Design and Management

The proposed site drainage features for this site are outlined in Section 4.5 of the EIAR. The following sections give an outline of drainage management arrangements in terms of pre-construction, construction, and operational phases of the Proposed Project.

3.2.4.1 Pre-Construction Drainage

There is an existing drainage network across the site. There are three main watercourses which drain the Proposed Project site and there are numerous manmade drains that are in place predominately to drain the forestry plantations. This existing drainage system will continue to function as it is during the pre-construction phase.

Prior to commencement of works in sub-catchments across the site, main drain inspections will be competed 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.

Drainage and associated pollution control measures will be implemented onsite in conjunction with the main construction works. Where possible drainage controls will be installed during seasonally dry ground conditions. This will reduce the possibility of impact on surface waters by suspended sediment released during construction and entrained in surface run-off.

3.2.4.2 Construction Phase Drainage

The Project Hydrologist will attend the site to set out and assist with the implementation of the proposed drainage controls as outlined in Section 2.5 of Appendix 4-5 Surface Water Management Plan and shown in the drainage design drawings included in Appendix A of Appendix 4-5 Surface Water Management Plan in the EIAR. The drainage system will be excavated and constructed in conjunction with the road and hard standing construction. Drains will be excavated and stilling ponds constructed to eliminate any suspended solids within surface water running off the site.

The implementation of a Schedule of Works Operation Record (SOWOR) will continue through the construction phase of the project. The SOWOR provides number of abandonment triggers which will ensure that site management are well informed as to the level of incident that will require the abandonment of works. Refer to Appendix B of Appendix 4-5 Surface Water Management Plan in the EIAR. The various triggers both pre-commencement and abandonment ensure best practice in terms of water quality management is maintained prior to commencement and during the various felling and construction phases.

Best practice and practical experience on other similar projects suggest that in addition to the drainage plans that are included in and as part of this application, there are additional site-based decisions that can only be made in the field through interaction between the Site Construction Manager, the Project Hydrologist and the Project Geotechnical Engineers. The mechanisms for interaction between these are outlined within Section 4 of this CEMP.

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 Section 6 below, and to ensure protection of all watercourses.

3.2.4.2.1 *Preparative Site Drainage Management*

All materials and equipment necessary to implement the drainage measures outlined above will be brought on-site in advance of any works commencing.

An adequate quantity of straw bales, clean stone, terram, stakes, etc. will be kept on site at all times to implement the drainage design measures as necessary. The drainage measures outlined in the above will be installed prior to, or at the same time as the works they are intended to drain.

3.2.4.2.2 Pre-emptive Site Drainage Management

The works programme for the initial 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 vegetation 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 basis at the site to direct proposed construction activities:

- General Forecasts: Available on a national, regional and county level from the Met Eireann 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 Eireann 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 Eireann 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 threshold rainfall values, listed below, will allow work to be safely controlled (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event.
- Works will be suspended if forecasting suggests either 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);
    - >half monthly average rainfall in any 7 days.

Prior to works being suspended the following control measures will be completed:

- Secure all open excavations;
- Provide temporary or emergency drainage to prevent back-up of surface runoff; and,
- Avoid working during heavy rainfall (listed above) and for up to 24 hours after heavy events to ensure drainage systems are not overloaded.

3.2.4.2.3 Reactive Site Drainage Management

The detailed drainage plan prepared for the site has provided for reactive management of drainage measures. 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 Environmental Clerk of Works (ECoW) on-site. The ECoW 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. 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 the situation on the ground at a particular time.

In the unlikely event that works are giving rise to siltation of watercourses, the ECoW or project 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, as outlined in Section 2.5 of Appendix 4-5 Surface Water Management Plan in the EIAR, will be installed in advance of works recommencing.

3.2.4.3 Operational Phase Drainage Management

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 below:

- Some interceptor drains will be left in place, upgradient of the proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be re-distributed over the ground by means of a level spreader.
- Swales/roadside drains will remain in place to intercept and collect runoff from access roads and hardstanding areas of the site, likely to have entrained suspended sediment, and channel it to stilling ponds for sediment settling;
- Check dams will be put in place at regular intervals along interceptor drains and swales/roadside drains in order to reduce flow velocities and therefore minimise erosion within the system during storm rainfall events; and,
- Stilling ponds/settlement ponds, emplaced downstream of swales and roadside drains, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses. The stilling ponds will be sized according to the size of the area they will be receiving water from (refer to Appendix 9-3 of the EIAR) but will be sufficiently large to accommodate peak flows storm events. Inspection and maintenance of all settlement ponds, along with the entire drainage network, will be ongoing through the construction period.

In the operational phase of the wind farm, the reliance on the drainage system summarised above will become reduced as areas naturally revegetate. Once areas revegetate, this will result in a resumption of the natural drainage management that will have existed prior to any construction.

3.2.5 Forestry Felling

Tree felling to facilitate the Proposed Project will not be undertaken simultaneously with construction groundworks. Keyhole felling to facilitate construction works will take place prior to groundworks commencing.

Water protection 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 in Section 3.2.3 above. The water protection measures to be adopted during felling operations are set out as follows:

- Machine combinations (i.e. hand-held or mechanical) will be chosen which are most suitable for ground conditions at the time of felling, and which will minimise soils disturbance;
- Trees will be cut manually inside the 50m buffer and using machinery to extract whole trees only;
- Checking and maintenance of roads and culverts will be on-going through any felling operation. No tracking of vehicles through watercourses will occur, as vehicles will use road infrastructure and existing watercourse crossing points. Where possible, existing drains will not be disturbed during felling works;

- Ditches which drain from the proposed area to be felled towards existing surface watercourses will be blocked, and temporary silt traps will be constructed. No direct discharge of such ditches to watercourses will occur. Drains and sediment traps will be installed during ground preparation. Collector drains will be excavated at an acute angle to the contour (~0.3%-3% gradient), to minimise flow velocities. Main drains to take the discharge from collector drains will include water drops and rock armour, as required, where there are steep gradients, and will avoid being placed at right angles to the contour;
- Sediment traps will be sited in drains downstream of felling areas. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of in the peat disposal areas.;
- In areas particularly sensitive to erosion or where felling inside the 50 metre buffer is required, double or triple sediment traps will be installed.
- Double silt fencing will also be put down slope of felling areas which are located inside the 50 metre buffer zone;
- All drainage channels will taper out before entering the aquatic buffer zone. This ensures that discharged water gently fans out over the buffer zone before entering the aquatic zone, with sediment filtered out from the flow by ground vegetation within the zone. On erodible soils, silt traps will be installed at the end of the drainage channels, to the outside of the buffer zone;
- Drains and silt traps will be maintained throughout all felling works, ensuring that they are clear of sediment build-up and are not severely eroded. Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimized and controlled;
- Brash mats will be used to support vehicles on soft ground, reducing peat and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal will take place when they become heavily used and worn. Provision will be made for brash mats along all off-road routes, to protect the soil from compaction and rutting. Where there is risk of severe erosion occurring, extraction will be suspended during periods of high rainfall (refer to Section 3.2.4.2.2 above);
- Timber will be stacked in dry areas, and outside a local 50 metre watercourse buffer. Straw bales and check dams to be emplaced on the down gradient side of timber storage/processing sites;
- Works will be carried out during periods of no, or low rainfall, in order to minimise entrainment of exposed sediment in surface water run-off;
- Checking and maintenance of roads and culverts will be on-going through the felling operation;
- No crossing of streams by machinery will be permitted and only travel perpendicular to and away from streams will be allowed;
- Refuelling or maintenance of machinery will not occur within 100m of a watercourse. Mobile bowser, drip kits, trained personnel will be used where refuelling is required;
- A permit to refuel system will be adopted at the site; and,
- Branches, logs or debris will not be allowed to build up in aquatic/buffer zones (refer to Table 3-1 below). All such material will be removed when harvesting operations have been completed, but care will be taken to avoid removing natural debris deflectors.

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

3.2.5.1 Forestry Felling Drainage Management

Before the commencement of any felling works, an Environmental Clerk of Works (ECoW) will be appointed to oversee the keyhole and extraction works. The ECoW will be experienced and competent, and will have the following functions and operate their record using a Schedule of Works Operation Record (SOWOR), 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 – refer to Table 3-1 above), 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 Tool Box 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 Section 3.4 (Monitoring and Recording) and Appendix C (Site Monitoring Form (Visual Inspections)) of the *Forestry & Freshwater Pearl Mussel Requirements.*
- 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 will be collected upstream and downstream of the keyhole felling site at suitable sampling locations.
    - Sampling will be taken from the stream / riverbank, with no in-stream access permitted.
    - The following minimum analytical suite will be used:
        - pH,
        - Electrical Conductivity,
        - Temperature
        - Total Suspended Solids, Biochemical Oxygen Demand, 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.

3.2.6 Borrow Pit Drainage

While surface water will be contained in the borrow pit areas, the design proposal is to control the level of water in the borrow pit area by creating a single point outlet from the basin-like area that will ensure the water does not overtop the pit area. Run-off from the proposed borrow pit areas will be controlled via a single outlet that will be installed at the edge of the borrow pit. The single outfall point will be constructed to control runoff from the borrow pit and its immediate surrounds. Interceptor drains will already have been installed upgradient of the borrow pit area before any extraction begins.

During the construction phase of the project, it will be necessary to keep the borrow pit area free of standing water while rock is still being extracted. This will be achieved by using a mobile pump, which will pump water into the same series of drains, settlement ponds with a level spreader, siltbuster or equivalent, which will receive the water from the single outlet.

3.2.7 Peat and Spoil Repository Area Drainage

It is proposed that excavated spoil and peat will be used for landscaping where required. The excess material will then be placed in 4 no. dedicated Peat Repository Areas (PRA) and 1 no. Spoil Repository Area (SRA). All proposed PRAs and the SRA are located outside of 50m watercourse buffers and outside of OPW mapped fluvial flood zones.

During the initial construction of repository/deposition areas, silt fences, straw bales and biodegradable geogrids will be used to control surface water runoff from works areas.

Where applicable, the vegetative top-soil layer of the peat and spoil management areas will be rolled back to facilitate placement of excavated spoil, following which the vegetative-top soils layer will be reinstated. Where reinstatement is not possible, spoil and peat management areas will be sealed with a digger bucket and seeded as soon possible to reduce sediment entrainment in runoff.

Drainage from peat and spoil storage areas will ultimately be routed to an oversized swale and a number of stilling ponds pond with appropriate storage and settlement designed for a 1 in 50-year return period before being discharged to the on-site drains.

Peat/subsoil reinstatement areas will be sealed with a digger bucket and vegetated as soon possible to reduce sediment entrainment in runoff. Once re-vegetated and stabilised peat/subsoil reinstatement areas will no longer be a potential source of silt laden runoff.

3.2.8 Floating Road Drainage

Where sections of floating road are to be installed, cross drains will be installed beneath the road construction corridor to maintain existing clean water drainage paths. Large surface water drainage pipes will be placed to form the cross-drains below the level of the proposed road sub-base. These drainage pipes will be extended each side of the proposed road and cable trench construction corridor, along the paths of the existing drains.

With the exception of the installation of cross drains under the floating road corridor, minimal additional drainage will be installed to run parallel to the roads, in order to maintain the natural hydrology of the peatland areas over which the roads will be floated.

3.2.9 Cable Trench Drainage

Cable trenches are typically developed in short 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.

To efficiently control drainage runoff from cable trench works areas, excavated material is stored on the upgradient side of the trench. Will any rainfall cause runoff from the excavated material, the material will be contained in the downgradient cable trench. Excess subsoil will be removed from the cable trench works area immediately upon excavation, and in the case of the Proposed Project, will be transported to one of the peat repository areas, the on-site borrow pit or used for landscaping and reinstatements of other areas elsewhere on site.

On steeper slopes, silt fences, as detailed in Section 2.5.12 of Appendix 4-5 Surface Water Management Plan in 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.

3.2.10 Peatland Enhancement Area

The overall aim of the peatland enhancement plan is to put the selected bog area at the Site on a trajectory towards becoming naturally functioning peatland by rewetting the surface of the bog by raising the water table in the drains, and in adjacent areas primarily through drain blocking in order to reduce run-off rates and carbon losses. To maximise the effectiveness of the re-wetting proposal and to increase the chances of future success, any works undertaken as part of the enhancement plan will be based on approaches and methods that were successful at other peatland sites in Ireland.

Peat water level monitoring, by means proposed piezometer installs, will be carried out to monitor the effectiveness of the bog re-wetting. The monitoring will continue through the lifetime of the Proposed Project.

3.3 Refuelling, Fuel and Hazardous Materials

The following mitigation measures will be implemented in full to avoid release of hydrocarbons at the site:

- Minimal refuelling or maintenance of construction vehicles or plant will take place on site. On-site refuelling will occur at a controlled fuelling station;
- On-site refuelling will take place using a mobile double skinned fuel bowser;
- The fuel bowser, a double-axel custom-built refuelling trailer will be re-filled off site and will be towed around the site by a 4x4 jeep to where machinery is located.
- 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 (outside of Gurteen/Cloonmore GWS refined ZoC).
- Mobile measures such as drip trays and fuel absorbent mats will be used during all refuelling operations.
- Onsite refuelling will be carried out by trained personnel only;
- A permit to fuel system will be put in place;
- Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system;
- Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage;
- Fuels volumes stored on site will be minimised. The fuel storage areas, within the temporary construction compounds, will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor;
- Fuels stored on site will be minimised. Fuel storage areas if required will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor (outside of Gurteen/Cloonmore GWS refined ZoC);
- The plant used will be regularly inspected for leaks and fitness for purpose; and,
- An emergency plan for the construction phase to deal with accidental spillages will be developed (refer to Section 5 of this CEMP). Spill kits will be available to deal with any accidental spillage in and outside the refuelling area.

3.4 Cement Based Products Control Measures

The following mitigation measures will be implemented in full to avoid release of cement leachate from the site:

- 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;
- Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable (see Plate 3-1 below). 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 will be undertaken at lined cement washout ponds located outside of Gurteen/Cloonmore GWS refined ZoC;
- Weather forecasting will be used to plan dry days for pouring concrete; and,
- The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.

The 50m wide river buffer zone will be in place for the duration of the construction phase. No construction activity will occur within the buffer zone with the exception of bridge and culvert construction. The buffer zone will:

- Prevent any cement-based products accidentally entrained in the construction phase drainage system entering directly into watercourses, achieved in part by ending drain discharge outside the 50m buffer zone and allowing percolation across the vegetation of the buffer zone;
- Provide a buffer against accidental direct pollution of surface waters by any pollutants, or by pollutants entrained in surface water run-off.

Plate 3-1 Typical concrete chute wash out area

3.5 Peat Stability Management

Peat instability or failure refers to a significant mass movement of a body of peat that would have an adverse impact on wind farm development and the surrounding environment. Peat failure excludes localised movement of peat that could occur below an access road, creep movement or erosion type events. In the absence of appropriate mitigation, the consequence of peat failure at the study area may result in:

- Death or injury to site personnel;
- Damage to machinery;
- Damage or loss of access tracks;
- Drainage disrupted;
- Site works damaged or unstable;
- Contamination of watercourses, water supplies by sediment particulates; and,
- Degradation of the environment.

3.5.1 General recommendations for Good Construction

Based on the mitigation measures given in the GDG's Peat and Spoil Management Plan (Appendix 4-3 in the EIAR) and Geotechnical and Peat Stability Assessment Report (Appendix 8-1 in the EIAR) report being strictly adhered to during construction and the detailed peat stability assessment carried out, it has been showed that the site has an acceptable margin of safety.

The risk assessment at each turbine location identified a number of control measures to further reduce the potential risk of peat failure. Access roads to turbines will be subject to the same relevant control measures that apply to the nearest turbine as detailed in the GDG's Peat Stability Assessment Report in Appendix 8-1 in the EIAR.

The following measures which will be implemented in full during the construction phase of the project will assist in the management of the risks for this site.

- Appointment of experienced and competent contractors;
- The site will be supervised by experienced and qualified personnel;
- Allocate sufficient time for the project (be aware that decreasing the construction time has the potential to increase the risk of initiating a localised peat movement);
- Undercutting of slopes and unsupported excavations will not occur;
- A managed robust drainage system as set out above;
- 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.
- Maintain hydrology of area as far as possible by maintaining existing drains to water pressures in the peat to avoid peat becoming "boyant".
- Use of experienced geotechnical staff for site investigations
- Use of experienced contractors and trained operators to carry out the work.
- Confirmatory ground investigation to determine peat, mineral soil and bedrock condition and properties.
- Uncontrolled concentrated water discharge onto peat slopes identified as being unsuitable for such discharge will be avoided. All water discharged from excavations during work will be piped over areas specifically assessed as being unsuitable and hence directly into suitable drainage lines.

- All excavations will be suitably supported to prevent collapse and development of tension cracks.
- Avoidance of placing fill and excavations in the vicinity of steeper peat slopes, that is at the crest or toe of the slope.
- Installation and regular monitoring of geotechnical instrumentation during construction in areas of possible poor ground, such as deeper peat deposits.
- Site reporting procedures will be implemented to ensure that working practices are suitable for the encountered ground conditions. Ground conditions will be assessed by a suitably experienced geotechnical engineer.
- Regular briefing of all site staff (e.g., toolbox talks) to provide feedback on construction and ground performance and to promote reporting of any observed change in ground conditions.
- Routine inspection of wind farm site by the Contractor and Project Geotechnical Engineer will be undertaken and will include an assessment of ground stability conditions (e.g., cracking, excessive floating road settlement, disrupted surface, closed-up drains) and drainage conditions (e.g., blocked drains, absence of water in previously flowing drains, springs, etc.).

3.5.2 Placement of Excavated Material in Peat and Spoil Repository Areas

The placement of peat and spoil in their respective repository areas, excavated during the construction phase of the Proposed Project, as presented in GDG's Peat & Spoil Management Plan in Appendix 4-3 in the EIAR, is outlined in Section 2.5.3.3 above. This methodology includes procedures that are to be included in the construction to minimise any adverse impact on peat stability.

3.6 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.

Proposed measures that will be implemented in full to control dust include:

- A wheel wash facility will be installed on the Proposed Wind Farm site and will be used by vehicles before leaving the Site.
- 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 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.

3.7 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. Proposed measures that will be implemented in full to control noise include:

- Keep local residents informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern;
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and be subject to programmed maintenance;
- Select inherently quiet plant where appropriate - all major compressors will be 'sound reduced' models fitted with properly lined and sealed acoustic covers, which will be kept closed whenever the machines are in use;
- All ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers;
- Machines will be shut down between work periods (or when not in use) or throttled down to a minimum;
- Regularly maintain all equipment used on site, including maintenance related to noise emissions;
- Vehicles will be loaded carefully to ensure minimal drop heights so as to minimise noise during this operation; and
- All ancillary plant such as generators and pumps will be positioned so as to cause minimum noise disturbance and if necessary, temporary acoustic screens or enclosures will be provided.
- At any location within 30m of a residential receptor, where trenching work or directional drilling activities are required for the underground grid connection cabling route, the installation of temporary boarding alongside the drilling rig or 'acoustic blanket panels' hanging from heras fencing (or similar) may be used to mitigate noise emissions.

3.8 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. *Rhododendron ponticum* was recorded in the eastern portion of the site.

An Invasive Species Management Plan in Appendix 6-4 will be prepared for the site to prevent the introduction or spread of any invasive species within the footprint of the works. The Invasive Species Management Plan will set out best practice control methods as summarised in the following sections.

3.8.1 Site Management

Careful preparation of the site and planning of the works is crucial to successful treatment of invasive species. The following list of guidelines, which is not exhaustive, will 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. Will 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.

3.8.2 Establish Good Site Hygiene

The following measures are proposed will be implemented in full to establish good site hygiene to ensure the control of any potential spread of invasive species during construction works:

- A risk assessment and method statement must be provided by the Contractor prior to commencing works.
- Fences will be erected around areas of infestation, as confirmed by test pits, and warning signs will be erected.
- A designated wash-down area will be created, where power-washed material from machinery can be contained, collected and disposed of with other contaminated material. This area will contain a washable membrane or hard surface.
- Stockpile areas will be chosen to minimise movement of contaminated soil.
- Stockpiles will be marked and isolated.
- Contaminated areas which will not be excavated will be protected by a root barrier membrane if they are likely to be disturbed by machinery. Root barrier membranes will be protected by a layer of sand above and below and topped with a layer of hardcore.
- The use of vehicles with caterpillar tracks within contaminated areas will be avoided to minimise the risk of spreading contaminated material.
- A suitably qualified ecologist will be on site to monitor and oversee the implementation of invasive species management plans.
- Plant and equipment which is operated within an area for the management of materials in contaminated areas will be decontaminated prior to relocating to a different works area.

The decontamination procedures will take account of the following:

- Personnel may only clean down if they are familiar with the plant and rhizome material and can readily identify it.
- Decontamination will only occur within designated wash-down areas.
- Vehicles will be cleaned using stiff-haired brush and pressure washers, paying special attention to any areas that might retain rhizomes e.g. wheel treads and arches.
- All run-off will be isolated and treated as contaminated material. This will be disposed of in already contaminated areas.

3.9 Waste Management

This section of the CEMP provides a waste management plan (WMP) which outlines the best practice procedures during the excavation and construction phases of the project. The WMP 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.

3.9.1 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 of the development to ensure that all contractors hired to remove waste from the site have valid Waste Collection Permits. It will then be necessary to ensure that the waste is delivered to a licensed or permitted waste facility. The hired waste contractors and subsequent receiving facilities must adhere to the conditions set out in their respective permits and authorisations.

The Environmental Protection Agency provides a document entitled, 'Best Practice Guidelines for the Preparation of Resource & Waste Management Plans for Construction and Demolition Projects' (2021).

It is important to emphasise that no demolition will take place at this site, however, this document was referred to throughout the process of completing this WMP.

3.9.2 Waste Management Hierarchy

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

Prevention and Minimisation:

The primary aim of the WMP 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 and Demolition waste such as using waste concrete as fill for new roads.

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

3.9.3 Construction Phase Waste Management

3.9.3.1 Description of the Works

The construction of the Proposed Project will involve the construction of 11 no. turbines, new and upgrade of site access roads, internal cabling and the underground cable route, substation, control buildings and all associated infrastructure.

The turbines will be manufactured off site and delivered to site where on site erection will occur.

The turbine foundations will consist of stone from the local quarries 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 construction of the substation will comprise of a concrete foundation with concrete masonry blocks and a timber roof structure with 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 site roads will be constructed with rock won from the on-site borrow pit.

The waste types arising from the construction phase of the development 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

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.

3.9.3.2 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. 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.

3.9.3.3 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 Site. Therefore, all wastes streams generated on Site will be deposited into a single waste skip. This waste material will be transferred to a 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 waste generated from the turbine erection 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 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.

3.9.3.4 Reuse

Many construction materials can be reused a number of times before they have to 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.
- Excavated material can be reused for reinstatement of the areas around turbine foundations and adjacent to proposed roads.

3.9.3.5 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.

3.9.4 Waste Arising from Decommissioning

The design life of the Proposed Project is 35 years after which time a decision will be made to determine whether or not the turbines will be replaced by new turbines or if decommissioning will occur. The lengthy time frame between the completion of the construction phase and decommissioning will result in the only materials remaining on site at that time will be infrastructural material such as the turbine foundations, turbines and the granular material used to construct roads. When the Site is decommissioned, cranes will disassemble each turbine tower and all equipment. The associated components will be removed from site for re-use, recycling or waste disposal. Any structural elements

that are not suitable for recycling will be disposed of in an appropriate manner. All lubrication fluids will be drained down and put aside for appropriate collection, storage, transport and disposal. Any materials which cannot be re-used or recycled will be disposed of by an appropriately licenced contractor.

