APPENDIX 4-3

CONSTRUCTION AND ENVIRONMENTAL MANAGEMENT PLAN

Planning and Environmental Consultants

Construction and Environmental Management Plan

Lackareagh Wind Farm, Co. Clare - EIAR

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1. INTRODUCTION

This Construction and Environmental Management Plan (CEMP) has been developed by MKO on behalf of EDF Renewables Ireland Ltd. who intend to apply to Clare County Council for planning permission for the construction of a wind energy development, comprising up to 7 no. wind turbines and associated infrastructure in the townlands of Kilbane, Killeagy (Ryan), Shannaknock, Killeagy (Stritch), Killeagy (Goonan), Ballymoloney, Magherareagh and Lackareagh Beg and neighbouring townlands near Kilbane Co. Clare.

For the purposes of this CEMP:

- Where the 'Proposed Project' is referred to this encompasses the entirety of the project for the purposes of this EIA in accordance with the EIA Directive. The Proposed Project is described in detail in Chapter 4 of this EIAR.
- Where proposed development is referred to, this encompasses everything within RLB including the Wind Farm infrastructure and the grid connection infrastructure.
- Where the 'Proposed Wind Farm' is referred to, this refers to turbines and associated foundations and hardstanding areas, including access roads, underground cabling, permanent meteorological mast, temporary construction compounds, carriageway strengthening works, junction accommodation works, peat and spoil management, tree felling, site drainage, operational stage signage, battery energy storage system, 38kV onsite substation, and all ancillary works and apparatus. The Proposed Wind Farm is described in detail in Chapter 4 of this EIAR.
- Where the 'Proposed Grid Connection Route' is referred to, this refers to underground 38kV cabling connecting to the existing Ardnacrusha 110kV substation, and all ancillary works and apparatus. The Grid Connection Route is described in detail in Chapter 4 of this EIAR.
- Where 'the site' is referred to, this relates to the primary study area for the EIAR, as delineated by the EIAR Site Boundary in green as shown on Figure 2-1.

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 Clare County Council.

Prior to the commencement of construction of the Proposed Project, the CEMP will be updated, in line with all conditions and obligations which apply to any relevant grant of permission. The CEMP should 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 include:

- 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.
- Any amendments will be in full compliance with the planning consent and mitigation measures as presented in the EIAR, NIS and all other relevant planning documents.

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 CEMP is presented as a guidance document for the construction of the Proposed Wind Farm in the townlands of Kilbane, Killeagy (Ryan), Shannaknock, Killeagy (Stritch), Killeagy (Goonan), Ballymoloney, Magherareagh and Lackareagh Beg in Co. Clare. 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.

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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 Proposed Project site and 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 to be implemented on the Proposed Project site. Onsite 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 general Health and Safety measures that will be implemented on site during the construction phase
- **Section 6** outlines the Emergency Response Procedure to be adopted in the event of an emergency in terms of site health and safety and environmental protection.
- **Section 7** consists of a summary table of all mitigation proposals to be adhered to during the construction and operation of the Proposed Project, categorised into three separate headings, 1) pre-commencement measures; 2) construction-phase measures and 3) operational-phase measures.
- **Section 8** consists of a summary table of all monitoring requirements and proposals to be adhered to during the Proposed Project, categorised into three separate headings, 1) pre-commencement measures; 2) construction-phase measures and 3) operational-phase measures.
- **Section 9** sets out a programme for the timing of the works.

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

1.2 Targets and Objectives

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

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

The key site objectives are as follows:

- Using recycled materials if possible, e.g. excavated stone, overburden;
- Ensure sustainable sources for materials supply where possible;
- Avoidance of any pollution incident or near miss as a result of working around or close to existing watercourses and having emergency measures in place;
- Avoidance of vandalism;
- 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 Proposed Wind Farm is located approximately immediately east of the village of Kilbane, Co. Clare and 6km west of Killaloe, Co. Clare. It is proposed to access the Proposed Wind Farm via upgrades to the L7080 Local Road (the Gap Road) which bisects the Proposed Wind Farm site, with proposed infrastructure located both north and south of the Local Road. The Proposed Wind Farm is served by a number of existing public, forestry and agricultural roads and tracks.

The Proposed Grid Connection Route includes for underground 38kV cabling from the proposed onsite 38kV substation, in the townland of Killeagy (Goonan), to the existing Ardnacrusha 110kV substation in the townlands of Ballykeelaun and Castlebank. The Proposed Grid Connection Route to Ardnacrusha, measuring approximately 14.7 km in length, is primarily located within the public road corridor.

Current land-use on the Proposed Wind Farm site comprises coniferous forestry and agriculture. Current land-use along the Proposed Grid Connection Route comprises of public road corridor, public open space, pastures, mixed forestry and land principally used by agriculture with significant areas of natural vegetation, as well as discontinuous urban fabric. Land-use in the wider landscape of the site comprises a mix of agriculture, quarrying, low density residential and commercial forestry.

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 this EIAR, is contained in Chapter 4 of this EIAR.

The townlands within which the Proposed Project is located are listed in Table 2-1. All townlands are located in Co. Clare.

Table 2-1 Townlands within with the Proposed Project is located

Development Works	Townlands in Co. Clare
Proposed Wind Farm	
Wind Turbines and Associated Foundations and Hardstanding Areas, Access Roads, Underground Cabling, Onsite 38kV Substation, Battery Energy Storage System, Permanent Meteorological Mast, Temporary Construction Compounds, Peat and Spoil Management, Tree Felling, Site Drainage, Operational Stage Site Signage and all ancillary works and apparatus	Kilbane, Killeagy (Ryan), Shannaknock, Killeagy (Stritch), Killeagy (Goonan), Ballymoloney, Magherareagh and Lackareagh Beg
Proposed Grid Connection Route	
Underground 38kV Cabling Route connecting to the existing Ardnacrusha 110kV substation	Killeagy (Goonan), Killeagy (Stritch), Cloonyconry Beg, Ballymoloney, Ballyquin Beg, Ballyquin More, Springmount, Leitrim, Fahy More South, Aharinaghmore, Ballybrack, Toreen, Coolderry, Blackwater, Parkroe, Rosmadda West, Lakyle, Ballykeelaun, Castlebank

Development Works	Townlands in Co. Clare
Turbine Delivery Route facilitation works	
Accommodation works to facilitate the delivery of large turbine components and other abnormally sized loads	Killeagy (Stritch), Killeagy (Goonan), Kilbane, Cloonyconry More, Ballyquin Beg, O'Briensbridge

2.2 Description of the Proposed Project

The Proposed Project will comprise the construction of 7 No. wind turbines with a blade tip height range of between 179.5 and 180 metres and all associated works, and a 38kV substation and associated works, including underground 38kV cabling to connect to the national grid at the Ardnacrusha 110kV substation. The full description of the Proposed Project is detailed in Chapter 4 of this EIAR.

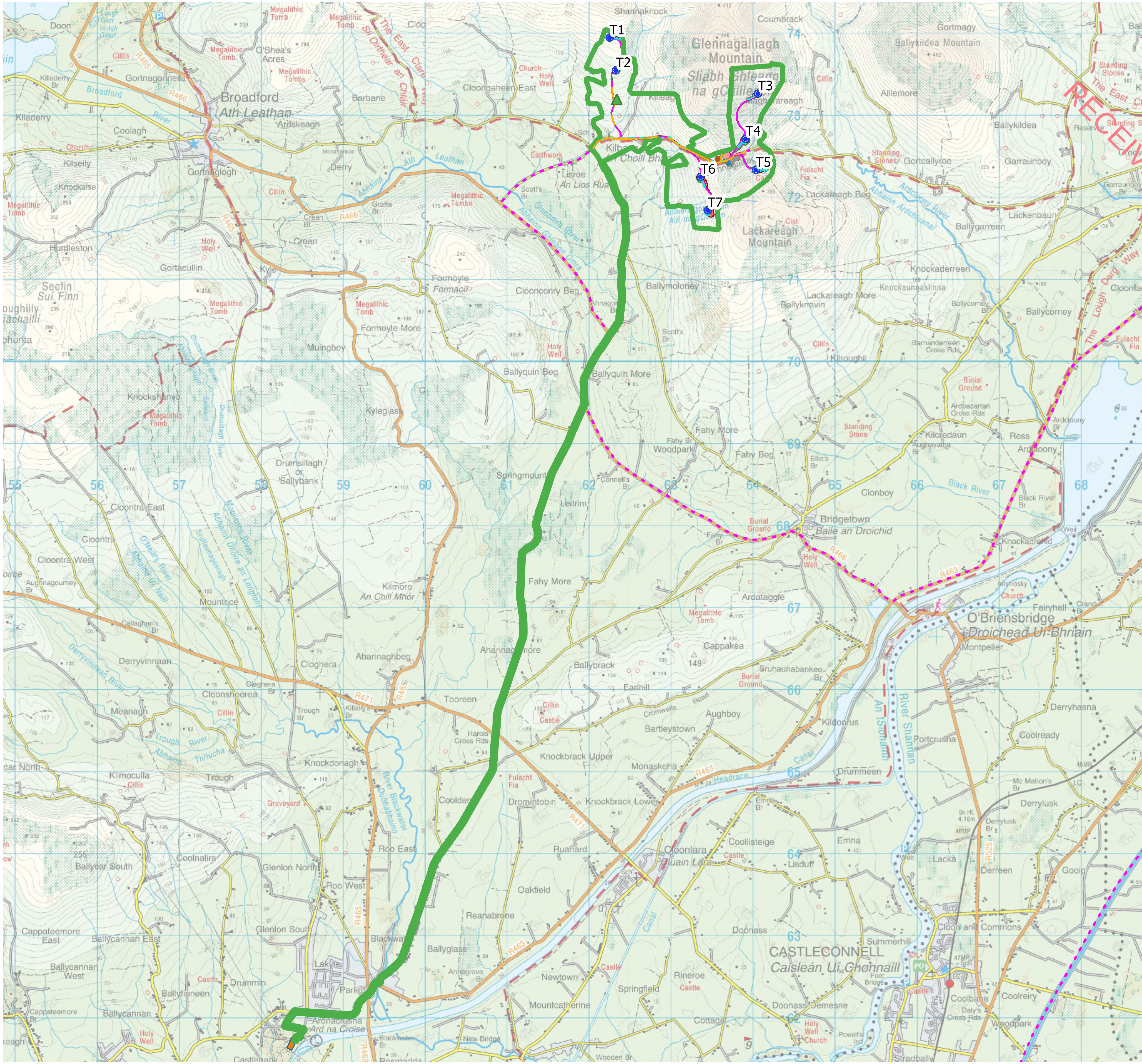
The Proposed Project will consist of the provision of the following:

i. *The construction of 7 no. wind turbines with the following parameters:*
   a. *Total tip height range of 179.5m – 180m,*
   b. *Rotor diameter range of 149m – 155m,*
   c. *Hub height range of 102.5m to 105m,*
ii. *Construction of associated foundations, hardstand and assembly areas;*
iii. *All associated wind farm underground electrical and communications cabling connecting the turbines and mast to the proposed electrical substation;*
iv. *Construction of 1 no. permanent 38kV electrical substation including a single-story control building with welfare facilities, all associated electrical plant and equipment, security fencing, entrance on to new access road, all associated internal underground cabling, drainage infrastructure, wastewater holding tank, retention separator tank, and all ancillary works, in the townland of Killeagy (Goonan), Co. Clare;*
v. *A Battery Energy Storage System within the 38kV electrical substation compound;*
vi. *1 no. permanent meteorological mast of c. 36.5m in height, associated foundation and hard-standing area in the townland of Shannaknock;*
vii. *The permanent upgrade of 1 no. existing site entrance off the L7080 ('The Gap Road') for the provision of construction and operational access;*
viii. *Provision of 3 no. new permanent site entrances off the L7080 for the provision of construction and operational access;*
ix. *Provision of 3 no. new temporary site entrances off the L7080 for the provision of construction access;*
x. *Upgrade of existing tracks/ roads, including the L7080, and the provision of new site access roads, 4 no. watercourse crossings, junctions and hardstand areas;*
xi. *1 no. temporary construction compound with temporary offices and staff facilities in the townland of Killeagy (Goonan);*
xii. *1 no. temporary storage area in the townland of Killeagy (Goonan);*
xiii. *1 no. borrow pit in the townland of Killeagy (Goonan);*
xiv. *Peat and Spoil Management;*
xv. *Tree Felling to accommodate the construction and operation of the proposed development;*
xvi. *Operational stage site and amenity signage; and*
xvii. *All ancillary apparatus and site development works above and below ground, including soft and hard landscaping and drainage infrastructure.*

This application is seeking a ten-year permission and 35-year operational life from the date of commissioning of the renewable energy development.

As stated in Section 2.1 above, it is intended to connect the development to the national electricity grid via a 38kV underground cable which will connect the proposed onsite 38kV substation to the existing Ardnacrusha 110kV substation, in the townlands of Ballykeelaun and Castlebank Co. Clare. The Proposed Grid Connection Route cabling will measure approximately 14.7km in length.

The site location context of the Proposed Project is shown on Figure 2-1, the Proposed Wind Farm is shown in Figure 2-2, and the Proposed Grid Connection Route is shown in Figure 2-3.



Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Proposed Hardstands
- Proposed Grid Connection Route
- Proposed Onsite 38kV Substation and Battery Storage Compound
- Proposed Met Mast
- Proposed New Roads
- Proposed Upgrades to Existing Roads
- Proposed Borrow Pit
- Proposed Storage Area
- Proposed Temporary Construction Compound
- Proposed Turbine Delivery Route
- Ardnacrusha 110kV Substation

N

Drawing Title	
Proposed Project Layout	
Project Title	
Lackareagh Wind Farm, Co. Clare	
Drawn By: CJ	Checked By: NMcH
Project No.: 220245	Drawing No.: Figure 2-1
Scale: 1:45,000	Date: 2024-07-23

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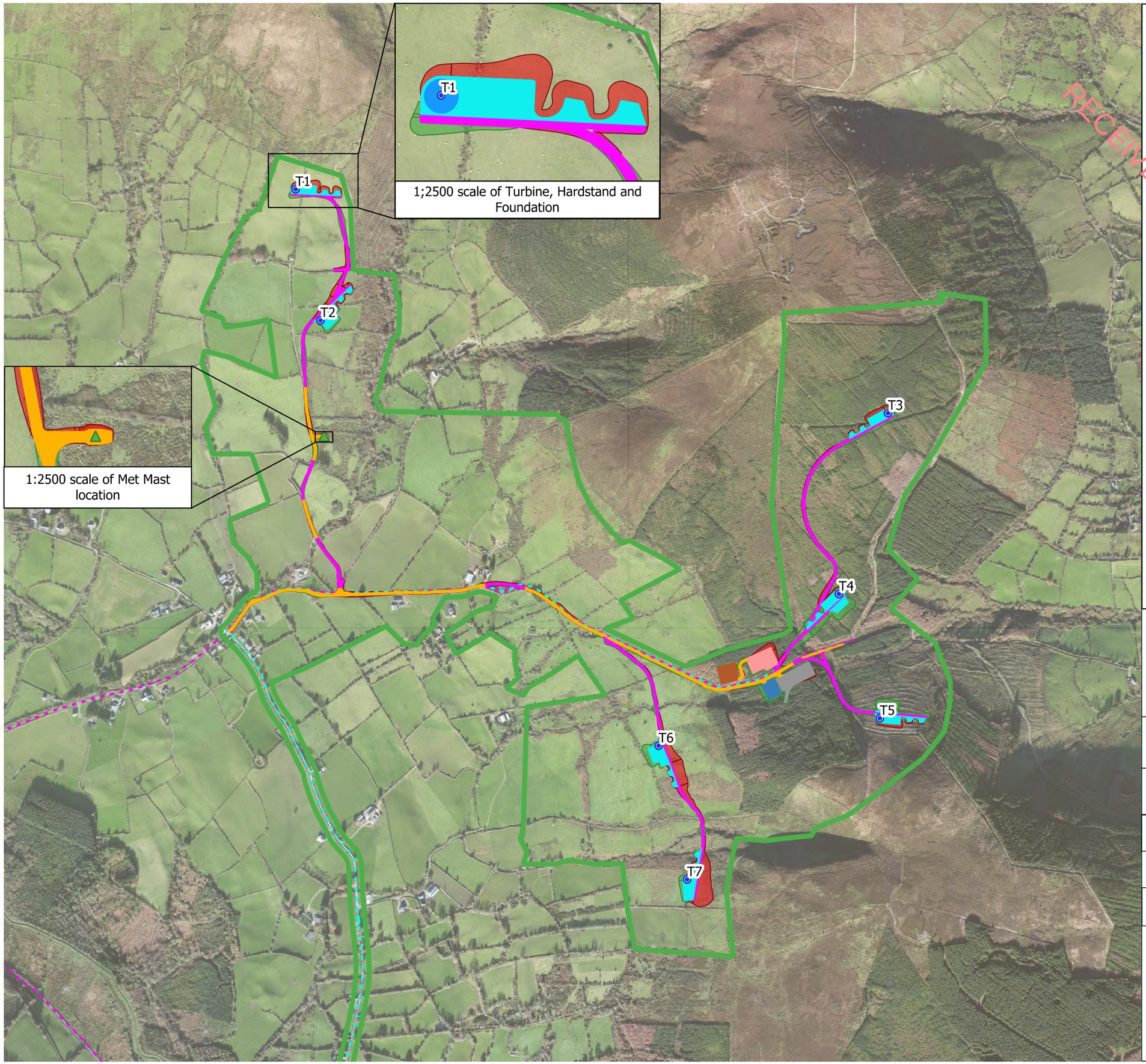

Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Proposed Foundations
- Proposed Hardstands
- Proposed Met Mast
- Proposed New Roads - V5 - 2024.06.20 - 22024
- Proposed Upgrades to Existing Roads - V5 - 202
- Proposed Grid Connection Route
- Proposed Onsite 38kV Substation and Battery Storage Compound
- Ardnacrusha 110kV Substation
- Proposed Temporary Construction Compound
- Proposed Turbine Delivery Route
- Proposed Borrow Pit
- Proposed Storage Area

N

Drawing Title
Proposed Wind Farm Layout

Project Title
Lackareagh Wind Farm, Co. Clare

Drawn By	Checked By
CJ	NMcH
Project No. 220245	Drawing No. Figure 2-2
Scale 1:11,250	Date 2024-07-23

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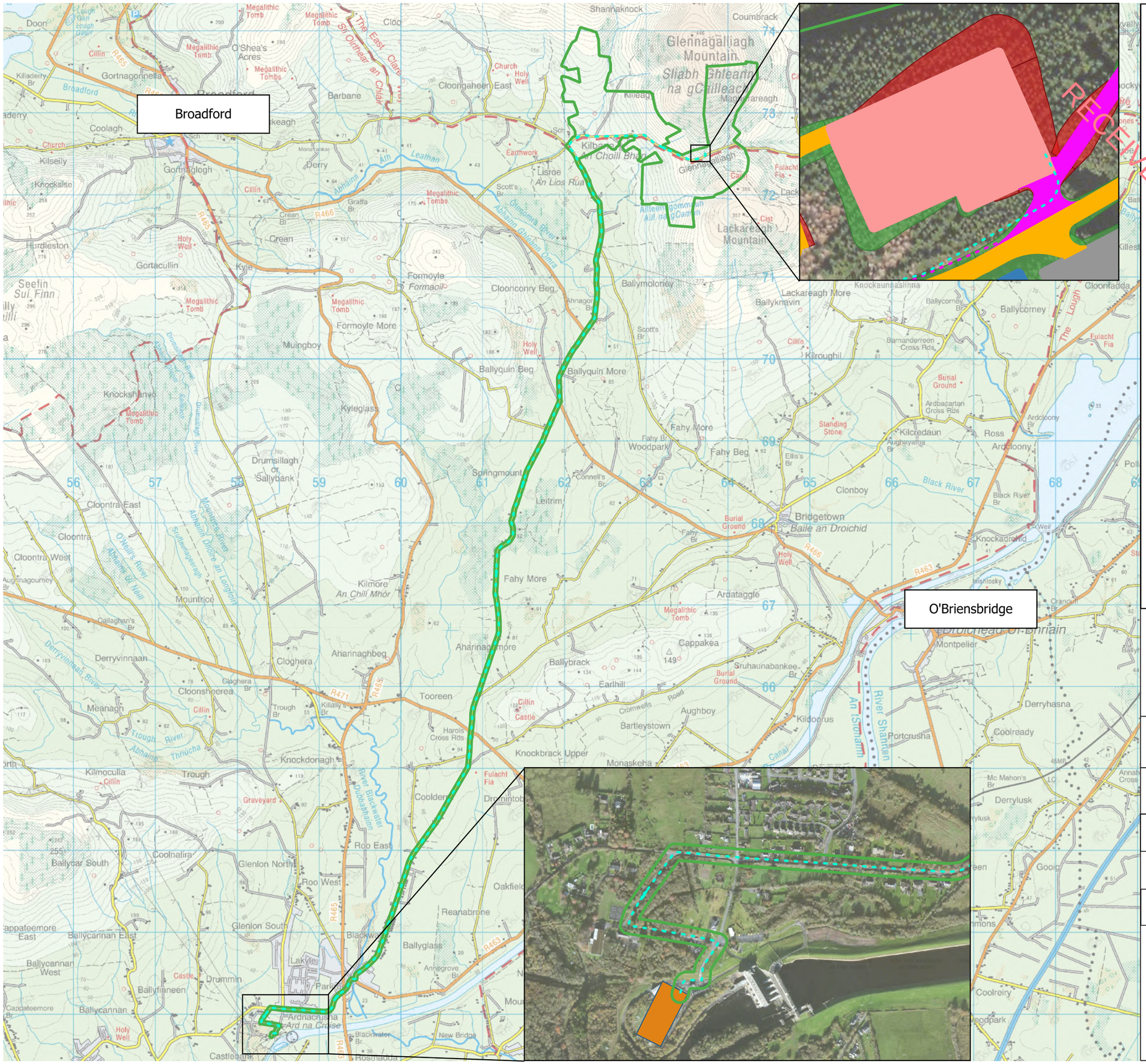

Map Legend

- EIAR Site Boundary
- Proposed Grid Connection Route
- Proposed Onsite 38kV Substation and Battery Storage Compound
- Ardnacrusha 110kV Substation

Drawing Title
Propsoed Grid Connection Route

Project Title
Lackareagh Wind Farm

Drawn By	Checked By
CJ	NMcH
Project No. 220245	Drawing No. Figure 2-3
Scale 1:45,000	Date 2024-07-23

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2.3 Construction Methodology Overview

2.3.1 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 Methodologies is provided below.

2.3.2 Overview of Proposed Construction Methodology

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

- Temporary Construction Compound and temporary setdown area;
- Borrow Pit;
- Peat and Spoil Management;
- Tree Felling;
- Site Drainage System;
- Site Access Roads (New & Upgrade to Existing Tracks);
- Turbine and Meteorological Mast Foundations;
  - Crane Hardstands;
- Onsite Electricity Substation, Control Buildings and Battery Energy Storage System;
- Site Underground Cabling
- Proposed Grid Connection Route Construction Methodology
  - Existing Underground Services
  - Joint Bays
  - Watercourse/Culvert Crossings
  - Horizontal Directional Drilling
  - Bridge strapping
- Culvert Crossings within the Proposed Wind Farm site
- Proposed Wind Farm Watercourse/Service Crossing
  - Upgrade to existing culverts within the Proposed Wind Farm Site
- Turbine Delivery Route Accommodation Works
- Decommissioning

2.3.3 Temporary Construction Compound and Temporary Set-Down Area

There is 1 no. temporary construction compound proposed for the Proposed Wind Farm site in the townland of Killeagy (Goonan), Co. Clare. The compound will be located in the east of the site at the junction to T4 and T5 and will measure approximately 4,000m2 in area. There is also a temporary set-down area proposed in order to facilitate the construction of the Proposed Wind Farm in the townland of O'Briensbridge, Co. Clare. Turbine components will temporarily be stored here during the turbine assembly process. The location of the compound and set-down area are shown in Figure 2-2.

The temporary 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 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.

The temporary set-down area will not have any temporary structures or staff facilities but will be constructed using the same methodology as outlined below.

The temporary construction compound and set-down area 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 as discussed in Section 2.3.10 below;
- A layer of geo-grid will be installed where deemed necessary by the designer 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;
- A limited amount of fuel will have to be stored on the Proposed Wind Farm site and for the Proposed Grid Connection Route in appropriately bunded containers and a bunded area for oil storage will be constructed within the temporary construction compound.
- Areas within the temporary construction compound will be constructed as site roads and used as vehicle hardstanding's during deliveries and for parking;
- A bunded containment area will be provided within the temporary construction compound for the storage of lubricants, oils and site generators etc;
- A waste storage area will be provided within the temporary construction compound;
- The compound and set-down areas will be fenced and secured with locked gates if necessary; and,
- Upon completion of the Proposed Wind Farm the temporary construction compound and set-down area will be decommissioned and allowed to vegetate naturally.

2.3.4 Peat and Spoil Management

The construction of the Proposed Project will require the excavation of peat and spoil. The quantities of peat and spoil, requiring management on the site of the Proposed Project has been calculated and are presented in Appendix 4-2 Peat and Spoil Management Plan.

It is proposed to manage any excess overburden generated through construction activities within the Proposed Project site, through deposition in the borrow pit, landscaping proposals, side-casting of materials along proposed infrastructure, and through the reuse of suitable materials as fill volume. The side-casting of materials will take the form of linear berms along access roads where appropriate, and landscaping around turbine bases. A detailed breakdown of the capacity of the peat and spoil management areas within the Proposed Project site is provided in Section 4.4.9.2 of Chapter 4 of this EIAR.

As rock is removed from the borrow pit, it is proposed to backfill the borrow pit area with excavated peat and spoil generated from the cut exercise. The excavated rock from the borrow pit will be used in the construction of the infrastructure elements (turbine foundations, hardstands, access roads, etc.) at the wind farm. The contractor excavating the rock will be required to develop the borrow pit in a way which will allow the excavated peat and spoil to be placed safely. It is proposed to construct cells within the borrow pit for the placement of the excavated peat and spoil. This is to allow for the safe placement and grading of the peat and spoil using dumper trucks and excavators.

The following, outlined in the Peat and Spoil Management Plan in Appendix 4-2, particular recommendations/best practice guidelines for the placement of peat and spoil with respect to specific aspects of the wind farm will be considered and taken into account during construction.

