APPENDIX 4-5

CONSTRUCTION AND ENVIRONMENTAL MANAGEMENT PLAN

Planning and Environmental Consultants

Construction and Environmental Management Plan

Laurclavagh Renewable Energy Development, Co. Galway

DOCUMENT DETAILS

Client:	**Laurclavagh Ltd.**
Project Title:	**Laurclavagh Renewable Energy Development, Co. Galway**
Project Number:	**210627**
Document Title:	**Construction and Environmental Management Plan**
Document File Name:	**CEMP D4 - 2024.03.12 - 210627**
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Planning and Environmental Consultants

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02	Draft	22/02/2024	KB/NMcH	ÓM

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1. INTRODUCTION

This Construction and Environmental Management Plan (CEMP) has been prepared by MKO on behalf of Laurclavagh Ltd, who intend to apply to An Bord Pleanála for planning permission to construct a renewable energy development which will comprise of 8 no. wind turbines and associated infrastructure, in the townland of Laurclavagh and adjacent townlands, near Tuam. The Proposed Project comprises the Proposed Wind Farm (subject to Section 37E planning application) and the Proposed Grid Connection (subject to a separate planning application under Section 182A of the Planning & Development Act 2000, as amended). ,. As detailed in Section 1.1.1 in Chapter 1 of the EIAR, for the purposes of this CEMP, the various project components are described and assessed using the following references: 'Proposed Project, 'the Site', 'Proposed Wind Farm' and ' Proposed Grid Connection'.

The CEMP has been prepared in conjunction with the Environmental Impact Assessment Report (EIAR) and by the Natura Impact Statement ('NIS') which will accompany the planning application for the Proposed Project to be submitted to the competent authority. Should the Proposed Project secure planning permission, the CEMP will be updated, in line with all conditions and obligations which apply to any grant of permission. The CEMP should be read in conjunction with the EIAR 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.

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 Management Plan

This report is presented as a guidance document for the construction of the proposed Laurclavagh Renewable Energy Development which will comprise of 8 no. wind turbines and associated infrastructure, in the townland of Laurclavagh and adjacent townlands, near Tuam, and a 110kV on-site substation and associated works, including underground 110kV cabling to connect to the national grid at Cloon 110kV substation, in the townland of Cloonascragh, Co. Galway.

For the purposes of the CEMP:

- The 'Proposed Wind Farm' refers to the 8 no. turbines and supporting infrastructure which is the subject of this Section 37E application.
- The 'Proposed Grid Connection' refers to the 110kV substation and supporting infrastructure which will be the subject of a separate Section 182A application.
- The 'Proposed Project' comprises the Proposed Wind Farm and the Proposed Grid Connection, all of which are located within the EIAR Site Boundary (the'Site') and assessed together within this EIAR.

The CEMP outlines clearly the mitigation measures and monitoring proposals that are required to be adhered to in order to complete the works in an appropriate manner.

The report is divided into nine sections, as outlined below:

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

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

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

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

Section 5 provides detail on the Health and Safety procedures to be followed on site.

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

Section 7 consists of a summary table of all mitigation proposals to be adhered to during the Proposed Project, categorised into 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 PROPOSED PROJECT DETAILS

2.1 Site Location

The Proposed Project site is used primarily for pastural agricultural land. The surrounding land use is also primarily pastural agricultural lands, as well as one-off rural housing.

The site location context is shown in Figure 2-1a and Figure 2-1b.

Access to the site, for Heavy Goods Vehicles (HGV), abnormal loads (e.g., turbine components) and general site traffic, such as construction staff and Light Goods Vehicles, will be via proposed new temporary access road at the west of the site, from the N83 for about 60m before joining up with the existing L61461, which will be upgraded as part of the Proposed Project. The Proposed Project is served by a number of existing public and agricultural roads and tracks.

The Proposed Grid Connection includes for underground 110kV cabling from the proposed 110kV onsite substation, in the townland of Laurclavagh, to the existing Cloon 110kV substation in the townland of Cloonascragh, Co. Galway. The underground cabling route to Cloon, measuring approximately 14.3km in length, is primarily located within the public road corridor. Current land-use along the grid connection comprises of public road corridor, public open space, and agriculture.

A full and detailed description of the Proposed Wind Farm for the purposes of the planning application and the additional elements that form part of the Proposed Project, assessed in this EIAR, is contained in Chapter 4 of this EIAR.

The townlands within which the Proposed Project (i.e., the Proposed Wind Farm and the Proposed Grid Connection) is located are listed in Table 2-1. All townlands are located in Co. Galway.