The waste types arising from the decommissioning of the Proposed Project are outlined in Table 3-3.

Table 3-3 - Waste Types arising from the decommissioning of the Proposed Project

Material Type	Example	EWC Code
Cables	Electrical wiring	17 04 11
Metals	Copper, aluminium, lead, iron and rebar	17 04 07
Inert materials	Crushed stone, concrete	17 01 07

3.9.4.1 Reuse

Many construction materials will be reused a number of times before they have to be disposed of:

- Concrete will be reused as aggregate for roads cable trench backfilling material.
- Plastic packaging etc. will be sued to cover materials on site or reused for the delivery of other materials.
- Excavated material will be reused for reinstatement of the areas around turbine foundations and adjacent to site roads.

3.9.4.2 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.

3.9.5 Implementation

3.9.5.1 Roles and Responsibilities

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.

3.9.5.2 Training

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

3.9.5.2.1 *Record Keeping*

The WMP 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 WMP 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

3.9.5.3 Waste Management Plan Conclusion

The WMP will be properly adhered to by all staff involved in the 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 WMP has been prepared to outline the main objectives that are to be adhered to for the preparation of a more detailed WMP to be completed after the planning phase of the Proposed Project.

4. ENVIRONMENTAL MANAGEMENT IMPLEMENTATION

4.1 Roles and Responsibilities

The Site Supervisor/Construction Manager and/or Environmental Clerk of Works (ECoW) are the project focal point relating to construction-related environmental issues.

In general, the ECoW will maintain responsibility for monitoring the works and Contractors/Sub-contractors from an environmental perspective. The ECoW will act as the regulatory interface on environmental matters by reporting to and liaising with Galway County Council and other statutory bodies as required.

The ECoW will report directly to the Site Supervisor/Construction Manager. An ECoW, Project Ecologist, Project Hydrologist, Project Geotechnical engineer will visit the site regularly and report to the Site Environmental Office. This structure provides a "triple lock" review/interaction by external specialists. An organogram structure, as shown below in Figure 4-1 for the construction stage is as follows:

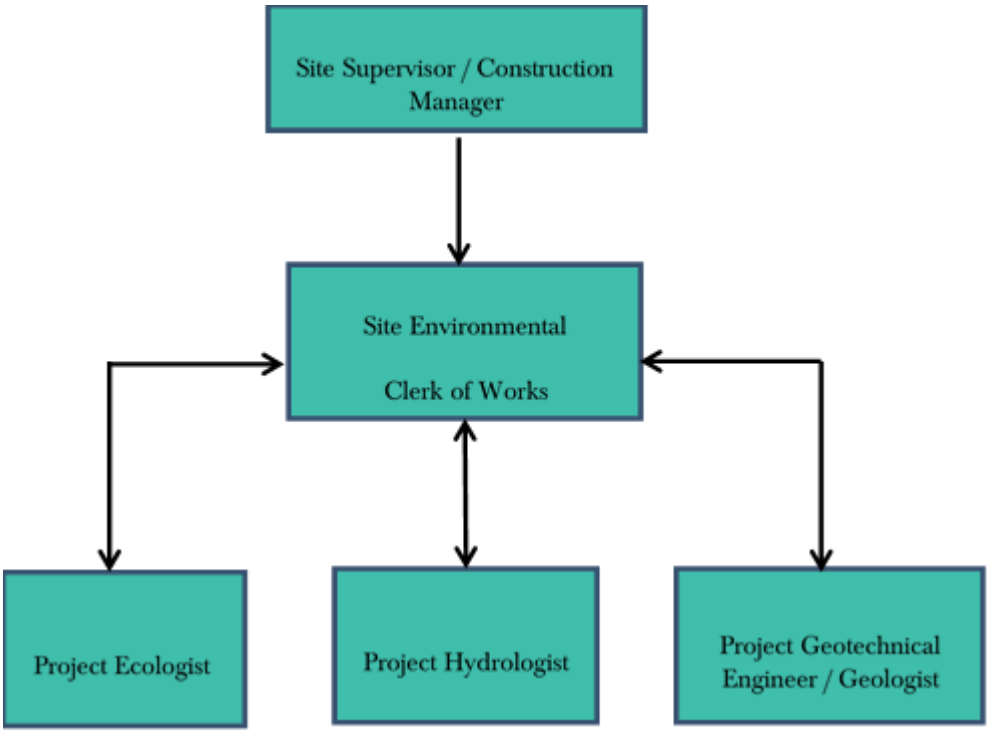

Figure 4-1 Site Management Chain of Command

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, including site stability, will certify the said works, will be adhered to. Such an engineer will be appointed to oversee and supervise the construction phase of the project.

4.1.1 Construction Manager /Site Supervisor

The Construction Manager / Site Supervisor will have overall responsibility for the organisation and execution of all related environmental activities as appropriate, in accordance with regulatory and

project environmental requirements. The duties and responsibilities of the Site Supervisor/Construction Manager will include:

- Ensure that all works are completed safely and with minimal environmental risk;
- Approve and implement the CEMP and supporting environmental documentation, and ensure that all environmental standards are achieved during the construction phase of the project;
- Take advice from the Environmental Clerk of Works on legislation, codes of practice, guidance notes and good environmental working practice relevant to their work;
- Ensure compliance through audits and management site visits;
- Ensure timely notification of environmental incidents; and,
- Ensure that all construction activities are planned and performed such that minimal risk to the environment is introduced.

Ensure that all construction activities are planned and performed such that minimal risk to the environment is introduced.

4.1.2 Environmental Clerk of Works

The main contractor will be required to engage a qualified Environmental Engineer, Environmental Scientist, or equivalent, with experience in wind farm construction to fulfil the role of Environmental Clerk of Works (ECoW), and to monitor all site works and to ensure that methodologies and mitigation are followed throughout construction to avoid negatively impacting on the receiving environment.

The ECoW will report to the Site Supervisor/Construction Manager. The responsibilities and duties of the ECoW will include the following:

- Preparation and update of the CEMP as required, and supporting environmental documentation and review/approval of contractor method statements;
- Undertake inspections and reviews to ensure the works are carried out in compliance with the CEMP;
- Monitor the implementation of the CEMP, particularly all proposed/required Environmental Monitoring;
- Generate environmental reports as required to show environmental data trends and incidents 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;
- Ensure the specified mitigation measures are initiated and adhered to during the construction phase;
- Liaise with Project Ecologist, Project Hydrologist, Project Geotechnical Engineer and any other members of the project team to ensure regular site visits and audits/inspections are completed;
- Ensure adequate arrangements are in place for site personnel to identify potential environmental incidents;
- Ensure that details of environmental incidents are communicated in a timely manner to the relevant regulatory authorities, initially by phone and followed up as soon as is practicable by e-mail;
- 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; and,
- Identify environmental training requirements and arrange relevant training for all levels of site based staff/workers.

The level, detail and frequency of reporting expected from the ECoW 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 project.

4.1.3 Project Ecologist

The Project Ecologist will report to the ECoW and is responsible for the protection of sensitive habitats and species encountered during the construction phase of the proposed renewable energy project. The Project Ecologist will also be responsible for the monitoring and reporting on the results of the biodiversity enhancement proposals which are outlined in the Biodiversity Management and Enhancement Plan included in Appendix 6-6 in the EIAR. The Project Ecologist will not be full time on site but will visit the site at least once a month during construction.

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

- Review and input to the final construction phase CEMP in respect of ecological matters;
- In liaison with Environmental Clerk of Works, oversee and provide advice on all relevant ecology mitigation measures set out in the EIAR and planning permission conditions;
- Regular inspection and monitoring of the development, through all phases of construction/operation and provide ecological advice as required;
- Carry out ecological monitoring and survey work as may be required by the planning authority.

Carry out ecological monitoring and survey work as may be required by the planning authority.

4.1.4 Project Hydrologist

The Project Hydrologist will report to the ECoW and is responsible for inspection and review of drainage and water quality aspects associated with construction of the proposed renewable energy development. The Project Hydrologist will supervise the drain blocking measures, to be undertaken at the proposed peatland enhancement area, which are outlined in Section 4.3 of the Biodiversity Management and Enhancement Plan included in Appendix 6-6 in the EIAR. The Project Hydrologist will not be full time on site but will visit the site at least once a month during construction and on a weekly basis during site preparation/groundworks.

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

- Assist in compiling a detailed drainage design before construction commences and attend the site to set out and assist with micro siting of drainage controls. This will be completed over several site visits at the start of the construction phase;
- Review and input to the final construction phase CEMP in respect of drainage and water quality management;
- Following the initial stage of drainage construction regular site visits will be required, at least once a month, to complete hydrological and water quality audits and reviews and report any issues noted to the Site Supervisor/Construction Manager; and,
- Complete ongoing inspection and monitoring of the development, particularly in areas of drainage control, through all phases of construction (including pre, during and post construction) and ensure construction is carried out as specified in the EIAR, and in relevant planning conditions.

4.1.5 Project Geotechnical Engineer/Geologist

The Geotechnical Engineer or Project Geologist will report to the ECoW and is responsible for inspection and review of geotechnical aspects associated with construction of the proposed renewable energy development. The Geotechnical Engineer or Project Geologist will supervise the drain blocking measures, to be undertaken at the proposed peatland enhancement area, which are outlined in Section 4.3 of the Biodiversity Management and Enhancement Plan included in Appendix 6-6 in the EIAR. The Geotechnical Engineer will not be full time on site but will visit site at least once a month during the construction phase and on a weekly basis during site preparation/groundworks.

The responsibilities and duties of the Geotechnical Engineer or Geologist 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 Site Supervisor/Construction Manager;
- Ensuring that identified hazards are listed in the Construction Risk Register and that these are subject to ongoing monitoring; and,
- Ongoing inspection and monitoring of the development, particularly in areas of peatland and the 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

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 Appendix 4-5 Surface Water Management Plan in the EIAR.

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

5. EMERGENCY RESPONSE PLAN

An 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 in terms of site health and safety and environmental protection.

5.1 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 project.

5.1.1 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 5-1 below. 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 5-1. This will be updated throughout the various stages of the project.

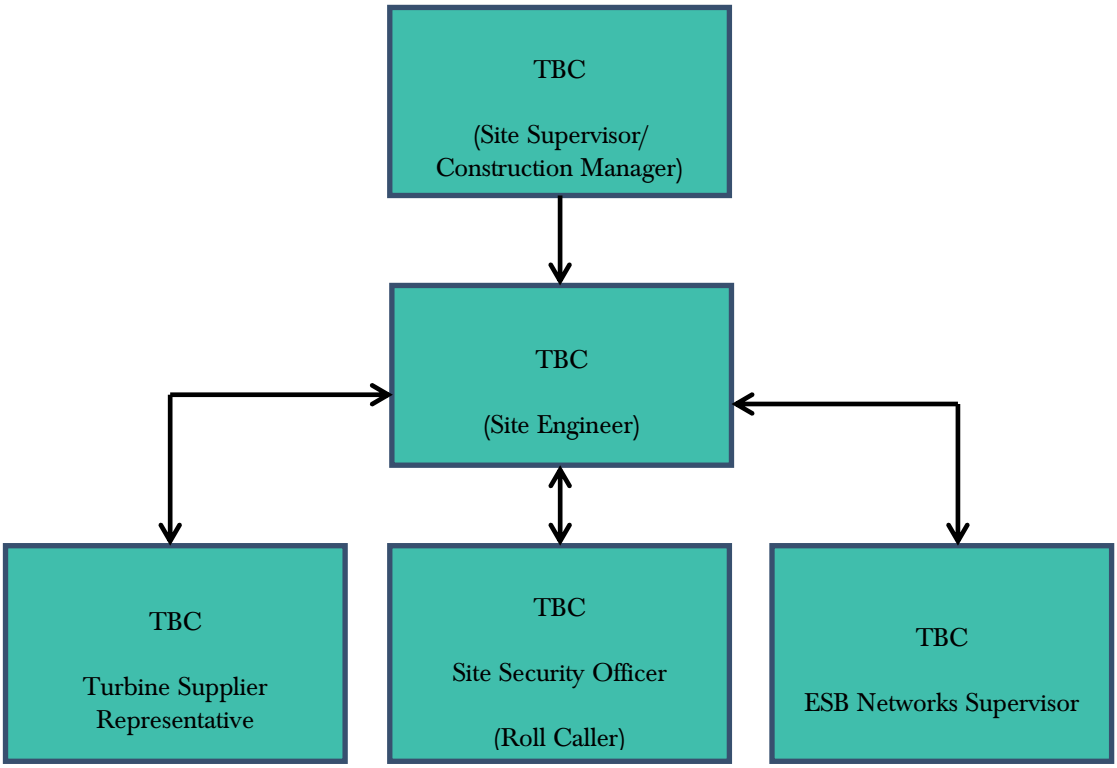

Figure 5-1 Emergency Response Procedure Chain of Command

5.1.2 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 5-1 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

In the event of an emergency situation associated with, but not restricted to, the hazards outlined in Table 5-1 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/fog-horn 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 will proceed, without exception. The site evacuation procedure is outlined in Section 5.1.3.
- 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 5.3 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 as provided in Section 5.4.
- Contact the next of kin of any injured personnel where appropriate.

5.1.3 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 fog-horn 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.

5.2 Environmental Emergency Response Procedure

5.2.1 Excessive Peat Movement

Where there is excessive peat movement or continuing peat movement recorded at a monitoring location, or identified at any location within the site, but no apparent signs of distress to the peat (e.g. cracking, surface rippling) then the following will be carried out.

- All construction activities will cease within the affected area.
- Increased monitoring at the location will be carried out. The area will be monitored, as appropriate, until such time as movements have ceased.
- Re-commencement of limited construction activity will only start following a cessation of movement and the completion of a geotechnical risk assessment by a geotechnical engineer.

5.2.2 Onset of Peat Slide

Where there is the onset or actual detachment of peat (e.g. cracking, surface rippling) then the following will be carried out.

- On alert of a peat slide incident, all construction activities will cease and all available resources will be diverted to assist in the required mitigation procedures.
- Where considered possible action will be taken to prevent a peat slide reaching any watercourse. This will take the form of the construction of check barrages on land. Due to the terrain, the possible short run-out length to watercourses, speed of movement and the inability to predict locations it may not be possible to implement any on-land prevention measures, in this case a watercourse check barrage will be implemented.
- For localised peat slides that do not represent a risk to a watercourse and have essentially come to rest the area will be stabilised initially by rock infill, if required. The failed area and surrounding area will then be assessed by the engineering staff and stabilisation procedures implemented. The area will be monitored, as appropriate, until such time as movements have ceased.

5.2.3 Spill Control Measures

Every effort will be made to prevent an environmental incident during the construction and operational phase of the 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 ensure the necessary measures are in place to contain and clean up the spill and prevent further spillage from occurring.
- The ECoW will notify the appropriate regulatory body such as Galway County Council, and the Environmental Protection Agency (EPA), 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 will be immediately notified.
- If necessary, the ECoW 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 Main Contractor. These records will be made available to the relevant authorities such as Galway County Council, EPA 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.

5.3 Contact the Emergency Services

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.

Due to the remoteness of the Site, it may be necessary to liaise with 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 will form part of the site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable.

5.4 Contact Details

A list of emergency contacts is presented in Table 5-2. 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 5-2 Emergency Contacts

Contact	Telephone no.
Emergency Services – Ambulance, Fire, Gardaí	999/112
Doctor – Lakeview Medical Centre, Clonbern	094 9659049
Hospital – University Hospital Galway	091 524222
ESB Emergency Services	1850 372 999

Contact	Telephone no.
Gas Networks Ireland Emergency	1850 20 50 50
Gardaí – Dunmore Garda Station.	093 38131
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
Clonberne Wind Farm Ltd	TBC

5.4.1 Procedure for Personal 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.

5.5 Induction Checklist

Table 5-3 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 project.

Table 5-3 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	
Due to the remoteness of the site, 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 will 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.	

6. MITIGATION MEASURES

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

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 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 6-1 Site Preparation and Mitigation Measures