Temporary Management

To manage the material arisings effectively, the following points outline specific guidelines and practices for their temporary management and handling on-site:

- The amount of peat and spoil necessary for landscaping, reinstatement and backfilling shall be stored locally at turbine hardstands, in distinct stockpiles. Any surplus material will be promptly transported to the proposed borrow pit shown Figure 4 of the Peat and Spoil Management Plan (PSMP), which is provided as Appendix 4-2 to the EIAR.
- Before stockpiling any glacial till spoil, the proposed deposition area would be stripped of topsoil/ peat which would be removed and placed in a suitable area to prevent the mixing of materials and facilitate reuse during restoration work.
- Peat will be stored on top of existing and undisturbed peat areas located only on the uphill slopes to ensure stability. The suitability of the underlying peat and the topography will be reviewed by a geotechnical engineer at the detailed design stage and during the construction phase. This will determine the maximum height of peat that maybe stored, which shall not exceed 1.5m.
- Glacial till will not be placed on top of peat or topsoil; instead, it will be deposited only on other glacial till material.
- In order to prevent erosion and surface water contamination, silt fencing can be utilized to secure these stockpiles, where necessary.
- The excavated material which is unsuitable for use in construction will not be spread over any existing heath, bog, or grassed areas.
- Following the reinstatement of the turbine bases and hardstands, all temporarily stockpiled material not required will be removed and transported to the proposed borrow pit.
- The proposed locations for the temporary stockpiling of peat and spoil will be confirmed by the geotechnical engineer at detailed design stage.

2.3.5 Tree Felling

A proportion of the Proposed Wind Farm site (5%) currently comprises commercial coniferous forestry plantation. As part of the Proposed Wind Farm, 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 13.8 hectares of commercial forestry will be permanently felled within and around the footprint of the Proposed Wind Farm in order to facilitate infrastructure construction and turbine erection.

The tree felling activities required as part of the Proposed Wind Farm 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 13.8 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. 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.

The proposed methodology for the forestry felling activities is as follows:

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 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 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 to facilitate the creation of mats elsewhere within the site.
- 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 to authorised sawmills.

2.3.6 Site Drainage Systems

The early establishment of temporary drainage facilities will manage the risk of impacts on watercourses on and adjacent to the Proposed Project site during construction. In addition, construction operations will adopt best working practices which are outlined in Section 3.2.3 Best Practice Guidelines below. The development of the Proposed Project 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 4.7 of the EIAR and in the Surface Water Management Plan included as Appendix 4-4 of this EIAR.

2.3.7 Site Access Roads

The road construction design has taken into account the following key factors as stated in the Peat & Spoil Management Plan (PSMP) in Appendix 4-2 of the EIAR:

- Buildability considerations
- Serviceability requirements for construction and wind turbine delivery and maintenance vehicles
- Minimise excavation arisings
- 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 detailed site investigation stages.

The 2 no. road construction types proposed are as follows:

- Construction of New Excavated Roads – Type A
- Upgrade of Existing Access Roads or Tracks – Type B

The locations where the above construction types are proposed is shown in Figure 2 and Figure 3 of the PSMP. This document is included as Appendix 4-2 of this EIAR.

2.3.7.1 Construction of New Excavated Roads

The excavation of peat and spoil and founding of access roads on competent stratum (below the peat) for new access roads will be carried out at various locations on the Proposed Wind Farm site. The proposed locations for new access roads on site are shown in Figure 2-2 above.

Excavate and replace type access roads are the conventional method for construction of access roads on peatland sites provided sufficient placement/reinstatement capacity is available on site for the excavated peat. The general construction methodology for the construction of new roads, as presented in in the accompanying PSMP in Appendix 4-2, is summarised below.

- All the access tracks across the site will be constructed to solid sub-formation. For excavations in peat and spoil, side slopes shall be not greater than 1 (v): 2 or 3 (h). This slope inclination should be reviewed during construction, as appropriate.
- Where areas of weaker peat are encountered then slacker slopes will be required.
- New excavated roads constructed through excavation and the removal of organic material and soft subsoil to achieve a suitable formation level.
- A layer of geogrid or geotextile material will be laid at the formation level to separate the road building material from the subsoil.
- A minimum of 450mm of granular fill material, such as Class 6F2 stone, will then be placed and compacted in layers, as specified by the detailed designer.
- The road will then be finished with a 150mm layer of capping material, such as Cl. 804.

- The finished road width will have a running width of 5m, with wider sections on bends and passing bays.
- Access road construction will be to the line and level requirements as per design/planning conditions.
- Prior to any works commencing on the upgrade of existing roads, the requirement for additional roadside drainage will be considered by the Project Hydrologist in line with the proposals outlined in this CEMP.

Sections of New Excavated Roads – Type A are shown in Figure 4-7 in Chapter 4 of this EIAR.

2.3.7.2 Upgrade to Existing Roads or Tracks

It is proposed to utilise the existing road network at the site as much as possible; existing roads account for 33% of the total length of roads required to access the Proposed Wind Farm site. It was observed that the existing forestry tracks are in relatively good condition. Upgrading of these existing tracks will likely involve both widening and resurfacing works. The general construction methodology for upgrading of existing sections of excavated roads or tracks, as presented in the Peat & Spoil Management Plan in Appendix 4-2, is summarised below.

- All the access tracks across the site will be constructed to solid sub-formation. For excavations in peat and spoil, side slopes shall be not greater than 1 (v): 2 or 3 (h). This slope inclination should be reviewed during construction, as appropriate.
- Where areas of weaker peat are encountered then slacker slopes will be required.
- Upgrading of these existing tracks will involve both widening and resurfacing works, and will typically take place on both sides of the road. However, in areas of steeper slopes, widening of existing tracks will take place on the upslope side of the road.
- The existing roads will be widened through excavation and the removal of organic material and soft subsoil to achieve a suitable formation level.
- The new section of the road will be constructed by placing a minimum of 450mm of granular fill material, such as Class 6F2 stone, and compacting it in layers on top of a layer of geogrid or geotextile, depending on site conditions and as specified by the detailed designer.
- This road construction will be similar in build up to the construction of the Type A - New Excavated Road. The increased road width and the existing road surface, where necessary, will be capped with a 150mm layer of Clause 804 similar material.
- The finished road width will have a running width of 5m, with wider sections on bends and passing bays.
- Access road construction will be to the line and level requirements as per design/planning conditions.
- Prior to any works commencing on the upgrade of existing roads, the requirement for additional roadside drainage will be considered by the Project Hydrologist in line with the proposals outlined in this CEMP.

Sections of Upgrade of Existing Access Roads or Tracks – Type B are shown in Figure 4-8 in Chapter 4 of this EIAR.

2.3.8 Turbine and Meteorological Mast Foundations

The wind turbines and meteorological mast foundations will be a reinforced concrete base designed to Eurocode 2/BS8110. Foundation loads will be provided by wind turbine and mast supplier, and factors of safety will be applied to these in accordance with European design regulations. The size of the foundation will be dictated by the turbine manufacturer, and the final turbine selection will be the subject of a competitive tender process. Different turbine manufacturers use circular turbine foundations with some variation, depending on the requirements of the final turbine supplier, however, a foundation area large enough to accommodate modern turbine models has been assessed in this

EIAR adopting a precautionary approach. The turbine foundation transmits any load on the wind turbine into the ground. The maximum horizontal and vertical extent of the turbine foundation will be 23.5m and 4m respectively, which has been assessed in the EIAR and is shown in Figure 4-4 in Chapter 4 of the EIAR.

After the foundation level of each turbine has been formed on competent strata (i.e. bedrock or subsoil of sufficient load bearing capacity), the "Anchor Cage" is levelled and reinforcing steel is then built up around and through the anchor cage. The outside of the foundation is shuttered with demountable formwork to allow the pouring of concrete and is backfilled accordingly with appropriate granular fill to finished surface level following completion of the foundation.

The foundations will be constructed 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 peat will be stripped over the area of the excavation and stored locally for reuse, the subsoil will be excavated and stored to one side for reuse during the landscaping around the finished turbine;
- No material will be removed from site and storage areas will be stripped of vegetation prior to stockpiling in line with best working practices;
- All groundwater and surface water arising from turbine base excavation will be pumped to the dirty water system prior to discharge from the works area;
- Soil excavation shall be observed by a qualified archaeologist in accordance with the agreed scheme of archaeological monitoring to identify any significant remains as they come to light and,
- The foundation excavation will be raised to formation level by compacted layers of well graded granular material, spread and compacted to provide a hard area for the turbine foundation.

Standard excavated reinforced concrete bases will be completed as follows:

- A layer of concrete blinding will be laid approximately 75mm thick directly on top of the newly exposed formation, tamped and finished with a screed board to leave a flat level surface. The concrete will be protected from rainfall during curing and all surface water runoff from the curing concrete should be prevented from entering surface water drainage directly;
- High tensile steel reinforcement will be fixed in accordance with the designer's drawings & schedules. The foundation anchorage system will be installed, levelled and secured to the blinding using steel box section stools;
- Ductwork will be installed as required, and formwork erected around the steel cage and propped from the backside as required;
- The foundation anchorage system will be checked both for level and line prior to the concrete being installed in the base. These checks will be passed to turbine manufacturer for their approval;
- Concrete will be placed using a concrete pump and compacted using vibrating pokers to the levels and profile indicated on the drawings. Upon completion of the concreting works the foundation base will be covered and allowed to cure;
- Steel shutters will be used to pour the circular chimney section;
- Earth wires will be placed around the base; and,
- The foundation will be backfilled with a cohesive material, where possible using the material arising during the excavation and landscaped using the vegetable soil set aside during the excavation.
- Soil, rock and other materials excavated during construction shall be managed in line with recommendations/ best practice guidelines

2.3.8.1 Hardstanding Areas

Hardstanding areas consisting of levelled and compacted hardcore are required around each turbine base to facilitate access, turbine assembly and turbine erection. The hard-standing areas are used to accommodate cranes used in the assembly and erection of the turbine, offloading and storage of turbine components, and provide a safe, level working area around each turbine position. The hard-standing areas are extended to cover the turbine foundations once the turbine foundation is in place. All crane hardstand areas will be designed taking account of the loadings provided by the turbine manufacturer and will consist of a compacted stone structure. The crane hardstands will be constructed in a similar manner to the excavated site roads. The sizes, arrangement and positioning of hard standing areas are dictated by turbine suppliers. The proposed hard standing areas are illustrated in the detailed drawings included in Appendix 4-1 of this EIAR. The extent of the required areas at each turbine location may be optimised on-site depending on topography and the turbine supplier's exact requirements.

2.3.9 Onsite Electricity Substation and Battery Energy Storage System

2.3.9.1 Onsite Substation

A new proposed 38kV onsite substation along with ancillary control buildings is proposed to be constructed within the confines of the Proposed Wind Farm site, adjacent to a new section of road in, as shown in Figure 2-3. The dimensions of the substation area will be set to meet the requirements and specifications of ESB and the necessary equipment to operate the wind farm safely and efficiently, refer to Appendix 4-1 for detailed drawings of the proposed onsite 38kV substation.

The works will consist of construction of 1 no. control buildings and the electrical substation components necessary to consolidate the electrical energy generated by each wind turbine and export that electricity from the onsite 38kV substation to the national grid. The layouts and elevations of the proposed onsite 38kV substation are shown on Figure 4-13 and 4-14 within Chapter 4 of the EIAR. The onsite substation will be constructed by the following methodology:

- The area of the onsite substation will be marked out using ranging rods or wooden posts and the soil and overburden stripped and removed to a nearby spoil management area for later use in landscaping. Any excess material will be sent to one of the on-site spoil management areas.
- The dimensions of the onsite substation area have been designed to meet the requirements of the ESB and the necessary equipment to safely and efficiently operate the Proposed Project;
- 1 no. control buildings will be built within the onsite substation compound;
- The foundations will be excavated down to the level indicated by the designer and appropriately shuttered reinforced concrete will be laid over it. An anti-bleeding admixture will be included in the concrete mix;
- The block work walls will be built up from the footings to DPC level and the floor slab constructed, having first located any ducts or trenches required by the follow on mechanical and electrical contractors;
- The block work will then be raised to wall plate level and the gables & internal partition walls formed. Scaffold will be erected around the outside of the building for this operation;
- The roof slabs will be lifted into position using an adequately sized mobile crane;
- The timber roof trusses will then be lifted into position using a telescopic load all or mobile crane depending on site conditions. The roof trusses will then be felted, battened, tiled and sealed against the weather.
- The electrical equipment will be installed and commissioned.

- Perimeter fencing will be erected.
- The construction and components of the substation are to ESB specifications.

2.3.9.2 Battery Energy Storage System

A battery-based energy storage system (BESS) will adjoin the 38kV onsite substation and is located within the substation compound. The BESS primarily consists of 6 no. steel containers assembled in rows within the BESS compound at the site.

Prior to installing the steel containers, clearance of the site area, levelling off the ground surface and creation of a hard stand will be undertaken. These containers and the adjacent infrastructure house the batteries, inverters, transformers, fire suppression equipment and associated electrical components. The containers will be mounted onto concrete plinth foundations. The containers shall be spaced to allow airflow around the containers, feeding their climate control systems.

2.3.10 Site Underground Electrical (20kV or 33kV) and Communications Cabling

Each turbine will be connected to the on-site electricity substation via underground 20kV or 33kV (kilovolt) electricity cabling. Fibre-optic cables will also connect each wind turbine and the met mast to the onsite substation. The electricity and fibre-optic cabling connecting to the onsite substation compound will be run in cable ducts in the road or direct buried alongside the internal tracks approximately 0.9 metres beneath ground level to the top of the cable. The route of the cable will follow the access track to each turbine location and are illustrated on the site layout drawings included as Appendix 4-1, the exact number and configuration of cable may vary within the cabling trench. Plate 2-1 below shows two variations of a typical 33kV cable trench, one for off-road trenches and one for on-road trenches. The cabling may be placed on either side of the roads, on both sides of the road or within the road. The exact configuration of the underground cabling will be set by the requirements of the electrical designers at detailed design stage.

Clay plugs (water flow barrier) will be installed at regular intervals of not greater than 50 metres along the length of the trenches where required to prevent the trenches becoming conduits for runoff water. Backfill material will be compacted in layers with approved engineer's specified material, which may be

imported onto the Proposed Project site should sufficient volumes of suitable material not be encountered during the excavation phase of the proposed infrastructure.

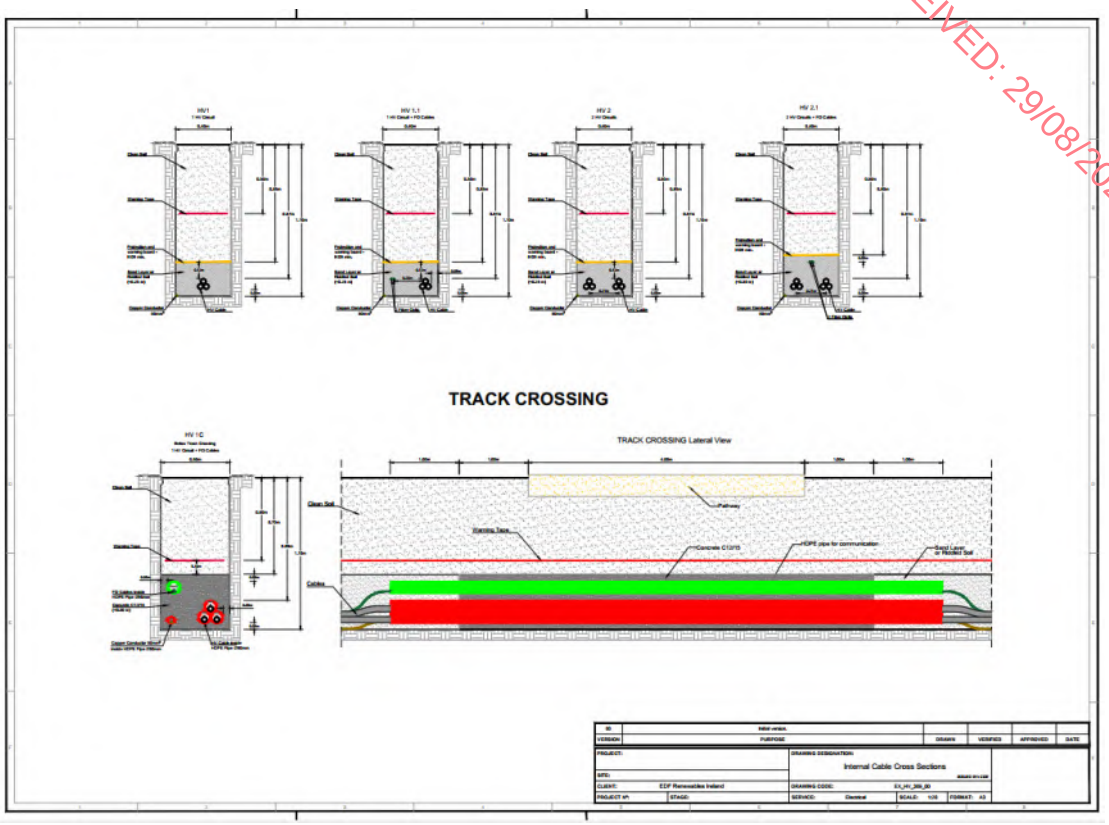

Plate 2-1: Internal Cable Cross Sections

2.3.11 Grid Connection Construction Methodology

A 38kV connection between the onsite substation and the national electricity grid will be necessary to export electricity from the Proposed Wind Farm. It is proposed to construct an onsite 38kV substation within the Proposed Wind Farm site and to connect from here via the Proposed Grid Connection Route, i.e., a 38kV underground electrical cable connection to the existing 110kV Ardnacrusha substation, in the townlands of Castlebank and Ballykeelaun near the village of Ardnacrusha, Co. Clare. The Proposed Grid Connection Route is approximately 14.7km in length to Ardnacrusha 110kV substation. The entirety of the Proposed Grid Connection Route is located within Co. Clare. A detailed description of the Proposed Grid Connection Route is included in Section 4.4.8 of the EIAR.

Works associated with the Proposed Grid Connection Route 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, with variations on this design to adapt to bridge crossings, service crossings and watercourse crossings. The power cable ducts will accommodate 3 no. power cables. The communications duct will accommodate a fibre cable to allow communications between the onsite 38kV substation and the existing Ardnacrusha 110kV substation.

The power cable ducts will accommodate the power cables and the communications duct will accommodate a fibre cable to allow communications between the onsite 38kV substation and the existing Ardnacrusha 110kV substation. The ducts will be installed, and the trench will be reinstated in accordance with landowner or local authority specification, and then the electrical cabling/fibre cable is pulled through the installed ducts in approximately every 1000m to 1150m. Construction methodologies to be implemented and materials to be used will ensure that the Proposed Grid Connection Route is installed in accordance with the requirements and specifications of ESB.

The underground cable required to facilitate the Proposed Grid Connection Route will be laid beneath the surface of the site and/or public road 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, Clare County Council etc. will be contacted and all up to date drawings for all existing services sought.
- When the cable is located on public roads, a traffic management plan will be prepared 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.
- Excavated material will be temporarily stockpiled onsite for re-use during reinstatement. Stockpiles will be restricted to less than 2m in height. Stockpiles will be located a minimum of 50m from surface water features.
- Excavated material shall be employed to backfill the trench where appropriate and any surplus material will be transported off site and disposed of at a fully authorised soil recovery site
- 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 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.

2.3.11.1 Existing Underground Services

In order to facilitate the installation of the Proposed Grid Connection Route, 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.

The construction of the Proposed Grid Connection Route will also be subject to a Road Opening License (ROL). The timing of these works would therefore be controlled by the ROL process with the relevant Local Authority.

2.3.11.2 Joint Bays

Joints Bays are to be provided approximately every 1000m to 1150m along the Proposed Grid Connection Route to facilitate the jointing of 2 no. lengths of underground cable. 38kV Joint Bays are typically 2.03m x 4.5m x 1.475m pre-cast concrete structures installed below finished ground level. Joint Bays will be located in the non-wheel bearing strip of roadways, however given the narrow profile of local roads this may not always be possible.

In association with Joint Bays, Communication Chambers are required at every joint bay location to facilitate communication links between the onsite 38kV substation and the existing Ardnacrusha 110kV substation. Earth sheath links are used for earthing and bonding cable sheaths of underground power cables, installed in a flat formation so that the circulating currents and induced voltages are eliminated or reduced. Earth sheath link chambers and communication chambers are located close to joint bays. Earth sheath link chambers and communication chambers will typically be pre-cast concrete structures with an access cover at the finished surface level.

Marker posts will be used on non-roadway routes to delineate the duct route and joint bay positions. The marker posts will consist of a corrosion-proof aluminium triangular danger sign, with a 750mm base, and with a centred lightning symbol, on engineering grade fluorescent yellow background. The marker posts will be installed inadequately sized concrete foundations and will also be placed where the cable has not been buried to the standard depth, due to existing road conditions. Drawings of the joint bays and communication chambers are included within this planning package.

The precise siting of all Joint Bays, Earth Sheath Link Chambers and Communication Chambers, within the curtilage of the public road, is subject to approval by ESBN and EirGrid.

The locations of the joint bays are shown in the Proposed Grid Connection Route layout drawings in Appendix 4-1 of this EIAR.

2.3.11.3 Proposed Grid Connection Route Watercourse/Culvert Crossings

The Proposed Grid Connection Route will involve 3 No. bridge crossings. 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 relevant Local Authority and relevant environmental agencies. The Proposed Grid Connection Route 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 horizontal directional drilling (HDD) may be employed as an alternative.

- **Bridge 1** - Stainless Steel Pipe Fixture. Bridge 1 is located along the L-3056 and traverses the River Blackwater. Further detail on the bridge strapping proposal are provided in Section 4.7.10 below.
- **Bridge 2** – Ducting in Trefoil within Bridge Deck: Bridge 2 is located along the L3022-8. This bridge has sufficient room to install the cable to ESBN specifications, so it is proposed that the cable will utilize the bridge deck to hold the ducts while remaining in trefoil formation
- **Bridge 3** – HDD: Bridge 3 is located on the L-3022-8. Site visits showed that the bridge had insufficient room to install the cable to ESBN specifications. It was decided that HDD be utilised at this location

Crossing existing culverts will be implemented using open trenching with either an undercrossing or an overcrossing, depending on the depth of the culvert. The Proposed Grid Connection Route will include for 9 no. culvert/pipe crossing locations which will be crossed via a flat formation undercrossing. These culverts will remain in place and the ducting will be installed beneath / adjacent to these culverts to provide minimum separation distances in accordance with ESB and Úisce Éireann specification. Where the Proposed Grid Connection Route underground cabling 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 relevant Local Authority and relevant environmental agencies.

The bridge and culvert crossing locations are shown on the layout drawings in Appendix 4-1 of the EIAR. The detail bridge and culvert crossing methods are detailed in Drawing No. 220245-21 in Appendix 4-1.

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 Grid Connection Route.

2.3.11.3.1 Horizontal Directional Drilling

It is proposed to implement HDD for 1 no. bridge crossings (Bridge 3).

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 per Section 6 of Appendix 4-5 is as follows:

- A works area of circa. 40m^2 will be fenced on both sides of the river crossing,
- 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 ESBN and Clare County Council.
- A transition coupler will be installed at either side of the bridge/ following the horizontal directional drilling as per ESB requirements, this will join the HDD ducts to the standard ducts.

2.3.11.4 Cable Strapping at Blackwater Bridge

In order for the Proposed Grid Connection Route underground cable to traverse the Blackwater Bridge (Bridge 1) the most feasible option was deemed to be strapping the cable to the side of the bridge structure. This crossing methodology option is illustrated in Figure 4-30 of Chapter 4. The option of strapping of the cable to the side of the Blackwater Bridge was deemed the most environmentally prudent and most efficient way to traverse the River Blackwater due to the presence of environmental constraints. These constraints include the fact that the Blackwater Bridge has insufficient room to install the cable to ESB specifications within the existing deck, making the bridge unsuitable to accommodate the ducts in the carriageway as a consequence. Furthermore, executing a horizontal directional drill (HDD) was determined not to be possible at this location given the curvature of the road, significant elevation change which would be required as part of construction, and the ecology of the area. Surveys in the vicinity of the bridge identified invasive species such as giant hog weed and ecological eDNA sampling identified the presence of lamprey in the Blackwater River,

Based on the above constraints, the TLI Group advised it would not be possible to host the cable within the bridge deck, therefore it was identified that the option of a Bridge Strapping Solution would be the most appropriate crossing methodology in this particular instance. The Blackwater Bridge is listed as a protected structure under the Record of Protected Structures, registered as RPS no. 650. Because of this, it was deemed necessary to discuss this proposal with a member of the Heritage Department of Clare County Council and a suitable qualified archaeologist. Further details of the discussions had with Clare County Council on this matter can be found in Chapter 2 and Chapter 14 of this EIAR.

Mark Murphy Consultancy was commissioned by TLI Group to undertake a principle inspection of the Blackwater Bridge in Co. Clare; this report is included as Appendix 4-6 to this EIAR. An assessment of the arch structure was carried out in accordance with the TII Stage 1 Assessment of Road Bridges and Structures and the methods outlined in the UK Highways Agency Design Manual for Roads and Bridges. The Principle Inspection Report concludes that the Blackwater Bridge is capable of carrying the infrastructure associated with the Proposed Grid Connection Route underground cabling from the onsite 38kV substation to the existing Ardnacrusha 110kV substation.

The construction methodology of the bridge strapping solution is laid out below:

- In advance of the works to the existing structure, an underbridge access unit will be required to carry out the installation of a metal clad stainless steal berm supported by cleats/brackets at desired intervals to enclose ESB networks across the bridge
- Weather conditions will be considered when planning construction activities with the works to be undertaken during low flows in the river
- Ivy to be removed from the bridge (outside of bird nesting season)
- All works will be conducted by a suitably qualified contractor and supervised by a suitably qualified archaeologist;
- Prior notice of intent to begin construction works will be provided to Clare County Council Heritage Department;

- Proposed open trenching with ducts to be pre-installed prior to works commencing on bridge exterior. Ducts to be exposed at the periphery of the walled parapets, dug in beneath to allow for coupling;
- Hammer drill existing parapet exterior and fix hot drilled 'L' brackets at regular intervals.
- All brackets will be placed within the existing joints of the bridge in order to maintain the flagstones on the bridge and ensure the works are reversible;
- Metal-clad stainless steel beam with ESB HV stencilled to be laid across the aforementioned brackets once fixed. Galvanised straps will be used for reinforcement with anchored Hilti bolts;
- Install ESBN ducting as required within metal-clad beam and conjoin onto pre-installed ducting along bridge parapets;
- Installation of anti-climb guard either side of bridge to restrict unauthorised access;
- Maintain wall drainage and below-ground waterproofing;
- Permanent reinstatement of local road with surface dressing in accordance with local road engineer and County Council requirements;
- Remove any debris as required, and
- Bridge will be repointed by the contractor.

The proposed works will be carried out by employing accepted good work practices during construction, and environmental management measures. Mitigation measures as required by Clare County Council Heritage Department have also been incorporated into the construction methodology outlined above. The following good-practice measures will be supplemented by further specific environmental protection measures that will be included in method statements prepared for specific tasks during the works and will form part of the detailed Construction and Environmental Management Plan to be developed based on Appendix 4-3 CEMP.