Table 2-1 Townlands within which the project is located.

Proposed Project Assessed in the EIAR & NIS	Project Component	Townlands
	Proposed Wind Farm	Ballynacreg North, Bunahevelly More, Cahermorris, Cluidrevagh, Kilcurriv Eighter, Kilcurrivard, Laurclavagh, Pollacossaun Oughter, Pollacossaun Eighter,
	Proposed Grid Connection	Ballynacreg North, Carheenshowagh, Claretuam. Clogh South, Cloonascragh, Cloonmore, Cloontooa, Common, Culleen, Cummer, Glennafosha, Killeelaun, Kilmore, Kilcurrivard, Laurclavagh, Moneen, Pollcossaun Eighter, Pollcossaun Oughter, Rusheens North, Rusheens South

2.2 Description of the Development

This section describes the Proposed Project (Proposed Wind Farm and Proposed Grid Connection) and its component parts which are the subject of separate planning applications under Section 37E (Wind Farm) and Section 182A (Grid Connection) of the Planning and Development Act 2000, as amended. The current application for planning permission to An Bord Pleanála in accordance with Section 37E of the Planning and Development Act 2000, (as amended) is for the Proposed Wind Farm.

For the purpose of this application the Proposed Project, hereafter the 'Proposed Wind Farm' will consist of the following:

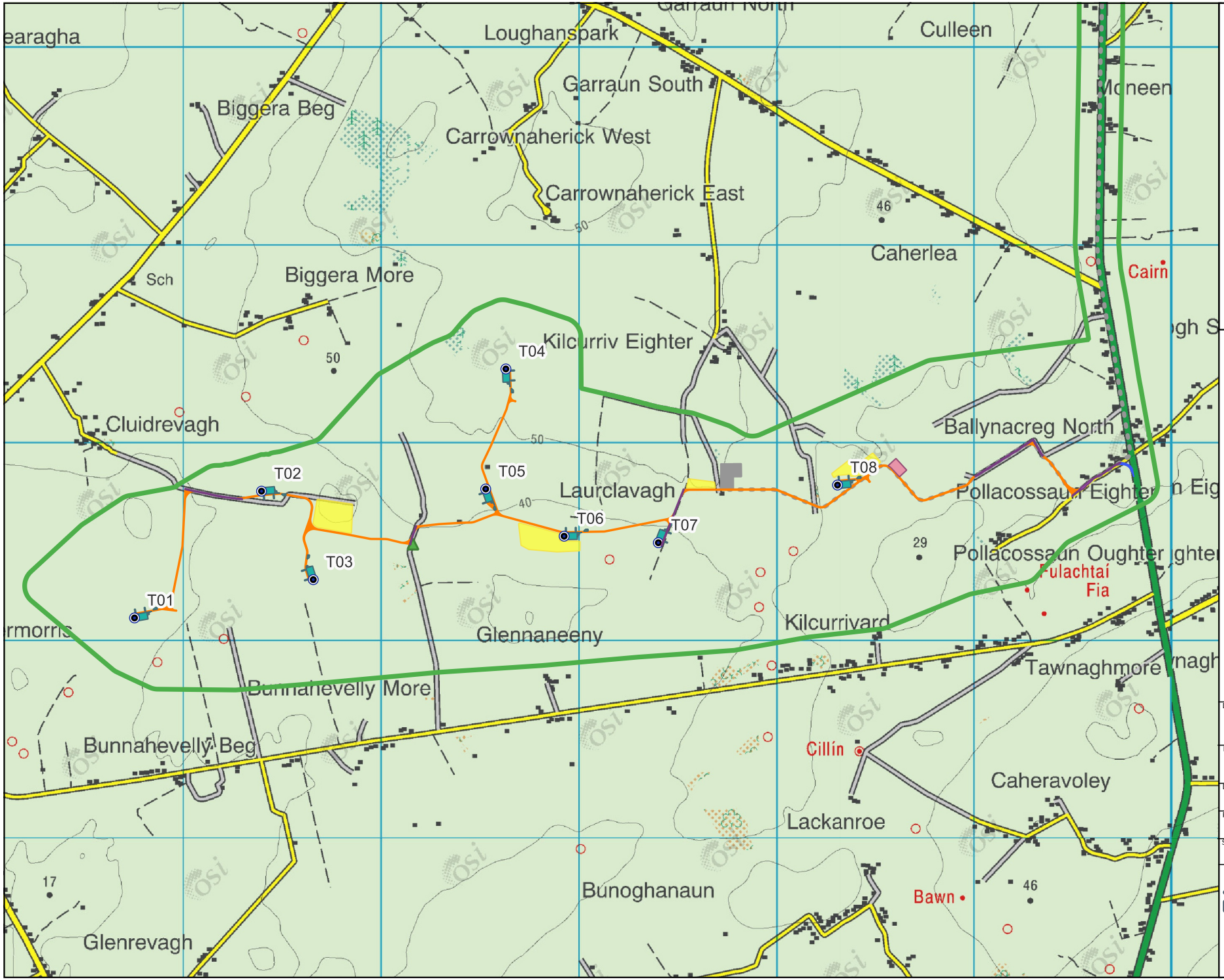
i. *8 no. wind turbines with an overall turbine tip height of 185 metres; a rotor blade diameter of 163 metres; and hub height of 103.5 metres, and associated foundations, hard-standing and assembly areas;*
ii. *A thirty-year operational life of the wind farm from the date of full commissioning of the wind farm and subsequent decommissioning;*
iii. *Underground electrical cabling (33kV) and communications cabling;*
iv. *A temporary construction compound;*
v. *A temporary security cabin;*
vi. *A meteorological mast with a height of 30 metres and associated foundation and hard-standing area;*
vii. *A new gated site entrance on the L61461;*
viii. *Junction accommodation works and a new temporary access road off the N83 to the L61461, to facilitate turbine delivery and construction access to the site;*
ix. *Upgrade of existing site tracks/ roads and provision of new site access roads, junctions and hardstand areas.*
x. *Upgrade of the existing L61461;*
xi. *Spoil Management;*
xii. *Site Drainage;*
xiii. *Tree and hedgerow removal;*
xiv. *Biodiversity Enhancement measures (including the planting of natural woodland, hedgerows and species rich grassland for new habitat);*
xv. *Operational stage site signage; and*
xvi. *All ancillary works and apparatus.*