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
EIAR Chapter 4 – Description of the Proposed Project					
Pre-Commencement Phase					
MM1	Environmental Management	EIAR Section 4	All proposed activities on the site of the Proposed Project will be provided for in an environmental management plan. A Construction and Environmental Management Plan (CEMP) has been prepared for the Proposed Project and is included in Appendix 4-3 of the EIAR. The CEMP sets out the key environmental considerations to be taken into account by the contractor during construction of the Proposed Project. The CEMP also details the mitigation measures to be implemented in order to comply with the environmental commitments outlined in the EIAR.		
MM2	Environmental Management	EIAR Section 4	The on-site construction staff will be responsible for implementing the mitigation measures specified in the EIAR and compiled in the Audit Report. Their implementation will be overseen by the ECoW or supervising hydrogeologists, environmental scientists, ecologists or geotechnical engineers, depending on who is best placed to advise on the implementation. The system of auditing referred to above ensures that the mitigation measures are maintained for the duration of the construction phase, and into the operational phase where necessary.		
MM3	Drainage Inspection	CEMP Section 4 SWMP Section 3	Prior to commencement of works in sub-catchments across the site, main drain inspections will be competed 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. Drainage and associated pollution control measures will be implemented onsite in conjunction with the main construction works. Where possible drainage controls will be installed during seasonally dry ground conditions. This will reduce the possibility of impact on surface waters by suspended sediment released during construction and entrained in surface run-off.		
MM4	Concrete Deliveries	EIAR Section 4 CEMP Section 3	The arrangements for concrete deliveries to the site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site washout of trucks and discussing emergency procedures.		
MM5	Site Drainage Plan	EIAR Section 4 CEMP Section 4	A detailed drainage design for the Proposed Project, incorporating all principles and measures outlined in Section 4.7 of the EIAR, has been prepared, and is included in Appendix A of Appendix 4-5 of the EIAR.		
MM6	Preparative Site Drainage Management,	CEMP Section 4 SWMP Section 3	All materials and equipment necessary to implement the drainage measures outlined above will be brought on-site in advance of any works commencing. An adequate quantity of straw bales, clean stone, terram, stakes, etc. will be kept on site at all times to implement the drainage design measures as necessary. The drainage measures outlined in the above will be installed prior to, or at the same time as the works they are intended to drain.		
MM7	Drainage Maintenance	EIAR Section 4 CEMP Section 4	Prior to the commencement of construction an inspection and maintenance plan for the on-site drainage system will be prepared by the ECoW in consultation with the Project Hydrologist. 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.		
MM8	Waste Management	EIAR Section 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 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM9	Felling	EIAR Section 4, 7	In the interest of breeding birds, construction will not commence during the Breeding Bird season from April to July inclusive. Construction may commence at any stage from August onwards to the end of March, so that construction activities are ongoing by the time the next breeding bird season comes around and can continue throughout the next breeding season. Should any of the species identified as Important Ecological Features be recorded breeding within the given distances of the works area, a buffer zone (using above distances) will be established around the expected location of the nest (location identified as far as is possible without causing disturbance to the bird) and all works will be restricted within the zone until it can be demonstrated by an ornithologist that the species has completed the breeding cycle in the identified area. Any restricted area that is required to be set up will be marked clearly using hazard tape fencing and all site staff will be alerted through toolbox talks.		
MM10	Felling Licence	EIAR Section 4 CEMP Section 4	The tree felling activities required as part of the Proposed Project will be the subject of a Limited Felling Licence (LFL) application to the Forest Service in accordance with the "Forestry Act" and the Forestry Regulations 2017 (SI 191/2017) and as per the Forest Service's policy on granting felling licenses for wind farm developments.		
MM11	Peat Management	CEMP Section 2	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. Interceptor drains will be installed upslope of the access road alignment to divert any surface water away from the construction area. Prior to commencing floating road construction movement monitoring posts will be installed in areas where the peat depth is greater than 2.0m.		
MM12	Invasive Species Management	CEMP Section 3	To establish good site hygiene to ensure the control of any potential spread of invasive species during construction works, a risk assessment and method statement must be provided by the Contractor prior to commencing works.		
MM13	Traffic Management	EIAR Section 4	Prior to the Traffic Management Plan being finalised, a full dry run of the transport operation along the proposed route will be completed using vehicles with attachments to simulate the dimensions of the wind turbine transportation vehicles. This dry run will inform the Traffic Management Plan submitted for agreement with the local authority. All turbine deliveries will be provided for in a transport management plan which will have to be prepared in advance of the construction stage, when the exact transport arrangements are known, delivery dates confirmed and escort proposals in place. Such a transport management plan will be submitted to the Planning Authority for agreement in advance of any abnormal loads using the local roads, and will provide for all necessary safety measures, including a convoy and Garda escort as required, off-peak turning/reversing movements and any necessary safety controls.		
MM14	Health and Safety	EIAR Section 4	All relevant Site Health & Safety procedures, in accordance with the relevant Health and Safety Legislation and guidance (listed in Section 5.8.2.1 of the EIAR), including the preparation of the Health & Safety Plan, erection of the relevant and appropriate signage on site, inductions and toolbox talks will take place prior to and throughout the construction phase of the Proposed Project.		
Construction Phase					
MM15	Wastewater Management	EIAR Section 4	Temporary toilets, located within staff portacabins, will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by a permitted waste collector to wastewater treatment plants.		
MM16	Refuelling	EIAR Section 4 CEMP Section 3	• 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 site by a 4x4 jeep to where machinery is located. It is not practical for all construction machinery to travel back to a single refuelling point, given the size of the cranes, excavators, etc. that will be		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			used during the construction of the proposed wind farm. 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. • The fuel bowser will be parked on a level area in the construction compound (outside of Gurteen/Cloonmore GWS refined Zone of Contribution (ZoC)) 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 • Only designated trained and competent operatives will be authorised to refuel plant on site. • Fuels volumes stored on site will be minimised. Fuel storage areas if required will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor (outside of Gurteen/Cloonmore GWS refined ZoC); • Mobile measures such as drip trays, spill kits and fuel absorbent mats will be available if necessary, during all refuelling operations. • The plant used will be regularly inspected for leaks and fitness for purpose; and, • An emergency plan for the construction phase to deal with accidental spillages will be developed (refer to Section 5 of this CEMP). Spill kits will be available to deal with any accidental spillage in and outside the refuelling area.		
MM17	Concrete Deliveries and Management	EIAR Section 4 CEMP Section 3	The following mitigation measures will be implemented in full to avoid release of cement leachate from the site: • No batching of wet-cement products will occur on site; • The arrangements for concrete deliveries to the site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site washout of trucks and discussing emergency procedures. • Only ready-mixed concrete will be used during the construction phase, with all concrete being delivered from local batching plants in sealed concrete delivery trucks. The use of ready-mixed concrete deliveries will eliminate any potential environmental risks of on-site batching. No washing out of any plant used in concrete transport or concreting operations will be allowed on-site; • When concrete is delivered to site, only the chute of the delivery truck will be cleaned, using the smallest volume of water necessary, before leaving the site. Concrete trucks will be washed out fully at the batching plant, where facilities are already in place. Use weather forecasting to plan dry days for pouring concrete; • Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event; • The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area. Where temporary lined impermeable containment areas are used, such containment areas are typically built using straw bales and lined with an impermeable membrane. • 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. The 50m wide river buffer zone will be in place for the duration of the construction phase. No construction activity will occur within the buffer zone with the exception of bridge and culvert construction. The buffer zone will: • Prevent any cement-based products accidentally entrained in the construction phase drainage system entering directly into watercourses, achieved in part by ending drain discharge outside the 50m buffer zone and allowing percolation across the vegetation of the buffer zone; • Provide a buffer against accidental direct pollution of surface waters by any pollutants, or by pollutants entrained in surface water run-off.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			The risks of pollution arising from concrete deliveries will be further reduced by the following: • Concrete trucks will not be washed out on the site but will be directed back to their batching plant for washout. • Site roads will initially be constructed with a subgrade and compacted with the use of a roller to allow concrete delivery trucks access all areas where the concrete will be needed. The final wearing course for the site roads will not be provided until all bases have been poured. No concrete will be transported around the site in open trailers or dumpers so as to avoid spillage while in transport. All concrete used in the construction of turbine bases will be pumped directly into the shuttered formwork from the delivery truck. If this is not practical, the concrete will be pumped from the delivery truck into a hydraulic concrete pump or into the bucket of an excavator, which will transfer the concrete to the location where it is needed. • The arrangements for concrete deliveries to the site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site washout and discussing emergency procedures. • Clearly visible signage will be placed in prominent locations close to concrete pour areas specifically stating washout of concrete lorries is not permitted on the site. Due to the scale of the main concrete pours that will be required to construct the Proposed Project, the main pours will be planned days or weeks in advance. Special procedures will be adopted in advance of and during all concrete pours to minimise the risk of pollution. These may include: • Using weather forecasting to assist in planning large concrete pours, and avoiding large pours where prolonged periods of heavy rain is forecast. • Restricting concrete pumps and machine buckets from slewing over watercourses while placing concrete. • Ensuring that excavations are sufficiently dewatered before concreting begins and that dewatering continues while concrete sets. • Ensuring that covers are available for freshly placed concrete to avoid the surface washing away in heavy rain. • The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area, or a Siltbuster-type concrete wash unit (https://www.siltbuster.co.uk/sb_prod/siltbuster-roadside-concrete-washout-rcw/) or equivalent. • Disposing of surplus concrete after completion of a pour in agreed suitable locations away from any watercourse or sensitive habitats.		
MM18	Dust Suppression	EIAR Section 4	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 ponds in the site's drainage system and will be pumped into a bowser or water spreader to dampen down haul roads and site compounds to prevent the generation of dust. Silty or oily water will not be used for dust suppression, because this would transfer the pollutants to the haul roads and generate polluted runoff or more dust. Water bowser movements will be carefully monitored, as the application of too much water may lead to increased runoff.		
MM19	Vehicle Washing	EIAR Section 4	Wheels or vehicle underbodies are often washed before leaving sites to prevent the build-up of mud on public (and site) roads. Due to the presence of the Gurteen/Cloonmore GWS refined ZoC, wheel-wash locations have been proposed as part of the measures to protect the ZoC from polluted waters from construction activities. Two wheel-wash facilities will be provided during the construction phase of the Proposed Project – one such location is at the proposed site entrance.		
MM20	Road Cleanliness	EIAR Section 4	A road sweeper will be available if any section of the public roads were to be dirtied by trucks associated with the Proposed Project.		
MM21	Waste Management	EIAR Section 4	In Section 3.9 of Appendix 4-4 CEMP, a waste management plan (WMP) is provided and which outlines the best practice procedures during the construction phase of the project. The WMP outlines the methods of waste prevention and		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		CEMP Section 3	minimisation by recycling, recovery, and reuse at each stage of construction of the Proposed Project. Disposal of waste will be a last resort. 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.		
MM22	Turbine Component Delivery	EIAR Section 4 EIAR Section 15	The deliveries of turbine components to the site may be made in convoys of three to five vehicles at a time, and mostly at night when roads are quietest. Convoys will be accompanied by escorts at the front and rear operating a "stop and go" system. The delivery escort vehicles will ensure the turbine transport is carried out in a safe and efficient manner with minimal delay or inconvenience for other road users. All deliveries comprising abnormally large loads where required will be made outside the normal peak traffic periods, at night, to avoid disruption to work and school-related traffic.		
MM23	Watercourse Buffers	EIAR Section 4 CEMP Section 3	All discharges from the proposed works areas will be made over vegetation filters at an appropriate distance from natural watercourses. Buffer zones of 50m around rivers and streams, respectively, have been used to inform the layout of the Proposed Project.		
MM24	Water Discharge	EIAR Section 4 CEMP Section 3	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.		
MM25	Drainage Swales	EIAR Section 4 CEMP Section 3	Drainage swales will be installed downgradient of any works areas to collect surface flow runoff where it might have come into contact with exposed surfaces and picked up 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. Drainage swales 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.		
MM26	Interceptor Drains	EIAR Section 4 CEMP Section 3	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 picked up 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. This will minimise the volume of potentially silty runoff to be managed within the construction area. The interceptor drains will be installed in advance of any main construction works commencing. The material excavated to make the drain will be compacted on the downslope edge of the drain to form a diversion dike.		
MM27	Check Dams	EIAR Section 4 CEMP Section 3	Check dams will not be used in any natural watercourses, only artificial drainage channels and interceptor drains. Check dams are designed to reduce velocity and control erosion and are not specifically designed or intended to trap sediment, although sediment is likely to build up. If necessary, any excess sediment build up behind the dams will be removed. For this reason, check dams will be inspected and maintained regularly to insure adequate performance. Maintenance checks will also ensure the centre elevation of the dam remains lower than the sides of the dam.		
MM28	Level Spreaders	EIAR Section 4 CEMP Section 3	A level spreader will be constructed at the end of each interceptor drain to convert concentrated flows in the drain into diffuse sheet flow on areas of vegetated ground. The levels spreaders will be located downgradient of any proposed works areas in locations where they are not likely to contribute further to water ingress to construction areas of the site.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM29	Piped Slope Drains	EIAR Section 4	Piped slope drains will be used to convey surface runoff from diversion drains safely down slopes to flat areas without causing erosion. Once the runoff reaches the flat areas it will be reconverted to diffuse sheet flow. Level spreaders will only be established on slopes of less than 6% in grade. Piped slope drains will be used to transfer water away from areas where slopes are too steep to use level spreaders.		
MM30	Vegetation Filters	EIAR Section 4	Vegetation filters are the existing vegetated areas of land that will be used to accept surface water runoff from upgradient areas. The selection of suitable areas to use as vegetation filters will be determined by the size of the contributing catchment, slope and ground conditions. Vegetation filters will carry outflow from the level spreaders as overland sheet flow, removing any suspended solids and discharging to the groundwater system by diffuse infiltration. Vegetation filters will not be used in isolation for waters that are likely to have higher silt loadings. In such cases, silt-bearing water will already have passed through stilling ponds prior to diffuse discharge to the vegetation filters via a level spreader.		
MM31	Stilling Ponds	EIAR Section 4 CEMP Section 3	Stilling or settlement ponds will be used to attenuate runoff from works areas of the site of the Proposed Project during the construction phase and will remain in place to handle runoff from roads and hardstanding areas of the Proposed Project during the operational phase.		
MM32	Dewatering Silt Bag	EIAR Section 4	Dewatering silt bags are an additional drainage measure that can be used downgradient of the stilling ponds at the end of the drainage swale channels and will be located, wherever it is deemed appropriate, throughout the site. The water will flow, via a pipe, from the stilling 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 the stream.		
MM33	Siltbuster	EIAR Section 4	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 stilling ponds or swales. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit.		
MM34	Sediments entrapment mats	EIAR Section 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		
MM35	Culverts	EIAR Section 4	The following mitigation is proposed for completion of wind farm culvert upgrades: • All new proposed culverts and proposed culvert upgrades will be suitably sized for the expected peak flows in the watercourse. • The size of culverts will be influenced by the depth of the track or road sub-base. In some cases, two or more smaller diameter culverts may be used where this depth is limited, though this will be avoided as they will have a higher associated risk of blockage than a single, larger pipe. • 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. • All culverts will be inspected regularly to ensure they are not blocked by debris, vegetation or any other material that may impede conveyance. • It is proposed to construct clear-span crossings watercourse crossings along the wind farm access roads using a bottomless box culvert. The locations of these crossings are shown on the layout drawings included in Appendix 4-1 of the EIAR. The clearspan watercourse crossing methodologies presented below will ensure that no instream works are necessary.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• The watercourse crossings 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. • The service crossings will be constructed in accordance with Gas Networks Ireland Code of Practice 2021. These crossing designs will be approved by GNI before works commence on site. • Confirmatory inspections of each proposed new watercourse crossing location will be carried out by the project civil/structural engineer and the project hydrologist prior to the construction of each crossing. • The watercourse crossings 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 suitable backfill material.		
MM36	Silt Fences	EIAR Section 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 50-metre buffer zone of a stream or a 100-metre of a lake, which is inevitable where existing roads in proximity to watercourses are to be upgraded as part of the Proposed Project. These areas include around existing culverts, around the headwaters of watercourses, and the proposed locations are indicated on the detailed drainage design drawings included in Appendix A of Appendix 4-5 of the EIAR. • The silt fence designs follow the technical guidance document 'Control of Water Pollution from Linear Construction Projects' published by CIRIA (Ciria, No. C648, 1996). Up to three silt fences may be deployed in series. • Site fences will be inspected regularly to ensure water is continuing to flow through the fabric, and the fence is not coming under strain from water backing up behind it.		
MM37	Excavation seepages and treatment	EIAR Section 4	• There will be no direct discharges to any natural watercourses, with all drainage waters being dispersed as overland flows. • A five-metre-wide working area will be required around each turbine base, with the sides of the excavated areas sloped sufficiently to ensure that slippage does not occur. Some of the material excavated to create the working area will be stored locally for later reuse in backfilling the working area around the turbine foundation. The excavated material will be sealed using the back of the excavator bucket to ensure no water is trapped within the material and it will be surrounded by silt fences to ensure sediment-laden run-off does not occur. • A two to three-metre-wide working area will be required around each hardstanding area, with the sides of the excavated areas sloped sufficiently to ensure that slippage does not occur. Material excavated to create the working area will be stored locally for later reuse in backfilling the working area around the turbine foundation. The excavated material will be covered with polythene sheets and surrounded by silt fences to ensure sediment-laden run-off does not occur. 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 picked up 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. This will minimise the volume of potentially silty runoff to be managed within the construction area.		
MM38	Peat Management	EIAR Section 4 CEMP Section 2, 3 Appendix 4-3	The General Construction methodologies, as outlined in the Peat and Spoil Management Plan Appendix 4-3, are aimed to minimise the impact to the stability of the peat. Proposed New Roads:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required

			• Excavation of the new access road to competent strata (see Section 3 for guidance on correctly handling and storing the different peat layers). Maximum excavation side slopes will be 1:1.5.
			  ○ Drainage shall be installed to divert surface and groundwater from the construction areas.
			• A layer of geogrid/geotextile may be required at the base of the excavation. To be confirmed at detailed design.
			• Placement of granular fill-in layers following the designer's specification. The fill thickness is 200mm above the existing ground level, which is required to backfill the excavation to a suitable competent strata below the existing ground level.
			• Access roads are to be finished with a granular running surface across the full width of the road.
			
			New Floated Roads:
			
			• A geotextile-geogrid composite layer is placed directly onto the peat surface following the designer's specification.
			• Placement of granular fill up to 800mm and reinforcing geogrids in layers following the designer's specification, with due regard to any settlement and deformation of peat anticipated at the access track.
			  ○ Cross-drains shall be installed within the road to divert surface and groundwater from upslope to downslope.
			  ○ Stone delivered to the floating road construction area shall be end-tipped onto the constructed floating road to avoid excessive impact loading on the peat due to concentrated end-tipping. Direct tipping of stone onto the peat shall not be carried out.
			  ○ Stone will be spread and placed from the constructed floating road onto the peat surface using a bulldozer.
			• Access roads are to be finished with a granular running surface across the full width of the road.
			
			No excavations (e.g., drainage or peat cuttings) shall be carried out within 5m of a completed floated access road edge or at a distance determined following a site inspection by the Contractor's Geotechnical Engineer.
			
			Upgrade of Existing Founded Roads
			
			• Excavation on one or both sides of the existing access road to competent strata.
			• Placement of granular fill up to 200m above existing ground level and reinforcing geogrids in layers following the designer's specification, with due regard to any settlement and deformation of peat anticipated at the access track.
			• Overlay of the existing access road with selected granular fill following the designer's specification.
			  • Where coarse granular fill has been used in the existing floated access road make-up, a layer of geogrid will be placed on top of the existing floated access road.
			• Access roads will be finished with a granular running surface across the full width of the road.
			  • A layer of geogrid/geotextile may be required at the surface of the existing access road following the designer's specification.
			
			Upgrade of Existing Floated Roads
			
			• A geotextile is placed on one or both sides of the existing access road directly onto the peat surface, following the designer's specification.
			• Benching of existing road and placement of granular fill and reinforcing geogrids in layers following the designer's specification, with due regard to any settlement of peat anticipated for the widened area.
			  • It may be necessary to stage the widening to maintain peat stability – i.e., to reduce the fill placement rate to allow the peat layers to consolidate and increase in strength.
			  • It may be necessary to anchor the geogrids into the existing roads, requiring significant benching of existing roads.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required

			• Overlay of the existing access road with selected granular fill following the designer's specification.
			  • Where coarse granular fill has been used in the existing floated access road make-up, a layer of geogrid will be placed on top of the existing floated access road.
			  • The surface of the existing access road will be graded/levelled before the placement of any geogrid/geotextile, where necessary (to prevent damaging the geogrid/geotextile).
			• Access roads are to be finished with a layer of capping across the full width of the road.
			  • A layer of geogrid/geotextile may be required at the surface of the existing access road following the designer's specification.
			
			Where there are cross slopes, any road widening works required will be carried out on the upslope side of the existing access road, where possible. Particular design details will be required at the detailed design stage at the transitions between floating and founded roads to reduce differential settlements between the two construction types.
			
			• The following general construction guidelines will be implemented for the access roads on site.
			
			• Where an open ditch is present alongside an existing/proposed floating access track, the ditch will need to be filled prior to upgrading/constructing the access track. The ditch will be filled with suitable drainage stone. As applicable, a perforated pipe will be laid into a ditch prior to filling so as to maintain water flow within the ditch.
			• Where existing drainage crosses the road then it will be necessary to ensure that this drainage is not affected by settlement of the upgraded access road. Cross drains comprising flexible perforated pipes within a permeable stone fill surround will be used to maintain the existing drainage.
			• No excavations (e.g., drainage, peat cuttings) will be carried out within 5m distance of a completed floated access road edge, or at a distance determined following site inspection. The presence of excavations can destabilise the road. Temporary excavations will be excavated in short lengths and backfilled as soon as practicable.
			• Floating roads will not be constructed on areas of sidelong ground.
			• No stockpiling of materials will take place on or adjacent to floated access roads so as to avoid bearing failure of the underlying peat.
			• End-tipping of stone onto the road during the construction/upgrading of the access road will be carefully monitored to ensure that excessive impact loading, which may adversely affect the underlying peat, is limited.
			• Due to the nature of floating road construction, it will be necessary to monitor the settlement/movement of the road. Survey points will be located along the road at 10m intervals in areas of deep peat (greater than 2m). These surveys points will be surveyed on a weekly basis, and more frequently when construction activities are ongoing in the area.
			• The construction and upgrading of access roads in areas of deep peat (greater than 2m) will be inspected on a routine basis during the works, particularly before/following trafficking by heavy vehicular loads.
			• In the event of excessive vertical displacement of the road during/following construction then mitigation measures will be required to ensure the stability of the road. This will include:
			  ○ Introduction of pressure berms either side of the road (that are 2m to 5m wide by 0.5m deep stone layer).
			  ○ Where peat is relatively willow then excavate peat and replace with suitable fill.
			  ○ Slowing the rate of construction.
			• Settlement of a floated access road is expected and will likely be in order of several 100mm in the deeper peat area; as such it will be necessary to re-level the road at convenient intervals during the works. The magnitude and extent of the settlement is likely to be greater in areas of deeper peat with the rate of settlement reducing over time. Prior to completion of the works, the road will be re-levelled using crushed stone.		

MM39	Peat and Spoil Repository Areas	EIAR Section 4	• The following outlines guidelines for the careful handling and placement of peat at the Proposed Project site:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required