- Weather conditions will be considered when planning construction activities to minimise risk of run-off from site into surface watercourses;
- The contractor will ensure that all personnel working onsite are trained in pollution incident control response. A regular review of weather forecasts of heavy rainfall is required, and the contractor is required to prepare a contingency plan for before and after such events;
- The contractor will carry out visual examinations of local watercourses from the proposed works during the construction phase to ensure that sediment is not above baseline conditions. In the unlikely event of water quality concerns, the Environmental Manager and ECoW will be consulted;
- Excavations will be temporarily reinstated by minimal periods to avoid acting as a conduit for surface water flows;
- Only emergency breakdown maintenance will be carried out on site. Emergency procedures and spillage kits will be available and construction staff will be familiar with emergency procedures

2.3.12 Culvert Crossings within the Proposed Project

Crossing existing culverts will be implemented using open trenching with either an undercrossing or an overcrossing, depending on the depth of the culvert. The Proposed Grid Connection Route will involve 9 no. culvert crossings locations which will be crossed via a flat formation undercrossing. A schedule of the culverts has been identified at this stage where the crossing method to be implemented has be detailed. The culvert crossing methods are detailed in Figure 10 and Figure 11 in Appendix 4-5.

Culvert will be installed with a minimum internal gradient of 1% (1 in 100). Smaller culverts will have a smooth internal surface. The use of corrugated surfaces will be confirmed by the Project Ecologist and Project Hydrologist. 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 doesn't 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. Any watercourse crossings required will be installed outside of the salmonid spawning season, October to June in any year, in accordance with Inland Fisheries Ireland best practice (IFI, 2016). This will ensure no potential impacts on salmonid spawning habitat.

All of the above works will be supervised by the ECoW and the Project Hydrologist.

2.3.13 Proposed Wind Farm Watercourse/Service Crossings

In order to facilitate the construction and operation of the Proposed Wind Farm, 4 no. new watercourse crossings will be constructed along the proposed new access roads. The locations of all 4 no. new watercourse crossings are detailed below:

- **Watercourse Crossing 1**: located along access road to T2, approximately 165m north of the L7080 Local Road along the proposed new access road;
- **Watercourse Crossing 2**: located along the proposed access road to T6, approximately 270m south of the L7080 along the proposed new access road;
- **Watercourse Crossing 3**: located along the access road between T6 and T7, approximately 121m south of T6 along the proposed access road, and
- **Watercourse Crossing 4**: located approximately 52m north of T7 hardstand

All 4 no. watercourses will be traversed using either of the following crossing methodologies:

- Clearspan crossing structure
- Box culvert

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

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.
- Once the foundation base has been completed, the pre-cast concrete box culvert 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 box culvert is installed in sections, 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 4-27 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.

Mitigation Measures for watercourse crossings are detailed below and in Section 9.5.2.9 of the EIAR and are summarised as follows:

- The proposed new stream crossing and upgrade of an existing crossing will be clear span bridge crossings and the existing banks will remain undisturbed. No in-stream excavation works are proposed at this location and therefore there will be no direct impact on the stream at the proposed crossing location;
- All guidance / mitigation measures required by the OPW and/or the Inland Fisheries Ireland (IFI)1 is incorporated into the design of the proposed crossings;
- All drainage measures will be installed in advance of the works;
- Plant and equipment will not be permitted to track across the watercourse;
- Access to the opposite site of the watercourse for excavation and foundation installation will require the installation of a temporary pre-cast concrete or metal bridge;
- Once the foundations have been completed at both sides of the watercourse, the pre-cast concrete box culvert will be installed using a crane and there will be no contact with the watercourse;
- Where the box culvert is installed in sections, the joint will be sealed to prevent granular material entering the watercourse;
- As a further precaution, near stream construction work, will only be carried out during the period permitted by IFI for in-stream works according to the IFI (2016) guidance document "Guidelines on protection of fisheries during construction works in and adjacent to waters", i.e., July to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI);
- Where works are necessary inside the 50m buffer 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 concrete 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.

2.3.14 Turbine Delivery Route Accommodation Works

During the construction of the Proposed Wind Farm, a number of road and junction temporary works will be completed to provide access to the Proposed Wind Farm site during turbine delivery. All these accommodation works will be re-used during decommissioning and turbine component removal. On complete of the turbine component removal from the Proposed Wind Farm site, the temporary accommodation area will be fully re-instated.

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

2.3.14.1 Blade Transition Area

A blade transition area will be constructed along the R466 Regional Road, approximately 300m north from O'Briensbridge, Co. Clare. The blades will be offloaded from the Super Wing Carrier and transferred onto a Blade Adapter vehicle by two cranes.

An overhead line traverses the field in which the blade transition area will be located, however, sufficient distance has been provided from the edge of the blade transition area to the overhead line, i.e., 10m.

The proposed blade transition area will be constructed as follows:

- The area to be used as the blade transition area 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 blade transition area platform will be established using a similar technique as the construction of the substation platform as discussed in Section 2.3.10 below;
- A layer of geo-grid will be installed where deemed necessary by the designer 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 blade transition area will be constructed as site roads and used as vehicle hardstanding's during deliveries and for parking;
- A waste storage area will be provided within the blade transition area;
- The compound and set-down areas will be fenced and secured with locked gates if necessary; and,
- Upon completion of the Proposed Wind Farm the blade transition area will be decommissioned and allowed to vegetate naturally.

2.3.15 Decommissioning

The wind turbines proposed as part of the Proposed Wind Farm are expected to have a lifespan of approximately 35 years. Following the end of their useful life, the equipment may be replaced with a new technology, subject to planning permission being obtained, or the Proposed Wind Farm may be decommissioned fully.

Upon decommissioning of the Proposed Wind Farm, the wind turbines will be disassembled in reverse order to how they were erected. The turbines will be disassembled with a similar model of crane that was used for their erection. The turbine will likely be removed from site using the same transport methodology adopted for delivery to site initially. The turbine materials will be transferred to a suitable recycling or recovery facility.

The underground electrical cabling connecting the turbines to the on-site substation will be removed from the cable ducts. The cabling will be pulled from the cable ducts using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at the original cable jointing pits which will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance. The cable materials will be transferred to a suitable recycling or recovery facility.

All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and would be covered with earth and 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 unnecessary environment emissions such as noise, dust and/or vibration.

Site roadways could be in use for purposes other than the operation of the Proposed Wind Farm by the time the decommissioning of the Proposed Wind Farm site is to be considered, and therefore it may be more appropriate to leave the site roads in situ for future use. It is envisaged that the roads will provide a useful means of extracting the commercial forestry crop which exists on the site, and as agricultural roads. The onsite 38kV substation will remain in place as it will be under the ownership and control of the ESB Networks and/or EirGrid and will form a permanent part of the national electricity grid. The battery energy storage system will remain in place as it will also form a permanent part of the national electricity grid.

The Proposed Grid Connection Route will remain in place as it will be under the ownership and control of the ESB Networks and/or EirGrid and will form a permanent part of the national electricity grid. The battery energy storage system will remain in place as it will also form a permanent part of the national electricity grid.

A Decommissioning Plan has been prepared (Appendix 4-6) the 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 agree with the competent authority at that time. The potential for effects during the decommissioning phase of the Proposed Project has been fully 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 Proposed 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, Natura Impact Statement (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 Proposed Project 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 4-4 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 would result in significantly less erosion and siltation. Construction activities in the hydrological buffer zones shall be avoided during or after prolonged rainfall or an intense rainfall event and work will cease entirely near watercourses when it is evident that water quality is being impacted. Given that this site has an established drainage network and 4 no. watercourse crossing points where either clearspan crossing structures or a box culvert crossing will be constructed, and there will be minimal impacts on watercourses.

3.2.2 Site Drainage Principles

The Proposed Project site drainage features have been outlined in Chapter 4, Section 4.7 of the EIAR in addition to the drainage design and management for the Proposed Project. The protection of the watercourses within and surrounding the Proposed Project site, and downstream catchments that they feed is of utmost importance in considering the most appropriate drainage proposals for the site of the Proposed Wind Farm. The Proposed Wind Farm'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.

The routes of any natural drainage features will not be altered as part of the Proposed Wind Farm. Turbine locations have been 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 Wind Farm.

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 Legislation and Best Practice Guidance

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

There is no one guidance document that deals with drainage management and water quality controls for wind farms and other renewable energy developments. However, a selection of good practice approaches have been adopted in preparation of this CEMP, and these are taken from the various best practice guidance documents listed below. These relate to infrastructure and operational works on 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:

- Department of Environment, Heritage and Local Government (2006): Wind Energy Development Guidelines for Planning Authorities;
- Department of Environment, Heritage and Local Government (2019) Draft Revised Wind Energy Development Guidelines for Planning Authorities;
- Forestry Commission (2011): Forests and Water UK Forestry Standard Guidelines, Fifth Edition. Publ. Forestry Commission, Edinburgh;
- Coillte Forest (2013): Operations and 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 (2008): 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;
- Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- Scottish Natural Heritage (2019): 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 2006: Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors (CIRIA C532, 2006).
- Control of water pollution from linear construction projects -Technical guidance. CIRIA C648 London, 2006.
- DoHPLG (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment
- European Union (2017) Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU),
- Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.

3.2.4 Site Drainage Design and Management

The proposed site drainage features for the Proposed Wind Farm site are outlined in Section 4.7 of Chapter 4 of the EIAR. As this CEMP is a working document and is presented as an Appendix to the EIAR, the drainage measures are not included in this document. When the final CEMP report is prepared, and presented as a standalone document, all drainage measures will be included in that document. These drainage proposals will be developed further prior to the commencement of construction as part of the detailed drainage design. The following sections give an outline of drainage management arrangements in terms of pre-construction, construction, operational and decommissioning phases of the Proposed Project.

3.2.4.1 Pre-Construction Drainage

There is an existing drainage network across the site. The Proposed Wind Farm site is drained by several 1st and 2nd order streams. These natural watercourses originate within the Proposed Wind Farm site boundaries and flow downslope before discharging into the Ardcloony River to the east and the Broadford River to the southwest.

There are also numerous manmade drains that are in place predominately to drain the forestry plantations and agricultural fields. 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 Proposed Wind Farm 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 before the main construction works commence. 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.

The routes of any natural drainage features will not be altered as part of the Proposed Wind Farm. Turbine locations have been selected to avoid natural watercourses. It is proposed that 2 no. new watercourse crossing will be required to facilitate the Proposed Wind Farm infrastructure.

Where artificial drains are currently in place in the vicinity of proposed works areas, these drains may have to be diverted around the proposed works areas to minimise the amount of water in the vicinity of works areas. In order to facilitate the construction of T1 and its associated hardstand, the course of 1 no. manmade drain will be diverted in order to maintain a separation distance from the proposed infrastructure. Where it may not be possible to divert artificial drains around proposed work areas, the drains will be blocked to ensure sediment laden water from the works areas has no direct route to other

watercourses. Where drains have to be blocked, the blocking will only take place after an alternative drainage system to handle the same water has been put in place.

3.2.4.2 Construction Phase Drainage

The Project Hydrologist will attend the Proposed Wind Farm site to set out and assist with the implementation of the proposed drainage controls as outlined in Section 4.7 of Chapter 4 of this EIAR, as outlined in Section 2.5 and 3.3 of the SWMP and shown in the drainage design drawings included with this planning application. 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 Scheduling of Works Operating Record (SOWOR) will continue through the construction phase of the project. The SOWOR provides a 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. 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 below.

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 Sections 2.5 and 3.3 of the SWMP, 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.
- 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;
- Monthly site inspections by the Project Hydrologist/ ECoW of the drainage measures during construction phase;
- Quarterly site inspections by the Project Hydrologist/ ECoWof 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 the CEMP which will be maintained on-site during the construction phase.

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); or,
- >half monthly average rainfall in any 7 days.

Prior to works being suspended the following control measures shall 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 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, following a confirmatory inspection by the project hydrologist, and the modifications will draw on the various features outlined in Section 2.5 of the SWMP 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 above, 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:

- Interceptor drains will be installed up-gradient of all Proposed Project 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/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 have been designed in consideration of the greenfield runoff rate.

In the operational phase of the Proposed 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.

The drainage system will not be altered upon decommissioning. Measures which will be implemented to ensure no impacts upon the drainage system during decommissioning will be outlined within the Decommissioning Plan (Appendix 4-6) and fully agreed with the local authority prior to any decommissioning works.

3.2.5 Forestry Felling

Tree felling will be required within the Proposed Wind Farm site and will commence before the initial construction groundworks on a phased basis across the site. The commercial forestry felling activities required as part of the Proposed Wind Farm 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.

Tree felling to facilitate the Proposed Wind Farm will not be undertaken simultaneously with construction groundworks. Keyhole felling to facilitate construction works will take place prior to groundworks commencing. During tree felling there is a potential to generate silts and sediments in surface water runoff due to tracking of machinery and disturbance of the ground surface etc, however mitigation is provided in Chapter 9 Water with regard surface water quality protection for this activity which is summarised below. 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. handheld or mechanical) will be chosen which are most suitable for ground conditions and which will minimise soils disturbance;
- All machinery will be operated by suitably qualified personnel;
- 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;
- Machines will traverse the site along specified off-road routes (referred to as racks);
- The location of racks will be chosen to avoid wet and potentially sensitive areas;
- Brash mats will be placed on the racks to support the vehicles on soft ground, reducing peat and mineral soil disturbance and erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal should take place when they become heavily used and worn. Provision should 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;
- Silt fences will be installed at the outfalls of existing drains downstream of felling areas. No direct discharge of such drains to watercourses will occur. Sediment traps and silt fences will be installed in advance of any felling works and will provide surface water settlement for runoff from work areas and will prevent sediment from entering downstream watercourses. Accumulated sediment will be carefully disposed of at pre-selected peat and spoil repository areas. Where possible, all new silt traps will be constructed on even ground and not on sloping ground;
- In areas particularly sensitive to erosion it will be necessary to install double or triple sediment traps and increase buffer zone width. These measures will be reviewed on site during construction;
- Double silt fencing will also be put down slope of felling areas which are located in close proximity to streams and/or relevant watercourses;
- 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;
- Timber will be stacked in dry areas, and outside watercourse buffer zones. 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 runoff;
- Refuelling or maintenance of machinery will not occur within 50m of an aquatic zone or within 20m of any other hydrological feature. Mobile bowser, drip kits, qualified personnel will be used where refuelling is required; and,
- 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.

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 ECoW shall be appointed to oversee the keyhole and extraction works. The ECoW shall be experienced and competent, and shall have the following functions as proposed in the planning application:

- Attend the site for the setup period when drainage protection works are being installed and be present on site during the remainder of the forestry keyhole felling works.
- Prior to the commencement of works, review and agree the positioning by the Operator of the required Aquatic Buffer Zones (ABZs), silt traps, silt fencing (see below), water crossings and onsite storage facilities for fuel, oil and chemicals (see further below).
- Be responsible for preparing and delivering the Environmental Tool Box Talk (TBT) to all relevant parties involved in site operations, prior to the commencement of the works.
- Take representative photographs showing the progress of operation onsite, and the integrity and effectiveness of the water protection measures.
- Collect water samples for analysis by a 3rd party accredited laboratory, adhering to the following requirements:
    - Surface water samples shall be collected upstream and downstream of the keyhole felling site at suitable sampling locations.
    - Sampling shall be taken from the stream / river bank, with no in-stream access permitted.
    - The following minimum analytical suite shall 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 Peat and Spoil Management Area Drainage

It is proposed that excavated peat/subsoil (spoil) will be stored in excavated borrow pit within the Proposed Wind Farm site or used for landscaping throughout the site. The borrow pit is located outside the 50m stream buffer zone.

Proposed surface water quality protection measures regarding the peat and spoil repository areas are as follows:

- During the initial emplacement of peat and subsoil at the borrow pit, silt fences, straw bales and biodegradable matting will be used to control surface water runoff from the enclosure.
- The borrow pit is an enclosed area. Its drainage can be easily managed.
- Drainage from the borrow pit will be pumped to settlement ponds as required or will overflow through controlled overflow pipes.
- Discharge or pumping will be intermittent and will depend on preceding rainfall amounts.
- Once the borrow pit has been seeded and vegetation is established the risk to downstream surface water is significantly reduced.

Therefore, the above mitigation measures will be deployed to ensure protection of downstream water quality.

The borrow pit settlement ponds have been designed to allow a 24hr retention time as per EPA guidance (2006) which is highest level of protection recommended by the EPA with regard to retention time.

3.2.7 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. Should any rainfall cause runoff from the excavated material, the material is contained in the downgradient cable trench. Excess subsoil is removed from the cable trench works area immediately upon excavation, and in the case of the Proposed Wind Farm site, would be used for landscaping and reinstatements of other areas elsewhere on site. The same control measures would apply during the excavation for cabling on the Proposed Wind Farm and the Proposed Grid Connection Route.

On steeper slopes, silt fences, as detailed in Section 4.7 of the EIAR will be installed temporarily downgradient of the cable trench works area, or on the downhill slope below where excavated material is being temporarily stored to control run-off.

3.2.8 Refuelling, Fuel and Hazardous Materials Storage

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

On-site refuelling of machinery will be carried out at dedicated refuelling locations using a mobile double skinned fuel bowser. The fuel bowser, a double-axle custom-built refuelling trailer will be re-filled off site and will be towed around the Proposed Wind Farm site by a 4x4 jeep to where machinery is located. It is not practical for all vehicles to travel back to a single refuelling point, given the size of the cranes, excavators, etc. that will be used during the construction of the Proposed 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.

Only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays, spill kits and fuel absorbent mats will be available if necessary, during all refuelling operations. Only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays, spill kits and fuel absorbent mats will be available if necessary, during all refuelling operations. The following mitigation measures are proposed to avoid release of hydrocarbons at the site:

- All plant will be inspected and certified to ensure that they are leak free and in good working order prior to uses at the Proposed Project 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 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;
- Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system;
- All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area;
- Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage.

3.2.9 Cement Based Products Control Measures

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

The following mitigation measures are proposed to avoid release of cement leachate from the Proposed Project site:

- No batching of wet-concrete products will occur on site. Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place;
- 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 directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined concrete washout ponds;
- 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
- All concrete will be paced in shuttering and will not be in contact with soils or groundwater until after it has set;
- Use weather forecasting to plan dry days for pouring concrete; and,
- 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.
- 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.

The 50m wide watercourse 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 clear span crossing construction and upgrade works to existing roads. 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 wash out areas

3.3 Archaeological Management

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

No National Monuments in State Care or those subject to a Preservation Order are located within the Proposed Wind Farm site, in the proposed blade transition area, or along the Proposed Grid Connection Route. Three National Monuments in State Care, one of which is also subject to a Preservation Order, are located within 10km of the Proposed turbines. Three of the monuments are located in County Clare, with Derry Castle (PO 4/2001) located in County Tipperary. No National Monuments in State Care or those subject to a Preservation Order are located within 100m of the Proposed Grid Connection Route or on the footprint of the proposed onsite 38kV substation. The nearest National Monuments to the proposed onsite 38kV substation are located in Killaloe over 6km to the east.

Three recorded monuments, CL044-063—, CL044-031— and CL044-086— are located within the Proposed Wind Farm site. A total of 131 recorded monuments are located within 5km of the Proposed turbines and include the three monuments within the Proposed Wind Farm site as referenced above. Regarding the three recorded monuments within the Proposed Wind Farm site, the site walk-over survey and visual inspection of the Proposed Wind Farm site in addition to the desktop assessment shows that CL044-086— has no surviving above-ground remains, while CL044-031— comprises an upstanding monument with trees and scrub growing on its perimeter. A review of the available aerial photography for the area suggests that CL044-063— has some upstanding remains, albeit low visibility. In this regard the Moderate theoretical significance of effect on the setting of CL044-086— will in reality be Imperceptible as it has no above-ground remains. Similarly, the low-visibility nature of CL044-063— will ameliorate the theoretical significance of the visual effect on the setting of this monument.

Since the majority of the remaining monuments are located at a sufficient distance from the Proposed Wind Farm site, no direct effects to the monuments will occur. The monuments are listed in Chapter 13 of this EIAR.

No Protected Structures subject to statutory protection are located within the Proposed Wind Farm site therefore direct effects to the same as a result of the Proposed Project infrastructure therein are not identified. Ten protected structures are located within 5km of the Proposed Wind Farm. Since these

structures are located at a sufficient distance from the Proposed Wind Farm site, no direct effects to the structures will occur.

Two Protected Structures (RPS Ref. 188, Kilbane Bridge and Ref. 640 Blackwater Bridge) are located within 100m of the Proposed Grid Connection Route with none in proximity to the proposed onsite 38kV substation. Works to Kilbane Bridge, which is located adjacent to the Proposed Grid Connection Route , are not proposed therefore direct effects to this structure will not occur. It is proposed to strap the cables to the side of Blackwater Bridge (RPS Ref. 650) as there is insufficient cover over the bridge deck to bury the cables and HDD is not suitable given the curvature of the road at this location. The cables will be attached to the bridge as per the methodology outlined in Chapter 4 of the EIAR. The strapping of the cables to the bridge will result in a change to the immediate setting of the structure. It should be noted, however, that the elevation of the bridge to which the cables will be attached is not currently readily visible from the public road. A utility service is also already attached to the opposing bridge elevation which has altered the original visual appearance of the structure, albeit not readily visible from the public road. A change to the setting of the bridge as a result of the strapping of the cable to the structure is acknowledged but is regarded as Not Significant. Mitigation measures will be put in place to ensure no impact on the protected structures, these are as follows:

- The cables should be attached to Blackwater Bridge (RPS Ref. 650) as per the methodology outlined in Chapter 4 of the EIAR.
- The work shall be carried out in consultation with the Heritage Office of Clare County Council and shall ensure that any requirements of that office regarding works to the Protected Structure are implemented in full.

During the construction phase the Proposed Project may result in direct effects. Direct effects refer to a 'physical impact' on a monument or site. The construction phase of a development may consist of earthmoving activities such as topsoil removal and excavation works as part of the construction phase. This may have a number of potential negative effects on the known and potential archaeological heritage. These are outlined below within Chapter 13 of this EIAR, suggested appropriate mitigation measures are as follows:

- Pre-construction archaeological testing of the proposed turbine bases, hardstands, proposed roads, compounds, onsite 38kV substation, and any other proposed infrastructure within the Proposed Wind Farm site 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). Testing within forested areas may only be possible once clear-felling has taken place.
- A report on the testing will be compiled on completion of the work and submitted to the NMS and the relevant 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.
- 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 relevant 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.

3.4 Traffic Management

This section of the CEMP provides an outline of the traffic management proposals for the construction phase of the Proposed Project. In the event planning permission is granted the final Traffic

Management Plan will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned.

3.4.1 Turbine and Materials Transport Route

Foynes (Shannon) Port is the proposed point of arrival for the large turbine components for the Proposed Wind Farm. The port is a well-established point of arrival for wind turbine components of similar scale into the State on a regular basis, as is the road network between the port and the national road network. It is envisaged that large wind turbine components will be delivered to the Proposed Wind Farm site, from Foynes (Shannon) Port, via the N69, N18, M7, R494, R463, R466, L3022, and L7080. The proposed turbine transport route from Foynes (Shannon) to the Proposed Wind Farm site is shown on Figure 4-24 of Chapter 4 of this EIAR.

3.4.1.1 Turbine Component Delivery Route and Accommodation Areas

3.4.1.1.1 *Proposed Wind Farm*

All deliveries of turbine components to the site will only be via the proposed transport routes outlined in Figure 15-1 of Chapter 15 Material Assets.

The deliveries of turbine components to the Proposed Wind Farm site may be made in convoys of three to four vehicles at a time, and at night when roads are quietest. Convoys will be accompanied by escorts at the front and rear operating a “stop and go” system. Although the turbine delivery vehicles are large, they will not prevent other road users or emergency vehicles passing, should the need arise. The delivery escort vehicles will ensure the turbine transport is carried out in a safe and efficient manner with minimal delay or inconvenience for other road users. Furthermore, it is not anticipated that any section of the public road network will be closed during transport of turbines. All deliveries comprising abnormally large loads where required will be made outside the normal peak traffic periods, usually at night, to avoid disruption to work and school-related traffic.

The roads and bridges along the haul route will be subject to a condition survey by a suitably qualified engineer both before and after construction as appropriate. Protection measures for such infrastructure as specified by the appointed engineers report will be implemented in full prior to construction.

Prior to the delivery of oversized loads, the developer will engage with the local community to provided information on the scale, time and duration of such deliveries. This information will be informed by pre-delivery surveys which will be completed by the suppliers. This information along with any other information relevant to the Proposed Project will be relayed to the local community by information leaflet and a website if deemed necessary. In addition, complaints will be documented in the site complaints log and the Environmental Manager/ECoW (See Section 4.1 of this CEMP) will arrange to meet with those affected. The situation will be acted upon immediately and reviewed by the Project Manager.

Prior to the Traffic Management Plan (TMP) (Appendix 15~~-X-~~2 of this EIAR) being finalised, a full dry run of the transport operation along the potential routes will be completed using vehicles with attachments to simulate the dimensions of the wind turbine transportation vehicles. This dry run will inform the TMP for agreement with the relevant Authorities. All turbine deliveries will be provided for in a TMP which will be finalised in advance of oversized load deliveries, when the exact transport arrangements are known, delivery dates confirmed and escort proposals in place. Such a traffic management plan is typically submitted to the relevant Authorities 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.

The proposed turbine delivery route is as follows:

- From the access road serving Foynes Port the route turns left (south) onto the N69 National Secondary Road at the existing priority junction (Location 1).
- From this point the route heads east on the N69 for approximately 32kms, passing through the roundabout at Ballbrown (Location 2).
- The route then turns right from the N69 onto the N18 at Location 3 accessing the motorway via the double roundabouts followed by the eastbound access ramp.
- From this point the N18 heads east for approximately 3.2 km to Rossbrien where the route continues from Junction 1 of the M7 in a northeast direction for a further 20.8 km to Junction 27of the M7 at Coolderry. At his point the route exits the motorway via the exit ramp and turns left at the roundabout onto the R494, which is indicated as Location 4.
- From this point the route heads north on the R494 for approximately 5.4km to the junction with the R496 and the new crossing of the River Shannon to the south of Killaloe and Ballina passing through the roundabout at Birdhill (Location 5).
- After crossing the new bridge which is approximately 0.9km long, the route turns left at the new junction between the bridge and the R463. The junction on the eastern side of the bridge is shown as Location 6 with the junction on the western side of the River Shannon onto the R463 shown as Location 7.
- The route then travels southwest for approximately 6.8km, passing through a bend at Knockadrohid (Location 8) before turning right onto the R466 at Location 9. At this location it is proposed that there will be a proposed blade transition area constructed on the northeastern corner of the R463 / R466 junction for the purpose of transferring the blades, which up to this point, will travel using standard Super Wing Carrier trailers, onto blade adapters, where the blades will be lifted to and angle of 60º.
- The route then travels northwest on the R466 for approximately 7.6km passing through Bridgetown (Location 10) and a sharp bend (Location 11) to the junction of the L-3022 where the route turns right onto the L-3022 (Location16). On this section of the R466 the route passes through the crossroads near Glenomeara (Location 12), a right hand bend on the R466 near Glenomeara (Location 13), a left hand bend at the junction with the L-3033-8 (Location 14), and at a location in Clonycory, shown as Location 15, where the raised blades will require to be lowered to a horizontal position in order to pass under overhead HV cables.
- On turning right at the R466 / L-3022 junction (Location 16) the route travels northeast on the L-3022 for approximately 1.3km before continuing on the L-7080 for a further 1.9km from which the Proposed Wind Farm will be accessed via 4 separate junctions as discussed subsequently in Sections 15.1.4.1 and 15.1.10 of this EIAR.