This application seeks a ten-year planning permission

The Proposed Grid Connection, which will be subject to a separate planning application, includes for an onsite 110kV substation compound (2 no. control buildings with welfare facilities, all associated electrical plant and apparatus, security fencing, underground cabling, waste water holding tank, site drainage and all ancillary works), a temporary construction compound and approximately 14.3km of underground 110kV electrical cabling connecting the proposed onsite 110kV substation to the existing Cloon 110kV substation, near Tuam, Co. Galway.

The layout of the Proposed Project has been led by consideration of constraints and facilitators, thereby avoiding the environmentally sensitive parts of the Site. The roads layout for the Proposed Project utilises existing onsite access roads and tracks where possible, with approximately 1.5 kilometres of existing roadway/ tracks requiring upgrading and approximately 6.4 kilometres of new access road to be constructed.

The layout of the Proposed Wind Farm is shown on Figure 2-1 and the layout of the Proposed Grid Connection is shown on Figure 2-2.



Map Legend

- EIAR Site Boundary
- Proposed Turbine Location
- Proposed Hardstands
- Temporary Construction Compoun
- Proposed Met Mast Location
- Existing Roads For Upgrade
- Proposed New Roads
- Temporary Link Road
- Spoil Management Areas
- Section 182 Infrastructure

Drawing Title: Proposed Wind Farm Layout

Project Title: Laurclavagh Renewable Energy Development

Drawn By	Checked By
KB	OM
Project No.	Drawing No.
210627	Figure 2-1
Scale	Date
1:25,000	2024-03-13