		CEMP Section 2	• Care shall be taken during peat excavation to ensure it is segregated from other soil types. Therefore, particular care will be taken to review recorded peat depths.
			• Peat shall be separated and placed by type, namely the acrotelmic and catotelmic layers.
			  • Acrotelm (interpreted as the upper 0.5m of peat) is generally required for landscaping and shall be stripped and temporarily placed for reuse as required. Acrotelm stripping shall be undertaken before the main excavations.
			  • Where possible, the acrotelm shall be placed with the vegetation part of the sod facing the right way up to encourage the growth of plants and vegetation.
			  • All catotelm peat (peat below about 0.5m depth) shall be transported immediately on excavation to the designated peat repository areas,
			  • The careful handling and segregation of peat types will help to optimise the reuse of peat, aiding in the retention of structure and integrity of the excavated peat material.
			• Peat and spoil shall be separated and stored separately in designated peat and spoil repository areas. It is not proposed to place peat in the borrow pit.
			• Depending on what vegetation is found on site, more fibrous material may be placed at steeper angles. Unconsolidated peat, generally comprising of catotelmic material, is often not suitable for general dressing, and any unconsolidated peat excavated must only be used for reinstatement where such reuse poses no risk of polluting water courses and evidence can be provided that the required water table at the chosen location can be maintained. However, from a review of the ground investigation logs, which identify predominantly fibrous and pseudo-fibrous material, it is considered that the material excavated will be generally suitable to facilitate:
			  • Placement in designated Peat Repository Areas
			  • Placement in restricted thicknesses on track shoulders and around infrastructure locations where topography permits.
			• Construction sequence planning shall minimise the time that peat is placed before reuse; however, some temporary peat placement will be required for spoil management and separation of spoil horizons before it can be placed in its reinstatement location. The principles on which the temporary placement of excavated peat will be based upon the general and particular placement and handling methodologies set out within this section. Temporary placement will be safe as it protects the structure and integrity of the excavated peat subject to prevailing local conditions. Temporary placement of peat must not be carried out in:
			  • any area outlined as a peat stockpile restriction or safety buffer area in Section 2.5.
			  • Areas possessing a slope angle of greater than 5°,
			  • Areas within 50m of a watercourse
			• Reinstatement of peat and peat turves will be completed during the Construction Phase at the earliest practicable opportunity to avoid prolonged placement
			• Any temporary placement locations will be in suitably wet conditions or be irrigated to prevent the peat from desiccating and precautions will be taken to ensure that turves are not allowed to dry out before reinstatement. The condition of turves will be monitored throughout the duration of placement. Irrigation of peat turves will be agreed in advance with the Ecological Clerk of Works (ECoW). Should wetting of turves be required to prevent desiccation, mitigation will be adopted to prevent run-off or discharge to any adjacent watercourses.
			• Sequencing of construction activities will be timed to allow peat placement in at least one peat repository area during all phases of construction. It may be necessary to utilise existing roads before the upgrade to allow the placement of peat in the initial phases of construction.
			•
			• Plant movements and haul distances related to earthworks activity and peat excavation will be kept to a minimum.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• Peat and spoil repositories cannot substantially erode or become dry. • Any material stockpiles or repository locations will be located at least 50m away from watercourses, including site ditches/sheughs, to reduce the potential for sediment to be transferred into the wider hydrological system. • Where possible, excavation will be timed to avoid very wet weather, periods of extreme rainfall and/or extended periods of prolonged rainfall. • Peat and spoil repository locations have been selected to limit re-handling as far as reasonably possible. • Excavated peat will be placed as close as possible to the immediate area of excavation. • The Contractor will consult the ECoW to agree on locations for material stockpiles and to avoid potential impacts on sensitive ecological receptors. • The Contractor will consult the site Geotechnical Engineer and review and take into account the PSRA (EIAR Technical Appendix 8-1) to avoid the risk of peat instability in peat excavations, peat stockpiling and all material stockpiling in areas underlain by peat. • Runoff from repositories shall be directed through the site drainage system, including silt fences, settlement ponds and other drainage measures as appropriate. These details will be outlined in the Contractor's Construction and Environmental Management Plan. • Peat Repository Areas • Peat repository areas have been identified at locations where the topography (slope angle <5°), peat depth, resulting stability assessment (FoS of >1.3 for 1m peat surcharge) and other environmental constraints (including 50m buffer from all watercourses) have allowed. These areas are designated for the permanent placement of up to 1m of peat material. • A cell berm will be constructed similarly to the peat repository area detail outlined in Appendix B of Appendix 4-3 Peat and Spoil Management Plan. This cell berm will help to prevent the flow of saturated peat material. The stone berm will be constructed with a sufficiently coarse granular material or rock to enable the drainage of the placed peat material and prevent any instabilities within the repository area. • The stone cell berm will require a geotextile separator. The stone cell berm will be constructed using low-ground pressure machinery working from bog mats where necessary. The founding stratum for each stone buttress will be inspected and approved by a competent geotechnical engineer. • The height of the cell berm constructed will be greater than the height of the placed peat & spoil to prevent any surface peat runoff. Berms up to 1.25m in height will be required, subject to detailed design. • The cell berm is subject to the detail designer's specification; however, some peat excavation or installation of a shear key may be required to prevent global instabilities within the stored material. The shear key will comprise an excavation below the existing ground level beneath the cell berm to provide resistance against lateral forces. • Where possible, the placed peat and spoil surface will be shaped to allow efficient runoff of surface water from the peat and spoil repository areas. • Silting ponds will be required at the repository area's lower side/outfall location. • Intermediate berms or buttresses of spoil material may be installed within the peat repository area to aid in the placement and stability of the peat material. These berms will be shaped to align with the contours of the repository area. • The Contractor shall make every reasonable effort to promote growth in the peat repository areas following the placement of peat and completion of construction stage activities. Upper acrotelm layers shall be placed on the surface the right way up to promote vegetation growth. This growth will aid in stabilising the placed peat material and help in preventing it from becoming saturated following heavy periods of rain. • Spoil Repository Area • Cohesive glacial tills considered unsuitable for reuse in the Proposed Project will require placement in a separate spoil repository area. • The spoil repository area has been identified in a location where the topography (slope angle <5°), peat depth, resulting stability assessment (Factor of Safety of >1.3 for 1m peat surcharge) and other environmental		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			constraints (including 50m buffer from all watercourses) have allowed. This area is designated for permanently placing up to 1m of non-peat spoil material. • Side slopes of placed spoil material are to be no greater than 1(V):2(H). • Where possible, the surface of the placed spoil will be shaped to allow efficient surface water runoff from the peat placement areas. • Silting ponds may be required at the repository area's lower side/outfall location. • Intermediate berms or buttresses of granular material may be installed within the spoil repository area to aid in the placement and stability of the spoil material. These berms will be shaped to align with the contours of the repository area.		
			Operational Phase		
MM40	Wastewater Management	EIAR Section 4	• The removal and disposal of wastewater from the site will be carried out by a fully permitted waste collector holding valid Waste Collection Permits as issued under theWaste Management (Collection Permit) Regulations, 2007.		
MM41	Electrical Substation	EIAR Section 4	• The electrical substation will be bunded appropriately to the volume of oils likely to bestored, and to prevent leakage of any associated chemicals and to groundwater orsurface water. The bunded area will be fitted with a storm drainage system and anappropriate oil interceptor.		
			Decommissioning Phase		
MM42	Decommissioning	EAIR Section 4	• Prior to the end of the operational period the Decommissioning Plan (Appendix 4-6 ofthe EIAR) will be updated in line with decommissioning methodologies that may exist atthe time and will be agreed with the competent authority at that time.		
MM43	Decommissioning	EIAR Section 4 DP Section 2	• On removal of turbines, the covering of the foundation will be completed using locally sourced material imported to site as the required quantity of material does not currentlyexist at the site. The imported soil will be spread and graded over the foundation using atracked excavator and revegetation enhanced by spreading of an appropriate seed mix to assist in revegetation.		
MM44	Decommissioning	EIAR Section 4 DP Section 3	• The following mitigation measures are proposed to avoid the release of hydrocarbons at the 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 will be re-filled off site and will be towed around the site by a 4x4 jeep to where machinery is located. 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 (outside of Gurteen/Cloonmore GWS refined ZoC) 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; • Onsite refuelling will be carried out by trained personnel only; • A permit to fuel system will be put in place; • Fuels stored on site will be minimised. Fuel storage areas if required will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor (outside of Gurteen/Cloonmore GWS refined ZoC); • The plant used during construction will be regularly inspected for leaks and fitness for purpose; • An emergency plan for the decommissioning phase to deal with accidental spillages will be developed. Spill kits will be available to deal with and accidental spillage in and outside the refuelling area. • A programme for the regular inspection of plant and equipment for leaks and fitness for purpose will be developed at the outset of the decommissioning phase.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM45	Decommissioning	EIAR Section 4 DP Section 3	Proposed mitigation measures to control dust include: • A wheel wash facility will be installed on the Proposed Wind Farm Site and will be used by vehicles before leaving the Site. • 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 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.		
MM46	Decommissioning	EIAR Section 4 DP Section 3	The operation of plant and machinery, including site vehicles, is a source of potential impact that will require mitigation at all locations within the site. Proposed measures to control noise include: • Limiting the hours during which site activities likely to create noticeable levels of noise or vibration are permitted; • Establishing channels of communication between the Applicant or contractor, Local Authorities and residents; • Selection of plant with low inherent potential for generation of noise and/or vibration; • No plant or machinery will be permitted to cause a public nuisance due to noise; • The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. • All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of works; • Compressors 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; and • The hours of decommissioning works (and associated traffic movements) will, insofar as possible, be limited to avoid unsociable hours. Activities shall generally be restricted to between 07:00hrs and 19:00hrs Monday to Friday and between 07:00hrs and 13:00hrs on Saturdays, with no activities on Sundays or public holidays unless in the event of an emergency.		
MM47	Decommissioning	EIAR Section 4 DP Section 3	The reinstatement of any areas disturbed during the decommissioning works will be undertaken. The contractor will record excavated volumes and storage areas, and volumes and type of material utilised for reinstatement of relevant areas. This information will be updated for the duration of the decommissioning works.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Reinstatement will be completed using site-won materials wherever possible without compromising or damaging established/existing habitats. Natural vegetation will be preferred; however, native seed mixes may also be selected to complement surrounding species. The seed mix and method of application will be agreed with a suitably qualified ecologist to ensure that the reinstated habitats are compatible with those existing and surrounding the reinstated areas at the time of decommissioning. All temporarily stockpiled materials will be stored in designated areas and isolated from any surface drains and a minimum of 50m away from surface water where possible. Aggregate or fine materials storage will be enclosed and screened/sheeted. No storage of materials within areas of blanket bog or wet heath shall be permitted.		
Chapter 5: Human Beings					
Pre-Commencement Phase					
MM48	Human Health	EIAR Section 5	Prior to commencement of any works, the occupants of dwellings in the vicinity of theproposed works will be contacted and the scheduling of works will be identified in linewith the engagement plan. Local access to properties will also be maintained throughoutany construction works and local residents will also be supplied with the number of theworks supervisor in order to ensure that disruption will be kept to a minimum.		
Construction Phase					
MM49	Human Health	EIAR Section 5	The Proposed Project will be constructed, operated and decommissioned 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 (Work at Height) Regulations 2006 (S.I. No. 318 of 2006). 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 2006'*. This will encompass the use of all necessary Personal Protective Equipment, Risk Assessment and Method Statements and adherence to the site Health and Safety Plan.		
MM50	Human Health	EIAR Section 5	Fencing will be erected in areas of the site where uncontrolled access is not permitted. Appropriate health and safety signage will also be erected on this fencing and at locations around the site.		
MM51	Human Health	EIAR Section 5	Best practice measures for noise control will be adhered to onsite during the construction phase of the Proposed Project in order to mitigate the slight short-term negative effects associated with this phase of the development. These measures will include: • No plant used on site will be permitted to cause an on-going public nuisance due to noise. • The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. • All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• 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. • During the course of the construction programme, supervision of the works will include ensuring compliance with the limits detailed in Chapter 12 using methods outlined in British Standard BS5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise. • The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Saturday. However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (i.e. concrete pours, large turbine component delivery, rotor/blade lifting) it could occasionally be necessary to work out of these hours. Where rock breaking is employed in relation to the proposed borrow pit location, 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. • Use a dampened bit to eliminate ringing. • 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.		
MM52	Human Health	EIAR Section 5	Aggregate material for the construction phase will be sourced from the proposed borrow pit and this will reduce the amount of aggregate material to be delivered to the site from off-site sources. Truck wheels will be washed to remove mud and dirt before leaving the site. All plant and materials vehicles shall be stored in the dedicated compound area. Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction. Construction traffic will be restricted to defined routes and a speed limit will be implemented. In periods of extended dry weather, dust suppression may be necessary during tree felling, along haul roads and around the borrow pit areas to ensure dust does not cause a nuisance. If necessary, water will be taken from the site's drainage system, and will be pumped into a bowser or water spreader to dampen down haul roads and the temporary site compound 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. The active construction area along the proposed underground cable route options will be small, ranging from 550-750m in length at any one time. Should separate crews be used during the construction phase they will generally be separated by 1-2 kilometres. All construction machinery will be maintained in good operational order while on-site, minimising any emissions that are likely to arise. Aggregate materials for the construction of the underground cable route will be sourced from the on-site borrow pits to reduce the amount of emissions associated with vehicle movements.		
MM53	Human Health	EIAR Section 5	All construction vehicles and plant machinery will be maintained in good operational order while onsite, thereby minimising any emissions that arise. Where applicable, low carbon intensive construction materials will be sourced and utilised onsite. The expected waste volumes generated onsite are unlikely to be large enough to warrant source segregation at the Proposed Project site. Therefore, all wastes streams generated onsite will be deposited into a single waste skip which will be covered.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			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 MRF facility will be local to the Proposed Project site to reduce the amount of emissions associated with vehicle movements. The nearest licensed waste facility to the site is located approximately 12.7km to the southwest of the Proposed Project site. When stationary, delivery and on-site vehicles will be required to turn off engines. Turbines components will be transported to the site on specified routes only unless otherwise agreed with the Planning Authority.		
MM54	Human Health	EIAR Section 5	Aggregate materials for the construction of any additional site tracks will be obtained from the proposed borrow pit on the site of the Proposed Project. This will significantly reduce the number of delivery vehicles required to access the site.		
			Operational Phase		
MM55	Human Health	EIAR Section 5	Access to the turbines is through a door at the base of the structure, which will be locked at all times outside maintenance visits. Staff associated with the project will conduct frequent visits, which will include inspections to establish whether any signs have been defaced, removed or are becoming hidden by vegetation or foliage, with prompt action taken as necessary. Signs will also be erected at suitable locations across the site as required for the ease and safety of operation of the wind farm. These signs include: • Buried cable route markers at 50m (maximum) intervals and change of cable route direction; • Directions to relevant turbines at junctions; • "No access to Unauthorised Personnel" at appropriate locations; • Speed limits signs at site entrance and junctions; • "Warning these Premises are alarmed" at appropriate locations; • "Danger HV" at appropriate locations; • "Warning – Keep clear of structures during electrical storms, high winds or ice conditions" at site entrance; • "No unauthorised vehicles beyond this point" at specific site entrances; and • Other operational signage required as per site-specific hazards. An operational phase Health and Safety Plan will be developed to fully address identified Health and Safety issues associated with the operation of the site and providing for access for emergency services at all times.		
MM56	Air (Exhaust Emissions)	EIAR Section 5	Ensure that all maintenance and monitoring vehicles will be maintained in good operational order while onsite, and, when stationary, be required to turn off engines thereby minimising any emissions that arise. 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 the emissions associated with vehicle movements.		
MM57	Air (Dust)	EIAR Section 5	Maintenance vehicles brought onsite during the operational phase will be maintained in good operational order, thereby minimising any dust emissions that arise. 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 the emissions associated with vehicle movements.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM58	Climate	EIAR Section 5	Ensure that all maintenance and monitoring vehicles will be maintained in good operational order while onsite, and, when stationary, be required to turn off engines thereby minimising any emissions that arise. As detailed in Appendix 6-6, a Biodiversity Enhancement Plan for the Proposed Project has identified enhancement activities such as planting of hedgerow and peatland enhancement.		
MM59	Major Accidents and Natural Disasters	EIAR Section 5	The Proposed Project will be designed and built 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 onsite to ensure an effective response to disasters or the risk of accidents. The plan will include sufficient preparedness and emergency planning measures. The Proposed Project will also be subject to a fire safety risk assessment in accordance with Chapter 19 of the Safety, Health and Welfare at Work Acts 2005 to 2014, which will assist in the identification of any major risks of fire onsite, and mitigation of the same during operation.		
MM60	Human Health	EIAR Section 5	Where daily or annual shadow flicker exceedances are predicted at any occupied receptor or 3rd party property, a site visit will be undertaken firstly to determine the existing screening and window orientation. This will determine if the receptor has an actual line of sight to any turbine. Once this is completed and all of the potential receptors identified, the following measures will be employed. **Wind Turbine Control Measures** Wind turbines can be fitted with shadow flicker control units to allow the turbines to be controlled to prevent the occurrence of shadow flicker at properties surrounding the wind farm. The shadow flicker control units will be added to any required turbines. A shadow flicker control unit allows a wind turbine to be programmed and controlled using the wind farm's Supervisory Control And Data Acquisition (SCADA) control system to change a particular turbine's operating mode during certain conditions or times, or even turn the turbine off if necessary. All predicted incidents of shadow flicker can be pre-programmed into the wind farm's control software. The wind farm's SCADA control system can be programmed to shut down any particular turbine at any particular time on any given day to ensure that shadow flickers occurrences at properties which are not naturally screened or cannot be screened with measures outlined above. Where such wind turbine control measures are to be utilised, they need only be implemented when the specific combined circumstances occur that are necessary to give rise to the shadow flicker effect in the first instance. Therefore, if the sun is not shining on a particular day that shadow flicker was predicted to occur at a nearby property, there would be no need to shut down the relevant turbines that would have given rise to the shadow flicker at the property. Similarly, if the wind speed was below the cut-in speed that caused the turbine rotor to rotate and give rise to a shadow flicker effect at a nearby property, there would be no need to shut down the relevant turbines that otherwise would have caused shadow flicker. The atmospheric variables that determine whether shadow flicker will occur or not, are continuously monitored at the wind farm site and the data fed into the wind farm's SCADA control system. The strength of direct sunlight is measured by way of photocells, and if the sunlight is of sufficient strength to cast a shadow, the shadow flicker control mechanisms come into effect. Wind speed and direction are measured by anemometers and wind vanes on each turbine and on the wind farm's met mast, and similarly, and if wind speed and direction is such that a shadow will be cast, the shadow flicker control mechanisms come into effect. The moving blades of the turbine will require a short period of time to cease rotating and as such there may be a very short period (less than 3 to 5 minutes) during which the blades are slowed to a complete halt. The turbines giving rise to shadow flicker may be turned off on different days to prevent excessive wear and tear on any single turbine.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			In order to ensure that the model and SCADA system is accurate and working well a site visit will be carried out to verify the system. The shadow flicker prediction data will be used to select dates on which a shadow flicker event could be observed at one or multiple affected properties and the following process will be adhered to. • Recording the weather conditions at the time of the site visit, including wind speeds and direction (i.e. blue sky, intermittent clouds, overcast, moderate breeze, light breeze, still etc.). • Recording the house number, time and duration of site visit and the observation point GPS coordinates. • Recording the nature of the sensitive receptor, its orientation, windows, landscaping in the vicinity, any elements of the built environment in the vicinity, vegetation. • In the event of shadow flicker being noted as occurring the details of the duration (times) of the occurrence will be recorded • The data will then be sent to the wind farm operational team to confirm that the model and SCADA system are working. • Following 12 months of full operation of the Proposed Project a report can be prepared for the Local Authority describing the shadow flicker mitigation measures used at the wind farm and confirming the implementation and successful operation of the system. This method of shadow flicker mitigation has been technically well-proven at wind farms in Ireland and also in areas outside Ireland that experience significantly longer periods of direct sunlight. This measure can be utilised at the site of the Proposed Project to prevent incidences of shadow flicker values at any house in line and with the Wind Energy Development Guidelines 2006. Where a shadow flicker mitigation strategy is to be implemented, the control mechanisms would only have to be applied to the turbines, which are causing the shadow flicker to occur. Should a complaint be received within twelve months of commissioning of the Wind Farm, field investigation/monitoring will be undertaken by the Wind Farm operator at the affected property. Notwithstanding the approach outlined above, should shadow flicker associated with the permitted development be perceived to cause nuisance at any home, the affected homeowner is invited to engage with the Developer. The homeowner will be asked to log the date, time and duration of shadow flicker events occurring on at least five different days. The provided log will be compared with the predicted occurrence of shadow flicker at the residence, and if necessary, a field investigation will be carried out. **Screening Measures** In the event of an occurrence of shadow flicker at residential receptor locations, mitigation options will be discussed with the affected homeowner, including: • Installation of appropriate window blinds in the affected rooms of the residence; • Planting of screening vegetation; • Other site-specific measures which might be agreeable to the affected party and may lead to the desired mitigation. If agreement can be reached with the homeowner, then it would be arranged for the required mitigation to be implemented in cooperation with the affected party as soon as practically possible and for the full costs to be borne by the wind farm operator.		
MM61	Human Health	EIAR Section 5	As outlined in Appendix 15-5 of this EIAR, the Developer and Three have reached agreement in relation to a radio link which traverses the site. The Developer has agreed to bear the costs related to the re-routing of the impacted radio link. The Developer and Three have agreed that any re-routing solution will take place in advance of the construction and operation of the Proposed Project. In the event of interference occurring to telecommunications owned by Enet, the Guidelines acknowledge that 'electromagnetic interference can be overcome' by the use of divertor to relay links out of line with the wind farm. As		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			outlined in their scoping replies, Enet are in agreement regarding the commitment by the Developer for the implementation of the necessary mitigation measures in order to protect the link should both the Proposed Project and the link co-exist.		
Chapter 6 Biodiversity					
Pre-Commencement Phase					
MM62	Invasive Species Management	EIAR Section 6 Appendix 6-4	A pre-construction invasive species survey will be undertaken a part of the proposedproject. This will provide updated data in advance of any construction given theintervention time period between the original survey work and any future grant ofpermission/ construction. Measures will be in place to prevent the spread of these speciesduring the proposed works. In addition, all necessary precautions will be taken to preventthe introduction of invasive species to the site from elsewhere.		
MM63	Fauna	EIAR Section 6	Prior to the commencement of construction works associated with the installation of watercourse crossings, the following measures will be undertaken for the avoidance of disturbance/displacement and direct mortality and to ensure that no otter holts/breeding sites have been established since the original surveys undertaken (TII, 2007): • From a precautionary basis, a pre-commencement otter survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works to ensure that current activity levels are confirmed prior to commencement of works. In the unlikely event that an otter holt is identified within or immediately adjacent to the Proposed Project footprint, consultation will be undertaken with the National Parks and Wildlife Service and a derogation licence applied for. • All conditions of a derogation licence will be implemented in full. • No works will be undertaken within 150m of any holts at which breeding females or cubs are present. • No wheeled or tracked vehicles (of any kind) will be used within 20m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance will not take place within 15m of such holts, except under licence (TII, 2006). • All of the above works will be undertaken or supervised by an appropriately qualified ecologist.		
MM64	Fauna	EIAR Section 6	• Pre-commencement surveys will be undertaken for marsh fritillary to determine if any marsh fritillary are using the site at that time. • If any areas larval webs are identified during these pre-construction surveys, these areas of habitat will be fenced off or clearly marked prior to the commencement of any site works under the guidance and supervision of a suitably qualified Ecological Clerk of Works (ECoW). • Vegetation structure and suitability will be monitored following the NBDC survey methodology (NBDC, 2019). • Proposed tree-planting that is proposed as part of the Biodiversity Management Plan will avoid areas of suitable marsh fritillary habitat. • Pollinator enhancement measures through habitat creation. • Habitat condition monitoring will be undertaken to ensure that there are no negative effects on marsh fritillary habitat.		
MM65	Fauna	EIAR Section 6	Prior to the commencement of any construction works associated with the wind farm, grid route or any associated infrastructure, the following measures will be undertaken for the avoidance of disturbance and/or direct mortality to badger and to ensure no additional setts have been established since the original surveys undertaken. The following measures are in line with *Guidelines For The Treatment Of Badgers Prior To The Construction Of National Road Schemes* (TII 2009).		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• From a precautionary basis, a pre-commencement badger survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works to ensure that no additional setts in close proximity to proposed infrastructure have been built. In the event that a badger sett is identified within or immediately adjacent to the Proposed Project footprint, mitigations as per the above referenced TII document will be implemented for the new sett. • An exclusion of the existing sett will be carried out to ensure no badgers are present within the sett during road upgrade works. The exclusion will be carried out in line with TII guidelines as follows: • Local NPWS staff will be informed in advance of the exclusion works. • The exclusion will not take place during badger breeding season (December to June inclusive) • One way exclusion gates will be installed on each sett entrance. • The one-way gates will be left in place for a period of 21 days and works will proceed immediately after once exclusion of badgers has been confirmed by an Ecologist. • An Ecologist will monitor the gates every 3 to 5 days during the 21-day period to ensure badgers do not succeed in re-entering the sett. • If badgers succeed in re-entering during the 21-day period, the exclusion process and 21-day period must start again. • All of the above works will be undertaken or supervised by an appropriately qualified ecologist.		
MM66	Bats	Appendix 6-2	A pre-commencement survey will be carried out by a suitably qualified ecologist on trees with PRFs proposed for felling. A bat derogation licence will be obtained from the NPWS for the loss of any confirmed roost resource, prior to felling, and the felling activity will be supervised by a qualified ecologist. Tree-felling of mature deciduous trees will be carried out according to the following standard mitigating procedures: • Trees with suitable potential roost features proposed for felling will be checked for bats by a suitably qualified arborist/ecologist at the time of felling. • Trees will be nudged two or three times prior to limb removal, with a pause of 30 seconds in between, to allow bats to wake and move. • Rigged felling shall be used to lower the limbs and trunk carefully to ground level and cavities searched by a qualified ecologist. • Felled trees will be left in-situ for a minimum of 24 hours prior to sawing or mulching, to allow any bats present to escape (National Roads Authority, 2006). • Any tree felling will be undertaken outside the bat maternity season (May- August) and the hibernation period (December-February) (Marnell, Kelleher and Mullen, 2022).		
MM67	Bats	Appendix 6-2	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.		
Construction Phase					
MM68	Invasive Species Management	EIAR Section 6 Appendix 6-4	The following best practice measures should be adhered to during the treatment and management of the invasive species (IS) within the Proposed Project site. • No ground works should take place on site prior to the application of this site-specific Invasive Species Management Plan (ISMP). The ISMP will ensure all measures are taken to avoid the spread of species listed on the Third Schedule. • All staff will be given a Toolbox Talk, by a qualified ecologist, on invasive species removal, and their management on site. • Ensure all visitors to the site are made aware of the location of the ISs recorded and are familiar with its characteristics and method of reproduction.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• A designated bio-secure area/exclusion zone will be set up at recorded invasive species locations to prevent disturbance in these areas. Third schedule invasive species will be marked with hazard tape in order to identify the species prior to vegetation clearance works and to keep it separate from other brash material. • All machinery should be thoroughly cleaned down prior to arriving on the site to avoid the potential spread of invasive species from elsewhere. • Machinery that is used for excavation and onsite removal of invasive material will not be used for any other works until they are fully cleaned down and then visually inspected by a specialist to ensure no fragments of Invasive plant material are present. • Prior to leaving the invasive species exclusion zones, all boots and clothing will be thoroughly brushed down to remove any contaminated material prior to leaving the area. Any collected loose material will be collected and disposed of in the cell/bund. • The contractor will assign a member of their team as Environmental Officer to ensure the management plan is adhered to throughout the proposed works. • All works in relation to the Third Schedule invasive species will be supervised by a suitably qualified ecologist. • As a precautionary measure, machinery will be thoroughly cleaned down before exiting the site to prevent potential spread of invasive species elsewhere. • Clean down will be carried out using brushes and shovels and power washing will be avoided insofar as possible. This is to prevent potentially contaminated run-off spreading outside the site. • Material used for tracking machinery out of the contaminated areas on site and bund location e.g. plywood will be thoroughly cleaned down under supervision of the suitably qualified ecologist prior to removal off site. • Once the machinery has been cleaned down as much as possible the machines will be power-washed, or air blasted to remove any remaining material. The machine will track out of the contaminated areas on site and bund location over plywood or other suitable material in order to protect the machine from potential contamination while exiting the contaminated cell/bund area. • 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. • Any material imported to the site should be screened for invasive species by a suitably qualified ecologist before transportation to the site. • All measures prescribed in the invasive species management plan will be incorporated into the contractor's respective method statements for works where Third Schedule invasive species and invasive species of potential concern occur.		
MM69	Aquatic Fauna	EIAR Section 6	In relation to new watercourse crossings, Inland Fisheries Ireland (IFI) will be consulted a minimum of four weeks in advance of the installation of pre-cast concrete bottomless box culverts. The Inland Fisheries Ireland (2016): *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*; and the Scottish Natural Heritage (SNH) *Good Practice During Wind Farm Construction* (SNH, 2019, 4th Edition) will also be adhered to. 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).		
MM70	Habitats	EIAR Section 6 Appendix 6-6	The Proposed Project also provides for the ecological enhancement of areas of cutover bog through rewetting to promote the development of wetland vegetation. It is proposed to restore 11.6ha of Raised bog (PB1) habitat that remains within the southeast of the Site. This area is designated as Article 17 Degraded raised bog still capable of natural regeneration [7120] but has been subject to extensive drainage in the past in order to facilitate the cutting of peat, and therefore has a highly altered hydrological regime.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM71	Habitats	EIAR Section 6 Appendix 6-6	The Proposed Project provides for the replacement of the woodland habitats that will be lost in other parts of the site to ensure that there will be no net loss of woodland and scrub. It is proposed to replant approximately 2.89ha of native woodland to the north of Turbine 9. This will result in a net gain of 0.75ha of woodland habitat		
MM72	Habitats	EIAR Section 6 Appendix 6-6	The Proposed Project has been deliberately designed to avoid the majority of the *Molina* Meadow habitat on site. In addition, the Proposed Project provides for the replacement of the *Molina* Meadow habitat that will be lost in other parts of the site to ensure that there will be no net loss of *Molinia* Meadow habitat.		
MM73	Habitats	EIAR Section 6	In order to compensate for the loss of linear vegetation, approximately 1,875 linear metres of new replacement hedgerow planting will be carried out along sections of proposed new and upgraded roads in order to ensure that there will be no net loss of linear habitat features. This proposed planting of 2,419m of hedgerow habitat will result in a net gain of 1,358m in linear habitat within the site. Tree/shrub species planted in these locations will be of a similar composition to those occurring on site, will be native and of local provenance. The areas chosen for the planting of new hedgerows to replace those lost were chosen because they provide habitat connectivity between existing treelines and hedgerows and other areas of the Site.		