Road and junction widening are sometimes required along proposed turbine transport routes to accommodate the large vehicles used to transport turbine components to proposed wind energy development sites. The proposed transport route for the Proposed Wind Farm has been the subject of a route assessment to determine if any works are required along its length. Full details of the assessment are included as part of the traffic impact assessment set out in Section 15.1 of this EIAR and summarised below. There are sections on the route where the vertical alignment may require specialist transport vehicles. These sections will be further considered by the appointed transport company following turbine procurement process. Accommodation works will be required at various locations on the national and regional road network between the port of arrival in Foynes and the Proposed Wind Farm site. These will be limited to temporary measures including temporary local road widening, overruns of roundabout island and temporary relocation of some signs and street furniture.

Where any temporary accommodation works are required along turbine haul route these areas will be reinstated to original condition after deliveries have been completed. In the event of construction damage arising on any roads or bridges along the haul route it will be rectified immediately by the developer under consultation with the relevant roads engineer.

Accommodation works will be completed at 18 no. locations. These are as follows:

- Location 1 – Port of Foynes Harbour/N69 Junction
- Location 2 – Roundabout Junction on N69, Ballbrown
- Location 3 – N18 Junction 2
- Location 4 – M7 Junction 27 near Applegreen Service Station
- Location 5 – Birdhill Roundabout, R494
- Location 6 – Proposed Roundabout and River Crossing, Ballina
- Location 7 – Proposed Roundabout and River Crossing, Killaloe
- Location 8 – Right Bend on R436, Knockadrohid
- Location 9 – O'Briensbridge Cross R463/R466
- Location 10 – Left bend on the R466 at the Junction with the L-3082, Bridgetown
- Location 11 – Left Bend on the R466 at the Junction with Riverdale. Bridgetown
- Location 12 – Crossroads on R466 near Glenomeara
- Location 13 – Right Bend on R466 near Glenomeara
- Location 14 – Left bend on R466 at Junction with L3022-8, Glenomeara
- Location 15 – Overhead HV Cables, Clonyconry
- Location 16 – R466/L3022-0 Junction
- Location 17 – Crossroad Junction, Kilbane
- Location 18 – Right Bend on L-7080 north of Crossroads at Kilbane

3.4.1.1.2 *Proposed Grid Connection*

A description of the Proposed Grid Connection Route is provided in Section 4.4.8 of Chapter 4 of this EIAR. It is proposed that the 38kV onsite electrical substation in the townlands of Killeagy (Goonan), Co. Clare is connected by means of an underground 38kV electricity cable to the existing Ardnacrusha 110kV substation, located in the townlands of Ballykeelaun and Castlebank, Co. Clare. The Proposed Grid Connection Route is approximately 14.7km in length and is primarily located within the public road corridor.

Deliveries of materials for the construction of the Proposed Grid Connection Route will be via the public road network along the identified route. The proposed works will be transient in nature; approximately 100-150m of the Proposed Grid Connection Route will be at any one time. As the Proposed Grid Connection Route is located primarily within the public road corridor, it is estimated that a total of approximately 147 days to construct during which a road closure will be required at one point on the network on all of these days.

The traffic generation that is forecast to be generated during the construction of the Proposed Grid Connection Route, including, material excavated from the trench, cabling and other components of the Proposed Grid Connection Route, stone for infill and plant delivery, are included in the impact assessment set out in Section 15.1.6 and 15.1.7 of this EIAR. All traffic for the Proposed Grid Connection Route and the onsite 38kV substation will be delivered to the Proposed Wind Farm site via the via the TDR and along the Proposed Grid Connection Route itself.

The construction methodology of providing a Proposed Grid Connection Route under and along local road networks is well established and accepted nationwide. Detailed construction methodology for the Proposed Grid Connection Route is provided in Appendix 4-5 of this EIAR. There are in excess of 300 wind farms currently operational in Ireland and the majority of these are connected to the national grid via underground cable connections predominantly along the public road networks.

3.4.1.2 Deliveries of Stone and Ready-Mix Concrete from Quarries

All deliveries will access the site via specified routes for the duration of construction as per the programme outlined in Section 9 below. All deliveries of construction materials to the site will take place within the defined working hours of 7am – 7pm. It may be necessary on occasion, to commence works before 7am where concrete pours will be required to start earlier due to the volume of concrete

required and the location of the concrete pour relative to the concrete supplier's batching plant. Main pours will be planned days and weeks in advance and will ensure disruption to work and school related traffic is avoided. The locations of all turbine foundations where large concrete pours will take place are off the public road and will be accessed by the internal site roads and will therefore eliminate the potential for queuing of trucks on the adjoining public road network. The typical vehicle type for delivery of construction materials to site with the exception of the wind turbines will be with standard heavy goods vehicles (HGV).

A detailed traffic and transport management plan for turbine delivery will be prepared by the haulage company, when appointed and will be submitted to the relevant Planning Authority for approval. The plan will include:

- A delivery schedule.
- A schedule of control measures for exceptional wide and heavy loads.
- A dry run of the route using vehicles with similar dimensions.

The proposed route for HGVs delivering crushed stone originates from StoneDirect.ie near Broadford, Co. Clare and travels east along the L7004 Local Road for approximately 4km before turning left onto the L7080 for approximately 1km before entering the Proposed Project site. The proposed route for HGVs delivering ready mix concrete from quarries such as the following:

- Bobby O'Connell & Sons Ltd Quarry
- Clare Concrete Plant

Deliveries of materials for the construction of the Proposed Grid Connection Route will be via the public road network along the identified route. The proposed works will be rolling in nature; approximately 100-150m of the Proposed Grid Connection Route will be at any one time. As such, deliveries of construction materials will utilise the surrounding road network along the Proposed Grid Connection Route as it moves along the public road network in which it's proposed.

3.4.2 Traffic Mitigation Measures During the Construction Stage

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

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

Traffic Management Coordinator – a competent Traffic Management Coordinator 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 Clare County Council in advance of deliveries of turbine components to the Proposed Wind Farm.

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 Coordinator, 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 of the EIAR and 3.4.1 of this CEMP.

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

Travel plan for construction workers to Proposed Project site– While the assessment above has assumed the worst case that construction workers will drive to the Proposed Project 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.

Temporary traffic signs – As part of the traffic management measures temporary traffic signs will be put in place at all key junctions, including the Proposed Wind Farm site access junctions off the L-7080 and the proposed blade transition area at the R463 / R466 junction. 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). 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.

Diversion routes during the construction of the Proposed Grid Connection Route – As set out in Section 15.1.7 of Chapter 15 of this EIAR.

Additional measures - Various additional measures will be put in place in order to minimise the effects of the project 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.

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 Proposed Project site 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 recommendations and control measures given in the Peat Stability Risk Assessment (PRSA) (Appendix 8-1 of the EIAR) report being strictly adhered to during construction and the detailed stability assessment carried out for the peat slopes which 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 PRSA.

The following measures which will be implemented during the construction phase of the Proposed Project and 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 Proposed Project (be aware that decreasing the construction time has the potential to increase the risk of initiating a localised peat movement);
- Prevent undercutting of slopes and unsupported excavations;
- Upslope cut-off drains will be installed in advance of construction activities to prevent water build up in excavations.
- The sides within excavated peat will be sloped back at an angle of 30 degrees to the horizontal to prevent slippage.
- No excavations shall take place unless fill material is available for filling at the point of excavation. Excavation will be limited to the reach of the excavator sitting on the constructed road surface.
- Any excavations will be immediately backfilled with suitable material when available.
- Excavation for access track to be backfilled as soon as practicable in intact peat. Excavation and filling operations will be co-ordinated to minimise the time an excavation remains unfilled.
- Deposition of excavated material must not occur outside designated areas; temporary stock piling would take place within the development footprint of turbine hardstands before reinstatement and disposal at proposed deposition areas.
- Temporary deposition of excavated soils will only be allowed in areas with peat depth less than 0.5m.
- Excavated spoil will not be deposited on the downslope or upslope edges of adjacent peat.
- Existing drainage patterns in peat will be maintained whenever possible, and any uncontrolled discharges of water onto peat will be prevented.
- Engineered drainage to prevent concentrated flow onto slopes or into excavations. Pumping to be used as required until a permanent solution is in place.
- As per Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Energy Consents Unit Scottish Government, 2017) catch wall fences shall be positioned downslope of the suspected or known landslide prone area to slow or halt runout. Similarly, catch ditches may also be used to slow or halt runout, although it is preferable that they are cut in non-peat material.
- Machinery use on peat surfaces would be minimized, and dependant on site topography the use of vibrating rollers may not be permitted.
- Materials must not be stockpiled, and heavy machinery must not be parked on peat surfaces.

- The use of low ground bearing pressure machines to be used on areas of peat exceeding 1m depth.
- No operatives other than the excavator driver to be allowed in close proximity to open excavations.
- Monitoring posts to be installed in vicinity of risk areas and to be inspected prior to and following works each day by a competent person.
- A qualified geotechnical and/or environmental engineer will conduct regular site visits and assessments to monitor the potential for a peat slide regularly during construction.
- Upon commencement of the reinstatement works, guidance from a suitably qualified environmental professional will be sought to confirm the methodology and programme.
- Exclusion zones delineating the working corridor will be established around all working areas using post and rope fences. No activity will be permitted past this fence.
- The environmental manager or other designated person will conduct induction training and toolbox talks with site staff to explain the risks associated with working on peat, the procedures for reducing the risk of peat slides, and the location of exclusion zones.
- Strict adherence to method statements is required at all times, and any deviation from the agreed work methodology must be approved by a suitably qualified environmental professional or the site geotechnical engineer.
- Particular attention will be paid to conditions during and after heavy rainstorms, especially following extended dry periods when the likelihood of peat movement is higher. The site supervisor would suspend work if either work practices or weather conditions are deemed unsafe.
- After reinstatement is completed, the disposal sites will be re-vegetated using the topsoil, sod or harvested peat.

3.5.2 Peat and Spoil Management Areas

The placement of peat and spoil, excavated during the construction phase of the Proposed Project, as presented in the Peat & Spoil Management Plan in Appendix 4-2 of the EIAR, is outlined in Section 2.3.4 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 to control dust include:

- Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions. Silty or oily water will not be used for dust suppression.
- Construction traffic will be restricted to defined routes and a speed limit implemented.
- The designated public roads outside the Proposed Project site and along the main transport routes to the site will be regularly inspected by the ECoW for cleanliness, and cleaned as necessary;
- Material handling systems and material storage areas will be designed and laid out to minimise exposure to wind;
- Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods;
- Water misting or bowsers will operate on-site as required to mitigate dust in dry weather conditions;

- The transport of soils or other material, which has significant potential to generate dust, will be undertaken in tarpaulin-covered vehicles where necessary;
- All construction related traffic will have speed restrictions on un-surfaced roads to 15 kph;
- Daily inspection of construction sites to examine dust measures and their effectiveness.
- When necessary, sections of the haul route will be swept using a truck mounted vacuum sweeper; and,
- All vehicles leaving the construction areas of the site will pass through a wheel washing area prior to entering the local road network.

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. The following proposed measures to control noise will be implemented in full 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 onsite, 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 directional drilling activities are required for the Proposed Grid Connection 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. Two invasive plant species listed on the Third Schedule were recorded within the Proposed Wind Farm site, Japanese knotweed (*Reynoutria japonica*) and Rhododendron (*Rhododendron ponticum*). Other low to high impact invasive plant species recorded within the Proposed Project site are Winter heliotrope (*Petasites fragrans),* Cherry laurel (*Prunus laurocerasus*) and Hardy Fuchsia (*Fuchsia magellanica).* One invasive species listed on the Third Schedule was recorded along the Proposed Grid Connection Route, Giant hogweed (*Heracleum mantegazzianum*).

Rhododendron, Japanese knotweed and Giant hogweed regrow vigorously when cut. As a result, some method of stump killing, or removal is always necessary. Any untreated cut stump will regrow and in most cases flower within 3-4 years. The following measures will be in place:

- A pre-commencement survey for invasive species within the footprint of the Proposed Wind Farm site will be carried out by a suitably qualified ecologist to ensure there is no new growth of Third Schedule invasive species in these areas.
- If new infestations of invasive species are recorded within the construction areas, an Invasive Species Management Plan will be prepared in advance of construction which will incorporate the measures necessary to prevent spread additional to the measures laid out below.
- A Toolbox Talk will be given by the Environmental Clerk of Works or Ecological Clerk of Works in relation to the management of invasive species within construction areas.
- The infested area will be demarcated and works in the vicinity of the infestation will only be carried out under supervision by a suitably qualified Ecological Clerk of Works or Environmental Clerk of Works.
- In advance of construction of the road upgrade works in the vicinity of the infested area, it will be necessary to completely remove the infestation outside of the flowering period (May to July) and dig the roots completely out. The effectiveness of this technique is increased by removing all viable roots. To avoid regrowth, stumps will be turned upside down and soil will be brushed off roots. The roots are relatively shallow, seldom being deeper than 45cm[2]
- Once the supervising ecologist confirms that the material is dried out and non-viable, it will be chipped and composted on-site.
- It is envisaged that no contaminated soil is to be removed from the Site but is to be reinstated within the site, thus negating the need for transport off-site, further risk of spread, and licencing requirements. Should potentially contaminated spoil be required to be removed from the site, it will be transported to a suitably licenced waste facility and will require a licence from the NPWS prior to its transportation.

In order to avoid the potential for spread of invasive species into the site:

- Any construction material imported into the Site will come from a source confirmed to be free of invasive species.
- All plant and machinery will be thoroughly cleaned before entering and exiting the Site.

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, shall be followed by all on-site personnel. Only those who have been inducted into biosecurity measures on-site may enter the contaminated zones within the works areas. Should any risk of contaminated material escaping be observed by the Site Supervisor, the management plan for the site must be amended by an appropriately qualified person to mitigate against the risk.

3.8.2 Establish Good Site Hygiene

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

[2] *TII (2020) - The Management of Invasive Alien Plant Species on National Roads – Technical Guidance GE-ENV-01105*

- A risk assessment and method statement will 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 shall 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.
- An ECoW/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 describe the waste types expected to be produced during the project and identify the waste management action proposed (please refer to Section 3.9.3 and 3.9.4 below). Estimates of the quantities to be produced will be inserted into a detailed waste management spreadsheet and the data will be updated as the work progresses, and information is available and performance against the estimates will be monitored.

This WMP outline's the methods of waste prevention and minimisation by recycling, recovery, and reuse at each stage of construction of the Proposed Project. Please see the Waste Management Hierarchy below in Plate 3-2. 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 Department of the Environment provides a document entitled, '*Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects*' (2006). 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 is set out in Plate 3-2 below.

Plate 3-2 Waste Hierarchy (sourced from the European Commission)

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

Prevention and Minimisation:

'Prevention' means any measures taken before a substance, material or product has become waste that reduces:

- The quantity of waste, including through the re-use of products or the extension of the life span of products;
- The adverse impacts of the generated waste on the environment and human health; or
- The content of harmful substances in materials and products.

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:

'Reuse' means any operation by which products or components that are not waste are used again for the same purpose for which they were conceived; 'preparing for re-use' means checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other preprocessing.

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. 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 used 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.

Recycling of Waste:

'Recycling' means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials.

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

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.

Recovery of Waste

'Recovery' means any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.

Where recycling is not possible, every effort will be made to assess the wastes capabilities for recovery.

Disposal of Waste

'Disposal' means any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy.

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 development will involve the construction of 7 no. turbines, new and upgrade of site access roads, internal cabling, onsite 38kV substation and battery energy storage system, control buildings and all associated infrastructure, as well as an underground 38kV electrical cable connection the Proposed Wind Farm to the existing Ardnacrusha 110kV substation. A full description of the Proposed Project is provided in Chapter 4 of the EIAR.

The turbines will be manufactured off site and delivered to Proposed Wind Farm site where onsite erection will occur.

The turbine foundations consist of stone from the onsite borrow pit and a concrete base which 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 onsite 38kV 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 from the onsite borrow pit.

All types of wastes generated at the site will be identified by reference to the classification of waste determined by the local regulations. The relevant waste regulations will be used to identify and classify the predicted waste streams from the site. The quantities of waste will be expressed and recorded in m^3 or tonnes in the WMP.

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
Other waste engine, gear or lubricating oils	Engine oil, engine lubricant, motor oil, gear oil	13 02 08
Waste from storage tanks and barrels containing oil	Residual oils leftover when cleaning interceptors, barrels, and onsite storage tanks	16 07 08
Metals	Copper, aluminium, lead, iron and steel	17 04 07
Inert materials	Sand, stones, plaster, rock, blocks	17 01 07
Concrete	Concrete	17 01 01
Mixed municipal waste	Daily canteen waste from construction workers, miscellaneous	20 03 01
Waste from sewage cleaning	Daily sewage waste from construction workers	30 03 06
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. The volume of the bunded compound will be 110% of the capacity of the tank and any refuelling should be supervised at all times - and preferably done on an impermeable surface. 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 wind farm site. Therefore, all wastes streams generated on site will be deposited into a single waste skip. This waste material will be transferred to a 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.

3.9.4 Waste Arising from Decommissioning

The design life of the proposed Lackareagh Wind Farm 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 development are outlined in Table 3-3 below.

Table 3-3 Expected waste types arising during the Decommissioning Phase

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
Other waste engine, gear or lubricating oils	Engine oil, engine lubricant, motor oil, gear oil	13 02 08
Waste from storage tanks and barrels containing oil	Residual oils leftover when cleaning interceptors, barrels, and onsite storage tanks	16 07 08

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 the legal producer of all waste on site and 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 waste management plan. All employees working on site during the construction phase of the project will be trained in materials management and thereby, should be able to:

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

3.9.5.3 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.

Before any waste is removed from the site, appropriate information for each waste stream and the validity of the facilities authorised to receive the waste will be identified and recorded in the WMP. 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/Quantity of Material
- Type of Disposal at Destination Facility
- Signature of Confirmation of Dispatch detail
- Date and Time of Waste Arrival at Destination
- Site Address of Destination Facility

3.9.5.4 Waste Management Plan Conclusion

The WMP will be properly adhered to by all staff involved in the Proposed Project which will be outlined within the induction process for all site personnel. The waste hierarchy should 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 prior to the construction phase of the Proposed Project. The WMP will be in place throughout the construction and decommissioning phase of the Proposed Project and will be in line with all relevant legislation detailed in Section 3.9.1 above.

4. ENVIRONMENTAL MANAGEMENT IMPLEMENTATION

4.1 Roles and Responsibilities

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

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

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

The ECoW will also have to call upon the Project Ecologist, Project Hydrologist, or other members of the Project Developer's design team, as required, to oversee the contractor's works on-site.

An organogram structure for the construction stage roles is as outlined below.

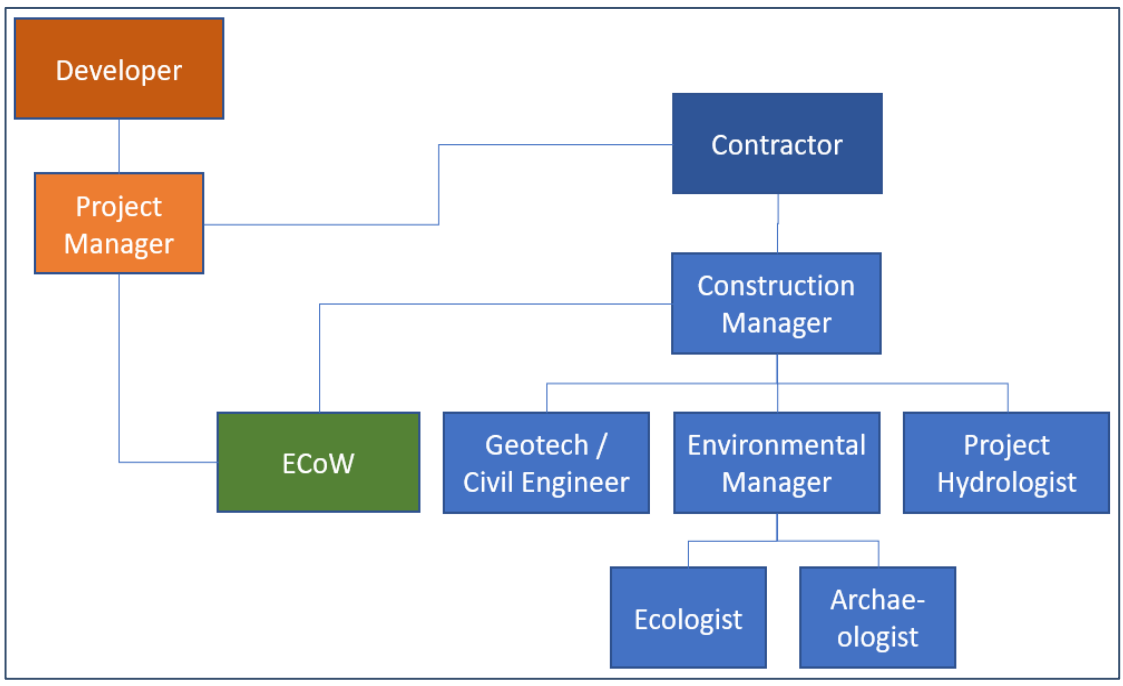

Figure 4-1 Proposed Project Organogram

Any requirement of the granted permission, for the works to be supervised by an engineer with professional indemnity insurance, who upon completion of the works, including site stability, shall

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

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

4.1.2 Site Environmental Clerk of Works

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

- Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be identified in line with the engagement plan. Local access to properties will also be maintained throughout any construction works and local residents will also be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum.
- Review/approval of the CEMP and supporting environmental documentation and review/approval of contractor method statements;
- Undertake environmental monitoring, inspections and reviews to ensure the works are carried out in compliance with the CEMP by the Project Contractor;
- Manage the water quality monitoring programme and turbidity monitors;
- Maintain a live Actions List and accompanying map outlining any corrective actions across the site requiring attention or action by the contractor;
- Confirm for the Project Contractor that pre-commencement requirements have been met to allow construction activities to commence;
- Highlight for the contractor, any abandonment triggers that are occurring and inform the contractor that works are to cease;

- Generate environmental reports as required to show environmental data trends and ensure environmental records are maintained throughout the construction period;
- Advise site management/contractor/sub-contractors on:
  - Prevention of environmental pollution and improvement to existing working methods;
  - Changes in legislation and legal requirements affecting the environment;
  - Suitability and use of plant, equipment and materials to prevent pollution;
- Environmentally sound methods of working and systems to identify environmental hazards;
- Assist the contractor in coordinating the required inputs and site visits from the Project Ecologist or Project Hydrologist to support the ECoW role;
- Ensure immediate notification of any environmental incidents are issued to the Construction Manager and Project Developer;
- Support the investigation of incidents of significant, potential or actual environmental damage and ensure corrective actions are carried out, recommend means to prevent recurrence and communicate incident findings to relevant parties.
- Liaise with the Project Design Team and attend meetings to report on audit findings
- Support the contractor who will be responsible for providing toolbox talks and site induction content to ensure the requirements of the CEMP are delivered on site.
- The geotechnical design requirements of the Proposed Project are not within the remit of the ECoW.

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 Proposed Project.

4.1.3 Site Engineer

The main contractor will engage a qualified site engineer who will have input into the environmental management of the site. The Site Engineer will report to the Construction Manager and is responsible for inspection and review of geotechnical aspects associated with construction of the Proposed Project. The proposed engineer has extensive experience in the construction of wind farms in Ireland and has fulfilled an environmental management role as part of those projects.

The Site Engineer will report to the Construction Manager and liaise with the ECoW. The responsibilities and duties of the Site Engineer will include the following:

- Regularly visit site and undertake inspections, including visual inspections at watercourse crossings, and reviews to ensure the works are carried out in compliance with the CEMP;
- Advise site management/contractor/sub-contractors regarding:
  - Prevention of environmental pollution and improvement to existing working methods;
  - Suitability and use of plant, equipment and materials to prevent pollution;
  - Environmentally sound methods of working and systems to identify environmental hazards.

4.1.4 Project Ecologist/Ornithologist

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

- Undertake a pre-construction transect/walkover bird survey to ensure that significant effects on breeding birds will be avoided.
- Inform and educate on-site personnel of the ornithological and ecological sensitivities within the site.
- Oversee management of ornithological and ecological issues during the construction period and advise on ornithological 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.
- Carry out ecological monitoring and survey work as may be required by the planning authority.

4.1.5 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 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.

4.1.6 Project Archaeologist

The Project Archaeologist will report to the Environmental Manager and is responsible for archaeological monitoring of the site during the construction phase. This will include monitoring of site investigations and excavation works as well as the monitoring and metal detection of spoil during construction. The Project Archaeologist will also monitor all construction works in relation to the strapping of the Proposed Grid Connection Route underground electrical cabling to the Blackwater Bridge, which is a protected structure. The Project Archaeologist will not be full time on site but will undertake pre-commencement/monitoring surveys and visit the site as required.

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

4.1.7 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 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 9.3.7.1 and 9.3.7.2 of Chapter 9 of the EIAR. Section 4 of the Surface Water Management Plan (SWMP) which is included as Appendix 4-4 of the EIAR.

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

5. HEALTH AND SAFETY

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

- Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005);
- Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2016 (S.I. No. 36 of 2016);
- S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021 and
- Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006).

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

- A Health and Safety Plan covering all aspects of the construction process will address the Health and Safety requirements in detail. This will be prepared on a preliminary basis at the procurement stage and developed further at construction stage.
- All hazards will be identified, and risks assessed. Where elimination of the risk is not feasible, appropriate mitigation and/or control measures will be established. The contractor will be obliged under the construction contract and current health and safety legislation to adequately provide for all hazards and risks associated with the construction phase of the project. SafePass registration cards are required for all construction, delivery and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme card where required. The developer is required to ensure a competent contractor is appointed to carry out the construction works. The contractor will be responsible for the implementation of procedures outlined in the Safety and Health Plan. Public safety will be addressed by restricting Site access during construction. Fencing will be erected in areas of the Site where uncontrolled access is not permitted.
- All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the Site Health and Safety Plan.

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

- Identify hazards arising from the design or from the technical, organisational, planning or time related aspects of the project;
- Where possible, eliminate the hazards or reduce the risks;
- Communicate necessary control measures, design assumptions or remaining risks to the PSCS so they can be dealt with in the Safety and Health Plan;
- Ensure that the work of designers is coordinated to ensure safety;
- Organise co-operation between designers;

- Prepare a written Safety and Health Plan;
- Prepare a safety file for the completed structure and give it to the client; and
- Notify the Authority and the client of non-compliance with any written directions issued.