MM74	Bats	EIAR Section 6 Appendix 6-2	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).		
MM75	Bats	EIAR Section 6 Appendix 6-2	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 Site, and consequently on bats i.e. Lighting will be directed away from mature trees/treelines around the periphery of the site boundary 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 site shall be designed in accordance with the Institute of Lighting Professionals Guidance Note 08/23 Bats and artificial lighting in the UK (ILP, 2023). In addition, the applicant commits to the use of lights during construction, operation and decommissioning (such that they are necessary) in line with the following guidance that is provided in the Dark Sky Ireland Lighting Recommendations: • Every light needs to be justifiable, • Limit the use of light to when it is needed, • Direct the light to where it is needed, • Reduce the light intensity to the minimum needed, • Use light spectra adapted to the environment, • When using white light, use sources with a “warm” colour temperature (less than 3000K).		
MM76	Bats	EIAR Section 6 Appendix 6-2 Appendix 6-6	It is proposed to plant new linear features and bolster existing habitat features to offset any potential loss in linear habitat features and to provide additional new opportunities for commuting and foraging bats. A total of 2,419m of linear habitat will be added, which will result in a net gain of 1,358m in linear habitat features within the Site. The locations in which the proposed linear hedgerow planting will take place will be subject to final landowner agreement. However, indicative areas for planting are proposed in Appendix 6-4 BMEP.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Species planted in these locations will be of a similar composition to those occurring on site, namely, hawthorn and hazel.		
			Operational Phase		
MM77	Bats	EIAR Section 6 Appendix 6-2	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 Site, and consequently on bats i.e. Lighting will be directed away from mature trees/treelines around the periphery of the site boundary 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 site shall be designed in accordance with the Institute of Lighting Professionals Guidance Note 08/23 Bats and artificial lighting in the UK (ILP, 2023). In addition, the applicant commits to the use of lights during construction, operation and decommissioning (such that they are necessary) in line with the following guidance that is provided in the Dark Sky Ireland Lighting Recommendations: • Every light needs to be justifiable, • Limit the use of light to when it is needed, • Direct the light to where it is needed, • Reduce the light intensity to the minimum needed, • Use light spectra adapted to the environment, When using white light, use sources with a “warm” colour temperature (less than 3000K). Commercial forestry felling to facilitate the bat buffers will only be required for Turbine 3 and Turbine 8. The bat buffer formula has also been used to identify the extent of vegetation removal around all other proposed turbines. These vegetation-free areas will be maintained during the operational life of the Proposed Project.		
MM78	Bats	EIAR Section 6 Appendix 6-2	NIEA Guidelines also recommend that, in addition to buffers applied to habitat features, all wind turbines are subject to ‘feathering’ of turbine blades when wind speeds are below the cut-in speed of the proposed turbine. This means that the turbine blades are pitched at 90 degrees or parallel to the wind to reduce their rotation speed to below two revolutions per minute while idling. This measure has been shown to significantly reduce bat fatalities (by up to 50%) in some studies (NIEA, 2021). In accordance with NIEA Guidelines, blade feathering will be implemented as a standard across all proposed turbines when wind speeds are below the cut-in speed of the turbine.		
			Decommissioning Phase		
MM79	Bats	EIAR Section 6 Appendix 6-2	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 Site, and consequently on bats i.e. Lighting will be directed away from mature trees/treelines around the periphery of the site boundary 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			The proposed lighting around the site shall be designed in accordance with the Institute of Lighting Professionals Guidance Note 08/23 Bats and artificial lighting in the UK (ILP, 2023). In addition, the applicant commits to the use of lights during construction, operation and decommissioning (such that they are necessary) in line with the following guidance that is provided in the Dark Sky Ireland Lighting Recommendations: • Every light needs to be justifiable, • Limit the use of light to when it is needed, • Direct the light to where it is needed, • Reduce the light intensity to the minimum needed, • Use light spectra adapted to the environment, When using white light, use sources with a "warm" colour temperature (less than 3000K). Commercial forestry felling to facilitate the bat buffers will only be required for Turbine 3 and Turbine 8. The bat buffer formula has also been used to identify the extent of vegetation removal around all other proposed turbines. These vegetation-free areas will be maintained during the operational life of the Proposed Project.		
Chapter 7 Ornithology					
Pre-commencement Phase					
MM80	Birds	Appendix 7-7	Pre-commencement surveys will be undertaken prior to the initiation of works at the wind farm. This survey will aim to identify sensitive sites e.g., roosts. Any requirement for construction works to run into the subsequent breeding seasons following commencement will be subject to a repeat of the pre-commencement bird surveys to confirm the absence of breeding birds of conservation concern once per month during the breeding season (April to July). The survey will aim to identify sensitive sites e.g., nests or roosts depending on the season in question.		
Construction Phase					
MM81	Birds	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.		
MM82	Birds	Appendix 7-7	If winter roosts or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the construction phase. If the roost/nest is found to be active during the construction phase no works shall be undertaken, works will cease within a species-specific buffer of this location (as per Goodship, N.M. and Furness, R.W., 2022) in line with best practice. No works shall be permitted within the buffer until it can be demonstrated that the roost or nest is no longer occupied. 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 off using hazard-tape fencing to alert all personnel on site to the suspension of works within that area.		
MM83	Birds	EIAR Section 7 Appendix 4-4	The following measures are proposed for the construction phase: • A Construction and Environmental Management Plan (CEMP) has been prepared. The 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. The CEMP is included as an Appendix to Chapter 4.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• Construction works will begin outside the bird nesting season as defined by the Wildlife Act 1976 as amended (1st of March to the 31st of August). • All removal of woody vegetation will be undertaken in accordance with Section 40 of the Wildlife Act 1976 as amended. • 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. • Plant machinery will be turned off when not in use. • All plant and equipment for use will comply with the European Communities (Noise Emission by Equipment For Use Outdoors) Regulations, 2001 (S.I. No. 632/2001) and other relevant legislation. • An Ecological Clerk of Works (ECoW) will be appointed. Duties will include: • Oversee a pre-construction transect/walkover bird survey is undertaken, to avoid significant effects on breeding birds will be avoided. Further details are provided in Section 7.8 below. • Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Project. • Oversee management of ornithological and ecological 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.		
Chapter 8: Land, Soils and Geology					
Pre-Commencement Phase					
MM84	Earthworks	EIAR Section 8	Placement of turbines and associated infrastructure in areas with shallower peat has been achieved during the design phase; Maximum use of the existing road network to reduce peat excavation volumes;		
Construction Phase					
MM85	Earthworks	EIAR Section 8	• Placement of turbines and associated infrastructure in areas with shallower peat; • 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, insofar as possible, sensitive habitats within the Site; and, • Construction of settlement ponds will be volume neutral, and all excess material will be used locally to form pond bunds and surrounding landscaping.		
MM86	Contamination of Soils	EIAR Section 8	• On-site re-fuelling will be undertaken using a double skinned bowser with spill kits kept on site for accidental leakages or spillages; • 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;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• 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, oil and chemical stores including tanks and drums will be regularly inspected for leaks and signs of damage; • The electrical control building (at the 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; • Safety data sheets for all chemicals used will be kept on-site; and, • An emergency response plan for the construction phase to deal with accidental spillages is contained within the Construction and Environmental Management Plan (which is contained in Appendix 4-4).		
MM87	Erosion of Exposed Subsoils and Peat	EIAR Section 8	• The upper vegetative layer (where still present) of excavated peat will be stored with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the stored peat within the peat storage areas; • Re-seeding and spreading/planting will also be carried out in these areas; • Brash/bog mats will be put in place to support vehicles on soft ground, reducing peat and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur; and, • A full Peat and Spoil Management Plan for the development is included as **Appendix 4-3** of the EIAR.		
MM88	Peat Instability and Failure	EIAR Section 8	Firstly, the key mitigation with regard peat stability risk at the Proposed Project site was the carrying out of a robust, multidisciplinary site investigation and peat stability risk assessment carried out in accordance with best practice guidance (PLHRAG, Scottish Government, 2017). The findings of the peat assessment, which involved analysis of 194 no. locations, showed that the Proposed Project areas have an acceptable margin of safety and that the site is suitable for the Proposed Project. The peat stability risk assessment report provides a number of mitigation/control measures to reduce the potential risk of peat failure at each infrastructure location. Sections of access roads to the nearest infrastructure element will be subject to the same mitigation/control measures that apply to the nearest infrastructure element. The required mitigation/control measures are shown below: The following control measures incorporated into the construction phase of the project will ensure the management of the risks for this site: • Appointment of experienced and competent contractors; • The site will be supervised by experienced and qualified personnel; • Allocate sufficient time for the 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 managed robust drainage system; • Prevent placement of loads/overburden on marginal ground; • Implementation of safety buffers around deep peat areas; • Adhere to the spoil and peat storage restriction areas detailed in the Peat Stability Risk Assessment Report (GDG, 2024); • Set up, maintain and report findings from monitoring systems as outlined in the Peat Stability Assessment Report (GDG, 2024); • 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM89	Turbine Delivery Route Works	EIAR Section 8	• All works are minor and localised and cover very small areas; • These works are distributed over a wide area; and, • All works are temporary in nature.		
MM90	Turbine Base Piling Works	EIAR Section 8	Other than surface level and minor excavation works, any piling works will not produce significant volumes of spoil as the proposed piling system are driven piles (these will displace soil/subsoil within the ground).		
MM91	Peatland Enhancement	EIAR Section 8	To maximise the effectiveness of the re-wetting proposal and to increase the chances of future success, any works undertaken as part of the enhancement works will be based on approaches and methods that were successful at other peatland sites in Ireland.		
			Operational Phase		
MM92	Land, Soils and Geology	EIAR Section 8	Mitigation measures for land, soils and geology during the operational phase include the use of aggregate from authorised quarries for use in road and hardstand maintenance. Oil used in transformers (at the substation and within each turbine) and storage of oils in tanks at the substation could leak during the operational phase and impact on ground/peat and subsoils and groundwater or surface water quality. The substation transformer will be in a concrete bunded capable of holding 110% of the stored oil volume. Turbine transformers are located within the turbines, so any leaks would be contained within the turbine. These mitigation measures are considered sufficient to eliminate potential risks to ground/peat/soils and subsoils, and groundwater and surface water quality.		
			Decommissioning Phase		
MM93	Land, Soils and Geology	EIAR Section 8	Mitigation measures applied during decommissioning activities will be similar to those applied during construction phase		
			Chapter 9 Hydrology		
			Pre-Commencement Phase		
MM94	Drainage	EIAR Section 9	Prior to the commencement of road upgrades (or new road/hardstand or turbine base installs) the following key temporary drainage measures will be installed: • All existing dry drains that intercept the proposed works area will be temporarily blocked down gradient of the works using temporary check dams/silt traps; • Clean water diversion drains will be installed upgradient of the works areas; • Check dams/silt fence arrangements (silt traps) will be placed in all existing drains that have surface water flows and also along existing roadside drains; and, • A double silt fence perimeter will be placed down-slope of works areas that are located inside the watercourse 50m buffer zones such as at watercourse crossings.		
MM95	Grid Connection Earthworks and Watercourse Crossings	EIAR Section 9	Pre-commencement Temporary Drainage Works: Prior to the commencement of substation, cable trenching, access road or end mast works the following key temporary drainage measures will be installed: • All existing roadside drains (where present) that intercept the proposed works area will be temporarily blocked down-gradient of the works using check dams/silt traps; • Culverts, manholes and other drainage inlets (where present) will also be temporarily blocked; • A double silt fence perimeter will be placed along the road verge on the down-slope side of works areas that are located inside the watercourse 50m buffer zone on the Levally Stream tributary.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Construction Phase		
MM95	Gurteen/Cloonmore GWS Spring	EIAR Section 9	The following proposed construction design measures will ensure the bedrock aquifer below the Wind Farm is not disrupted during works: • The proposed construction method for turbine bases located inside the refined ZoC (i.e. T1, T2, T3 and T4) will either be a gravity foundation or pre-cast piling; • The gravity foundation option will seek a suitable founding in the glacial tills at a maximum of 3 - 3.5mblg and therefore excavations will only require the removal of overburden to the final base level which will be within the overburden layer; • A protective layer of overburden will be left in place above the bedrock; • Gravity foundation is the preferred option unless further site investigations deem it unsuitable. If gravity foundation is not suitable at a depth of 3 - 3.5m or above, precast piling will be the approach; • Pre-cast piling will involve driving imported concrete piles down onto the top of bedrock below the glacial tills. The piles will not be drilled into the underlying bedrock aquifer nor will they be grouted in place; • The gravity foundation or pre-cast piling approach will not require excavations or grouting down into the bedrock aquifer and therefore there will be no risk of intercepting potential underlying bedrock conduits/fractures that transmit groundwater to the spring; • Short term pumping/dewatering of turbine base excavations is likely to be required in the gravity base scenario, but this will only be seepage from the overlying glacial overburden; and, • Therefore, with both approaches there will be no potential whatsoever to disrupt underlying groundwater flow paths (conduits/fractures) in the bedrock aquifer that feeds the GWS spring. As a precautionary design measure, the extraction depth of the borrow pit will not go deeper than 67m OD which means the borrow pit floor will always be above the water level in spring source sump (65.811m to 66.371m OD over the monitoring period). There is a shallow road cutting (<2m) required on the north of the Wind Farm site that is located on the northern edge of the GSI SPA/ZoC. The proposed cut is required to achieve appropriate road slope along the site entrance road. The cut will not extent into the underlying bedrock. The following mitigation is proposed at all construction works areas inside the refined ZoC: • No storage of fuels, oils, cements or chemicals will be permitted within the refined ZoC; • Refuelling of mobile plant (i.e. diggers, dumpers etc) will only be permitted outside the refined ZoC; • Refuelling of large immobile plant (i.e. cranes) will only be carried out with a double skinned fuel bowser that will be removed from ZoC immediately after use; • Spill kit stations will be present at each turbine location (T1, T2, T3 and T4); • There will be no long term storage of peat/spoil inside the ZoC; • An impermeable liner will be placed below the founding layer where concrete is to be poured; • All cement washout lagoons will be located outside the ZoC; and, • A protective layer of in-situ overburden (2 -3m) will remain above the top of bedrock where gravity foundation excavations are required for groundwater quality protection.		
MM96	Clear Felling	EIAR Section 8 EIAR Section 9	All felling operations will conform to current best practice Forest Service regulations, policies and strategic guidance documents as well as Coillte and DAFM guidance documents, including the specific guidelines listed below, to ensure that felling, planting and other forestry operations result in minimal potential negative effects to the receiving environment.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• Forestry Standards Manual (Forest Service, 2015) • Environmental Requirements for Afforestation (Forest Service, 2016a) • 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) • Forestry and the Landscape Guidelines (Forest Service, 2000c) • Forestry and Archaeology Guidelines (Forest Service, 2000d) • Forest Biodiversity Guidelines (Forest Service, 2000e) • Forests and Water, Achieving Objectives under Ireland's River Basin Management Plan 2018-2021 (DAFM, 2018) • Coillte Planting Guideline SOP • A Guide to Forest Tree Species Selection and Silviculture in Ireland (Horgan et al., 2003) • Management Guidelines for Ireland's Native Woodlands. Jointly published by the National Parks & Wildlife Service (Cross and Collins, 2017) • Native Woodland Scheme Framework (Forest Service, 2018) • Code of Best Forest Practice (Forest Service, 2000) During the Wind Farm construction phase a self-imposed buffer zone of 50 metres will be maintained for all streams where possible. Mitigation measures which will reduce the risk of entrainment of suspended solids and nutrient release in surface watercourses comprise best practice methods which are set out as follows: • Machine combinations (i.e., handheld or mechanical) will be chosen which are most suitable for ground conditions and which will minimise soils disturbance; • Checking and maintenance of roads and culverts will be on-going through any felling operation. No tracking of vehicle through watercourses will occur, as vehicles will use road infrastructure and existing watercourse crossing points. Where possible, existing drains will not be disturbed during felling works; • Ditches which drain from the proposed area to be felled towards existing surface watercourses will be blocked, and temporary silt traps will be constructed. No direct discharge of such ditches to watercourses will occur. Drains and sediment traps will be installed during ground preparation. Collector drains will be excavated at an acute angle to the contour (~0.3%-3% gradient), to minimise flow velocities. Main drains to take the discharge from collector drains will include water drops and rock armour, as required, where there are steep gradients, and will avoid being placed at right angles to the contour; • Sediment traps will be sited in drains downstream of felling areas. Machine access will be maintained to enable the accumulated sediment to be excavated. Sediment will be carefully disposed of in the peat disposal areas. Where possible, all new silt traps will be constructed on even ground and not on sloping ground; • All drainage channels will taper out before entering the 50m buffer zone. This ensures that discharged water gently fans out over the buffer zone before entering the aquatic zone, with sediment filtered out from the flow by ground vegetation within the zone. On erodible soils, silt traps will be installed at the end of the drainage channels, to the outside of the buffer zone; • Drains and silt traps will be maintained throughout all felling works, ensuring that they are clear of sediment build-up and are not severely eroded. Correct drain alignment, spacing and depth will ensure that erosion and sediment build-up are minimized and controlled; • Brash mats will be used to support vehicles on soft ground, reducing peat and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal will take place when they become heavily used and worn. Provision will be		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			made for brash mats along all off-road routes, to protect the soil from compaction and rutting. Where there is risk of severe erosion occurring, extraction will be suspended during periods of high rainfall; • Timber will be stacked in dry areas, and outside a local 50 metre watercourse buffer. Straw bales and check dams to be emplaced on the down gradient side of timber storage/processing sites; • Works will be carried out during periods of no, or low rainfall, in order to minimise entrainment of exposed sediment in surface water run-off; • Checking and maintenance of roads and culverts will be on-going through the felling operation; • Refuelling or maintenance of machinery will not occur within 100m of a watercourse. Mobile bowser, drip kits, qualified personnel will be used where refuelling is required; • A permit to refuel system will be adopted; • Branches, logs or debris will not be allowed to build up in aquatic zones. All such material will be removed when harvesting operations have been completed, but care will be taken to avoid removing natural debris deflectors; • Crossing of streams will not be permitted; • Trees will be cut manually from along streams and using machinery to extract whole tree; and, • Travel only perpendicular to and away from stream. **Silt Traps**: Silt traps will be strategically placed down-gradient within forestry drains near streams. The main purpose of the silt traps and drain blocking is to slow water flow, increase residence time, and allow settling of silt in a controlled manner. **Drain Inspection and Maintenance**: The following items shall be carried out during pre-felling inspections and after: • Communication with tree felling operatives in advance to determine whether any areas have been reported where there is unusual water logging or bogging of machines; • Inspection of all areas reported as having unusual ground conditions; • Inspection of main drainage ditches and outfalls. During pre-felling inspections the main drainage ditches shall be identified. Ideally the pre-felling inspection shall be carried out during rainfall; • Following tree felling all main drains shall be inspected to ensure that they are functioning; • Extraction tracks nears drains need to be broken up and diversion channels created to ensure that water in the tracks spreads out over the adjoining ground; • Culverts on drains exiting the site will be unblocked; and, • All accumulated silt will be removed from drains and culverts, and silt traps, and this removed material will be deposited away from watercourses to ensure that it will not be carried back into the trap or stream during subsequent rainfall. **Surface Water Quality Monitoring**: Sampling will be completed before, during (if the operation is conducted over a protracted time) and after the felling activity. The 'before' sampling will be conducted within 4 weeks of the felling activity commencing, preferably in medium to high water flow conditions. The "during" sampling will be undertaken once a week or after rainfall events. The 'after' sampling will comprise as many samplings as necessary to demonstrate that water quality has returned to pre-activity status (i.e., where an impact has been shown). Criteria for the selection of water sampling points include the following: • Avoid man-made ditches and drains, or watercourses that do not have year-round flows, i.e. avoid ephemeral ditches, drains or watercourses;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• Select sampling points upstream and downstream of the forestry activities; • It is advantageous if the upstream location is outside/above the forest in order to evaluate the impact of land-uses other than forestry; • Where possible, downstream locations will be selected: one immediately below the forestry activity, the second at exit from the forest, and the third some distance from the second (this allows demonstration of no impact through dilution effect or contamination by other land-uses where impact increases at third downstream location relative to second downstream location); and, • The above sampling strategy will be undertaken for all on-site sub-catchments streams where tree felling is proposed.		
MM97	Earthworks	EIAR Section 9	**Mitigation by Avoidance:** The key mitigation measure during the construction phase of the Proposed Project is the avoidance of sensitive aquatic areas where possible. The key areas of the Wind Farm infrastructure are actually significantly away from the 50m delineated buffer zones with the exception of existing road upgrades, new roads, proposed stream crossings and existing stream crossings requiring upgrading. 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 operated effectively. The proposed buffer zone will: • Avoid physical damage to watercourses, and associated release of sediment; • Avoid excavations within close proximity to surface water courses; • 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. **Mitigation by Design:** • Source controls: • Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sandbags, oyster bags filled with gravel, filter fabrics, and other similar/equivalent or appropriate systems. • Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures. • In-Line controls: • Interceptor drains, vee-drains, oversized swales, erosion and velocity control measures such as check dams, sandbags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems. • Treatment systems:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• Temporary sumps and attenuation ponds, temporary storage lagoons, sediment traps, and settlement ponds, and proprietary settlement systems such as Siltbuster, and/or other similar/equivalent or appropriate systems. It should be noted for this Wind Farm site is that an extensive network of forestry, bog, field and roadside drains already exists, and these will be integrated and enhanced as required and used within the Proposed Project drainage system. The integration of the existing forestry drainage network and the Proposed Project network is relatively simple. The key elements being the upgrading and improvements to water treatment elements, such as in line controls and treatment systems, including silt traps, stilling ponds and buffered outfalls. The main elements of interaction with existing drains will be as follows: • Apart from interceptor drains, which will convey clean runoff water to the downstream drainage system, there will be no direct discharge (without treatment for sediment reduction, and attenuation for flow management) of runoff from the Proposed Project drainage into the existing site drainage network. This will reduce the potential for any increased risk of downstream flooding or sediment transport/erosion; • Silt traps will be placed in the existing drains upstream of any streams where construction works / tree felling is taking place, and these will be diverted into proposed interceptor drains, or culverted under/across the works area; • Runoff from individual turbine hardstanding areas will be not discharged into the existing drain network but discharged locally at each turbine location through stilling ponds and buffered outfalls onto vegetated surfaces; • Buffered outfalls which will be numerous over the site will promote percolation of drainage waters across vegetation and close to the point at which the additional runoff is generated, rather than direct discharge to the existing drains of the site; and, • Drains running parallel to the existing roads requiring widening will be upgraded, widening will be targeted to the opposite side of the road. Velocity and silt control measures such as check dams, sandbags, oyster bags, straw bales, flow limiters, weirs, baffles, silt fences will be used during the upgrade construction works. Regular buffered outfalls will also be added to these drains to protect downstream surface waters. **Water Treatment Train** A final line of defence will be provided by a water treatment train such as a “Siltbuster”. If the discharge water from construction areas fails to be of a high quality during regular inspections, 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 for all of 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 water courses 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. Inspection and maintenance of these of these structures during construction phase is critical to their functioning to stated purpose. They will remain in place throughout the entire construction phase. Double silt fences will be placed within drains down-gradient of all construction areas inside the hydrological buffer zones. **Silt Bags**		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Silt bags will be used where small to medium volumes of water need to be pumped from excavations. As water is pumped through the bag, the majority of the sediment is retained by the geotextile fabric allowing filtered water to pass through. Silt bags will be used with natural vegetation filters or sedimats Sediment entrapment mats, consisting of coir or jute matting, will be placed at the silt bag location 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. **Settlement Ponds** The Wind Farm footprint has been divided into drainage catchments (based on topography, outfall locations, catchment size) and stormwater runoff rates based on the 50-year return period rainfall event were calculated for various catchment areas in order to size the settlement ponds. **Level Spreaders and Vegetation Filters** The purpose of level spreaders is to release treated drainage flow in a diffuse manner, and to prevent the concentration of flows at any one location thereby avoiding erosion. Level spreaders are not intended to be a primary treatment component for development surface water runoff. They are not stand alone but occur as part of a treatment train of systems that will reduce the velocity of runoff prior to be released at the level spreader. In the absence of levelspreaders, the potential for ground erosion is significantly greater than not using them. Vegetation filters are essentially end-of-line polishing filters that are located at the end of the treatment train. In fact, vegetation filters are ultimately a positive consequence of not discharging directly into watercourses which is one of the mitigation components of the drainage philosophy. This makes use of the natural vegetation of the Site to provide a polishing filter for the Wind Farm drainage prior to reaching the downstream watercourses. **Pre-emptive Site Drainage Management** The works programme for the entire construction stage of the Proposed Project will also take account of weather forecasts, and predicted rainfall in particular. Large excavations and movements of peat/subsoil or vegetation 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 basis at the site to direct proposed construction activities: • General Forecasts: Available on a national, regional and county level from the Met Eireann 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 Eireann 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 Eireann 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Using the safe threshold rainfall values will allow work to be safely controlled (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event. Works will be suspended if forecasting suggests either 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 works being suspended the following control measures will be completed: • Secure all open 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 Spoil Repository Areas** It is proposed that excavated spoil and peat will be used for landscaping where required. The excess material will then be placed in 4 no. dedicated Peat Repository Areas (PRA) and 1 no. Spoil Deposition Area (SDA). All proposed PRAs and the SDA are located outside of 50m watercourse buffers and also outside of OPW mapped fluvial flood zones. During the initial construction of repository/deposition areas, silt fences, straw bales and biodegradable geogrids will be used to control surface water runoff from works areas. Where applicable, the vegetative top-soil layer of the peat and spoil management areas will be rolled back to facilitate placement of excavated spoil, following which the vegetative-top soils layer will be reinstated. Where reinstatement is not possible, spoil and peat management areas will be sealed with a digger bucket and seeded as soon possible to reduce sediment entrainment in runoff. Drainage from peat and spoil storage areas will ultimately be routed to an oversized swale and a number of stilling ponds pond with appropriate storage and settlement designed for a 1 in 50-year return period before being discharged to the on-site drains. Peat/subsoil reinstatement areas will be sealed with a digger bucket and vegetated as soon possible to reduce sediment entrainment in runoff. Once re-vegetated and stabilised peat/subsoil reinstatement areas will no longer be a potential source of silt laden runoff. **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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM98	Excavation Dewatering and Surface Water Quality	EIAR Section 9	Management of excavation inflows and subsequent treatment prior to discharge into the drainage network will be undertaken as follows: • Appropriate interceptor drainage, to prevent upslope surface runoff from entering excavations will be put in place; • If required, pumping of excavation inflows will prevent build-up of water in the excavation; • The interceptor drainage will be discharged to the site constructed drainage system or onto natural vegetated surfaces and not directly to surface waters; • The pumped water volumes will be discharged via volume and sediment attenuation ponds adjacent to excavation areas, or via specialist treatment systems such as a siltbag; • There will be no direct discharge to surface watercourses, and therefore no risk of hydraulic loading or contamination will occur; • Daily monitoring of excavations by a suitably qualified person will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped and a geotechnical assessment undertaken; • At the borrow pit adequately sized settlement ponds will be constructed to treat pumped water prior to discharge into a local manmade drain; • A mobile 'Siltbuster' or similar equivalent specialist treatment system will be made available at the borrow pit location for emergencies in order to treat sediment polluted waters from settlement ponds or excavations should they occur. Siltbusters are mobile silt traps that can remove fine particles from water using a proven technology and hydraulic design in a rugged unit. The mobile units are specifically designed for use on construction-sites. They will be used as final line of defence if needed.		
MM99	Hydrocarbons	EIAR Section 9	Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows: • 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 will be re-filled off site, and will be towed around the site by a 4x4 jeep to where machinery is located. 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 (outside of Gurteen/Cloonmore GWS refined ZoC) 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; • Onsite refuelling will be carried out by trained personnel only; • A permit to fuel system will be put in place; • Fuels stored on site will be minimised. Fuel storage areas if required will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor (outside of Gurteen/Cloonmore GWS refined ZoC); • The plant used during construction will be regularly inspected for leaks and fitness for purpose; and, • An emergency plan for the construction phase to deal with accidental spillages will be included within the Construction and Environmental Management Plan (**Appendix 4-4**). Spill kits will be available to deal with and accidental spillage in and outside the re-fuelling area.		
MM100	Wastewater Disposal	EIAR Section 9	It is proposed to manage wastewater from the staff welfare facilities in the control buildings by means of a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. It is not proposed to treat wastewater on-site.		
MM101	Release of Cement Based Products	EIAR Section 9	• 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; • Where concrete is delivered on site, only the chute will be cleaned, using the smallest volume of water practicable. No discharge of cement contaminated waters to the construction phase drainage system or		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined cement washout ponds located outside of Gurteen/Cloonmore GWS refined ZoC; • Weather forecasting will be used to plan dry days for pouring concrete; and, • The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event.		
MM103	Morphological Changes to Surface Water Courses and Drainage Patterns	EIAR Section 9	• All proposed new stream crossings will be bottomless or clear span culverts and the existing banks will remain undisturbed. No in-stream excavation works are proposed and therefore there will be no direct impact on the stream at the proposed crossing location; • Where the proposed cable route follows an existing road or road proposed for upgrade, the cable will pass over or below the culvert within the access road; • All guidance / mitigation measures proposed by the OPW or the Inland Fisheries Ireland[2] is incorporated into the design of the proposed crossings; • As a further precaution, near stream construction work, will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document "Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites", i.e., May 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); • During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase. There will be no batching or storage of cement allowed in the vicinity of the crossing construction areas; and, • All new river/stream crossings will require a Section 50 application (Arterial Drainage Act, 1945). The river/stream crossings will be designed in accordance with OPW guidelines/requirements on applying for a Section 50 consent.		
MM104	Potential Hydrological Effects on Designated Sites	EIAR Section 9	Drainage mitigation measures for surface water quality protection during construction phase are summarised again below: • The proposed mitigation measures which will include 50m buffer zones for avoidance of sensitive hydrological features (streams and rivers); • Pre-construction drainage control measures; • Robust drainage control measures (i.e. interceptor drains, swales, settlement ponds and treatment trains such as Siltbuster) will ensure that the quality of runoff from Proposed Project areas will be very high; and, • Best practice measures with regard use of oils, fuels and cement based compounds.		
MM105	Turbine Delivery Works	EIAR Section 9	• All works are minor and localised and cover very small areas; • These works are distributed over a wide area; • All works are temporary in nature; and, • Application of the Pre-Construction Drainage Measures for surface water quality protection.		
MM106	WFD Status of Downstream Waterbodies	EIAR Section 9	Comprehensive surface water mitigation and drainage controls are outlined the aforementioned Felling of Coniferous Plantations, Earthworks, Excavation Dewatering, Hydrocarbons, Cement-based Products and Morphological Changes to Watercourses. These will ensure the protection of surface water quality and flows in all downstream receiving watercourses.		
MM107	Use of Siltbuster and Impacts on Downstream Surface Water Quality	EIAR Section 9	Measures employed to prevent overdosing and potential chemical carryover: • The siltbuster system comprises an electronic in-line dosing system which provides an accurate means of adding reagents, so overdosing cannot occur;		

[2] *Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters*

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• Continued monitoring and water analysis of pre and post treated water by means of an inhouse lab and dedicated staff, means the correct amount of chemical is added by the dosing system; • Dosing rates of chemical to initiate settlement is small, being in the order of 2-10 mg/L and the vast majority of the chemical is removed in the deposited sediment; • Final effluent not meeting the discharge criteria is recycled and retreated, which has a secondary positive effect of reducing carryover; and, • Use of biodegradable chemical agents can be used at very sensitive sites (i.e. upstream of SACs).		
MM108	Grid Connection Earthworks and Watercourse Crossing	EIAR Section 9	The following mitigation measures are proposed for the underground cabling watercourse crossing works: • No stock-piling of construction materials will take place along the grid route; • 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 will not take place at periods of high rainfall, and will be scaled back or suspended if heavy rain is forecast; • Local road drainage, culverts and manholes will be temporarily blocked during the works; • Machinery deliveries will be arranged using existing structures along the public road; • All machinery operations will take place away from the stream and ditch banks, apart from where crossings occur. Although no instream works are proposed or will occur; • Any excess construction material will be immediately removed from the area and sent to a licenced waste facility; • No stockpiling of materials will be permitted in the constraint zones; • Spill kits will be available in each item of plant required to complete the stream crossing; and, • Silt fencing will be erected on ground sloping towards watercourses at the stream crossings if required. • The area around the Clear Bore™ (or similar alternative) batching, pumping and recycling plants will be bunded using terram and sandbags in order to contain any spillages; • One or more lines of silt fences will be placed between the works area and adjacent rivers and streams on both banks; • Accidental spillage of fluids will be cleaned up immediately and transported off site for disposal at a licensed facility; and, • Adequately sized skips will be used for temporary storage of drilling arisings during directional drilling works. This will ensure containment of drilling arisings and drilling flush.		
MM109	Groundwater Effects associated with Piled Turbine Foundations	EIAR Section 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. Proposed mitigation measures relative to piling works will comprise: • 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.		
MM110	Wetland Hydrology	EIAR Section 9	The main mitigation with regard the safeguard of existing peatland hydrology was the avoidance of areas of intact bog. Proposed turbine locations T6, T7, T10 and T11 as well as the Grid Connection are at least 50m away from areas of intact bog. As assessed in Section 9.5.2.4 in EIAR Section 9 (groundwater level effects), no significant effects or long-term effects on groundwater levels will occur due to the relatively shallow depth of the gravity foundations (3 – 3.5m deep) and the low permeability nature of the peat and glacial till overburden to be excavated. Significant groundwater inflows into turbine excavations will not occur for these reasons.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Any effects on groundwater levels will only be for a temporary basis during the construction work. Groundwater level effects are unlikely to be perceptible beyond 10m from the turbine base excavation. Once construction is completed and the works area reinstated, the local groundwater levels and peat waters levels will return to baseline conditions.		
MM111	Peatland Enhancement	EIAR Section 9	To maximise the effectiveness of the re-wetting proposal and to increase the chances of future success, any works undertaken as part of the enhancement plan will be based on approaches and methods that were successful at other peatland sites in Ireland. Peat water level monitoring, by means proposed piezometer installs, will also be carried out to monitor the effectiveness of the bog re-wetting. The monitoring will continue through the lifetime of the Proposed Project		
Operational Phase					
MM112	Removal of Vegetation Cover and Progressive Replacement of Natural Surface with Low Permeability Surfaces	EIAR Section 9	**Mitigation by Design** The operational phase drainage system of the Proposed Project will be installed and constructed in conjunction with the road and hardstanding construction work as described below and as shown on the drainage drawings submitted with this planning application: • Interceptor drains will be maintained up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it will be re-distributed over the ground by means of a level spreader; • Swales/road side drains will be used to collect runoff from access roads and turbine hardstanding areas of the site, likely to have entrained suspended sediment, and channel it to settlement ponds for sediment settling; • On steep sections of access road transverse drains ('grips') will be constructed in the surface layer of the road to divert any runoff off the road into swales/road side drains; • Check dams will be used along sections of access road drains to intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock; • Settlement ponds, emplaced downstream of road swale sections and at turbine locations, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall, by retaining water until the storm hydrograph has receded, thus reducing the hydraulic loading to watercourses; and, • Settlement ponds will be designed in consideration of the greenfield runoff rate.		
MM113	Runoff Resulting in Suspended Solids Entrainment in Surface Waters	EIAR Section 9	The mitigation measures outlined in Sections 9.5.2.3 & 9.5.3.1 of EIAR Section 9 will ensure all surface water runoff from upgraded roads and new road surfaces (including hardstand and turbine base areas) will be captured and treated prior to discharge/release. Settlement ponds, checks dams and buffered outfalls will prevent roads acting as preferential flowpaths by providing attenuation and water quality treatment. It is proposed that bedrock won from the on-site borrow pit (i.e. limestone) will be used to construct the sub-base layer of proposed upgraded and new access roads, hardstand areas and turbine base areas. Once installed the subbase layer will be overlain by a clean capping layer of high-grade stone material which will be sourced from the borrow pit or local quarries.		
MM114	Gurteen/Cloonmore GWS Spring Source	EIAR Section 9	• During the operational phase of the Proposed Project, the only regular plant which will be required on site will be maintenance/inspection vehicles (jeeps/vans/quads) and these will not be refuelled on-site. • • Any hydrocarbons (oil) present within the turbine generator and gear box will be enclosed within a bund with 110% capacity. • • There will be storage of fuels, oils and chemicals inside any of the turbines.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Decommissioning Phase		
MM115	Decommissioning	EIAR Section 9	During decommissioning, it will be possible to reverse or at least reduce some of the potential effects caused during construction, and to a lesser extent operation, by rehabilitating constructed areas such as turbine bases and hard standing areas. This will be done by covering with peatland vegetation/scraw or poorly humified peat to encourage vegetation growth and reduce run-off and sedimentation. Mitigation measures to avoid contamination by accidental fuel leakage and compaction of soil by on-site plant will be implemented as per the construction phase mitigation measures.		
			Chapter 10: Air		
MM116	Exhaust Emissions	EIAR Section 10	• All construction vehicles and plant used during construction will be maintained in good operational order while onsite. If any vehicle requires repairs, 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. • Users of the Site will be required to ensure that all plant and vehicles are suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum. • 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 Materials Recovery Facility (MRF) will be local to the Proposed Project site to reduce the amount of emissions associated with vehicle movements. The nearest licensed waste facility to the Wind Farm Site is located approximately 12.7km to the southeast of the Site of the Proposed Project. • Waste associated with the construction of the underground grid connection cabling route will be disposed of at the closest MRF to where waste is generated along the underground electrical cabling route. The closest licensed waste facilities in the vicinity of the underground electrical cabling route, is located approximately 12.7km to the south.		
MM117	Dust Emissions	EIAR Section 10	• A wheel wash facility will be installed on the Proposed Wind Farm Site and will be used by vehicles before leaving the Site. • 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 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• 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. • A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-4). The CEMP includes dust suppression measures.		
			Operational Phase		
MM118	Exhaust Emissions	EIAR Section 10	• Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any emissions that arise. • • When stationary, delivery and on-site vehicles will be required to turn off engines.		
MM119	Dust Emissions	EIAR Section 10	• Maintenance vehicles brought onsite during the operational phase will be maintained in good operational order, thereby minimising any dust emissions that arise. • • 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 the emissions associated with vehicle movements.		
			Decommissioning Phase		
MM120	Decommissioning	EIAR Section 10	The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential impacts.		
			Chapter 11 Climate		
			Construction Phase		
MM121	Greenhouse Gas Emissions	EIAR Section 11	• 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. • 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 Construction and Environmental Management Plan (CEMP) (Appendix 4-3) includes a Waste Management Plant (WMP) which outlines the best practice procedures that will occur during the construction phase relating to waste material. ○ Section 4.6 of Chapter 4 for the 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. • Waste associated with the construction of the underground electrical cabling route will be either brought directly to a licensed MRF or brought back to the onsite temporary construction compounds, whichever is closest to the waste generation location in order to reduce vehicle movements. • Where applicable, low carbon intensive construction materials will be sourced and utilised onsite.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Operational Phase		
MM122	Greenhouse Gas Emissions	EIAR Section 11	• Ensure that all maintenance and monitoring vehicles will be maintained in good operational order while onsite, and, when stationary, be required to turn off engines thereby minimising any emissions that arise. • The Proposed Project provides for the restoration of approximately 11.6ha of peatland habitat. This is detailed in the Biodiversity Management and Enhancement Plan, available in Appendix 6-6. • Afforestation of the proposed commercial forestry felling for the Proposed Project will be completed as per the Forest Service's policy on granting felling licenses for wind farm development.		
			Decommissioning Phase		
MM123	Decommissioning	EIAR Section 11	The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential impacts.		
			Chapter 12 Noise		
			Pre-Commencement Phase		
MM124	Noise	EIAR Section 12	• Keep local residents informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern;		
			Construction Phase		
MM125	Noise	EIAR Section 12	Good practices, both for construction of the wind turbines and along the grid connection underground electrical cabling route and road junctions will be implemented to minimise the likely effects. Particular care will be taken at watercourse, culvert and drain crossings along the underground electrical cabling route. Section 8 of BS5228-1:2009+A1:2014 recommends a number of simple control measures as summarised below that can be employed onsite: • Keep local residents informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern; • All vehicles and mechanical plant will be fitted with effective exhaust silencers and be subject to programmed maintenance; • Select inherently quiet plant where appropriate - all major compressors will be 'sound reduced' models fitted with properly lined and sealed acoustic covers, which will be kept closed whenever the machines are in use; • All ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers; • Machines will be shut down between work periods (or when not in use) or throttled down to a minimum; • Regularly maintain all equipment used on site, including maintenance related to noise emissions; • Vehicles will be loaded carefully to ensure minimal drop heights so as to minimise noise during this operation; and • All ancillary plant such as generators and pumps will be positioned so as to cause minimum noise disturbance and if necessary, temporary acoustic screens or enclosures will be provided. • At any location within 30 m of a residential receptor, where trenching work or directional drilling activities are required for the underground grid connection cabling route, the installation of temporary boarding alongside the drilling rig or 'acoustic blanket panels' hanging from heras fencing (or similar) may be used to mitigate noise emissions.		
			Operational Phase		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM126	Noise	EIAR Section 12	The exact model of wind turbine to be used for the Proposed Project will be the result of a future tendering process. The final choice of turbine will, however, have to meet the derived WEDG 2006 noise limits and/or noise limits determined and contained within any planning permission condition imposed. In the event that mitigation is required, modern turbine control systems allow for turbines to operate in a reduced noise mode for a range of wind speeds and wind directions as required. Achievement of the noise limits determined by this assessment would be a key determining factor in the final choice of wind turbines for the site. In order to meet the Total WEDG Noise Limits at NAL5, certain turbines will need to be operated in a lower noise mode for a limited range of wind speeds and wind directions when considering the candidate wind turbines modelled in the noise assessment. Other wind turbine models would be available which may not require the use of low noise modes. Whilst it is not possible to predict if OAM will occur, in the event that complaints are received regarding OAM, mitigation measures are available. The design of such mitigation measures can only be determined once the wind farm is operational if OAM is found to occur frequently and at sustained levels. For this Proposed Project, the developer is committed to investigating noise complaints, inclusive of any complaint which may relate to OAM (i.e. beyond overall noise levels found in planning conditions). To deal with the eventuality of a complaint, the developer proposes the following: • A community liaison officer will be appointed prior to first generation of electricity and contact details made publicly available; • Any complaint relating to noise can be reported to the community liaison officer, who will undertake an initial screening of the complaint (review of logs submitted, review of wind conditions and turbine data etc.) and speak to the complainant in person, with an eventual visit to the complainant location if possible; • Following initial screening, the community liaison officer will be responsible for commissioning a detailed noise complaint investigation. This will include appointing a qualified acoustic consultant to undertake noise measurements at the complaint location and quantify the occurrence and depth (in dB) of OAM for every 10 minute of the measurement campaign. The measured 10 minute noise levels and OAM depth would also be correlated with 10 minute wind conditions and operational data to find patterns; and, • If frequent and sustained OAM is found, then appropriate mitigation would be designed and implemented, and the complainant informed by the community liaison officer. Mitigation measures considered would include: changes to the operation of the relevant wind turbine(s) by changing software parameters such as blade pitch for specific wind conditions and time periods, addition of blade furniture (such as vortex generators) to alter the flow of air over the wind turbine blades; and, in extreme cases, targeted wind turbine shutdowns in specific conditions.		
			Decommissioning Phase		
MM127	Decommissioning	EIAR Section 12	• Keep local residents informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern; • All vehicles and mechanical plant will be fitted with effective exhaust silencers and be subject to programmed maintenance; • Select inherently quiet plant where appropriate - all major compressors will be 'sound reduced' models fitted with properly lined and sealed acoustic covers, which will be kept closed whenever the machines are in use; • All ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers; • Machines will be shut down between work periods (or when not in use) or throttled down to a minimum; • Regularly maintain all equipment used on site, including maintenance related to noise emissions; • Vehicles will be loaded carefully to ensure minimal drop heights so as to minimise noise during this operation; and • All ancillary plant such as generators and pumps will be positioned so as to cause minimum noise disturbance and if necessary, temporary acoustic screens or enclosures will be provided.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• At any location within 30 m of a residential receptor, where trenching work or directional drilling activities are required for the underground grid connection cabling route, the installation of temporary boarding alongside the drilling rig or 'acoustic blanket panels' hanging from heras fencing (or similar) may be used to mitigate noise emissions.		
Chapter 13 Cultural Heritage					
Pre-Commencement Phase					
MM128	Sub-Surface Archaeological Pattern	EIAR Section 13	• Pre-development archaeological testing of the Proposed Project infrastructure in peatland or greenfield areas will be carried out under licence from the National Monuments Service. This is in order to identify any archaeological features at the earliest stage possible in the project to allow time to deal with any requirements such as preservation in situ (redesign / avoidance) or preservation by record (archaeological excavation). • A report on the testing will be compiled on completion of the work and submitted to the NMS and the Planning Authority. • Further mitigation such as preservation in situ (avoidance), preservation by record (excavation), buffer zones may be required depending on the results of the testing.		
Construction Phase					
MM129	Recorded Monuments	EIAR Section 13	• A buffer zone of 20m will be established around recorded monument GA030-073— prior to the commencement of construction works associated with the Proposed Wind Farm. • The buffer should comprise durable temporary fencing with keep out signage. • The presence of the monument and the requirement for the buffer zone will be added to the Construction and Environmental Management Plan (CEMP) for the Proposed Project. • No ground works, storage of materials or tracking of machinery will take place within the buffer zone.		
MM130	Sub-Surface Archaeological Pattern	EIAR Section 13	• Archaeological monitoring of all groundworks during the construction stage of the Proposed Project by a licensed archaeologist. • A report on the monitoring will be compiled on completion of the work and submitted to the NMS and the Planning Authority. • Further mitigation such as preservation in situ (avoidance), preservation by record (excavation), buffer zones may be required depending on the results of the monitoring.		
Operational Phase					
MM131	National Monuments	EIAR Section 13	• It is noted that natural screening, boundaries, buildings and vegetation are not taken into account in the ZTV model and therefore potential visual effects may in reality be less severe.		
MM132	Recorded Monuments	EIAR Section 13	• It is noted that natural screening, boundaries, buildings and vegetation will potentially screen some visual effects.		
MM133	Protected Structures	EIAR Section 13	• It is noted that natural screening, boundaries, buildings and vegetation will potentially screen some visual effects.		
MM134	NIAH Structures and Historic Gardens	EIAR Section 13	• It is noted that natural screening, boundaries, buildings and vegetation will potentially screen some visual effects.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM135	Features of Local Cultural Heritage Merit	EIAR Section 13	• It is noted that natural screening, boundaries, buildings and vegetation will potentially screen some visual effects.		
Chapter 14 Landscape					
Pre-Commencement, Construction and Operational Phases					
MM136	Mitigation by Design	EIAR Section 14	Through the iterative project design process, various best practice tools used for assessing the landscape and visual impact of a proposed wind farm development were used to bring forward the optimum design for the Proposed Project with respect to landscape and visual factors. These tools include, landscape modelling, ZTV mapping and preparation of photomontage visualisations. The final design of the Proposed Project and strategic siting of turbines in the landscape was informed by extensive early-stage analysis, including assessment of various turbine layouts and turbine models. The final design is also considered in the context of siting and design guidance stated in the *'Wind Energy Development Guidelines for Planning Authorities'* Published by the Department of Environment, Heritage and Local Government in 2006 – Hereafter referred to as the WEDGs (DoEHLG, 2006). The Proposed Project layout that is the subject of this LVIA, already incorporates the following landscape and visual design considerations for good wind farm design, with a particular focus on site selection: • The turbine layout has been designed to create a coherent cluster of turbines, contiguous and connected to each other visually and with consistent spacing in line with the guidance for design and siting of wind farms within Hilly and Flat Farmland Landscape Types in the Wind Energy Development Guidelines (hereafter referred to as the WEDGs) for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG), 2006). • Strategic siting of the proposed turbines on a flat site, reducing their visual prominence and visual effects in this relatively flat and heavily vegetated landscape, the proposed turbines are strategically sited within a modified working landscape where there is limited visibility (or large set back distances) from large population centres and designated landscape and visual receptors of high sensitivity. • The turbines have been located within a landscape defined by agricultural fields bordered by mature hedgerows and treelines which provide substantial screening effects, particularly when the turbines are viewed from locations in medium to long distance from the Proposed Project. Impacts on the landscape and visual receptors are thus highly localised. • Siting of proposed turbines adheres to the minimum 500 metre set back distance in the WEDGs (DoEHLG, 2006) and also the 4 times tip height set-back distance explicitly set out for residential visual amenity prescribed by the Draft Revised Wind Energy Development Guidelines (hereafter referred to as the draft WEDGs) (Department of Housing, Planning and Local Government (DoHPLG, 2019)). Siting of the Proposed Project in a landscape setting (The LVIA Study Area to 20km) which has limited numbers of designated sensitive landscape and visual receptors in local planning policy.		
MM137	Visual Effects	EIAR Section 14	General housekeeping measures, necessary for Health & Safety requirements, will ensure that the active construction areas will be kept tidy, mitigating localised visual impacts during the construction phase.		
MM138	Ancillary Infrastructure	EIAR Section 14	**Ancillary Infrastructure – 220kV Substation, Grid Connection and Access Roads** • Aside from the interface towers located in the townland of Laughil, the intended connection to the national electricity grid is primarily located underground thereby eliminating potential landscape and visual effects during the operational phase from large parts of the underground cabling route. • The proposed 220kV substation is sited within the Site with a large setback distance from the nearest visual receptors, with additional screening from the closest receptors provided by blocks of commercial forestry in the intervening space.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• The internal site road layout makes use of the existing tracks wherever possible (to be upgraded for construction and the delivery of wind turbine components), to minimise the requirement for new tracks within the Site. • Felling of existing coniferous plantation is predominantly limited to keyhole felling in localised parts of the Site, in keeping with existing practices in the commercial forestry plantation on-site.		
MM139	Borrow Pit	EIAR Section 14	A planting regime is proposed for the northern, western and southern boundaries of the borrow pit upon the exhaustion of the pit. The planting of 544m of hedgerow will provide screening of the borrow pit from the public road and will mitigate against any landscape effects.		
MM140	Grid Connection	EIAR Section 14	The following measures will be implemented to mitigate effects during the construction phase and operational phase of the Grid Connection underground electrical cabling route: • In all circumstances, excavation depths and volumes will be minimised, and excavated material will be re-used where possible. • Where the cable trench is to be located in the road verge, subsoil should be piled on site and re-used after cabling works. Should any medium planting be removed, it should be replaced with the same or similar species whenever it is not possible to salvage and reinstate. • Any areas of bare soil remaining after the landscaping phase will be seeded as soon as possible with a grass seed mix to minimise sediment run-off.		
MM141	Landscape receptors	EIAR Section 14	The following measures have been included in the Proposed Project design in order to avoid or reduce direct effects on landscape receptors (individual landscape features and the landscape character of the Site as a whole) on the Site: • The internal site road layout makes use of the existing roads wherever possible, to minimise the requirement for new tracks within the Site. • To minimise cut and fill activities required to construct the Proposed Project, the proposed access roads, and other infrastructure such as hardstands have been designed to align with the existing terrain within the landscape of the Site. • In all circumstances, excavation depths and volumes will be minimised, and excavated material will be re-used where possible. • During initial vegetation stripping, all topsoil material will be temporarily stored on the Site and used for 'dressing' the edges of the development infrastructure during reinstatement/regrading, including that of the spoil management areas and borrow pit. This will be particularly important in areas of cut and fill. The stripped topsoil will contain a natural seed source of local provenance and result in the re-establishment of baseline vegetation. • The layout and design of the Proposed Project has been designed to ensure minimal loss of valuable landscape receptors and biodiversity corridors such as woodland and hedgerows along field boundaries.		
Chapter 15 Material Assets (Traffic)					
Pre-Commencement					
MM142	Traffic	EIAR Section 15	Mitigation by design measures include the following: • Selection of the most appropriate delivery route to transport the wind turbine components, requiring the minimum remedial works to accommodate the vehicles as set out in Chapter 15.		
Construction Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM143	Traffic	EIAR Section 15	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. • A detailed **Traffic Management Plan (TMP)**, included as Appendix 15-1 of this EIAR, will be finalised and confirmatory detailed provisions in respect of traffic management agreed with the road's authority and An Garda Síochána prior to construction works commencing. 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 Galway County Council and other relevant authorities in advance of deliveries of turbine components to the Proposed Project site. • **Information to locals** – Locals in the area will be informed of any upcoming traffic related matters e.g. delivery of turbine components at night, via letter drops and posters in public places. Information will include the contact details of the Contract Project Co-ordinator, who will be the main point of contact for all queries from the public or local authority during normal working hours. An "out of hours" emergency number will also be provided. • **A Pre and Post Construction Condition Survey –** A pre-condition survey of roads associated with the Proposed Project will be carried out prior to construction commencement to record the condition of the road. A post construction survey will be carried out after works are completed. Where required the timing of these surveys will be agreed with the local authority. • **Liaison with the relevant local authorities** - Liaison with the relevant local authorities including the roads sections of local authorities that the delivery routes traverse, and An Garda Siochana, during the delivery phase of the large turbine vehicles, when an escort for all convoys will be required. • **Implementation of temporary alterations to road network at critical junctions** – At locations where required highlighted in Section 15.1.9. • **Identification of delivery routes** – These routes will be agreed and adhered to by all contractors. • **Travel plan for construction workers to Site–** While the assessment above has assumed a robust case 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 a routes to / from the site and identification of an area for parking. • **Traffic management measure for temporary construction access junction off the R328** – The traffic management measures that will be implemented at proposed temporary access junction off the R238 will include the following; - Traffic signs in accordance with the *"Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works"* (DoT now DoTT&S) and "Guidance for the Control and Management of Traffic at Roadworks" (DoTT&S). The proposed traffic management measures will be submitted to Galway Councils Roads section for agreement prior to the construction phase. - An application for a temporary reduction of the speed limit on the R328 for a short section either side of the proposed access junction for the duration of the construction phase. - The presence of a permanent "Flagman" during the entire construction phase. • **Temporary traffic signs** – As part of the traffic management measures temporary traffic signs will be put in place at all key junctions. All measures will be in accordance with the *"Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works"* (DoT now DoTT&S) and "Guidance for the Control and Management of Traffic at Roadworks" (DoTT&S). A member of construction staff (flagman) will be present at key junctions during peak delivery times. • **Delivery times of large turbine components** - The management plan will include the delivery of large wind turbine plant components at night in order to minimise disruption to general traffic during the construction stage.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• **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 sweeping / cleaning of local roads as required. • **Re-instatement works** - All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.		
			Decommissioning Phase		
MM144	Traffic	EIAR Section 15	In the event that the Proposed Project is decommissioned after the 35 years of operation, a decommissioning plan, will be prepared for agreement with the local authority, as described in Chapter 4 and Appendix 4-6 Decommissioning Plan. This plan will include a material recycling / disposal and traffic management plan will be prepared for agreement with the local authority prior to decommissioning.		
			Chapter 15 Material Assets (Non-Traffic)		
			Pre-Commencement Phase		
MM145	Services and Utilities	EIAR Section 15	The Proposed Wind Farm site infrastructure and Proposed Grid Connection underground electricity cabling route has been designed to avoid identified services and utilities. Prior to commencement of construction the survey of the route will be repeated and updated, to ensure any new services and utilities will not be impacted by the Proposed Project.		
			Construction Phase		
MM146	Services and Utilities	EIAR Section 15	Notwithstanding the above, specific measures are incorporated into the CEMP, included as Appendix 4-3 of the EIAR, to ensure that the construction of the Proposed Project will not have effect on underground electrical cables and built services at the Proposed Project site. The mitigation measures include the following: • Any area where excavations are planned will be surveyed and all existing services will be identified prior to commencement of any works. • Liaison will be had with the relevant sections of the Local Authority including all the relevant area engineers to ensure all services are identified. • Excavation permits will be completed and all plant operators and general operatives will be inducted and informed as to the location of any services. • The contractor must comply with and standard construction codes of practice in relation to working around electricity, gas, water, sewage, and telecommunications networks.		
			Operational Phase		
MM147	Telecommunications	EIAR Section 15	As outlined in Appendix 15-5 of the EIAR, the Developer and Three have reached agreement in relation to a radio link which traverses the site. The Developer has agreed to bear the costs related to the re-routing of the impacted radio link. The Developer and Three have agreed that any re-routing solution will take place in advance of the construction and operation of the Proposed Project. In the event of interference occurring to telecommunications owned by Enet, the Guidelines acknowledge that 'electromagnetic interference can be overcome' by the use of divertor to relay links out of line with the wind farm. As outlined in the scoping replies, Enet are in agreement regarding the commitment by the Developer for the implementation of the necessary mitigation measures in order to protect the link should both the Proposed Project and the link co-exist.		