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

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

6. EMERGENCY RESPONSE PLAN

6.1 Overview

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

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

6.1.1 Roles and Responsibilities

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

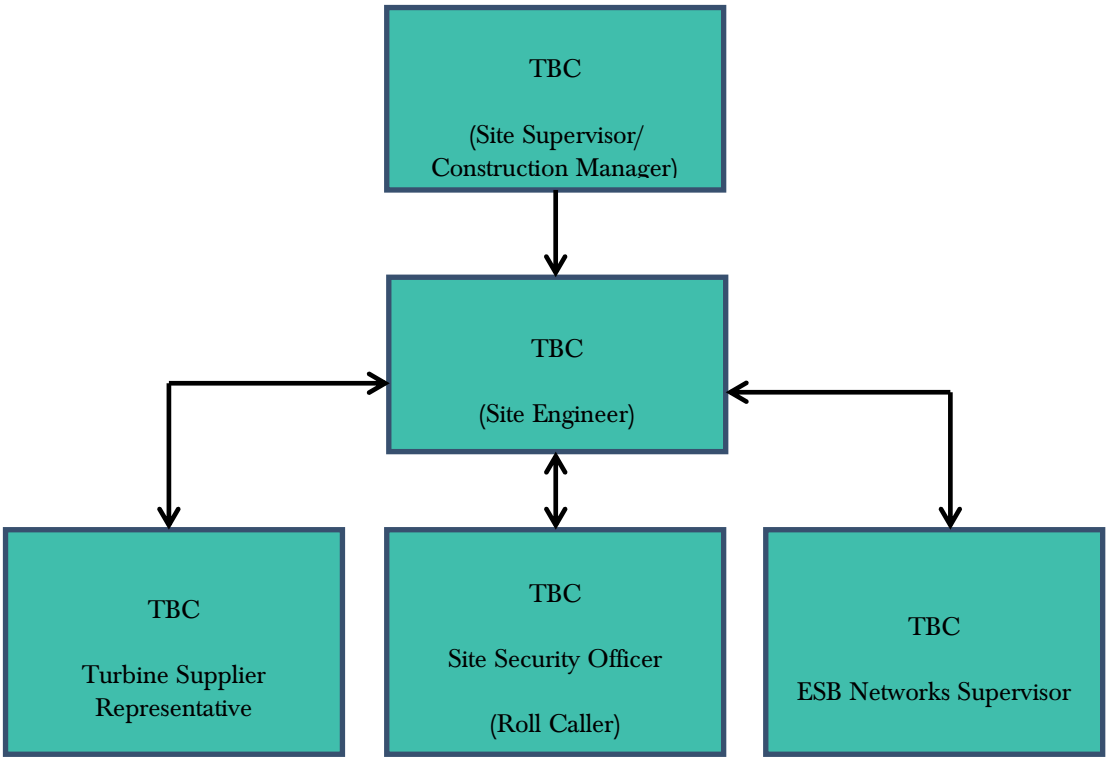

Figure 6-1 Emergency Response Procedure Chain of Command

6.1.2 Hazard Identification

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

Table 6-1 Hazards associated with potential emergency situations

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

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

- Establish the scale of the emergency situation and identify the number of personnel, if any, have been injured or are at risk of injury.
- Where necessary, sound the emergency siren/fog-horn that activates an emergency evacuation on the Proposed Project site. The Site Supervisor/Construction Manager must proceed to the assembly point if the emergency poses any significant threat to their welfare and if there are no injured personnel at the scene that require assistance. The Site Supervisor/Construction Manager will be required to use their own discretion at that point. In the case of fire, the emergency evacuation of the site should proceed, without exception. The site evacuation procedure is outlined in Section 6.1.3.
- Make safe the area if possible and ensure that there is no identifiable risk exists with regard to dealing with the situation e.g., if a machine has turned over, ensure that it is in a safe position so as not to endanger others before assisting the injured.
- Contact the required emergency services or delegate the task to someone. If delegating the task, ensure that the procedures for contacting the emergency services as set out in Section 6.3 is followed.
- Take any further steps that are deemed necessary to make safe or contain the emergency incident e.g., cordon off an area where an incident associated with electrical issues has occurred.
- Contact any regulatory body or service provider as required e.g., ESB Networks the numbers for which as provided in Section 6.4.
- Contact the next of kin of any injured personnel where appropriate.

6.1.3 Site Evacuation/Fire Drill

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

- Notification of the emergency situation. Provision of a siren or 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.

6.2 Environmental Emergency Response Procedure

6.2.1 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 Proposed Project site, but no apparent signs of distress to the peat (e.g., cracking, surface rippling) then the following shall be carried out.

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

6.2.2 Onset of Peat Slide

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

6.2.3 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 will be implemented in the event of such an incident:

- The source of the spill will be stopped, and the alarm will be raised to alert people working in the vicinity of any potential dangers.
- If applicable, any sources of ignition will be eliminated in the immediate vicinity of the incident.
- The spill will be contained using the spill control materials, track mats or other material as required. Do not spread or flush away the spill.
- If possible, any vulnerable areas will be covered or bunded off where appropriate such as drains, watercourses or sensitive habitats.
- If possible, clean up as much as possible using the spill control materials.
- Any used spill control material will be contained and disposed of appropriately using a fully licensed waste contractor with the appropriate permits so that further contamination is limited.
- The ECoW will be notified 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 Clare 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 will be investigated in accordance with the following steps.

- The ECoW must 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 (Special Protection Area or Special Area of Conservation), 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 Clare County Council and the 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.

6.2.4 Site Evacuation/Fire Drill

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

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

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

6.3 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 rural nature of the Proposed Project 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 should form part of the site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable.

6.4 Contact Details

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

Table 6-2 Emergency Contacts

Contact	Telephone no.
Emergency Services – Ambulance, Fire, Gardaí	999/112
Doctor – Shannon Health Centre	061 718 400
Hospital – University Hospital Limerick	061 301 111
ESB Emergency Services	1850 372 999
Gas Networks Ireland Emergency	1850 20 50 50
Gardaí – Ennis Garda Station	065 684 8100
Health and Safety Co-ordinator - Health & Safety Services	TBC
Health and Safety Authority	1890 289 389
Inland Fisheries Ireland (IFI)	0818 347 424
Project Supervisor Construction Stage (PSCS): TBC	TBC
Project Supervisor Design Stage (PSDS): TBC	TBC
EDF Renewables Ireland Ltd.	0871 344 002

6.4.1 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.

6.5 Induction Checklist

Table 6-3 provides a list of items highlighted in this Emergency Response Plan (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 6-3 Emergency Response Plan Items Applicable to the Site Induction Process

ERP Items to be included in Site Induction	Status
All personnel will be made aware of the evacuation procedure during site induction	
Due to the rural nature of the Proposed Project site, it may be necessary to liaise with and assist the emergency services on the	

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

7. MITIGATION 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 Clare County Council.

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 (Table 7-1), 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 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 Chapter 4	All proposed activities on the Proposed Project site 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 this EIAR. The CEMP includes details of drainage, peat and spoil management and waste management, and clearly outlines the mitigation measures and monitoring proposals that are required to be adhered to in order to comply with the environmental commitments outlined in the EIAR. In the event planning permission is granted for the Proposed Project, the CEMP will be updated prior to the commencement of the development, to address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned and will be submitted to the Planning Authority for approval.		
MM2	Environmental Management	EIAR Chapter 4	The ECoW will maintain responsibility for monitoring the construction works and audit the implementation of the CEMP. In addition, a Project Ecologist, Project Hydrologist, Project Archaeologist, Project Geotechnical Engineer will visit the site regularly and report to the ECoW.		
MM3	Environmental Management	CEMP Section 4	A site ECoW will oversee the site works and implementation of the CEMP and provide on-site advice on the mitigation measures necessary as necessary to ensure the project proceeds as intended. 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 parties where required prior to commencement of construction, and may be further adjusted as required during the course of the project.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM4	Surface Water Quality	EIAR Chapter 9	A total of 8 no. surface water grab samples were undertaken to determine the baseline water quality of the primary surface waters originating from the Proposed Project site. These samples were undertaken across 2 no. monitoring rounds each comprising of 4 no. samples		
MM5	Concrete Deliveries	EIAR Chapter 4 CEMP Section 3.4	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 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		
MM6	Waste Management	EIAR Chapter 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		
MM7	Site Drainage Plan	EIAR Chapter 4	Prior to any works commencing on the upgrade of existing roads, the requirement for additional roadside drainage will be considered by the Project Hydrologist in line with the proposals outlined in Section 4 of the CEMP. All drainage measures along the proposed road will be installed in advance of the works.		
MM8	Preparative Site Drainage Management	EIAR Chapter 4 CEMP Section 4	An inspection and maintenance plan for the drainage system onsite will be prepared in advance of commencement of any works on the Proposed Project.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM9	Drainage Inspections	EIAR Chapter 4	Regular inspections of all installed drainage features will be necessary, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water at parts of the systems where it is not intended. The inspection of the drainage system will be the responsibility of the ECoW or the Project Hydrologist		
MM10	Watercourse Inspection	EIAR Chapter 4 CEMP Section 2	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.		
MM11	Drainage Maintenance	EIAR Section 4 CEMP Section 4	An inspection and maintenance plan for the drainage system on site will be prepared in advance of commencement of any works. Regular inspections of all installed drainage systems will be necessary, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water at parts of the systems where it is not intended. The inspection of the drainage system will be the responsibility of the site ECoW or the Project Hydrologist.		
MM12	Traffic Management	EIAR Chapter 15	Prior to the Traffic Management Plan (TMP) being finalised, a full dry run of the transport operation along the potential routes will be completed using vehicles with attachments to simulate the dimensions of the wind turbine transportation vehicles. This dry run will inform the TMP for agreement with the relevant Authorities. All turbine deliveries will be provided for in a TMP which will be finalised in advance of oversized load deliveries, when the exact transport arrangements are known, delivery dates confirmed and escort proposals in place. Such a traffic management plan is typically submitted to the relevant Authorities 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM13	Earthworks	CEMP Section 3.2	Drainage and associated pollution control measures will be implemented onsite before the main construction works commence. 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.		
MM14	Felling	EIAR Chapter 4 Chapter 7	Before the commencement of any felling works, an Environmental Clerk of Works (ECoW) shall be appointed to oversee the keyhole and extraction works If winter roosting or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and no works shall be undertaken within a species-specific disturbance buffer in line with industry best practice (e.g. Goodship and Furness, 2022). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.		
MM15	Felling Drainage Management	EIAR Chapter 4 Chapter 9	Prior to the commencement of tree felling for subsequent road construction the following key temporary drainage measures will be installed: › All existing dry forestry drains that intercept the proposed works area will be temporarily blocked down-gradient of the works using forestry 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 forestry drains that have surface water flows and also along existing forestry roadside drains; and, › A double silt fence perimeter will be placed down-slope of works areas that are located inside the watercourse 50m buffer zone.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM16	Felling Licence	EIAR Chapter 4	The commercial forestry 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 policy requires that a copy of the planning permission for the Proposed Project be submitted with the felling licence application; therefore, the felling licence cannot be applied for until such time as planning permission is obtained for the Proposed Project.		
MM17	Traffic Management	EIAR Chapter 4 Chapter 15 CEMP Section 3.4	Prior to the TMP being finalised, a full dry run of the transport operation along the potential routes will be completed using vehicles with attachments to simulate the dimensions of the wind turbine transportation vehicles. The Proposed Grid Connection Route has been designed to avoid identified services and utilities. Prior to commencement of construction, the TLI Group will carry out site investigations to confirm design assumptions and undertake additional surveys to identify any new services and utilities and ensure they will not be impacted by the Proposed Project. The construction of the Proposed Grid Connection Route would also be subject to a Road Opening License (ROL). The timing of these works would therefore be controlled by the ROL process with the relevant Local Authority.		
MM18	Peat and Spoil Management Area Drainage	EIAR Chapter 4 CEMP Section 3.2	Prior to the use of any peat and spoil management area, an interceptor drain will first be excavated upslope in order to intercept existing overland flows and divert them around the deposition areas prior to discharge via a buffer zone on the downslope side Drainage swales are shallow drains that will be used to intercept and collect run off from construction areas of the site during the construction phase. 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-		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			metre buffer zone of a stream or 100m buffer zone 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 drainage design drawings included in Appendix 9-1. Where possible, the surface of the placed peat and spoil will be shaped to allow efficient runoff of surface water from the spoil placement areas. Any point source drainage from disposal areas will empty into a series of silt control measures designed in accordance with the surface water management plan.		
MM19	Proposed Grid Connection Route trench excavation, and communication s chambers/joint bay installation	EIAR Chapter 4	In association with Joint Bays, Communication Chambers are required at every joint bay location to facilitate communication links between the onsite 38kV substation and the existing Ardnacrusha 110kV substation. Earth Sheath Link Chambers are also required approximately every second joint bay along the Proposed Grid Connection Route. Communication Chambers will typically be pre-cast concrete structures with an access cover at finished surface level. The locations of the joint bays and chambers are shown in Appendix 4-1. The precise siting of all Joint Bays, Earth Sheath Link Chambers and Communication Chambers within the corridor assessed is subject to approval by ESBN and EirGrid.		
MM20	Cable Strapping at the Blackwater Bridge	EIAR Chapter 4	In order for the Proposed Grid Connection Route underground cable to traverse the Blackwater Bridge (Bridge 1) the only plausible method was deemed to be strapping the cable to the side of the bridge structure. The strapping of the cable to the side of the Blackwater Bridge was deemed the most environmentally prudent and most efficient way to traverse the River Blackwater due to the presence of environmental constraints. These constraints include the fact that the Blackwater Bridge has insufficient room to install the		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			cable to ESB specifications within the existing deck, making the bridge unsuitable to accommodate the ducts in the carriageway as a consequence. Based on the above constraints, the TLI Group advised it would not be possible to host the cable within the bridge deck, therefore the TLI Group identified a Bridge Strapping Solution to be the most appropriate crossing methodology in this particular instance. The Blackwater Bridge is listed as a protected structure under the Record of Protected Structures, registered as RPS no. 650. Therefore, a detailed Architectural Assessment will be carried out by the Project Archaeologist/Conservation Architect prior to any construction works, and agreed with the Local Authorities		
Construction Phase					
MM21	Refuelling	EIAR Chapter 4 CEMP Section 3.2	Wherever possible, vehicles will be refuelled off-site. This will be the case for regular, road-going vehicles. However, for construction machinery that will be based on-site continuously, a limited amount of fuel will have to be stored on site in appropriately bunded containersThe temporary construction compounds will consist of a bunded refuelling and containment area for the storage of lubricants, oils, and site generators etc, On-site refuelling of machinery will be carried out at dedicated refuelling locations using a mobile double skinned fuel bowser. The fuel bowser, a double-axle custom-built refuelling trailer will be re-filled off site and will be towed around the Proposed Project site by a 4x4 jeep to where machinery is located. It is not practical for all vehicles to travel back to a single refuelling point, given the size of the cranes, excavators, etc. that will be used during the construction of the Proposed Project. The 4x4 jeep will also carry fuel absorbent material and pads in the event of any accidental spillages. The fuel bowser will be parked on a level area in the construction compound when not in use. Refuelling operations will be carried out only by designated trained and competent operatives. Mobile anti-pollution measures such as drip trays and fuel absorbent mats will be used during all refuelling operations.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			The ECoW will review operator's records for plant inspections, evidence of contamination and leaks.		
MM22	Plant and Equipment Inspections	CEMP Section 3.2	A programme for the regular inspection of plant and equipment for leaks and fitness for purpose will be developed at the outset of the construction phase.		
MM23	Concrete Deliveries and Management	EIAR Chapter 4 CEMP Section 3.2	The risks of pollution arising from concrete deliveries will be further reduced by the following: › No batching of wet-cement products will occur on the site/along the Proposed Grid Connection Route works or near other ancillary construction activities. › 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 Where possible pre-cast elements for culverts and concrete works will be used. › When concrete is delivered to site, only the chute of the delivery truck will be cleaned, using the smallest volume of water necessary, before leaving the site. › Concrete trucks will be washed out fully at the batching plant, where facilities are already in place. › The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area. 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		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			chute will have solidified and can be broken up and disposed of along with other construction waste. › 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 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. › 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.		
MM24	Road Cleanliness	EIAR Chapter 4.	A road sweeper will be available if any section of the public roads requires cleaning due to construction traffic associated with the Proposed Project.		
MM25	Watercourse Buffers	EIAR Chapter 4. CEMP Section 2 & 3	Buffer zones around the existing natural drainage features have been used to inform the layout of the Proposed Wind Farm.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM26	Water Discharge	EIAR Chapter 4	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.		
MM27	Interceptor Drains	EIAR Chapter 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.		
MM28	Drainage Swales	EIAR Chapter 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.		
MM29	Check Dams	EIAR Chapter 4 CEMP Section 3	Check dams will not be used in any natural watercourses, only artificial drainage channels and interceptor drains. The check dams will be installed at regular intervals along the interceptor drains to ensure the bottom elevation of the upper check dam is at the same level as the top elevation of the next down-gradient check dam in the drain. The centre of the check dam will be approximately 150mm lower than the edges to allow excess water to overtop the dam in flood conditions rather than cause upstream flooding or scouring around the dams. Check dams will restrict flow velocity, minimise channel erosion and promote sedimentation behind the dam. The check dams will be installed as the interceptor		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			drains are being excavated. Check dams may also be installed in some of the existing artificial drainage channels on the site, downstream of where drainage swales connect in.		
MM30	Level Spreaders	EIAR Chapter 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.		
MM31	Vegetation Filters	EIAR Chapter 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.		
MM32	Stilling Ponds (Settlement Ponds)	EIAR Chapter 4 CEMP Section 3	Stilling ponds will be used to attenuate runoff from works areas of the site of the Proposed Project during the construction phase. Stilling ponds will be excavated/constructed at each required location as two separate ponds in sequence, a primary pond and a secondary pond. The points at which water enters and exits the stilling ponds will be stabilised with rock aprons, which will trap sediment, dissipate the energy of the water flowing through the stilling pond system, and prevent erosion. The primary stilling pond will reduce the velocity of flows to less than 0.5 metres per second to allow settlement of silt to occur. Water will then pass from the primary pond to the secondary pond via another rock apron. The secondary stilling pond will reduce the velocity of flows to less than 0.3 metres per second. Water will flow out of the secondary stilling pond through a stone dam, partially wrapped in geo-textile		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			membrane, which will control flow velocities and trap any sediment that has not settled out Stilling ponds will be located towards the end of swales, close to where the water will be reconverted to diffuse sheet flow. Stilling ponds will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and anything else that might interfere with flows.		
MM33	Dewatering Silt Bag	EIAR Chapter 4 CEMP Section 3	Dewatering silt bags allow the flow of water through them while trapping any silt or sediment suspended in the water. The silt bags provide a passive non-mechanical method of removing any remaining silt contained in the potentially silt-laden water collected from works areas within the site. Dewatering silt bags 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 silt into the stream.		
MM34	Siltbuster	EIAR Chapter 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. The mobile units are specifically designed for use on construction sites.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM35	New Culverts/Culvert Upgrades	EIAR Chapter 4	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.		
MM36	New Watercourse Crossings	EIAR Chapter 4	It is proposed to construct a clear-span watercourse crossing along the Proposed Wind Farm site access roads at 2 no. locations using a clear-span bridge. The Clear Span Watercourse Crossings will be installed following standards construction methodology. 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action 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. Once the foundation base has been completed, the pre-cast concrete box culvert 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 box culvert is installed in sections, 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 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. The clear-span watercourse crossing methodologies presented will ensure that no instream works are necessary.		
MM37	Silt Fences	EIAR Chapter 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 100m buffer zone 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 drainage design drawings included in Appendix 9-1.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Silt fences will be installed as single, double or a series of triple silt fences, depending on the space available and the anticipated sediment loading. The silt fence designs follow the technical guidance document '*Control of Water Pollution from Linear Construction Projects*' published by Construction Industry Research and Information Association (CIRIA, No. C648, 1996). Up to three silt fences may be deployed in series. All silt fencing will be formed using Terrastop Premium or equivalent silt fence product. 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.		
MM38	Sedimats	EIAR Chapter 4	Sediment entrapment mats, consisting of coir or jute matting, will be placed at the outlet of the silt bag to provide further treatment of the water outfall from the silt bag. Sedimats will be secured to the ground surface using stakes/pegs. The sedimat will extend to the full width of the outfall to ensure all water passes through this additional treatment measure.		
MM39	Hydrocarbon Interceptors	EIAR Chapter 4	A hydrocarbon (or petrol) interceptor is a trap used to filter out hydrocarbons from surface water runoff. A suitably sized hydrocarbon interceptor will be installed wherever it is intended to store hydrocarbons and oils (i.e., construction compounds and substation compound) or where it is proposed to park vehicles during the construction and operational phases of the Proposed Project (i.e., construction compounds and substation compound).		
	Proposed Grid Connection Route trench excavation, and communications chambers/joint bay installation,	EIAR Chapter 4	Any underground services encountered along the Proposed Grid Connection Route will be surveyed for level and the ducting will pass over the service provided adequate cover is available. A minimum clearance of 300 mm will be required between the bottom of the ducts and the service in question. If the clearance cannot be achieved the ducting will pass under the service and again 300 mm clearance between the top of the communications duct and bottom of the service will be achieved. In deeper excavations		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			an additional layer of marker tape will be installed between the communications duct and top-level yellow marker tape. If the required separation distances cannot be achieved then a number of alternative options are available such as using steel plates laid across the width of the trench and using 35N concrete surrounding the proposed ducting, with marker tape on the side of the trench. Back fill around any utility services will be with dead sand/pea shingle where appropriate. During construction the joint bay locations will be completely fenced off once they have been constructed, they will be backfilled until cables are being installed. 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.		
MM40	Peat and Spoil Management	EIAR Chapter 4 CEMP Section 4	**Temporary Management** To manage the material arisings effectively, the following points outline specific guidelines and practices for their temporary management and handling on-site: › The amount of peat and spoil necessary for landscaping, reinstatement and backfilling shall be stored locally at turbine hardstands, in distinct stockpiles. Any surplus material will be promptly transported to the proposed borrow pit shown on Figure 5 of the PSMP (Appendix 4-2). › Before stockpiling any glacial till spoil, the proposed deposition area would be stripped of topsoil/ peat which would be removed and placed in a suitable area to prevent the mixing of materials and facilitate reuse during restoration work.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Peat will be stored on top of existing and undisturbed peat areas located only on the uphill slopes to ensure stability. The suitability of the underlying peat and the topography will be reviewed by a geotechnical engineer at the detailed design stage and during the construction phase. This will determine the maximum height of peat that maybe stored, which shall not exceed 1.5m. › Glacial till will not be placed on top of peat or topsoil; instead, it will be deposited only on other glacial till material. › In order to prevent erosion and surface water contamination, silt fencing can be utilized to secure these stockpiles, where necessary. › The excavated material which is unsuitable for use in construction will not be spread over any existing heath, bog, or grassed areas. › Following the reinstatement of the turbine bases and hardstands, all temporarily stockpiled material not required will be removed and transported to the proposed borrow pit. › The proposed locations for the temporary stockpiling of peat and spoil will be confirmed by the geotechnical engineer at detailed design stage		
MM41	Peat and Spoil Management Areas	EIAR Chapter 4. CEMP Section 2	The construction of the Proposed Project will require the excavation of peat and spoil. The quantities of peat and spoil, requiring management on the site of the Proposed Project has been calculated and are presented in Appendix 4-2 Peat and Spoil Management Plan. It is proposed to manage any excess overburden generated through construction activities within the Proposed Project site, through deposition in the borrow pit, landscaping proposals, side-casting of materials along proposed infrastructure, and through the reuse of suitable materials as fill volume. The side-casting of materials will take the form of linear berms along access roads where appropriate, and landscaping around turbine bases. A detailed breakdown of the capacity of the peat and spoil management areas within the Proposed Project site is provided in Section 4.4.9.2 of Chapter 4 of this EIAR.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			As rock is removed from the borrow pit, it is proposed to backfill the borrow pit area with excavated peat and spoil generated from the cut exercise. The excavated rock from the borrow pit will be used in the construction of the infrastructure elements (turbine foundations, hardstands, access roads, etc.) at the wind farm. The contractor excavating the rock will be required to develop the borrow pit in a way which will allow the excavated peat and spoil to be placed safely. It is proposed to construct cells within the borrow pit for the placement of the excavated peat and spoil. This is to allow for the safe placement and grading of the peat and spoil using dumper trucks and excavators.		
MM42	Cable Strapping at Blackwater Bridge	EIAR Chapter 4 CEMP Section 2	Construction of the new fixture will require transportation, handling and lifting of prefabricated elements. The use of prefabricated units facilitates the speed of construction and minimises the period of time required for works within a platform on the bridge structure. › Proposed open trenching with ducts to be pre-installed prior to works commencing on bridge exterior. › Ducts to be exposed at the outer periphery of the walled parapets, dug in beneath to allow for coupling. › Hammer drill existing parapet exterior and fix Hot dipped “L” brackets at required intervals, › Fabricate metal clad stainless steel beam / girder (off site); › Metal clad stainless steel beam with ESB HV stenciled, to be laid across the aforementioned brackets once › fixed. Galvanised straps will be used for reinforcement with anchored Hilti bolts; › Install ESBN ducting as required within metal clad beam and conjoin onto preinstalled ducting beneath › bridge parapets; › Installation of anti-climb guard either side of bridge to restrict unauthorised access; › Maintain wall drainage and below ground waterproofing; › Permanent reinstatement of local road with surface dressing in accordance with local road engineer and County Council requirements;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Remove any debris (if required) and demobilise off site.		
			Operational Phase		
MM43	Wastewater Management	EIAR Chapter 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. The proposed wastewater storage tank will be fitted with an automated alarm system that will provide sufficient notice that the tank requires emptying. Full details of the proposed tank alarm system can be submitted to the Planning Authority in advance of any works commencing on-site. The wastewater storage tank alarm will be part of a continuous stream of data from the Proposed Wind Farm turbines, wind measurement devices and electricity substation that will be monitored remotely 24 hours a day, 7 days per week. Only waste collectors holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007(as amended), will be employed to transport wastewater away from the Proposed Project site.		
MM44	Surface Water Flooding	EIAR Chapter 4	The check dams will be installed at regular intervals along the interceptor drains. The centre of the check dam will be approximately 150mm lower than the edges to allow excess water to overtop the dam in flood conditions rather than cause upstream flooding or scouring around the dams.		
			Decommissioning Phase		
MM45	Decommissioning	EIAR Chapter 4	A Decommissioning Plan has been prepared (Appendix 4-6) the 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 agree with the competent authority at that time.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM46	Decommissioning	EIAR Chapter 4 DP Section 2	Upon decommissioning of the Proposed Wind Farm, the wind turbines will be disassembled in reverse order to how they were erected. The turbines will be disassembled with a similar model of crane that was used for their erection. The turbine will likely be removed from site using the same transport methodology adopted for delivery to site initially. The turbine materials will be transferred to a suitable recycling or recovery facility. All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and would be covered with earth and 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 unnecessary environment emissions such as noise, dust and/or vibration. The underground electrical cabling connecting the turbines to the on-site substation will be removed from the cable ducts and any direct buried cables will be cut and left in situ. The cabling will be pulled from the cable ducts using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at the original cable jointing pits which will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance. The cable materials will be transferred to a suitable recycling or recovery facility.		
MM47	Decommissioning	EIAR Chapter 4 DP Section 5	The following mitigation measures are proposed to avoid release of hydrocarbons at the site: › Road-going vehicles will be refuelled off site wherever possible; › On-site refuelling of machinery will be carried out at dedicated refuelling locations using a mobile double skinned fuel bowser.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Only designated trained and competent operatives will be authorised to refuel plant on site. Mobile measures such as drip trays, spill kits and fuel absorbent mats will be available if necessary, during all refuelling operations. › An emergency plan for the decommissioning phase to deal with accidental spillages will be developed (refer to DP Section 5). Spill kits will be available to deal with and accidental spillage in and outside the refuelling area.		
MM48	Decommissioning	EIAR Chapter 4	Upon completion of the Proposed Project the temporary construction compounds will be decommissioned and allowed to vegetate naturally.		
Chapter 5: Human Beings					
Pre-Commencement Phase					
MM49	Human Health	EIAR Chapter 5 CEMP Section 4	Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be identified in line with the engagement plan. Local access to properties will also be maintained throughout any construction works and local residents will also be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum.		
Construction Phase					
MM50	Human Health	EIAR Chapter 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);		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› 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). A Health and Safety Plan covering all aspects of the construction process will address the Health and Safety requirements in detail. All necessary health and safety signage will be erected to warn of deep excavations etc. Appropriate warning signs will be posted, directing all visitors to the site manager. Appropriate warning measures including 'goalposts' will be used as appropriate to prevent contact with any overhead lines that traverse the construction site. Fencing will be erected in areas of the site where uncontrolled access is not permitted.		
MM51	Human Health				
MM52	Human Health	EIAR Chapter 5	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 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.		
Operational Phase					
MM53	Human Health	EIAR Chapter 5	The build-up of ice on turbines is unlikely to present problems. The wind turbines will be fitted with anti-vibration sensors, which will detect any imbalance caused by icing of the blades. The sensors will cause the turbine to wait until the blades have been de-iced prior to beginning operation.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Lightning conduction cables, encased in protection conduits, will follow the electrical cable run, from the nacelle to the base of the turbine. The conduction cables will be earthed adjacent to the turbine base. The earthing system will be installed during the construction of the turbine foundations. Access to the turbines is through a door at the base of the structure, which will be locked at all times outside maintenance visits. Furthermore, signs will also be erected at suitable locations across the Proposed Project 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. › The onsite 38kV substation, which will be operated by ESB will be locked and fenced off from public access. The substation will be operational remotely and manually 24 hours per day, 7 days a week. Supervisory operational and monitoring activities will be carried out remotely using a SCADA system, with the aid of computers connected via a telephone modem link › For operational and inspection purposes, substation access is required. ○ Servicing of the substation equipment will be carried out in accordance with the manufacturer's specifications, which would be expected to entail the following:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			• Six-month service – three-week visit • Annual service – six-week visit • Weekly visits as required 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.		
MM54	Shadow Flicker	EIAR Chapter 5	Where daily shadow flicker exceedances have been predicted at buildings by the modelling software, a site visit will be undertaken firstly to determine the level of occurrence, existing screening, and window orientation. Upon commissioning of the Proposed Project, 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. 1. *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.).* 1. *Recording the house number, time and duration of site visit and the observation point GPS coordinates.* 2. *Recording the nature of the sensitive receptor, its orientation, windows, landscaping in the vicinity, any elements of the built environment in the vicinity, vegetation.* 3. *In the event of shadow flicker being noted as occurring the details of the duration (times) of the occurrence will be recorded.* **Screening Measures** In the event of an occurrence of shadow flicker exceeding guideline threshold values of 30 minutes per day at residential receptor locations, mitigation options will be discussed with the affected homeowner, including:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› 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. **Wind Turbine Control Measures** If it is not possible to mitigate any identified shadow flicker limit exceedance locally using the measures detailed above, wind turbine control measures will be implemented. 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 SCADA control system to change a particular turbine's operating mode during certain conditions or times, or even turn the turbine off if necessary.		
Chapter 6: Biodiversity					
Pre-Commencement Phase					
MM55	Invasive Species Management	EIAR Chapter 6	A small stand of *Rhododendron ponticum* was identified within the Proposed Wind Farm site outside the works area, **Japanese knotweed (*Reynoutria japonica*) was**		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		CEMP Section 3	**recorded along the channel of the Cloonconry Beg River, Ballymoloney** within the footprint of the Proposed Wind Farm. The infestation occurs throughout the channel and is located downstream of a proposed new water crossing between T6 and T7, potentially in the buffer of the works area. Additionally stands were recorded along the Kilbane stream adjacent to proposed road upgrades along the TDR in the village of Kilbane within the buffer of the works area. Giant hogweed was recorded along the Proposed Grid Connection Route within the vicinity of the Blackwater Bridge where bridge strapping is proposed adjacent to the works area. Due to the construction works associated with the upgrade of an internal road within the EIAR Site boundary, a water crossing, and bridge strapping associated with the Proposed Grid Connection Route in the absence of mitigation there is potential for spread of these species to other habitats within the EIAR Site Boundary and outside of the Site. This could occur via dispersal of seeds locally, or inappropriate disposal of the plant material whereby seeds or propagatable material are spread to another area. Vector material may also be spread to other sites as a result of entrainment within machinery or staff clothing/footwear. The potential for invasive species to be introduced into the EIAR Site Boundary also requires assessment. Rhododendron, Japanese knotweed and Giant hogweed regrow vigorously when cut. As a result, some method of stump killing, or removal is always necessary. Any untreated cut stump will regrow and in most cases flower within 3-4 years. The following measures will be in place: › A pre-commencement survey for invasive species within the footprint of the Proposed Wind Farm site will be carried out by a suitably qualified ecologist to ensure there is no new growth of Third Schedule invasive species in these areas. › If new infestations of invasive species are recorded within the construction areas, an Invasive Species Management Plan will be prepared in advance of construction which will incorporate the measures necessary to prevent spread additional to the measures laid out below.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› A Toolbox Talk will be given by the Environmental Clerk of Works or Ecological Clerk of Works in relation to the management of invasive species within construction areas. › The infested area will be demarcated and works in the vicinity of the infestation will only be carried out under supervision by a suitably qualified Ecological Clerk of Works or Environmental Clerk of Works. › In advance of construction of the road upgrade works in the vicinity of the infested area, it will be necessary to completely remove the infestation outside of the flowering period (May to July) and dig the roots completely out. The effectiveness of this technique is increased by removing all viable roots. To avoid regrowth, stumps will be turned upside down and soil will be brushed off roots. The roots are relatively shallow, seldom being deeper than 45cm[3] › Once the supervising ecologist confirms that the material is dried out and non-viable, it will be chipped and composted on-site. › It is envisaged that no contaminated soil is to be removed from the Site but is to be reinstated within the site, thus negating the need for transport off-site, further risk of spread, and licencing requirements. Should potentially contaminated spoil be required to be removed from the site, it will be transported to a suitably licenced waste facility and will require a licence from the NPWS prior to its transportation. In order to avoid the potential for spread of invasive species into the site: › Any construction material imported into the Site will come from a source confirmed to be free of invasive species. › All plant and machinery will be thoroughly cleaned before entering and exiting the Site		

[3] *TII (2020) - The Management of Invasive Alien Plant Species on National Roads – Technical Guidance GE-ENV-01105*

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM56	Fauna	EIAR Chapter 6	**Badger:** Whilst no badger setts were recorded within the Proposed Wind Farm site, baseline surveys identified that the site is being utilised by a local badger population. Prior to the commencement of construction works, the following measures will be undertaken for the avoidance of disturbance 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). › A pre-commencement badger survey will be carried out to identify the presence of any setts that may have been established in the intervening period. › Any setts identified within 150m of the Proposed Wind Farm infrastructure will subsequently be monitored for a minimum period of 2 weeks using remote cameras in order to ascertain use by badgers and levels of activity. If an active badger sett is identified and works can be undertaken safely (as to avoid sett collapse) then an exclusion zone will be set up around the sett as follows: Exclusion zone fencing, and appropriate signage will be put in place between working areas and badger sett exclusion zones to ensure that there will be no encroachment of the badger sett exclusion zones by construction activities. › If a newly established and active sett was identified within an area where works could not avoid direct impacts on the sett then the sett would likely need to be excluded prior to works commencing. This would need to be undertaken in line with current guidelines by an appropriately qualified ecologist in advance of construction works commencing and in consultation with NPWS. › Mitigation measures as per the above mentioned TII document will be implemented to prevent disturbance of any active sett. **Otter:** No signs of otter were recorded within any of the watercourses within the Proposed Wind Farm. However, signs of otter were recorded in the wider study area (see Aquatic Baseline Report) and at 1 no. location along the Proposed Grid Connection Route (Blackwater River(Clare)).		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Specific mitigation is provided in relation to water quality in Chapter 9: 'Water' of this EIAR and is assessed in Section 6.4.2.1.1 above. 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. In the unlikely event that an otter holt is identified within or immediately adjacent to the Proposed Project development footprint, consultation will be undertaken with the NPWS 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 should also 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.		
MM57	Fauna	EIAR Chapter 6	No specific pre-commencement mitigation is required for habitat loss.		
MM58	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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM59	Bats	EIAR Chapter 6 Appendix 6-2 Bat Report	A potential for temporary disturbance was identified as a result of the proposed cable strapping at the Blackwater Bridge. Any bridge strapping works on the Blackwater bridge are expected to incur no loss of roosting habitat. However, the works have the potential to affect roosting bats in the form of temporary disturbance during the construction phase of the Proposed Project. All bridges were considered to have either a low or moderate potential for roosting bats, a potential to result in temporary negative effects on the bat populations would be **considered significant at the local geographic scale only** in the absence of mitigation in the event that works are carried out during sensitive periods of the bat lifecycle. During the hibernation period, disturbance could result in a waste of energy and potential starvation, and during the maternity period it could cause abortions or pup abandonment. A pre-commencement bat activity survey will be undertaken prior to works to assess bat usage of the Blackwater Bridge. The function of this survey will be to reassess the baseline environment since the time of undertaking the assessment in 2022, and to identify bat presence at the time of works. If a bat roost is identified within the bridge, a bat derogation licence to disturb bats will be obtained from the NPWS, prior to works and the works will be supervised by a qualified ecologist		
Construction Phase					
MM60	Bats	EIAR Chapter 6 Appendix 6-2	› 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 (SI 359/1996). › Exterior lighting, during construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the Proposed Wind Farm, and consequently on bat		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ 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.		
MM61	Aquatic Habitats and Fauna	EIAR Chapter 6	**Groundwater, Surface Watercourses, Upland Eroding Rivers, Drainage ditches, and Sensitive Aquatic Faunal Species** New watercourse crossings will comprise pre-cast concrete bottomless box culverts or clear span culverts and will be constructed in accordance with guidance from Inland Fisheries Ireland (IFI). The IFI (2016) document: *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). Further to this: › 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 locations; › Where the proposed underground cabling route follows an existing road or road proposed for upgrade, the cable will pass over or below the culvert within the access road; › 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", that is, May to September inclusive. This time period coincides with the period of lowest		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			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; › During the near stream/river 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 on-site. › A self-imposed buffer zone of 50m has been put in place for on-site streams and rivers. In addition, a 10m buffer will be applied to the main manmade agricultural and forestry drains within the Proposed Wind Farm site. All of the key infrastructure areas are located significantly away from the delineated 50m watercourse buffer zones with the exception of the upgrading of the existing watercourse crossing, new watercourse crossings and upgrades to existing site access tracks. Mitigation measures in relation to the 5 no. proposed watercourse crossings within the Proposed Wind Farm site is detailed in Section 9.5.2.9 of Chapter 9. A drainage maintenance plan for the Proposed Project is provided in Section 4.7.7 (Chapter 4 of this EIAR). This plan provides details of how water quality will be protected during the construction of the Proposed Wind Farm site, as outlined in Section 9.5.2.2 the maintenance plan for the on-site construction drainage system will be prepared in advance of commencement of any works with regular inspections of all installed drainage systems undertaken throughout the Proposed Project (see further detail on monitoring in Section 9.5.2.2 Chapter 9.). **Wet Heath and Upland Blanket Bog** The Proposed Project has been specifically designed to avoid Article 17 mapped and unmapped areas of peatland habitat where possible and to minimise impacts thereon. This was achieved through an early-stage ecological constraints study informed by field surveys and habitat mapping. The proposed layout was thereby altered through the iterative design process to avoid sensitive habitats.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			The loss of minor, fragmented areas of wet heath for the Proposed Wind Farm development will be offset through the Biodiversity Management and Enhancement Plan (BMEP, Appendix 6-4) which includes for the restoration of peatland habitats which are currently forested within the EIAR Site Boundary. This will involve felling an area measuring approximately 12.7 hectares and a bespoke management and monitoring plan for restoration of peatland within these areas. In addition, the selected areas will provide linkages and join up previously fragmented areas of peatlands in the vicinity of the EIAR Site Boundary which will support the objective of Article 10 of the Habitats Directive to maintain landscape connectivity for flora and fauna. The Biodiversity Management and Enhancement Plan is provided as Appendix 6-4 to this EIAR and the proposed enhancement areas are shown in Figure 3-1 to 3-4 of this Plan. On completion of successful peatland restoration to peatland habitats, this will result in an additional area of 6.18ha of restored peatland habitat as a result of the Proposed Project. The mitigation/restoration measures will be monitored over the lifetime of the Proposed Project as part of the BMEP to determine their effectiveness and to allow for alteration in approaches where necessary. A Peat & Spoil Management Plan has been prepared and is provided in Appendix 4-2 of this EIAR. This Plan outlines construction methodologies with regard to infrastructure located on peat spoils which will minimise impacts on peat hydrology and prevent issues with peat stability during construction.		
MM62	Hedgerows, Treelines and Shrubs	EIAR Chapter 6	The footprint of the Proposed Wind Farm, including new internal roads and road widening will result in the loss of approx. 247meters of treeline (associated with new road access), 2104m of hedgerow (and associated stone wall) to enable widening of the existing access track into the site and 0.05ha of mixed broadleaved woodland to allow for a new water crossing. Only the north-western and south-eastern sections of hedgerow/stone wall will be removed. The Proposed Project will also result in the		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			temporary loss of approximately 112m of hedgerow at the proposed turbine blade transition area in a field north of the Regional road R466 as part of the accommodation works area. The construction of the Proposed Project has the potential to result in short-term negative effects on the local bat populations in the form of habitat loss. However, given the extensive area of habitat that will remain undisturbed throughout the site and the avoidance of the most significant areas of faunal habitat (i.e. natural hedgerows, treelines and scrub) no significant effects on bat species have been identified. The following potential long-term positive effects are noted. The felling of plantation forestry (WD4) within the site, to facilitate site access roads and turbine infrastructure, will result in the creation of more woodland edge habitat and as such can benefit feeding and commuting bat species.		
MM63	Invasive Species	EIAR Chapter 6 CEMP Section 3	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, shall be followed by all on-site personnel. Only those who have been inducted into biosecurity measures on-site may enter the contaminated zones within the works areas. Should any risk of contaminated material escaping be observed by the Site Supervisor, the management plan for the site must be amended by an appropriately qualified person to mitigate against the risk. The following measures are proposed 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 will 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 shall 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› 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. › An ECoW/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.		
MM64	Flora and Fauna	EIAR Chapter 6	The Proposed Wind Farm has the potential to result in enhancement of the surrounding areas through habitat rehabilitation management (as described in the Biodiversity and Enhancement Management Plan (Appendix 6-4) that will be implemented during the construction phase of the Proposed Wind Farm and maintained during the operational phase. Details of the management that will be undertaken are provided in the Biodiversity and Enhancement Management Plan in Appendix 6-4 of the EIAR. These include:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Invasive species eradication plan › Treelines and hedgerow planting ○ Approx. 890m of new native broadleaved treelines, approx. 1,240m of new native hedgerow and enhancement of approx. 550m of treelines and 530m of hedgerows via supplementary planting › Native broadleaved woodland planting ○ Broadleaved tree planting will be undertaken along the Kilbane Stream to produce a linear woodland of approx. 1.4 ha to enhance the watercourse. › Peatland restoration and enhancement		
MM65	Fauna	EIAR Chapter 6	**Badger** Given the nature of the Proposed Project, there will be some minimal loss of suitable badger foraging habitat i.e., agricultural grassland (GA1), conifer plantation (WD4) associated with the footprint of the Proposed Wind Farm infrastructure. However, this habitat loss will not be significant in the context of the widespread alternative foraging habitat available within the site and the wider area surrounding the Site. There will be no significant loss/fragmentation of badger habitat as a result of the Proposed Project. **Otter** Detailed mitigation measures in relation to the protection of surface water during construction is detailed in Chapter 9 'Water' of this EIAR. In summary, the key mitigation measure during the construction phase is the avoidance of sensitive hydrological features where possible, by application of suitable buffer zones. A self-imposed buffer zone of 50m has been put in place for on-site streams and rivers. In addition, a 10m buffer was applied to the main manmade agricultural and forestry drains within the Proposed Wind Farm site. All of the key infrastructure areas are located significantly away from the delineated 50m watercourse buffer zones with the exception of the upgrading of the existing watercourse crossing, new watercourse crossing and		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			upgrades to existing site access tracks. Detailed control measures in relation to the protection of surface waters during construction are detailed in Section 9.5.2.2 of Chapter 9.		
Operational Phase					
MM66	Bats	EIAR Chapter 6 Appendix 6-2	In order to reduce the value of the habitat for bat species in the areas surrounding the turbines, a buffer of at least 50m between the tip of the blade and any trees or other tall vegetation that could provide high quality foraging habitat for bat species will be implemented. A full description of the mitigation measures proposed during operational phase are described in Section 6.1 of the Bat Report (Appendix 6-2). Details of this mitigation and how it is calculated is provided in Appendix 6-2. **Noise Restrictions** 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). **Lighting Restrictions** 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).		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Buffering In accordance with NatureScot Guidance, a minimum 50m buffer to all habitat features used by bats (e.g., hedgerows, tree lines etc.) will be applied to the siting of all wind turbines (See example provided in Plate 6-1 below). An exception to this buffer has been proposed for turbine T1: the applied buffer would include areas of high suitability such as mature treelines and riparian habitats where most of the activity recorded in the area during manual surveys seemed to concentrate. In this case, it is considered detrimental to bats to remove these habitats, as the turbine is located on an hill, with the turbine base effectively being located above the tree crowns and not anticipated to affect the local bat community. NatureScot recommends that a distance of 50m between turbine blade tip and nearest woodland (or other key habitat features) is adequate mitigation. This 50m buffer will be implemented from the outset and monitored as per the post construction monitoring. The success of the buffer mitigation will be assessed as part of post construction monitoring and updated where necessary, as described in section 6.2. This mitigation measure is included within the forestry felling calculation outlined in Chapter 4, Section 4.3.10 of the EIAR and shown in Figure 4-20, and assumes the largest rotor diameter (155m) and the minimum hub height (102.5m), therefore providing the maximum tip height of 180m, and also detailing the maximum forestry buffer that would be required (97.2m), as this can only be based on the longest blade being placed on the lowest hub height (any other combination could only be based on a shorter rotor diameter or higher hub height which would therefore result in a reduction in the buffer requirement). The precautionary scenario has therefore been considered in the bat impact assessment. These vegetation-free areas will be maintained during the operational life of the Proposed Wind Farm. **Blade Feathering**		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			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. **Proposed Replanting** There will be a permeant loss of approx. 2104.2m of native hedgerow (and associated stone walls), 247.2 of native treeline and 0.05ha of linear broadleaved woodland to accommodate the footprint of the Proposed Wind Farm, including turbines (and associated bat buffers), wind farm roads and other key infrastructure. Replanting will be undertaken across the site in accordance to the Biodiversity and Enhancement and Management Plan, to ensure the loss of linear features is compensated for and the site enhanced for use by bats, by creating new linear features and bolstering existing ones.		
Decommissioning Phase					
MM67	Decommissioning	EIAR Chapter 6	The same mitigation to prevent significant impacts on water quality and associated aquatic fauna and other terrestrial fauna during construction will be applicable to the decommissioning phase.		
Chapter 7 Birds					
Pre-Commencement Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM68	Birds	EIAR Chapter 7	Pre-construction surveys will be undertaken prior to the initiation of works at the Proposed Wind Farm. The survey will include a thorough walkover survey to a 500m radius of the Proposed Project footprint and all works areas, where access allows. If winter roosting 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		
Construction Phase					
MM69	Birds	EIAR Chapter 7	› Works will commence outside the bird nesting season (1st of March to 31st of August inclusive). Any requirement for construction works to run into the subsequent breeding season following commencement will be informed by pre-construction bird surveys. › The removal of woody vegetation will be undertaken in full compliance with Section 40 of the Wildlife Act 1976 – 2022. Where sections of woody vegetation are removed for the purposes of the junction and road upgrades, these will be replaced with suitable hedge/tree species which are common in the local context. › During the construction phase, noise limits, noise control measures, hours of operation (i.e. dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds. All plant and equipment for use will comply with the European Communities (Noise Emission By Equipment For Use Outdoors) Regulations, 2001, as amended (SI 632/2001). Plant machinery will also be turned off when not in use. › Silt fences will be installed as an additional water protection measure around existing watercourses. › An Environmental Clerk of Works and Project Ecologist will be appointed. Duties will include: ○ Organise the undertaking of a pre-construction walkover bird survey to ensure that significant effects on birds will be avoided. ○ Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Wind Farm.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Oversee management of ornithological issues during the construction period and advise on ornithological issues as they arise. ○ Provide guidance to contractors to ensure legal compliance with respect to protected species onsite. ○ Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress as necessary If winter roosting or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and no works shall be undertaken within a species-specific disturbance buffer in line with industry best practice (e.g. Goodship and Furness, 2022). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.		
Operational Phase					
MM70	Birds	EIAR Chapter 7	No significant operational phase impacts requiring mitigation were identified		
Decommissioning Phase					
MM71	Birds	EIAR Chapter 7	During the decommissioning phase, disturbance limitation measures will be as per the construction phase described in Section 7.7.3. .		
EIAR Chapter 8 Land Soils & Geology					
Construction Phase					
MM72	Earthworks	EIAR Chapter 8	**Mitigation Measures by Design:** **Proposed Wind Farm**		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Placement of turbines and associated infrastructure in areas of shallow peat and suitable ground conditions (based on detailed site investigation data); › The peat and subsoil which will be removed during the construction phase will be localised to the Proposed Wind Farm infrastructure turbine location, substation and temporary compounds and access roads; › The Proposed Project has been designed to avoid sensitive habitats; › A minimal volume of peat, subsoil and rock will be excavated and removed to allow for infrastructure works to take place in comparison to the total volume of these materials present on the site due to optimisation of the Proposed Project design; › At the identified repository areas, the vegetative topsoil layer will be removed to allow for spoil to be placed and upon reaching the recommended height, the vegetative topsoil layer will be reinstated; › The identified spoil management areas will be developed in a phased approach, with the topsoil removed and temporarily stockpiled within the defined area while the spoil it being placed. The stockpiled topsoil will then be reinstated over the placed spoil, and the exercise will continue within the same spoil management area until the area is full; › The placement of spoil will be restricted to a maximum height of 1.0m, subject to confirmation by the Geotechnical Engineer; › Where practical, the surface of the placed spoil is shaped to allow efficient run-off of surface water. Where possible, shaping of the surface of the spoil will be carried out as placement of spoil within the area progresses. This will reduce the likelihood of debris run-off and ensure stability of the placed spoil; › Finished/shaped side slopes of the placed spoil will be not greater than 1 (v): 2 (h) in the dedicated spoil management zones and not greater than 1 (v): 1 (h) alongside access tracks; › Inspections of the spoil management areas will be made by a Geotechnical Engineer through regular monitoring of the works. The appointed contractor will review work		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			practices at spoil management areas when periods of heavy rainfall are expected so as to prevent excessive dirty water runoff from being generated; › An interceptor drain will be installed upslope of the identified spoil management areas to divert any surface water away from these areas; › Silt fences and double silt-fences will be emplaced down-gradient of spoil management areas and will remain in place throughout the entire construction phase, or until reseeding has been established to a sufficient level; › The surface of the deposited spoil will be profiled to a gradient to be agreed with the Geotechnical Engineer and vegetated or allowed to vegetate naturally as indicated by the Project Ecologist; › All the above-mentioned general guidelines and requirements will be confirmed by the Geotechnical Engineer prior to construction; › The material will be backfilled into the spoil management areas and will be spread evenly across the area; › It will be compacted to reduce air voids and reduce the migration paths for infiltration by precipitation. This will reduce the amount of potentially silt laden surface water run-off from these spoil management areas. Excavated soils/subsoils shall be excavated and stored separately to topsoil; this will prevent mixing of materials and facilitate reuse afterwards; › All materials which require management will be stockpiled at low angles (< 5-10°) to ensure their stability and secured using silt fencing where necessary. This will help to mitigate erosion and unnecessary additions of suspended solids to the drainage system; and, › Spoil management will take place within a minimal distance of each turbine to avoid excessive transport of materials within the site. **Proposed Grid Connection Route**: › Soils and subsoils excavated along the Proposed Grid Connection underground cabling route will be temporarily stored in covered stock piles along the edge of the road carriageway;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Once the emplacement of the 110kV cable has been completed, the stored soils and subsoils will be reinstated, with the minimal amount of compaction required to level the top surface; and, › The tarmacadam road surface will be replaced with the same design standard as the surrounding carriageway and in compliance with any requirements of Clare County Council.		
MM73	Contamination of Soils	EIAR Chapter 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; › All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area; › Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage; › The 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; › All waste tar material arising from works on hard top roads will be removed off site and taken to licenced waste facility; and, › An emergency response plan for the construction phase to deal with accidental spillages will be contained within the Construction Environmental Management Plan (which is contained in Appendix 4-3).		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM74	Erosion of soils and peat	EIAR Chapter 8	**Proposed Wind Farm** › Peat removed from the development locations and access roads will be reinstated within the Proposed Wind Farm site; › The upper vegetative layer (where still present) 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 site is shown as Appendix 4-2 and details control measures for the removal, storage and general management of the materials to be excavated during construction. **Tree Felling** All proposed felling works will be completed in accordance with the best practice Forest Service regulation, policies and strategic guidance documents as well as Coillte and DAFM guidance documents to ensure that felling results in minimal potential negative effects on the local peat, soil and subsoil environment. In addition, the following mitigation measures will be implemented during felling operations: › Before any works are completed silt fences will be installed to limit the movement of entrained sediment in surface water runoff; › The harvester and the forwarder are designed specifically for the forest environment and are low ground pressure machines; › All machinery will be operated by suitably qualified personnel;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› These machines will traverse the Proposed Wind Farm site along specified off-road routes (referred to as racks); › Brash mats will be placed on the racks to support the vehicles on soft ground, reducing peat and mineral soil disturbance and erosion and avoiding the formation of rutted areas, in which surface water ponding can occur; › As felling progresses, the harvester will collect brash produced by the felling and place it in front of the machine before it advances forward along the rack; › The condition of the racks will be continually monitored and fresh brash will be applied when the brash mat becomes heavily used and worm, ensuring that the mat remains effective throughout the operational phase; and, › The location of racks will be chosen to avoid wet and potentially sensitive areas. **Proposed Grid Connection Route** › Soil/subsoil removed from the trench will be transported to the on-site spoil management areas or to a local licenced facility. › Temporary drainage systems will limit runoff impacts during the construction phase. › The Proposed Grid Connection Route will be constructed in a stepwise manner along its length. This will minimise the time any particular section of the Proposed Grid Connection Route cabling trench is open before being reinstated.		
MM75	Peat Instability and Failure	EIAR Chapter 8 Appendix 8-1	Firstly, the key mitigation with regard peat stability risk at the Proposed Wind Farm site was the completion of a robust, multidisciplinary site investigation and peat stability risk assessment carried out in accordance with best practice guidance (PLHRAG, Scottish Government, 2017). A key mitigation measure is the avoidance of areas which are assessed as having a high risk of failure. This scenario does not apply to the Proposed Project and there was no necessity for a revised planning layout.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			The following control measures incorporated into the construction phase of the Proposed 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 Proposed Project (be aware that decreasing the construction time has the potential to increase the risk of initiating a localised peat movement); › Prevent undercutting of slopes and unsupported excavations; › Upslope cut-off drains will be installed in advance of construction activities to prevent water build up in excavations. › The sides within excavated peat will be sloped back at an angle of 30 degrees to the horizontal to prevent slippage. › No excavations shall take place unless fill material is available for filling at the point of excavation. Excavation will be limited to the reach of the excavator sitting on the constructed road surface. › Any excavations will be immediately backfilled with suitable material when available. › Excavation for access track to be backfilled as soon as practicable in intact peat. Excavation and filling operations will be co-ordinated to minimise the time an excavation remains unfilled. › Deposition of excavated material must not occur outside designated areas; temporary stock piling would take place within the Proposed Wind Farm footprint of turbine hardstands before reinstatement and disposal at proposed peat and spoil repository areas. › Temporary deposition of excavated soils will only be allowed in areas with peat depth less than 0.5m. › Excavated spoil will not be deposited on the downslope or upslope edges of adjacent peat.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Existing drainage patterns in peat will be maintained whenever possible, and any uncontrolled discharges of water onto peat will be prevented. › Engineered drainage to prevent concentrated flow onto slopes or into excavations. Pumping to be used as required until a permanent solution is in place. › As per *Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments* (Energy Consents Unit Scottish Government, 2017) catch wall fences shall be positioned downslope of the suspected or known landslide prone area to slow or halt runout. Similarly, catch ditches may also be used to slow or halt runout, although it is preferable that they are cut in non-peat material. › Machinery use on peat surfaces would be minimized, and dependant on site topography the use of vibrating rollers may not be permitted. › Materials must not be stockpiled, and heavy machinery must not be parked on peat surfaces. › The use of low ground bearing pressure machines to be used on areas of peat exceeding 1m depth. › No operatives other than the excavator driver to be allowed in close proximity to open excavations. › Monitoring posts to be installed in vicinity of risk areas and to be inspected prior to and following works each day by a competent person. › A qualified geotechnical and/or environmental engineer will conduct regular site visits and assessments to monitor the potential for a peat slide regularly during construction. › Upon commencement of the reinstatement works, guidance from a suitably qualified environmental professional will be sought to confirm the methodology and programme. › Exclusion zones delineating the working corridor will be established around all working areas using post and rope fences. No activity will be permitted past this fence. › The environmental manager or other designated person will conduct induction training and toolbox talks with site staff to explain the risks associated with working		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			on peat, the procedures for reducing the risk of peat slides, and the location of exclusion zones. › Strict adherence to method statements is required at all times, and any deviation from the agreed work methodology must be approved by a suitably qualified environmental professional or the site geotechnical engineer. › Particular attention will be paid to conditions during and after heavy rainstorms, especially following extended dry periods when the likelihood of peat movement is higher. The site supervisor would suspend work if either work practices or weather conditions are deemed unsafe. › After reinstatement is completed, the peat and spoil repository areas will be re-vegetated using the topsoil, sod or harvested peat. The above mitigation measures are proposed to reduce any existing risks to acceptable levels (AFRY, 2024).		
Operational Phase					
MM76	Soils and Geology	EIAR Chapter 8	Mitigation measures for soils and geology during the operational stage include › The use of aggregate from local, authorised quarries for use in road and hardstand maintenance. › Vehicles used during the operational phase will be refuelled off site before entering the site; › No fuels will be stored on-site during the operational phase; and › Spill kits will be available in all site vehicles to deal with an accidental spillage and breakdowns; and, › An emergency plan for the operational phase to deal with accidental spillages and breakdowns will be contained in the Construction and Environmental Management Plan (CEMP) included as Appendix 4-3. › All transformers and substation areas will be bunded to 110% of the volume of oil used in each transformer/substation;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› An emergency plan for the operational phase to deal with accidental spillages will be contained in the CEMP included as Appendix 4-3.		
Decommissioning Phase					
MM77	Decommissioning Phase	EIAR Chapter 8	Mitigation measures applied during decommissioning activities will be similar to those applied during construction where relevant. Some of the effects will be avoided by leaving elements of the Proposed Project in place where appropriate. The 38kV electrical substation and Proposed Grid Connection Route cabling will be retained by ESB or EirGrid. The turbine bases will be rehabilitated by covering with local topsoil/peat in order to regenerate vegetation which will reduce runoff and sedimentation effects. Internal roads will remain as amenity pathways and forestry access roads. 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.		
EIAR Chapter 9 Hydrology					
Pre-Commencement Phase					
MM78	Earthworks	EIAR Chapter 9	**Mitigation by Avoidance:** The key mitigation measure during the construction phase is the avoidance of sensitive hydrological features where possible, by application of suitable buffer zones (i.e. 50m to main watercourses). All of the key Proposed Project areas are located significantly away from the delineated 50m watercourse buffer zones with the exception of the upgrading of the existing watercourse crossing, new watercourse crossing, upgrades to existing site access tracks and cut and fill along section of new and existing roads to be upgraded.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			The large setback distance from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures (discussed below) to be properly installed and operate effectively. The proposed buffer zone will: › Avoid physical damage (river/stream banks and river/stream beds) to watercourses and associated release of sediment; › Avoid excavations within close proximity to surface watercourses; › Avoid the entry of suspended sediment from earthworks into watercourses; and, › Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone. **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. **Pre-commencement Temporary Drainage Works** Prior to the commencement of cable trenching or crossing works the following key temporary drainage measures will be installed: › All existing roadside drains 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 will also be temporarily blocked;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› 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. › The following mitigation measures are proposed for the grid connection crossing works: › No stockpiling 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.		
			Construction Phase		
MM79	Earthworks	EIAR Chapter 9	**Mitigation by Avoidance**		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			The key mitigation measure during the construction phase is the avoidance of sensitive hydrological features where possible, by application of suitable buffer zones (i.e. 50m to main watercourses). All of the key Proposed Project areas are located significantly away from the delineated 50m watercourse buffer zones with the exception of the upgrading of the existing watercourse crossing, new watercourse crossing, upgrades to existing site access tracks and cut and fill along section of new and existing roads to be upgraded. The majority of the Proposed Grid Connection Route is >50m from any nearby watercourse, sections within 50m of the Proposed Grid Connection Route are confined to existing watercourse crossings. It is proposed to limit any works in any areas located within 50m of any watercourse/waterbody including the stockpiling of excavated soils and subsoils. There are a total of 4 no. watercourse crossings along the Proposed Grid Connection Route. All the crossings are existing bridges and culverts along the public road. No in-stream works are required at any of these crossings, however due to the proximity of the watercourses to the construction work at the crossing locations, there is a potential for surface water quality impacts during trench excavation work. A constraint/buffer zone will be maintained for all crossing locations where possible, whereby all watercourses will be fenced off. In addition, measures which are outlined below will be implemented to ensure that silt laden or contaminated surface water runoff from the excavation work does not discharge directly to the watercourse. The large setback distance from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures (discussed below) to be properly installed and operate effectively. The proposed buffer zone will:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Avoid physical damage (river/stream banks and river/stream beds) to watercourses and associated release of sediment; › Avoid excavations within close proximity to surface watercourses; › Avoid the entry of suspended sediment from earthworks into watercourses; and, › Avoid the entry of suspended sediment from the construction phase drainage system into watercourses, achieved in part by ending drain discharge outside the buffer zone and allowing percolation across the vegetation of the buffer zone. **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 level spreaders, 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 Proposed Wind Farm site drainage prior to reaching the downstream watercourses. **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		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			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 such as those present in the subsoils/sandstone tills that overlie the site. 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:** 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 Proposed Project footprint has been divided into drainage catchments (based on topography, outfall locations, catchment size) and stormwater runoff rates based on the		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			10-year return period rainfall event were calculated for each catchment. These flows were then used to design settlement ponds for each drainage catchment. The settlement ponds are designed for 11hr or 24hr retention times used to settle out medium silt (0.006mm) and fine silt (0.004mm) respectively (EPA, 2006). Settlement ponds at the borrow pit are designed to allow 24hr retention and settlement ponds along access roads and at turbine hardstands will have 11hr retention as there is additional in-line drainage controls proposed along access tracks and at hardstands. **Management of Runoff from The Peat and Spoil Repository Areas:** It is proposed that excavated peat/subsoil (spoil) will be stored in excavated borrow pit within the Proposed Wind Farm site or used for landscaping throughout the site. The borrow pit is located outside the 50m stream buffer zone. Proposed surface water quality protection measures regarding the peat and spoil repository areas are as follows: › During the initial emplacement of peat and subsoil at the borrow pit, silt fences, straw bales and biodegradable matting will be used to control surface water runoff from the enclosure. › The borrow pit is an enclosed area. Its drainage can be easily managed. › Drainage from the borrow pit will be pumped to settlement ponds as required or will overflow through controlled overflow pipes. › Discharge or pumping will be intermittent and will depend on preceding rainfall amounts. › Once the borrow pit has been seeded and vegetation is established the risk to downstream surface water is significantly reduced. Therefore, the above mitigation measures will be deployed to ensure protection of downstream water quality.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			The borrow pit settlement ponds have been designed to allow a 24hr retention time as per EPA guidance (2006) which is highest level of protection recommended by the EPA with regard to retention time.		