7. MONITORING PROPOSALS

All monitoring proposals relating to the pre-commencement, construction and operational phases of the Proposed Project were set out in various sections of the EIAR, NIS and Biodiversity Enhancement Plan prepared as part of the planning permission application to An Board 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.

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 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 Monitoring Measures

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
Pre-Construction Phase						
MX1	Drainage Maintenance	EIAR Section 4 SWMP Section 4	Prior to commencement of works in sub-catchments across the site, main drain inspections will be competed 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 prior to the commencement of construction works across the site, as works in all areas will not commence simultaneously.	On going	Monthly	Project Hydrologist

MX2	Forestry Felling Drainage Management	EIAR Section 9
		
		SWMP Section 3
			Before the commencement of any felling works, an Environmental Clerk of Works (ECoW) will be appointed to oversee the keyhole and extraction works. The ECoW will be experienced and competent, and will carry out the following measures and operate their record using a Schedule of Works Operation Record (SOWOR):
			• 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 Tool Box 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 Section 3.4 (Monitoring and Recording) and Appendix C (Site Monitoring Form (Visual Inspections)) of the Forestry & Freshwater Pearl Mussel Requirements.
			• 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 will be collected upstream and downstream of the keyhole felling site at suitable sampling locations.
			  ○ Sampling will be taken from the stream / riverbank, with no in-stream access permitted.
			• The following minimum analytical suite will be used:
			  ○ pH,
			  ○ Electrical Conductivity,
			  ○ Temperature
			  ○ Total Suspended Solids, Biochemical Oxygen Demand, 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 an Emergency Response Plan (refer to Section 5 of the Construction and Environmental Management 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 register of all proposed drainage control/protection measures (Water Protection Measure Register). This document is to be updated weekly by the ECoW.
				As Required	Weekly	ECoW

MX3	Drainage Inspection	EIAR Section 9 SWMP Section 4	Drainage performance will form part of the civil works contract requirements. During the construction phase the effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treatment of potentially silt-laden water from the works areas will be monitored periodically	Daily/Weekly/Quarterly	As Required	ECoW/Project Hydrologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			(daily, weekly, and event based monitoring, i.e. after heavy rainfall events) by the ECoW and/or the Project Hydrologist. The ECoW will respond to changing weather and drainage conditions on the ground as the project proceeds, to ensure the effectiveness of the drainage design is maintained. Prior to the commencement of construction an inspection and maintenance plan for the on-site drainage system will be prepared by the ECoW in consultation with the Project Hydrologist. 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 check dams, the settlement ponds, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. The following periodic inspection regime will be implemented: • Daily general visual inspections at pre-determined locations, as chosen by the Project Hydrologist and by ECoW; • Weekly (existing & new drains) inspections of all drainage measures by the ECoW and/or the site Construction Manager; • Inspection to include all elements of drainage systems and all water quality monitoring. Inspections required to ensure that drainage systems are operating correctly and to identify any maintenance that is required. Any changes, such as discolouration, odour, oily sheen or litter shall be noted and corrective action shall be implemented. High risk locations such as settlement ponds will be inspected daily by the ECoW. Daily inspections checks will be completed on plant and equipment, and whether materials such as silt fencing 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 of the drainage measures by the Project Hydrologist during construction phase; and, ○ Quarterly site inspections of the drainage measures by the Project Hydrologist after construction for a period of one year following the construction phase. ○ A written record will be maintained or available on-site of all construction phase monitoring undertaken. The abandonment triggers as set out in the SOWOR will be adopted as part of drainage inspections to ensure that any of the conditions prescribed under any abandonment trigger does not exist at the locations under inspection.			
MX4	Surface Water Monitoring	SWMP Section 4	Water quality field testing and laboratory analysis will be undertaken prior to commencement of felling and construction at the site. The monitoring programme will be subject to agreement with Galway County Council but will be based on the planning stage programme already outlined in the EIAR and CEMP and presented in this document. It is proposed to begin baseline monitoring three months prior to the commencement of the construction phase. Analysis will be for a range of parameters with relevant regulatory limits along with Environmental Quality Standard's (EQSs) and sampling will be undertaken for each stream that drains from the construction site.	Twice	As Required	Project Hydrologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			Baseline sampling will be completed on at least two occasions and these will 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. There is an existing drainage network across the site and runoff drains relatively freely to local watercourses and streams. This existing drainage system will continue to function as it is during the pre-construction phase. However, prior to commencement of works in sub-catchments across the site, main drain inspections will be competed to ensure ditches and streams are free from debris and blockages that may impede drainage. These inspections will be done on a catchment by catchment basis as the construction works develop across the site, as works in all areas will not commence simultaneously. Sampling will be completed before, during (if the operation is conducted over a protracted time) and after the felling activity. The 'before' sampling will be conducted within 4 weeks of the felling activity commencing, preferably in medium to high water flow conditions. The "during" sampling will be undertaken once a week or after rainfall events. The 'after' sampling will comprise as many samplings as necessary to demonstrate that water quality has returned to pre-activity status (i.e., where an impact has been shown). Criteria for the selection of water sampling points include the following: • Avoid man-made ditches and drains, or watercourses that do not have year-round flows, i.e. avoid ephemeral ditches, drains or watercourses; • Select sampling points upstream and downstream of the forestry activities; • It is advantageous if the upstream location is outside/above the forest in order to evaluate the impact of land-uses other than forestry; • Where possible, downstream locations will be selected: one immediately below the forestry activity, the second at exit from the forest, and the third some distance from the second (this allows demonstration of no impact through dilution effect or contamination by other land-uses where impact increases at third downstream location relative to second downstream location); and, • The above sampling strategy will be undertaken for all on-site sub-catchments streams where tree felling is proposed. Also, daily surface water monitoring forms will also be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection. An inspection and maintenance plan for the on-site construction drainage system will be prepared in advance of commencement of any works. 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. Inspections will also be undertaken after tree felling. 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. Checks will be carried out on a daily basis.			

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX5	Invasive Species	EIAR Section 6 CEMP Section 3	A pre-commencement survey for Rhododendron will be undertaken by a fully qualified ecologist to determine the locations and extent of the species within the development site and to determine whether there have been any changes in the extent of the infestation since the undertaking of the most recent surveys in January 2024.	Once	As required	Project Ecologist
MX6	Flora and Fauna - Otter	EIAR Section 6	A pre-commencement confirmatory otter survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works.	Once	As required	Project Ecologist
MX7	Peatland Enhancement	BMEP Section 4.4	Prior to the commencement of the habitat enhancement measures described in this Plan, permanent vegetation monitoring plots will be established within the management areas. The monitoring plot locations will be selected using stratified random sampling. This will allow the monitoring plots to be representative of microtopography and vegetation cover, sampling areas from the wettest, intermediate and driest parts of the management areas. Monitoring plots will be surveyed and classified using the relevé method as per the National Survey of Upland Habitats (Perrin *et al.*, 2014) with plot sizes being 2m x 2m. Biotic and abiotic parameters that form baseline indicators of ecological and hydrological condition of the bog will be recorded. Monitoring plots will be marked out permanently using fencing posts and their location recorded using GPS. The number of monitoring plots will be determined by the level of plant community heterogeneity identified following felling/drain blocking. However, it is proposed that a minimum of ten 2m x 2m monitoring plots will be established across the enhanced areas. Monitoring plots will be surveyed once annually during the first five years of the windfarm and at 5 year intervals for the lifespan of the windfarm (35 years) by a suitably qualified ecologist. Habitat data gathered during the monitoring surveys will be classified and analysed according to the methodology provided within the following documents: • Vegetation Description and Data Analysis: A Practical Approach, 2nd Edition (Kent, 2011) • The Habitats of Cutover Raised Bog, Irish Wildlife Manuals No. 128 (Smith and Crowley, 2020) • Raised Bog Monitoring and Assessment Survey 2013, Irish Wildlife Manuals No. 81 (Fernandez *et al.*, 2014) Hydrological monitoring will also be required to assess the effectiveness of enhancement works. Water levels within areas where drains are blocked will be recorded bi-annually during the first five years of the windfarm and at 5-year intervals for the lifespan of the windfarm (35 years). A number of dipwells or piezometers will be inserted on the peatland to monitor the height of the water table. These will be constructed from 52mm internal diameter PVC. To stop peat filling the tube from the base, the pipe will be covered with gauze affixed with tape. This will be done prior to restoration to allow monitoring of water levels within both the restoration and enhancement areas. In this way, any positive impacts on the local hydrology can be verified and quantified.	Daily/Weekly/Quarterly	As Required	ECoW/Project Hydrologist
MX8	Flora and Fauna – Marsh Fritillary	EIAR Section 6	Pre-commencement surveys will be undertaken for marsh fritillary to determine if any marsh fritillary are using the site at that time.	Once	As Required	Project Ecologist
MX9	Flora and Fauna - Badger	EIAR Section 6	From a precautionary basis, a pre-commencement badger survey will be undertaken in accordance with standard best practice guidance prior to the commencement of site works to ensure that no additional setts in close proximity to proposed infrastructure have been built. In the event that a badger sett is identified within or immediately adjacent to the Proposed Project footprint, mitigations as per the above	Once	As Required	Project Ecologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			TII document (*Guidelines For The Treatment Of Badgers Prior To The Construction Of National Road Schemes* (TII 2009)) will be implemented for the new sett.			
MX10	Birds	Appendix 7-1	Pre-commencement confirmatory surveys will be undertaken within one month prior to the initiation of works at the study area to identify sensitive sites (e.g. roosts). Any requirement for construction works to run into the subsequent breeding seasons following commencement will be subject to a repeat of the pre-commencement bird surveys to confirm the absence of breeding birds of conservation concern once per month during the breeding season (April to July) and once during the winter season (October). The survey will aim to identify sensitive sites e.g., nests or roosts depending on the season in question. The survey will be undertaken by a suitably qualified ornithologist. The survey will comprise a thorough walkover survey of the development 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.	Once	As required	Project Ornithologist
			Construction Phase			
MX11	Woodland Replanting	BMEP Section 2.4	To confirm that habitat creation and enhancement has been successful the above outlined woodland replanting scheme will be monitored by a qualified ecologist at the following intervals: • 6 Months, • 1 Year, • 2 Years. • 3 Years, • 4 Years, • 5 Years. At the end of the 5-year monitoring plan as outlined above, the Project Ecologist will assess the need for and frequency of further monitoring of the woodland replanting area in agreement with the wind farm operator. In order to carry out monitoring, a qualified ecologist will conduct inspections and relevés of the planting area at the above outlined temporal intervals following the main growing season (i.e. in September). These inspections and relevés will be recorded and entered into a monitoring report. The collected information will inform the success of the proposal allow for adaptive intervention if it is deemed necessary e.g. if any shrubs are dead or damaged these will be replaced using the same species within the next planting season. Monitoring will be undertaken in partnership between the developer, the Project Ecologist, and the Landowner.	6 months/Annual	As Required	Project Ecologist
MX12	Linear Habitat Replanting	BMEP Section 3.4	Hedgerows and replanted 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 shrubs 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 an Environmental and Ecological Report.	Yearly	As Required	Project Ecologist
MX13	Grassland Management	BMEP Section 5.3	Permanent vegetation monitoring plots will be set up within the Molinia meadow habitat proposed for enhancement. Monitoring plots will be surveyed once annually during the first five years of the windfarm and at 5 year intervals for the lifespan of the windfarm (35 years) by a suitably qualified ecologist.	Yearly	As Required	Project Ecologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX14	Birds	Appendix 7-1	Any ground clearance of habitat during the period March to August that could support breeding birds will be walked to establish the presence of breeding birds (mainly passerines). This will be done by an ornithologist up to 10 days before the clearance works take place. If 10 days elapse without the clearing commencing, a further survey will take place. The focus will be on the area to be cleared but zones up to 100 m (approximately) around the area will also be included. Should a breeding territory be identified, the surveyor will attempt to establish the phase of building, e.g., nest building, incubating, feeding young, and will advise the contractor accordingly on measures to be followed (see Section 5.2).	As required	As required	Project Ornithologist
MX15	Archaeological Monitoring	EIAR Section 13	Pre-development archaeological testing of the Proposed Project (e.g. turbine bases, hardstands, proposed roads, compounds, substation site, etc) will be carried out by a suitably qualified archaeologist under licence from the National Monuments Service. As many of these areas are covered in dense forestry it is proposed that the testing will be carried out once the keyhole clear-felling required for the Proposed Project has taken place, but prior to the commencement of construction works. Further mitigation such as preservation in situ (avoidance), preservation by record (excavation) or buffer zones may be required depending on the results of the testing. Consultation with the NMS and the Planning Authority may be required to discuss the results of testing and any required mitigation. A report on the testing will be compiled on completion of the work and submitted to the NMS and the Planning Authority for consideration. Archaeological monitoring of all groundworks associated with the Proposed Project will be carried out by a suitably qualified archaeologist during the construction stage of the project. A report on the monitoring will be compiled on completion of the work and submitted to the relevant authorities.	As Required	As Required	Project Archaeologist
MX16	Water Quality and Monitoring	SWMP Section 4	Daily visual inspections of the installed drains and outfalls will 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, at the daily visual inspection locations, be higher than the baseline levels, the source will be identified, and additional mitigation measures implemented. Inspection sheets and photographic records will be kept on site. Inspection points will include the in-situ field monitoring point locations, the laboratory analysis sampling points and continuous monitoring locations. 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 supervising hydrologist who will monitor and advise on the records being received. Daily Visual Inspection locations will be chosen by the Project Hydrologist and ECoW, prior to the commencement of the construction phase, and a Daily Visual Check Sheet Template is included in Appendix C. Daily Visual Inspections are subject to change upon commencement of construction activity and works in progress within the catchment areas. The following periodic inspection regime will be implemented:	Daily	Daily	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			• Daily general visual inspections of site operations and inspections of all watercourses 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 any maintenance that is required. Any changes, such as discolouration, odour, oily sheen or litter shall be noted and corrective action shall be implemented. High risk locations such as settlement ponds will be inspected daily by the ECoW. 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 Environmental Clerk of Works 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/ Environmental Clerk of Works of the drainage measures during construction phase; • Quarterly site inspections by the Project Hydrologist/ Environmental Clerk of Works of the drainage measures 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 Construction Environmental Management Plan (CEMP) which will be maintained on-site during the construction phase.			
MX17	Water Quality and Monitoring	CEMP Section 3 SWMP Section 4	During, the construction phase, continuous, in-situ, monitoring equipment will be installed where required at locations surrounding the wind farm site. The monitoring equipment will provide continuous readings for turbidity levels, flow rate and water depth in the watercourse. This equipment will be supplemented by daily visual monitoring at their locations as outlined in the Section 4.1.2.1. • The proposed locations for continuous, in-situ monitoring will be determined by the Project Hydrologist.	Continuous	As Necessary	ECoW/Project Hydrologist
MX18	Water Quality and Monitoring	SWMP Section 4	Baseline laboratory analysis, at locations chosen by the Project Hydrologist, of a range of parameters with relevant regulatory limits and EQSs will be undertaken as per water monitoring programme for the overall windfarm development and each primary watercourse along the route. This will not be restricted to just these locations around the immediate wind farm site with further sampling points added as deemed necessary by the ECoW, in consultation with the Project Hydrologist and Site Manager, as the construction phase progresses.	Monthly	Monthly	ECoW Project Hydrologist
MX19	Water Quality and Monitoring	EIAR Section 9 SWMP Section 4	Field chemistry measurements of unstable parameters, (pH, specific electrical conductivity, temperature and turbidity) will be taken at the surface water monitoring locations, as per water monitoring programme for the overall wind farm development and each primary watercourse along the route and also at all installed sonde locations. These analyses will be carried out by either the ECoW or the Project Hydrologist. In-situ field monitoring will be completed on a weekly basis. 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.	At least weekly	As Necessary	ECoW/Project Hydrologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX20	Surface Water Quality	CEMP Section 4 SWMP Section 4	Visual inspection and monthly laboratory analysis results of 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 Environmental Clerk of Works 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 Galway County Council in advance. Sampling will be completed before, during (if the operation is conducted over a protracted time) and after the felling activity. The 'before' sampling will be conducted within 4 weeks of the felling activity commencing, preferably in medium to high water flow conditions. The "during" sampling will be undertaken once a week or after rainfall events. The 'after' sampling will comprise as many samplings as necessary to demonstrate that water quality has returned to pre-activity status (i.e., where an impact has been shown). Criteria for the selection of water sampling points include the following: • Avoid man-made ditches and drains, or watercourses that do not have year-round flows, i.e. avoid ephemeral ditches, drains or watercourses; • Select sampling points upstream and downstream of the forestry activities; • It is advantageous if the upstream location is outside/above the forest in order to evaluate the impact of land-uses other than forestry; • Where possible, downstream locations will be selected: one immediately below the forestry activity, the second at exit from the forest, and the third some distance from the second (this allows demonstration of no impact through dilution effect or contamination by other land-uses where impact increases at third downstream location relative to second downstream location); and, • The above sampling strategy will be undertaken for all on-site sub-catchments streams where tree felling is proposed. Also, daily surface water monitoring forms will also be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection.	As Required	Monthly	ECoW
MX21	Clear felling of Coniferous Plantation	EIAR Section 9	› Checking and maintenance of roads and culverts will be on-going throughout felling activity. › Communication with tree felling operatives in advance to determine whether any areas have been reported where there is unusual water logging or bogging of machines (i.e., hot spot areas). › Inspections of plant and machinery will be conducted prior to any works to assure all are in good condition.	As Required	As Required	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			➢ Inspection of drainage ditches and outfalls. During pre-felling inspections, the main drainage ditches will be identified. The pre-felling inspection will be conducted during rainfall events. Following tree felling, all main drains will be inspected to ensure that they are functioning.			
MX22	Construction Drainage System	EIAR Section 9	• Regular inspections of installed drainage systems will be undertaken, especially after heavy rainfall, to check for damage and blockages, and ensure there is no escape or build-up of standing water in parts of the systems where it is not intended. Inspections will also be undertaken after tree felling.	As Required	As Required	ECoW
MX23	Plant and Equipment Inspections	EIAR Section 9 CEMP Section 4	The plant used during construction will be regularly inspected for leaks and fitness for purpose	As Required	Monthly	ECoW
MX24	Flora and Fauna	CEMP Section 4	The responsibilities and duties of the Project Ecologist will include the following: • Review and input to the final construction phase CEMP in respect of ecological matters; • In liaison with Environmental Clerk of Works, oversee and provide advice on all relevant ecology mitigation measures set out in the EIAR and planning permission conditions; • Regular inspection and monitoring of the development, through all phases of construction/operation and provide ecological advice as required; • Carry out ecological monitoring and survey work as may be required by the planning authority.	As required	As required	Project Ecologist
MX25	Piped Slope Drains	EIAR Section 4	Piped slope drains will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and blockages. Stake anchors or fill over the pipe will be checked for settlement, cracking and stability. Any seepage holes where pipe emerges from drain at the top of the pipe will be repaired promptly.	Weekly	As required	ECoW
MX26	Check Dams	EIAR Section 4	Check dams will be inspected and maintained regularly to insure adequate performance. Maintenance checks will also ensure the centre elevation of the dam remains lower than the sides of the dam.	Weekly	As required	ECoW
MX27	Piped Slope Drains	EIAR Section 4	Piped slope drains will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and blockages. Stake anchors or fill over the pipe will be checked for settlement, cracking and stability. Any seepage holes where pipe emerges from drain at the top of the pipe will be repaired promptly.	Weekly	As required	ECoW
MX28	Stilling Ponds	CEMP Section 3 EIAR Section 4	Inspection and maintenance of all settlement ponds, along with the entire drainage network, will be ongoing through the construction period.	Weekly	As required	ECoW
MX29	Silt Fence	EIAR Section 4	Silt fences will be inspected regularly to ensure water is continuing to flow through the fabric, and the fence is not coming under strain from water backing up behind it.	Weekly	As required	ECoW
MX30	Peat Management	CEMP Section 2 CEMP Section 3	End-tipping of stone onto the road during the construction/upgrading of the access road will be carefully monitored to ensure that excessive impact loading, which may adversely affect the underlying peat, is limited.	As required/weekly	As required	ECoW/Project Geotechnical Engineer