MM80	Clear-felling of Coniferous Plantation	EIAR Chapter 9	**Mitigation by Avoidance:** There is a requirement in the Forest Service Code of Practice and in the FSC Certification Standard for the installation of buffer zones adjacent to aquatic zones at planting stage. Minimum buffer zone widths recommended in the Forest Service (2000) guidance document "Forestry and Water Quality Guidelines" are shown in Section 10.1.5 With moderate slopes existing across much of the Proposed Wind Farm site, a 10m setback for felling will be established along all aquatic zones. Buffer zone widths will be increased at vulnerable hydrological features where deemed necessary. This will ensure water quality is protected during the felling operations. However, most of the Proposed Project infrastructure is located outside of the 50m self-imposed hydrological buffer zone, thereby limiting the felling which will occur in close proximity to natural watercourses. The setback distance from sensitive hydrological features means that adequate room is maintained for the proposed mitigation measures (discussed below) to be properly installed and operate effectively. The buffer/setback zone will: › Avoid physical damage (river/stream banks and river/stream beds) to watercourses and the associated release of sediment; › Avoid peat/soil disturbance and compaction within close proximity to surface watercourses; › Avoid the entry of suspended sediment from works into watercourses; and,		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Avoid the entry of suspended sediment from the 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:** 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; › All machinery will be operated by suitably qualified personnel; › 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; › Machines will traverse the site along specified off-road routes (referred to as racks); › The location of racks will be chosen to avoid wet and potentially sensitive areas; › Brash mats will be placed on the racks to support the vehicles on soft ground, reducing peat and mineral soil disturbance and erosion and avoiding the formation of rutted areas, in which surface water ponding can occur. Brash mat renewal should take place when they become heavily used and worn. Provision should 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; › Silt fences will be installed at the outfalls of existing drains downstream of felling areas. No direct discharge of such drains to watercourses will occur. Sediment traps and silt fences will be installed in advance of any felling works and will provide surface water settlement for runoff from work areas and will prevent sediment from entering downstream watercourses. Accumulated sediment will be carefully		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			disposed of at pre-selected peat and spoil repository areas. Where possible, all new silt traps will be constructed on even ground and not on sloping ground; › In areas particularly sensitive to erosion it will be necessary to install double or triple sediment traps and increase buffer zone width. These measures will be reviewed on site during construction; › Double silt fencing will also be put down slope of felling areas which are located in close proximity to streams and/or relevant watercourses; › 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; › Timber will be stacked in dry areas, and outside watercourse buffer zones. 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 runoff; › Refuelling or maintenance of machinery will not occur within 50m of an aquatic zone or within 20m of any other hydrological feature. Mobile bowser, drip kits, qualified personnel will be used where refuelling is required; and, › 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. **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. **Pre-emptive Site Drainage Management :** The works programme for the felling operations will also take account of weather forecasts and predicted rainfall in particular. Operations will be suspended or scaled		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast. The following forecasting systems are available and will be used on a daily/weekly basis, as required, to allow site staff to direct proposed and planned construction activities: › General Forecasts: Available on a national, regional and county level from the Met Éireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates; › MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale; › 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events; › Rainfall Radar Images: Images covering the entire country are freely available from the Met Éireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and, › Consultancy Service: Met Éireann provide a 24-hour telephone consultancy service. The forecaster will provide an interpretation of weather data and give the best available forecast for the area of interest. Using the safe threshold rainfall values will allow planned works to be safely executed (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event. Works will be suspended if forecasting suggests any of the following is likely to occur: › >10 mm/hr (i.e. high intensity local rainfall events);		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or, › >half monthly average rainfall in any 7 days. **Timing of Proposed Project Felling Works:** Felling 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. **Drain Inspection and Maintenance**: The following items will 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 will be identified. Ideally the pre-felling inspection will be carried out during rainfall; › Following tree felling all main drains will be inspected to ensure that they are functioning; › Extraction tracks within 10m of drains will 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, if impeded by silt or debris, 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			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). Details of the proposed surface water quality monitoring programme are outlined in the Surface Water Management Plan (refer to Appendix 4-5). 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; › 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Also, daily surface water monitoring forms (for visual inspections and field chemistry measurements) will also be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection.		
MM81	Excavation Dewatering and Surface Water Quality	EIAR Chapter 9	Management of groundwater seepages 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 Siltbuster unit; › 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 the Environmental Clerk of Works will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped and a geotechnical assessment undertaken; and, › A mobile 'Siltbuster' or similar equivalent specialist treatment system will be available on-site 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM82	Potential Release of Hydrocarbons	EIAR Chapter 9 CEMP Section 3	Mitigation measures proposed to avoid release of hydrocarbons at the site are as follows: › All plant will be inspected and certified to ensure that they are leak free and in good working order prior to uses at the Proposed Project 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 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; › Taps, nozzles or valves associated with refuelling equipment will be fitted with a lock system; › All fuel storage areas will be bunded appropriately for the duration of the construction phase. All bunded areas will be fitted with a storm drainage system and an appropriate oil interceptor. Ancillary equipment such as hoses, pipes will be contained within the bunded area; › Fuel and oil stores including tanks and drums will be regularly inspected for leaks and signs of damage; › The electrical control building (at the substation) will be bunded appropriately to 110% of the volume of oils that will 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;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› 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 is included within the Construction and Environmental Management Plan (Appendix 4-3). Spill kits will be available to deal with any accidental spillage in and outside the re-fuelling area.		
MM83	Wastewater Management	EIAR Chapter 9	› During the construction phase, a self-contained port-a-loo with an integrated waste holding tank will be used at each of the site construction compounds, maintained by the providing contractor, and removed from site on completion of the construction works; › Water supply for the site office and other sanitation will be brought to site and removed after use from the site to be discharged at a suitable off-site treatment location; and, › No water or wastewater will be sourced on the site, nor discharged to the site.		
MM84	Release of Cement-Based Products	EIAR Chapter 9 CEMP Section 3	› No batching of wet-concrete 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 directly to any artificial drain or watercourse will be allowed. Chute cleaning water will be undertaken at lined concrete washout ponds; › 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM85	Morphological Changes to Surface Water Courses within Proposed Wind Farm site	EIAR Chapter 9	Within the Proposed Wind Farm site, there are a total of 3 no. watercourse crossings over EPA mapped watercourses (2 no. upgrades to existing crossings and 1 no. new proposed crossing). These crossing locations are outlined below: Mitigation measures for the proposed new crossings within the Proposed Wind Farm site are detailed below: › The proposed new stream crossings and upgrade of an existing crossing will be clear span or box culverts crossings and the existing banks will remain undisturbed. No in-stream excavation works are proposed at this location and therefore there will be no direct impact on the stream at the proposed crossing location; › All guidance / mitigation measures required by the OPW and/or the Inland Fisheries Ireland (IFI)[7] is incorporated into the design of the proposed crossings; › All drainage measures will be installed in advance of the works; › Plant and equipment will not be permitted to track across the watercourse; › Access to the opposite site of the watercourse for excavation and foundation installation will require the installation of a temporary pre-cast concrete or metal bridge; › Once the foundations have been completed at both sides of the watercourse, the pre-cast concrete box culvert will be installed using a crane and there will be no contact with the watercourse; › Where the box culvert is installed in sections, the joint will be sealed to prevent granular material entering the watercourse; › As a further precaution, near stream construction work, will only be carried out during the period permitted by IFI for in-stream works according to the IFI (2016) guidance document “Guidelines on protection of fisheries during construction works in and adjacent to waters”, i.e., July to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI); › Where works are necessary inside the 50m buffer 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 concrete 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. 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. 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.		
MM86	Morphological Changes to Surface Water Courses along the Proposed Grid Connection Route	EIAR Chapter 9	The Proposed Grid Connection Route includes a total of 5 no. crossings over EPA mapped watercourses. Prior to the commencement of cable trenching or crossing works the following key temporary drainage measures will be installed: › All existing roadside drains 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 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› The following mitigation measures are proposed for the grid connection crossing works: › No stockpiling 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.		
MM87	Effect of Siltbuster on Downstream Surface Water Quality	EIAR Chapter 9	Siltbusters are regularly used to remove suspended sediments on construction sites by means of chemical dosing and sedimentation (i.e. use of coagulants and flocculants to accelerate the settlement process). The benefits of using enhanced settlement systems on downstream surface water quality are widely known and provide a positive effect. However, potential overdosing with chemical agents means there is a perceived risk of chemical carryover in post treatment water which could result in negative effects on downstream water quality.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			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 agents so overdosing does not occur; › 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.		
MM88	Direction Drilling Effect on Surface Water Quality	EIAR Chapter 9	Surface water quality effects on local watercourses may occur during drilling and groundworks associated with potential directional drilling at the 2 no. bridge crossing locations along the Proposed Grid Connection Route to the existing Ardnacrusha 10kV substation. › Although no in-stream works are proposed, the drilling works will only be done over a dry period between July and September (as required by IFI for in-stream works) to avoid the salmon spawning season and to have more favourable (dryer) ground conditions; › The crossing works area will be clearly marked out with fencing or flagging tape to avoid unnecessary disturbance; › There will be no storage of material / equipment or overnight parking of machinery inside the 15m buffer zone; › Before any ground works are undertaken, double silt fencing will be placed upslope of the watercourse channel along the 15m buffer zone boundary; › Additional silt fencing or straw bales (pinned down firmly with stakes) will be placed across any natural surface depressions / channels that slope towards the watercourse;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Silt fencing will be embedded into the local soils to ensure all site water is captured and filtered; › The area around the bentonite batching, pumping and recycling plant will be bunded using terram (as it will clog) and sandbags in order to contain any spillages; › Drilling fluid returns will be contained within a sealed tank / sump to prevent migration from the works area; › Spills of drilling fluid will be clean up immediately and stored in an adequately sized skip before been taken off-site; › If rainfall events occur during the works, there will be a requirement to collect and treat small volumes of surface water from areas of disturbed ground (i.e. soil and subsoil exposures created during site preparation works); › This will be completed using a shallow swale and sump down slope of the disturbed ground; and water will be pumped to a proposed percolation area at least 50m from the watercourse; › The discharge of water onto vegetated ground at the percolation area will be via a silt bag which will filter any remaining sediment from the pumped water. The entire percolation area will be enclosed by a perimeter of double silt fencing; › Any sediment laden water from the works area will not be discharged directly to a watercourse or drain; › Works shall not take place during periods of heavy rainfall and will be scaled back or suspended if heavy rain is forecasted; › Daily monitoring of the compound works area, the water treatment and pumping system and the percolation area will be completed by a suitably qualified person during the construction phase. All necessary preventative measures will be implemented to ensure no entrained sediment, or deleterious matter is discharged to the watercourse; › If high levels of silt or other contamination is noted in the pumped water or the treatment systems, all construction works will be stopped. No works will recommence until the issue is resolved and the cause of the elevated source is remedied;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› On completion of the works, the ground surface disturbed during the site preparation works and at the entry and exit pits will be carefully reinstated and re-seeded at the soonest opportunity to prevent soil erosion; › The silt fencing upslope of the river will be left in place and maintained until the disturbed ground has re-vegetated; › There will be no batching or storage of cement allowed at the watercourse crossing; › There will be no refuelling allowed within 100m of the watercourse crossing; and, › All plant will be checked for purpose of use prior to mobilisation at the watercourse crossing.		
MM89	Fracture Blowout	EIAR Chapter 9	Fracture Blow-out (Frac-out) Prevention and Contingency Plan: › The drilling fluid/bentonite will be non-toxic and naturally biodegradable (i.e., Clear Bore Drilling Fluid or similar will be used); › The area around the drilling fluid batching, pumping and recycling plants will be bunded using terram and/or sandbags to contain any potential spillage; › One or more lines of silt fencing will be placed between the works area and the adjacent river; › Spills of drilling fluid will be cleaned up immediately and transported off-site for disposal at a licensed facility; › Adequately sized skips will be used where temporary storage of arisings are required; › The drilling process / pressure will be constantly monitored to detect any possible leaks or breakouts into the surrounding geology or local watercourses › This will be gauged by observation and by monitoring the pumping rates and pressures. If any signs of breakout occur then drilling will be immediately stopped; › Any frac-out material will be contained and removed off-site; › The drilling location will be reviewed, before re-commencing with a higher viscosity drilling fluid mix; and, › If the risk of further frac-out is high, a new drilling alignment will be sought at the crossing location.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM90	Karst Features	EIAR Chapter 9	A section of the Proposed Grid Connection Route (~2.4km in length) is underlain by a Regionally Important Karst Aquifer. The closest mapped karst feature is is a swallow hole mapped ~2.2km to the east of the Proposed Grid Connection Route. The potential for effects on the underling karst aquifer are limited for the following reasons: › Only a small section of the Proposed Grid Connection Route overlies the karst aquifer; › There are no mapped karst features in the immediate vicinity of the Proposed Grid Connection Route; and, › The proposed works are minor and transient in nature. Nevertheless, the following mitigation measures will be implemented: › Site drainage will be put in place in order to prevent any poor-quality drainage water reaching the local unmapped karst features. › Mitigation measures relating to hydrocarbons, cementitious materials and wastewater disposal as prescribed in Section 9.5.2.6 (hydrocarbons), Section 9.5.2.7 (cement-based products) and Section 9.5.2.8 (wastewater) will provide adequate protection to groundwater and surface water quality and will ensure that groundwater quality will not be impacted.		
MM91	Designated Sites	EIAR Chapter 9	The Doon Lough NHA, Glenomra Wood SAC/pNHA, and Lower River Shannon SAC are hydrologically connected with the Proposed Project site (Proposed Wind Farm and Proposed Grid Connection Route). **Doon Lough NHA**		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			This NHA is located downgradient of both the Proposed Wind Farm site and the Proposed Grid Connection Route. The potential for effects are reduced to the progressively increasing volumes of water within the Glenomra/Broadford rivers downstream of the Proposed Project site and the distance between the NHA and the site (6.35km). Mitigation measures relating to the protection of surface water drainage regimes and surface water quality within the Proposed Project site have been detailed in Section 9.5.2.1 (clear felling), Section 9.5.2.2 (suspended solids), Section 9.5.2.6 (hydrocarbons), Section 9.5.2.7 (cement-based products), Section 9.5.2.8 (wastewater) and Section 9.5.2.9 and 9.5.2.10 (morphological changes). The implementation of these mitigation measures will ensure the protection of the Doon Lough NHA. **Glenomra Wood SAC/pNHA** Due to the nature and scale of the works along the Proposed Grid Connection Route the potential for effects is limited. The works will be transient and short-term in nature and all works adjacent the SAC/pNHA will be located within the carriageway of the existing public road network. Mitigation measures relating to the protection of surface water and groundwater quality along the Proposed Grid Connection Route have been detailed in Section 9.5.2.2 (suspended solids), Section 9.5.2.6 (hydrocarbons) and Section 9.5.2.10 (morphological changes). The implementation of these mitigation measures will ensure the protection of the Glenomra Wood SAC/pNHA.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Lower River Shannon SAC The potential for the Proposed Project to effect the SAC is limited due to the large volumes of water within the River Shannon and Lough Derg. Mitigation measures relating to the protection of surface water drainage regimes and surface water quality within the Proposed Project site have been detailed in Section 9.5.2.1 (clear felling), Section 9.5.2.2 (suspended solids), Section 9.5.2.6 (hydrocarbons), Section 9.5.2.7 (cement-based products), Section 9.5.2.8 (wastewater) and Section 9.5.2.9 and 9.5.2.10 (morphological changes). The implementation of these mitigation measures will ensure the protection of the Lower River Shannon SAC.		
Operational Phase					
MM92	Progressive Replacement of Natural Surface with Lower Permeability Surfaces	EIAR Chapter 9 CEMP Section 3	**Proposed 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 installed up-gradient of all Proposed Project 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/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;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› 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 have been designed in consideration of the greenfield runoff rate. As described above the proposed integration of the Proposed Wind Farm site drainage with the existing forestry drainage is a key component of the proposed drainage management within the Proposed Project. In this context, integration means maintaining surface water flowpaths where they already exist, avoid creation of new or altered surface water flowpaths, and maintaining the drainage regime (i.e. normal flow) within each forestry compartment. Critically, there will be no alteration of the catchment size contributing to each of the main downstream watercourses. All Proposed Project drainage water captured within individual site sub-catchments will be attenuated and released within the same sub-catchments that it was captured.		
MM93	Runoff Resulting in Contamination of Surface Waters	EIAR Chapter 9	Mitigation measures for sediment control are the same as those outlined above for the construction phase and mitigation measures for control of hydrocarbons during maintenance works are similar to those in the construction phase also.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM94	WFD Water Body Status	EIAR Chapter 9	There is no direct discharge from the Proposed Project to downstream receiving waters. Mitigation for the protection of surface water during the operational phase of the Proposed Project will ensure the qualitative status of the receiving SWBs will not be altered by the Proposed Project. Similarly, there is no direct discharge to groundwaters associated with the Proposed Project. Mitigation for the protection of groundwater during the operational phase of the Proposed Project will ensure that the qualitative status of the receiving GWBs will not be altered by the Proposed Project. A full assessment of the potential effects of the operational phase of the Proposed Project on the status of the receiving waterbodies is included in WFD Compliance Assessment Report attached as **Appendix 9-3**.		
Decommissioning Phase					
MM95	Decommissioning	EIAR Chapter 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 vegetation to encourage vegetation growth and reduce run-off and sedimentation. No significant effects on the hydrological and hydrogeological environment will occur during the decommissioning stage of the Proposed Project.		
Chapter 10 Air					
Construction Phase					
MM96	Exhaust Emissions	EIAR Chapter 10	› All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise. If a vehicle requires		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			repair, this work will be carried out off site, thereby minimising any emissions that arise. › Turbines and construction materials will be transported to the site on specified routes only, unless otherwise agreed with the Planning Authority. › When stationary, delivery and on-site vehicles will be required to turn off engines. › 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 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. 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 as close as possible to the site to reduce the amount of emissions associated with vehicle movements.		
MM97	Dust Emissions	EIAR Chapter 10	› A wheel wash facility will be installed within the Proposed Project and will be used by vehicles before leaving site. › In periods of extended dry weather, dust suppression may be necessary along the haul roads, site roads, Proposed Grid Connection Route, road widening sections, onsite 38kV substation, and construction compounds 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, and site compounds to prevent the generation of dust where required. ○ Water bowser movements will be carefully monitored by the Ecological Clerk of Works to avoid, insofar as reasonably possible, increased runoff as outlined in the Construction and Environmental Management Plan (CEMP, Appendix 4-3).		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› 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 and spoil management areas. › Turbines components and construction materials will be transported to the Proposed Wind Farm on specified haul routes only, as agreed with the local authority. ○ The transportation of construction materials from locally sourced quarries for the Proposed Project will be covered by tarpaulin where necessary › 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. › A CEMP will be in place throughout the construction phase (see Appendix 4-3). The CEMP includes dust suppression measures.		
Operational Phase					
MM98	Exhaust Emissions	EIAR Chapter 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.		
MM99	Dust Emissions	EIAR Chapter 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› The MRF facility will be local to the site to reduce the emissions associated with vehicle movements.		
Decommissioning Phase					
MM100	Decommissioning Phase	EIAR Chapter 10	The mitigation measures prescribed for the construction phase of the Proposed Wind Farm will be implemented during the decommissioning phase thereby minimising any potential impacts.		
EIAR Chapter 11 Climate					
Construction Phase					
MM101	Greenhouse Gas Emissions	EIAR Chapter 11	› All plant and materials vehicles shall be stored in dedicated areas (onsite). Machinery will be switched off when not in use. › Turbines and construction materials will be transported to the site on specified routes only, unless otherwise agreed with the Planning Authority. Please see Chapter 15 Material Assets for details. › Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction. › The expected waste volumes generated onsite are unlikely to be large enough to warrant source segregation at the site. Therefore, all wastes streams generated onsite will be deposited into a single waste skip which will be covered. ○ This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. ○ The MRF will be local to the Proposed Project to reduce the emissions associated with vehicle movements; the closest MRF is the Scariff recycling centre and transfer station in Fossa Beg, County Clare, located approximately 22.1km north of the Proposed Wind Farm site › A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-3). › Aggregate materials for the construction of the Proposed Project will be obtained from the onsite borrow pit. This will reduce journey distances of the delivery		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			vehicles accessing the site, thereby reducing the amount of emissions associated with vehicle movements. › Where applicable, low carbon intensive construction materials will be sourced and utilised onsite		
Operational Phase					
MM102	Greenhouse Gas Emissions	EIAR Chapter 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. › As detailed in Appendix 6-4, a Biodiversity Management and Enhancement Plan (BMEP) for the Proposed Wind Farm has identified enhancement activities such as planting of hedgerow and woodland (approx. 890m of new native broadleaved treelines, approx. 1,240m of new native hedgerow and enhancement of approx. 550m of treelines and 530m of hedgerows via supplementary planting), peatland enhancement and restoration, and protected fauna habitat enhancement including badger, common frog, and otter. › Afforestation of the 13.8ha of forestry being felled for the Proposed Project will be completed as per the Forest Service's policy on granting felling licenses for wind farm development (Section 4.7.1 of Chapter 4 of this EIAR)		
Decommissioning Phase					
MM103	Greenhouse Gas Emissions	EIAR Chapter 11	The mitigation measures prescribed for the construction phase of the Proposed Wind Farm will be implemented during the decommissioning phase thereby minimising any potential impacts.		
EIAR Chapter 12 Noise					
Pre-commencement Phase					
MM104	Construction Noise	EIAR Chapter 12	Local residents will be kept informed of the proposed working schedule, where appropriate, including the times and duration of any abnormally noisy activity that may cause concern;		
Construction Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM105	Construction Noise	EIAR Chapter 12	Good onsite practices, both for construction of the Proposed Wind Farm and the Proposed Grid Connection Route will be implemented to minimise the likely effects. Particular care will be taken at watercourse, culvert and drain crossings along the Proposed Grid Connection Route. Section 8 of BS 5228-1:2009+A1:2014 recommends a number of simple control measures as summarised below that will 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 onsite, 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.		
Operational Phase					
MM106	Operational Phase Noise	EIAR Chapter 12	› A community liaison officer will be appointed prior to first generation of electricity and contact details made publicly available;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› 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					
MM107	Decommissioning Phase Noise	EIAR Chapter 12	The mitigation measures prescribed for the construction phase of the Proposed Wind Farm will be implemented during the decommissioning phase thereby minimising any potential impacts.		
Chapter 13 Landscape and Visual					
Construction Phase					
MM108	Landscape Effects	EIAR Chapter 13	**Mitigations for Proposed Grid Connection Route (Landscape).** The following measures should be implemented to mitigate effects during the construction phase and operational phase of the Proposed Grid Connection Route underground electrical cabling:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› 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 will 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.		
MM109	Visual Effects	EIAR Chapter 13	General housekeeping measures, necessary for Health & Safety requirements, will ensure that the active construction areas within the site will be kept tidy, mitigating localised visual impacts during the construction phase. A detailed description of the Proposed Project site is included in Chapter 4 'Description' of this EIAR.		
Operational Phase					
MM110	Landscape Effects	EIAR Chapter 13	A Biodiversity Management and Enhancement Plan (BMEP) has been prepared as part of this EIAR and is included as *Appendix 6-4* to this EIAR. Mitigation measures included in the BMEP will have a dual effect of providing ecological enhancement to the area as well as screening of some Proposed Wind Farm site infrastructure, thereby providing a mitigating effect on landscape. Mitigation measures proposed in the BMEP that will also have a mitigating effect on landscape areas as follows: › Avoidance of high-value peatland habitats within Slieve Bernagh Bog SAC at the most elevated extents of the Proposed Wind Farm; › Proposed planting of native broadleaf trees to establish new biodiversity corridors around low-intensity agricultural fields and along waterways; › Natural restoration of wetheath habitats around proposed turbines; › A berm and planting along the western perimeter of the proposed substation as a measure to provide visual screening of infrastructure within the landscape.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Please see the BMEP (Appendix 6-4) for further details.		
MM111	Visual Effects	EIAR Chapter 13	Chapter 13 of the EIAR emphasises two points to be discerned in relation to the Clare County Development Plan policy for designated scenic routes, as follows: **(1) The view is not 'seriously hindered or obstructed'.** The proposed turbines do not obstruct views of Glenomra Valley from the scenic route. While the Proposed Project is unavoidably visible within the commanding view of the ridges of Glenagalliagh Mt while journeying north along SR-26, the relatively small number of turbines (7 no.) and staggered placement on both sides of the ridge assures that the commanding view is not directly obstructed and is only moderately altered rather than seriously hindered. **(2) The Proposed Project is 'designed and located to minimise the visual impact'.** The design-optimisation factors reported in the above Section **13.4.4.** 'Landscape Character from WEDGs' indicate that the Proposed Project design has taken into account siting and design guidelines for the Transitional Marginal Landscape type from the WEDGs (DoEHLG, 2006) in order to minimise the visual impact; these factors are summarised as follows: › The location of proposed turbines is sited on or near peaks of elevation with clear visual separation from the complexity of the lower ground; › The spatial extent within each of the two clusters of proposed turbines (Cluster 1: T1, T2 and Cluster 2: T3–T7) is relatively small and the extent is such that turbines are sited within different types of landcover, as is appropriate for this landscape type; › The spacing of proposed turbines is uneven in a clustered layout; › The layout of proposed turbines within their separate clusters are themselves arranged in a staggered layout at the base and over the ridgetop between Glenagalliagh Mt and Lackareagh Mt;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› The height and scale of proposed turbines are appropriate within the relatively open and extensive upper ground on the upper slopes of Glenomra Valley.		
EIAR Chapter 14 Cultural Heritage					
Pre-commencement Phase					
MM112	Sub Surface Archaeological Potential	EIAR Chapter 14	› Pre-construction archaeological testing of the proposed turbine bases, hardstands, proposed roads, compounds, onsite substation, and any other proposed infrastructure within the Proposed Wind Farm site 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). Testing within forested areas may only be possible once clear-felling has taken place.		
Construction Phase					
MM113	National Monuments	EIAR Chapter 14	No National Monuments in State Care or those subject to a Preservation Order are located within the Proposed Wind Farm site, in the proposed Blade Transition Area along the TDR, or along the Proposed Grid Connection Route. Three National Monuments in State Care, one of which is also subject to a Preservation Order, are located within 10km of the Proposed turbines. In this regard, no direct effects to this aspect of the archaeological resource are identified and therefore no mitigation measures are proposed.		
MM114	Recorded Monuments within the Proposed Wind Farm site	EIAR Chapter 14	Three recorded monuments, CL044-063—, CL044-031— and CL044-086— are located within the Proposed Wind Farm site. None of the monuments are located within the footprint of proposed infrastructure or immediately adjacent to same therefore direct effects to the monuments as a result of the Proposed Project infrastructure therein are not identified. A total of 131 recorded monuments are located within 5km of the Proposed turbines and include the three monuments within the Proposed Wind Farm site as referenced above. Since the majority of these monuments are located at a sufficient		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			distance from the Proposed Wind Farm site, no direct effects to the monuments will occur. Operational effects are addressed in Section 14.4.4 below. No recorded monuments are located within the proposed Blade Transition Area on the TDR therefore direct effects to this aspect of the Cultural Heritage resource will not occur.		
MM115	Recorded Monuments along the Proposed Grid Connection Route	EIAR Chapter 14	Two recorded monuments, CL044-086— Enclosure and CL044-061— Enclosure, are located within 100m of the Proposed Grid Connection Route, while none are located within the Proposed Wind Farm site. The monuments are located off road and will not be directly affected by the Proposed Grid Connection Route which will be placed within the public road. The Proposed Grid Connection Route does not extend into the ZoN for either monument.		
MM116	Sub-surface Archaeology	EIAR Chapter 14	A report on the pre-construction archaeological testing will be compiled on completion of the work and submitted to the NMS and the relevant 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. 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 relevant 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM117	Protected Structures within 100m of the Proposed Wind Farm site and Proposed Grid Connection Route	EIAR Chapter 14	No Protected Structures subject to statutory protection are located within the Proposed Wind Farm site therefore direct effects to the same as a result of the Proposed Project infrastructure therein are not identified. Ten protected structures are located within 5km of the nearest Proposed turbine. Since these structures are located at a sufficient distance from the Proposed Wind Farm site, no direct effects to the structures will occur. Two Protected Structures (RPS Ref. 188, Kilbane Bridge and Ref. 640 Blackwater Bridge) are located within 100m of the Proposed Grid Connection Route. Works to Kilbane Bridge which is located adjacent to the Proposed Grid Connection Route are not proposed therefore direct effects to this structure will not occur. The option of strapping the Proposed Grid Connection Route underground cables to the side of the Blackwater Bridge (RPS No. 650) (as detailed in full in Chapter 4 of this EIAR) has been considered in relation to potential impacts on the bridge's status as a protected structure. The elevation to which it is proposed to strap the cable contains a single arch with voussoirs over the River Blackwater. The bridge also has parapet walls as is typical of stone road bridges. It is not envisaged that the works required to strap the cable to the bridge will negatively directly affect the parapet walls or arch, mitigation measures are recommended in order to ensure that such direct effects do not occur at the construction stage of the Proposed Project. › An assessment of the Blackwater Bridge (RPS Ref. 650) should be carried out by an architectural conservation specialist in order to identify any potential effects to the bridge and its associated features, e.g. parapet walls, arch, etc. › The cables should be attached to Blackwater Bridge (RPS Ref. 650) as per the methodology outlined in Chapter 4 of the EIAR. › The work shall be carried out in consultation with the Heritage Office of Clare County Council and shall ensure that any requirements of that office regarding works to the Protected Structure are implemented in full.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM118	Features of Local Cultural Heritage Merit	EIAR Chapter 14	No extant features of local cultural heritage merit are located within the Proposed Wind Farm site therefore direct effects to same are not identified. Two items of cultural heritage merit (CH1-2) were noted along the Proposed Grid Connection Route and comprise two bridges. HDD will be utilised at CH1 the unnamed bridge crossing, while the crossing at CH2, Ahnagor Bridge will be completed within the bridge deck as there is sufficient room to install the cable therein. Potential direct effects to the bridge structures as a result of either proposed crossing method are not identified.		
Chapter 15 Material Assets					
Pre-Commencement, Construction and Operational Phases					
MM119	Traffic & Transport				
MM120	Telecommunications	EIAR Chapter 15	In the event of interference occurring to telecommunications, the DoEHLG 2006 Guidelines acknowledge that '*electromagnetic interference can be overcome'* by the use of divertor relay links out of line with the wind farm. As detailed in Section 15.2.4.2 above, all constraints identified by Eir and Three have been taken into consideration for design of the Proposed Wind Farm. At the time of the initial scoping with the telecoms operators during May 2022, Eir identified one link that passes through the EIAR Site Boundary, south of T07, and could therefore be affected by the Proposed Wind Farm. Further engagement with Eir commenced and a clearance distance of 37.5 metres from the CE_2455 to CE_1886 link was proposed. This would require a change in turbine location (T07); the Applicant (EDF Renewables Ireland Ltd.) agreed to the change in turbine location in September 2022. It was then confirmed that the Proposed Wind Farm turbine (T07) will not affect this link once the turbine was moved outside of the clearance distance from the link identified by Eir.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			At the time of the initial scoping with the telecoms operators during May 2022, Three identified one microwave link that traverses the area and could potentially be affected. A clearance distance from the link to the rotor tip of the nearest proposed turbine of 30m would be required to ensure no impact on the link. The nearest proposed turbines (T05, T07) are located approximately 677m and 738m from the beginning of the microwave link and therefore the link would not be affected by the Proposed Wind Farm.		
MM121	Aviation	EIAR Chapter 15	Best practice measures for aviation will be adhered to during the operational phase of the Proposed Project in order to mitigate the effects associated with this phase of the development. The measures include: › Lighting requirements will be complied with for the Proposed Wind Farm and any further details will be agreed in advance of construction with the IAA and DoD, i.e crane erection. The coordinates and elevations for built turbines will be supplied to the IAA and DoD, as is standard practice for wind farm developments.		
Decommissioning Phase					
MM122	Decommissioning	EIAR Chapter 14	There are no electromagnetic interference impacts associated with the construction or decommissioning phases of the Proposed Wind Farm, and therefore no mitigation required		