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			The construction and upgrading of access roads in areas of deep peat (greater than 2m) will be inspected on a routine basis (by the Site manager/ECoW/Project Geotechnical Engineer) during the works, particularly before/following trafficking by heavy vehicular loads. Due to the nature of floating road construction, it will be necessary to monitor the settlement/movement of the road. Survey points will be located along the road at 10m intervals in areas of deep peat (greater than 2m). These surveys points will be surveyed on a weekly basis, and more frequently when construction activities are ongoing in the area. The construction and upgrading of access roads in areas of deep peat (greater than 2m) will be inspected on a routine basis during the works, particularly before/following trafficking by heavy vehicular loads. Inspection and maintenance of all settlement ponds, along with the entire drainage network, will be ongoing through the construction period.			
MX31	Peat and Placement Areas Peat Management	CEMP Section 2 CEMP Section 2	Movement monitoring instrumentation will be placed around the areas where peat has been placed. The locations where monitoring is required will be identified by the Project Geotechnical Engineer on site. Supervision by the Project Geotechnical Engineer will be carried out for the works. The construction and upgrading of access roads in areas of deep peat (greater than 2m) will be inspected on a routine basis (by the Site manager/ECoW/Project Geotechnical Engineer) during the works, particularly before/following trafficking by heavy vehicular loads. Due to the nature of floating road construction, it will be necessary to monitor the settlement/movement of the road. Survey points will be located along the road at 10m intervals in areas of deep peat (greater than 2m). These surveys points will be surveyed on a weekly basis, and more frequently when construction activities are ongoing in the area. The construction and upgrading of access roads in areas of deep peat (greater than 2m) will be inspected on a routine basis during the works, particularly before/following trafficking by heavy vehicular loads.	As required/weekly	As required	ECoW/Project Geotechnical Engineer
MX32	Peat and Placement Areas	CEMP Section 2	Movement monitoring instrumentation will be placed around the areas where peat has been placed. The locations where monitoring is required will be identified by the Project Geotechnical Engineer on site. Supervision by the Project Geotechnical Engineer will be carried out for the works.	As required	As required	Project Geotechnical Engineer
MX33	Birds	EIAR Section 7	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.	As required	As required	Project Ornithologist
MX34	Peatland Enhancement	EIAR Section 8	Peat water level monitoring, by means proposed piezometer installs, will also be carried out to monitor the effectiveness of the bog re-wetting. The monitoring will continue through the lifetime of the Proposed Project.	As required	As required	Project Hydrologist
MX35	Noise	Construction Noise Report Section 6	There are no specific requirements identified for mitigation to lessen noise levels to avoid significant effects, however, good practice during construction is recommended and will be presented in a Construction Environmental Management Plan (CEMP) to minimise any potential noise impacts.	As required	As required	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			Generally construction activities will be confined to the core hours periods 07:00 to 19:00 Monday to Friday, and 07:00 to 13:00 on Saturday. 6Good practices, both for construction of the wind turbines and along the grid connection underground electrical cabling route and road junctions will be implemented to minimise the likely effects. Particular care will be taken at watercourse, culvert and drain crossings along the underground electrical cabling route. Section 8 of BS5228-1:2009+A1:2014 recommends a number of simple control measures as summarised below that can be employed onsite: • keep local residents informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern; • ensure site work is within core hours and any required work outside core hours shall be programmed carefully with consideration to noise and nearby local residents; • ensure all vehicles and mechanical plant will be fitted with effective exhaust silencers and be subject to programmed maintenance; • select inherently quiet plant where appropriate - all major compressors will be 'sound reduced' models fitted with properly lined and sealed acoustic covers, which will be kept closed whenever the machines are in use; • ensure all ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers; • instruct that machines will be shut down between work periods or throttled down to a minimum; • regular maintenance of all equipment used on site, including maintenance related to noise emissions; • vehicles will be loaded carefully to ensure minimal drop heights to minimise noise during this operation; and • ensure all ancillary plant such as generators and pumps will be positioned to cause minimum noise disturbance and, if necessary, temporary acoustic screens or enclosures should be provided. • At any location within 30 m of a residential receptor, where trenching work or directional drilling activities are required for the underground grid connection cabling route, the installation of temporary boarding alongside the drilling rig or 'acoustic blanket panels' hanging from Heras fencing (or similar) may be used to mitigate noise emissions.			
			Operational Phase			
MX36	Bats	EIAR Section 6	To assess the effects of the Proposed Project on bat activity, at least 3 years of post-construction monitoring is proposed. Post-construction monitoring will include static detector surveys, walked survey transects and corpse searching to record any bat fatalities resulting from collision.	Yearly	As required	Project Ecologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			The results of post-construction monitoring shall be utilised to assess any potential changes in bat activity patterns and to monitor the implementation of the mitigation strategy. At the end of Year 1, and if a curtailment requirement is identified (i.e. significant bat fatalities encountered), a curtailment programme, in line with relevant guidelines, will be devised around key activity periods and weather parameters, as well as a potential increase in buffers. At the end of each year, the efficacy of the mitigation and monitoring plan will be reviewed, and any identified efficiencies incorporated into the programme. This approach allows for an evidence-based review of the potential for bat fatalities at the Site, post construction, to ensure that the necessary measures, based on a new baseline post-construction, are implemented for the protection of bat species locally. The effectiveness of any mitigation/curtailment needs to be monitored in order to determine (a) whether it is working effectively (i.e. the level of bat mortality is incidental), and (b) whether the curtailment regime can be refined such that turbine down-time can be minimised whilst ensuring that it remains effective at preventing casualties.			
MX37	Laboratory Monitoring	SWMP Section 4	Monthly sampling for laboratory analysis for the range of parameters adopted during pre-commencement and construction phases will continue after construction is complete. The project hydrologist will monitor and advise on the readings received from the testing laboratory and monitoring will only cease once the hydrologist is satisfied that the chemical and biological monitoring results show that there is no adverse impact on the quality of surface water within the natural watercourses draining the site.	Monthly	As required	Project Hydrologist
MX38	Birds	EIAR Section 7	Survey methods employed for operational monitoring will be in line with guidelines issued by the Scottish Natural Heritage (SNH, 2009 and SNH, 2017). Operational monitoring will be undertaken in Years 1, 2, 3, 5, 10 and 15 of the wind farm's lifetime. Post-construction monitoring will include vantage point surveys, breeding bird surveys, winter distribution and abundance surveys and a programme of regular corpse searching of birds that may potentially collide with operating turbines during the operational phase of the wind farm project. Bird monitoring will include the following survey methods: • Flight activity surveys: vantage point surveys • Breeding bird surveys: O'Brien & Smith methodology. • Winter distribution and abundance surveys: hen harrier roost surveys • Targeted bird collision surveys (corpse searches) will be undertaken by a trained dog and handler. The surveys will include detection and scavenger trials, to correct for these two biases and ensure the resulting data is robust. Vantage point surveys will be undertaken monthly during operational years 1, 2, 3, 5, 10 and 15 of the lifetime of the wind farm. The methodology for vantage point watches will follow guidelines issued by the NatureScot (2009) and NatureScot (2017). The proposed vantage point watches will adhere to a minimum of 36 hours/VP per season as per guidelines issued by NatureScot (2017). During monitoring years, monthly visits will be undertaken for twelve months commencing at the beginning of breeding or non-breeding season: depending on which comes first. During each visit, six-hour vantage point watches will be undertaken from each fixed vantage point location that offers an un-interrupted view of the study area. Vantage points will be undertaken from the same locations that pre-planning surveys which informed the EIAR application of the Proposed Project (i.e., VPs 1 & 2). Vantage point surveys will be timed to provide a spread over the full daylight period including dawn and dusk watches to coincide with the highest periods of bird activity. Behavioural categories for the observation of bird interactions with operational wind farms will be in line with terminology outlined by Meredith *et al.* (2002).	Yearly	As required	Project Ornithologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			During monitoring years, operational phase distribution and abundance surveys will consist of O'Brien & Smith walkover surveys. Survey methodology will be similar to methods employed for baseline EIAR surveys which will allow a comparison of data to be made for each monitoring year. The timing of visits will follow the recommendations of Calladine et al. (2009). Transects should ensure all areas of suitable breeding/ foraging habitat are approached to within 100m. Target species will include waders, raptors, waterbirds, gulls and other birds of conservation concern. Along with target species, all additional species observed will be recorded to inform the evaluation of supporting habitat. These surveys will follow the same routes that were followed during pre-planning surveys. A total of four site visits will be undertaken during the bird breeding season for each monitoring year and timed to coincide with the core breeding period April - July. Notes will be recorded on nesting and territorial behaviour and breeding signs using standard BTO codes. Non-breeding behaviour such as birds flying over the site will also be recorded. During monitoring years, operational phase winter distribution and abundance surveys will consist of hen harrier roost surveys. Survey methodology will be similar to methods employed for baseline EIAR surveys which will allow a comparison of data to be made for each monitoring year. Suitable habitat for roosting hen harrier within 500m of the Wind Farm Site (as per NatureScot, 2017) will be surveyed for the presence of hen harrier during the winter season. Survey work will be undertaken in accordance with the methodology devised by Gilbert et al. (1998) and the 'Irish Hen Harrier Winter Roost Survey' (unpublished document coordinated by members of NPWS). Surveys for bird casualties will follow survey methods broadly based on guidelines issued by the Scottish Natural Heritage (2009) and search methods adopted by Duffy & Steward, 'Turbine Search Methods and Carcass Removal Trials at the Braes of Doune Windfarm' (Natural Research Information Note 4. Natural Research Ltd, Banchory, UK, 2008). It is proposed to undertake a minimum of one visit per month during each survey year by a trained dog and handler. During each visit, searches will be undertaken at each operating turbine location by a trained dog and handler. Edkins (2014) "Impacts of Wind Energy Developments on Birds and Bats: Looking into The Problem", recommends the "search width should be equal to the maximum rotor tip height". Given a turbine rotor tip height of 180m the search area surrounding the base of the turbine would be taken as a radius of 90m centred on the turbine base. This area will be the subject of target searches for bird casualties. Searches will incorporate the use of transects spaced at 10m intervals apart with the observer covering 5m on either side for each transect. Locations and coordinates of transect routes will be confirmed using a portable GPS recording device. Recording sheets will be used to document bird carcasses encountered in the field. The following details will be considered during field surveys: GPS location of each bird carcass, photographic record, carcass condition (intact (carcass that is completely intact or not badly composed), scavenged (evidence that the carcass was fed upon by a scavenger/predator) or feather spot (ten or more feathers indicating predation or scavenging or two or more primary feathers must be present to consider the carcass a casualty)), distance from the turbine location, date, time, etc. Carcass removal trials and searcher efficiency trials will be undertaken to account for the ability of the dog team to find bird carcasses and the likelihood of scavenging of corpses by animals. This is done to ensure a more accurate estimation of the total number of collision victims. During carcass removal trials, a carcass is placed in a study area periodically and is monitored for a set number of days or until			

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			scavengers remove the carcass (this can be done with the use of a trail camera). A determination on carcass removal is made when no body parts containing flesh or bone or >10 disarticulated feathers can be found. During searcher efficiency trials, a number of carcasses are placed in a study area by one worker, then searched for by another worker with the dog. These may be conducted on the same day as surveys are carried out to avoid flooding the area with carcasses and increasing scavenger activity. The result of these trials provides a correction factor that can be applied to the results of the carcass searches.			
MX39	Surface Water Quality Sampling	EIAR Section 9	Sampling will be completed before, during (if the operation is conducted over a protracted time) and after the felling activity. The 'before' sampling will be conducted within 4 weeks of the felling activity commencing, preferably in medium to high water flow conditions. The "during" sampling will be undertaken once a week or after rainfall events. The 'after' sampling will comprise as many samplings as necessary to demonstrate that water quality has returned to pre-activity status (i.e., where an impact has been shown). Criteria for the selection of water sampling points include the following: • Avoid man-made ditches and drains, or watercourses that do not have year-round flows, i.e. avoid ephemeral ditches, drains or watercourses; • Select sampling points upstream and downstream of the forestry activities; • It is advantageous if the upstream location is outside/above the forest in order to evaluate the impact of land-uses other than forestry; • Where possible, downstream locations will be selected: one immediately below the forestry activity, the second at exit from the forest, and the third some distance from the second (this allows demonstration of no impact through dilution effect or contamination by other land-uses where impact increases at third downstream location relative to second downstream location); and, • The above sampling strategy will be undertaken for all on-site sub-catchments streams where tree felling is proposed. Also, daily surface water monitoring forms will also be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection.	As required	As required	ECoW
MX40	Major Accidents	EIAR Section 16	The operator of the Proposed Project will continue to assess the risk of major accidents and/or disasters on site on an on-going basis during operation. The maintenance programme, record of reported incidents, as well as general site activities will be monitored on an on-going basis to ensure risk of major accidents does not increase over time.	Ongoing	As required	ECoW
			Decommissioning Phase			
MX41	Decommissioning Plan	EIAR Section 4 EIAR Section 16	As outlined in Section 4.9 of the EIAR, a Decommissioning Plan has been prepared (Appendix 4-6) the final detail of which will be agreed with the local authority prior to any decommissioning. The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will be finalised with the competent authority at that time.	As required	As required	ECoW
MX42	Surface Water Quality Monitoring	Surface Water Management Plan Section 2	Monthly sampling for laboratory analysis for the range of parameters adopted during pre-commencement and construction phases will continue after construction is complete. The project hydrologist will monitor and advise on the readings received from the testing laboratory and monitoring will only cease once the hydrologist is satisfied that the chemical and biological monitoring results show that there is no adverse impact on the quality of surface water within the natural watercourses draining the site.	Monthly	As required	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX43	Invasive Species	DP Section 3 EIAR Section 6	Prior to the commencement of works in the Decommissioning phase, a pre-commencement survey for Rhododendron will be undertaken by a fully qualified ecologist to determine the locations and extent of the species within the development site and to determine whether there have been any changes in the extent of the infestation since the undertaking of the most recent surveys in January 2024.	As required	As required	Project Ecologist
MX44	Birds	EIAR Section 7 Bird Monitoring Programme Section 2	It is proposed that decommissioning 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. Pre-commencement confirmatory surveys will be undertaken within one month prior to the initiation of works at the study area to identify sensitive sites (e.g. roosts). Any requirement for construction works to run into the subsequent breeding seasons following commencement will be subject to a repeat of the pre-commencement bird surveys to confirm the absence of breeding birds of conservation concern once per month during the breeding season (April to July) and once during the winter season (October). The survey will aim to identify sensitive sites e.g., nests or roosts depending on the season in question. The survey will be undertaken by a suitably qualified ornithologist. The survey will comprise a thorough walkover survey of the development 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). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied. 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	Monthly	As required	Project Ornithologist

8. PROGRAMME OF WORKS

8.1 Construction Schedule

The construction phase will take approximately 18-24 months to complete from starting on site to the commissioning of the electrical system and export of electricity from site.

The EIAR stipulated that in the interest of breeding birds, construction would not commence during the breeding bird season, which runs from March to August. The EIAR also stipulated that the removal of conifers (forestry) by felling will take place between the 1st of September and the end of February, thus avoiding the period from the 1st of March to the 31st of August inclusive, as prescribed in the Wildlife Acts.

Works during the construction phase of the development, including delivery of construction materials will generally take place between 7 a.m. and 7 p.m. daily Monday to Friday and 7 a.m. to 2 p.m. on Saturdays, with large concrete pours requiring an earlier start when deemed necessary. Delivery of abnormal loads such as turbine tower sections and blades will take place at night outside of peak traffic hours.

The phasing and scheduling of the main construction task items are outlined in Figure 8-1 below, where 1st January has been selected as an arbitrary start date for construction activities.

			Year 1				Year 2			
ID	Task Name	Task Description	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Site Health and Safty									
2	Grid Conneciton									
3	Site Compounds	Site Compounds, site access, fencing, gates								
4	Site Roads	Construction/upgrade of roads, construct underpasses install drainage measures, install water protection measures								
5	Felling	Felling of forestry, hedgerows, scrub etc.								
6	Substation and Electrical Works	Construct substation, underground cabling, grid connection								
7	Turbine Hardstands	Excavate/pile for turbine bases where required								
8	Turbine Foundations	Fix reinforcing steel and anchorage system, erect shuttering, concrete pour								
9	Backfilling and Landscaping									
10	Turbine Delivery and Erection									
11	Substation Commissioning									
12	Turbine Commisioning									

Figure 8-1 Indicative Construction Schedule

9. COMPLIANCE AND REVIEW

9.1 Site Inspections and Environmental Monitoring

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 impacts, 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.

9.2 Auditing

The Contractor will be responsible for implementing the mitigation and monitoring measures specified throughout the EIAR and compiled in Sections 6 and 7 of this CEMP. The Contractor will also be responsible for ensuring that all construction staff understand the importance of implementing the mitigation measures. The implementation of the mitigation measures will be overseen by the environmental clerk of works or supervising hydrogeologists, environmental scientists, ecologists or geotechnical engineers, depending on who is best placed to advise on the implementation.

Environmental audits will be carried out during the construction phase of the project. In contrast to monitoring and inspection activities, audits are designed to highlight 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 contractor staff or alternatively by external personnel acting on their behalf. It is important that an impartial and objective approach is adopted. 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 project management personnel.

9.3 Environmental Compliance

The following definitions will apply in relation to the classification of Environmental Occurrences during construction of the proposed renewable energy development:

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.

9.4 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 ECoW 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.

9.5 Construction Phase Review

This CEMP will be updated and reviewed prior to commencement of construction, and also every six months thereafter during the construction phase of the project.