8. 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 Management and Enhancement Plan prepared as part of the planning permission application to Clare County Council.

This section of the CEMP 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 (Table 8-1) 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 8-1 Monitoring Measures

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
Pre-Construction Phase						
MX1	Drainage Maintenance	EIAR Chapter 4	An inspection and maintenance plan for the drainage system onsite will be prepared in advance of commencement of any works on the Proposed Project. Regular inspections of all installed drainage features will be necessary, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water at parts of the systems where it is not intended. The inspection of the drainage system will be the responsibility of the ECoW or the Project Hydrologist.	On going	Monthly	Project Hydrologist
MX2	Clear Felling of Coniferous Plantation	EIAR Chapter 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). Details of the proposed surface water quality monitoring programme are outlined in the Surface Water Management Plan (refer to Appendix 4-5).	As Required	Monthly	ECoW
MX3	Drainage Inspection	EIAR Chapter 9	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.	As Required	Monthly	Project Hydrologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			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. During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and Environmental Quality Standards (EQSs) will be undertaken for each primary watercourse, and specifically following heavy rainfall events (as per the CEMP included in Appendix 4-4 of this EIAR).			
MX4	Water Quality Monitoring	EIAR Chapter 9	Field hydrochemistry measurements of unstable parameters, electrical conductivity (µS/cm), pH (pH units) and temperature (°C) along with turbidity (NTU) were taken at 4 no. surface water sampling locations over 2 no. monitoring rounds completed between 14th July and 14th December 2023 within surface watercourses draining and directly downstream of the Proposed Wind Farm site and the Proposed Grid Connection Route. Surface water grab samples were also taken at these locations for laboratory analysis on 4 no. occasions (14th July and 14th December 2023, low flow and high flow conditions). Results of the laboratory analysis are shown alongside relevant water quality regulations in Chapter 9.	Twice	As Required	Project Hydrologist
MX5	Invasive Species	EIAR Chapter 6 CEMP Section 3	In the event that the presence of such species is found at or adjacent to the development footprint during pre-commencement surveys, particularly in areas where its excavation may be required, an invasive species management plan will be prepared for the site to prevent the introduction or spread of any invasive species within the footprint of the works. An invasive species management plan, if required, will set out best practice control methods as summarised in the following sections.	Once	As required	Project Ecologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX6	Birds	EIAR Chapter 7 Appendix 7-6	Pre-construction surveys will be undertaken prior to the initiation of works at the Proposed Wind Farm. The survey will include a thorough walkover survey to a 500m radius of the Proposed Project footprint and all works areas, where access allows. If winter roosting 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 it is found to be active during the construction phase, no works shall be undertaken within a disturbance buffer in line with industry best practice (e.g. Forestry Commission Scotland, 2006; Ruddock and Whitfield, 2007; Goodship and Furness, 2022). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.	Once	As required	Project Ornithologist
Construction Phase						
MX7	Archaeological Monitoring	EIAR Chapter 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 relevant 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.	As Required	As Required	Project Archaeologist
MX8	Water Quality and Monitoring	CEMP Section 3	The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat silt-laden water from the works areas, will be monitored continuously by the ECoW 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 in so far as is possible.	Daily	As Necessary	ECoW
MX9	Water Quality and Monitoring	EIAR Chapter 9	Daily surface water monitoring forms will be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection.	Daily	As Necessary	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX10	Surface Water Quality	CEMP Section 4	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). Details of the proposed surface water quality monitoring programme are outlined in the Surface Water Management Plan (refer to Appendix 4-5. Also, daily surface water monitoring forms (for visual inspections and field chemistry measurements) will also be utilised at every works site near any watercourse. These will be taken daily and kept on site for record and inspection. Daily monitoring of excavations by the Environmental Clerk of Works will occur during the construction phase. If high levels of seepage inflow occur, excavation work will immediately be stopped and a geotechnical assessment undertaken; and, aaily monitoring of the compound works area, the water treatment and pumping system and the percolation area will be completed by a suitably qualified person during the construction phase. All necessary preventative measures will be implemented to ensure no entrained sediment, or deleterious matter is discharged to the watercourse;	As Required	Monthly	ECoW
MX11	Clear felling of Coniferous Plantation	EIAR Chapter 9	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	As Required	Monthly	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			crossing points. Where possible, existing drains will not be disturbed during felling works. The ECoW will 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 3 (Site Monitoring Form (Visual Inspections)) of the Forestry & Freshwater Pearl Mussel Requirements.			
MX12	Existing Degraded Culvert Removal	EIAR Chapter 4	The topography and ground conditions will be reviewed at the location			
MX13	Plant and Equipment Inspections	EIAR Chapter 9 CEMP Section 4	The plant used will be regularly inspected for leaks and fitness for purpose.	As Required	Monthly	ECoW
MX14	Plant and Equipment Inspections	CEMP Section 3	The roads and bridges along the haul route will be subject to a condition survey by a suitably qualified engineer both before and after construction as appropriate. Protection measures for such infrastructure as specified by the appointed engineers report will be implemented in full prior to construction. Where any temporary accommodation works are required along turbine haul route these areas will be reinstated to original condition after deliveries have been completed. However, permanent carriageway strengthening works have been proposed at the Black Bridge. The Black Bridge carriageway strengthening works will be carried out to the specifications of the OPW bridge design guidelines 'Construction, Replacement or Alteration	Daily	Monthly	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			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. In the event of construction damage arising on any roads or bridges along the haul route it will be rectified immediately by the developer under consultation with the relevant roads engineer.			
MX15	Flora and Fauna	CEMP Section 4	The Project Ecologist/Ornithologist will be available to support the ECoW on matters relating to the protection of sensitive habitats and species encountered prior to or during the construction phase of the Proposed Project. The Project Ecologist will not be full time on site but will undertake pre-commencement surveys and visit the site as required. The responsibilities and duties of the Project Ecologist/Ornithologist will include the following: › Undertake a pre-construction transect/walkover bird survey to ensure that significant effects on breeding birds will be avoided. › Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Site. › Oversee management of ornithological and ecological issues during the construction period and advise on ornithological 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. › Carry out ecological monitoring and survey work as may be required by the planning authority.	As required	As required	Project Ecologist/Ornithologist
MX16	Noise and Vibration	CEMP Section 4	Monitoring typical levels of noise and vibration during critical periods and at sensitive locations will be carried out.	Daily	Monthly	ECoW

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
Operational Phase						
MX17	Surface Water Quality	EIAR Chapter 9 CEMP Section 4.2 SWMP	During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and Environmental Quality Standards (EQSs) will be undertaken for each primary watercourse, and specifically following heavy rainfall events (as per the CEMP included in Appendix 4-4 of this EIAR).	Monthly	Monthly	ECoW
MX18	Drainage Inspections	CEMP Section 3	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	Monthly	Monthly	ECoW
MX19	Ornithology	EIAR Chapter 7	A detailed post-construction Bird Monitoring Programme has been prepared for the operational phase of the Proposed Project (please refer to Appendix 7-6 for further details). The programme of works will monitor parameters associated with collision, displacement/barrier effects and habituation during the lifetime of the Proposed Project. Surveys will be scheduled to coincide with Years 1, 2, 3, 5, 10 and 15 of the lifetime of the Proposed Wind Farm. Monitoring measures are broadly based on guidelines issued by NatureScot (2009, 2017). The following individual components are proposed: › Vantage point surveys to monitor flight activity in the vicinity of Proposed Wind Farm turbines; › Breeding walkover surveys to monitor breeding bird activity at the Proposed Wind Farm site; › Collision monitoring, including carcass searches with trained dogs to monitor bird fatalities due to collision. These will include searcher efficiency and scavenger removal trails as a best practice measure.	Years 1, 2, 3, 5, 10 and 15	Monthly	Project Ornithologist

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
MX20	Bats	EIAR Chapter 6	**Bat Mitigation and Monitoring Plan** Full details of the proposed operational bat monitoring programme for the Proposed Wind Farm are provided in Section 6.2.1 of the Bat Report (Appendix 6-2) › The post-construction surveys will be carried out as per the pre-construction survey effort. Post-construction monitoring will include static detector surveys, walked survey transects and corpse searching to record any bat fatalities resulting from collision. › Static monitoring shall take place at each turbine during the bat activity season (between April and October) (NatureScot, 2021, NIEA, 2021). › Carcass searches, to monitor and record bat fatalities, shall be conducted at each turbine in accordance with NIEA Guidance. This shall include searcher efficiency trials and an assessment of scavenger removal rates to determine the appropriate correction factor to be applied in relation to determining an accurate estimate of collision mortality. › Monitoring surveys shall continue in Year 2 and 3, and where a curtailment requirement has been identified, the success of the curtailment strategy shall be assessed in line with the baseline data collected in the preceding year(s).	Years 1, 2, 3	Annually	Project Ecologist
MX21	Flora and Fauna	EIAR Chapter 6	The Biodiversity Management and Enhancement Plan (BMEP) sets out the measures to ensure that the Proposed Project will result in net gain in biodiversity. Monitoring will be undertaken on a yearly basis over 5 years as prescribed in this report and summarised in the BMEP. This will be undertaken in partnership between the Developer, the Project Ecologist and the Landowner. The proposed management actions will be conveyed to each	As required	As required	Project Ecologist The Developer The Landowner

Ref. No.	Reference Heading	Reference Location	Monitoring Measure	Frequency	Reporting Period	Responsibility
			of the landowners and management alterations implemented as required to achieve the targets of the management plan. Monitoring results will be reported by the Project Ecologist within an Annual Environmental Report. Any criteria failures identified and corrective actions will be implemented. Reports detailing the monitoring works carried out, the results obtained and a review of their success, along with any suggestions for amendments to the plan will be prepared. The enhancement plan will be updated and amended where required to improve the efficacy of the enhancement work.			
Decommissioning Phase						
MX22	Decommissioning	DP Section 3	The Site Manager in consultation with the ECoW will be responsible for employing the services of a suitably qualified ecologist and any other suitably qualified professionals as required throughout the decommissioning works.	As required	As required	Site Manager
MX23	Decommissioning	DP Section 3	Prior to decommissioning, a suitably qualified ecologist will complete an invasive species survey of any material proposed for use as part of foundation backfilling. The invasive species survey will also be undertaken along the cable route to identify invasive species at joint bay locations where excavation to expose the cabling for removal will be required.	As required	As required	Project Ecologist

9. PROGRAM OF WORKS

9.1 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.

It is estimated that the construction phase of the Proposed Project will take approximately 18-24 months from starting on site to the commissioning of the electrical system. Works will commence outside the bird nesting season (1st of March to 31st of August inclusive) if possible. Construction may commence at any stage from September onwards to the end of February, so that construction activities are ongoing by the time the next breeding bird season comes around and can continue throughout the next breeding season.

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 Saturday 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 main construction task items are outlined in Table 9-1 below, where 1st January has been selected as an arbitrary start date for construction activities.

Table 9-1 Indicative Construction Schedule

			Year 1				Year 2			
ID	Task Name	Task Description	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Site Health and Safety		■	■	■	■	■	■	■	■
2	Grid Connection	Construct Proposed Grid Connection Route to existing Ardnacrusha 110kV substation	■	■	■	■	■	■		
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	Substation and Electrical Works	Construct substation, and underground cabling between turbines		■	■	■	■	■		
6	Turbine Hardstands	Excavate/pile for turbine bases where required		■	■	■	■	■		
7	Turbine Foundations	Fix reinforcing steel and anchorage systems, erect shuttering, concrete pour				■	■	■		
8	Backfilling and Landscaping						■	■	■	■

9	Turbine Delivery and Erection										
10	Substation Commissioning										
11	Turbine Commissioning										

10. COMPLIANCE AND REVIEW

10.1 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.

10.2 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.

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

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

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

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

10.3 Environmental Compliance

The following definitions shall apply in relation to the classification of Environmental Occurrences during construction of the 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.

10.4 Corrective Action Procedure

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

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

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

If an environmental problem occurs on site that requires immediate attention direct communications between the Site supervisor/Construction Manager and the 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.

10.5 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 and will comply with the measures set out in the NIS, EIAR and any planning conditions.