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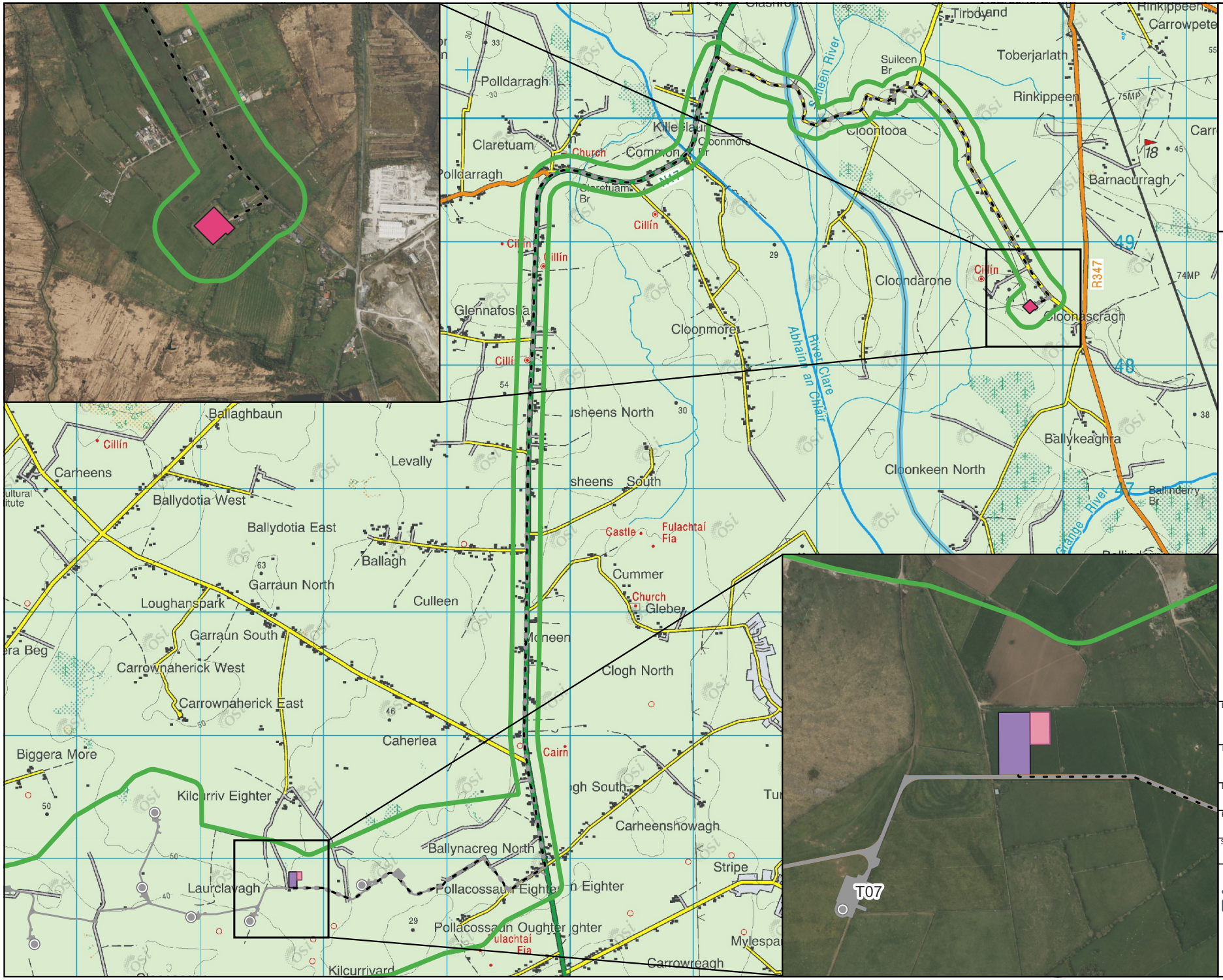
Map Legend
EIAR Site Boundary
Proposed 110kV Substation Location
Temporary Construction Compound
Proposed Underground Cabling Route
Cloon 110kV Substation
Section 37A Infrastructure
T07
Polldarragh
Claretuam
Church
Common
Killeclaun
Coonmore
Tirboyland
Toberjarlath
Rinkippeen
Carrowpeter
Suilcen Br
Cloontooa
Barnacurragh
Cloondarone
Cloonascragh
Cloonmore
Glennafosta
Ballykeaghra
Cloonkeen North
Ballaghbaun
Carheens
Levally
Ballydotia West
Ballydotia East
Ballagh
Garraun North
Loughanspark
Culleen
Garraun South
Carrownaherick West
Carrownaherick East
Caherlea
Biggera More
Kilcurriv Eighter
Laurclavagh
Ballynacreg North
Carheenshowagh
Stripe
Pollacossaun Eighter
Pollacossaun Oughter
Kilcurrivard
Carrowreagh
Mylespa
Cummer
Glebe
Castle
Fulachtaí Fia
Cairn
Clogh North
Ballinderry Br
Abhainn an Chlair River Clare
Grange River
Suilcen River
R347
Cillín
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Drawing Title
Proposed Grid Connection Layout
Project Title
Laurclavagh Renewable Energy Development
Drawn By
KB
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Project No.
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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 Compounds;
- Temporary Security Cabin;
- Hedgerow Removal and Replanting;
- Site Drainage;
- Spoil Management Areas;
- Access Roads (New & Upgrade to Existing Tracks);
- Meteorological Mast Foundations;
- Hardstanding Areas;
- Underground Electrical (33kV) and Communication Cabling
- Onsite 110 kV Substation and Control Buildings
- Underground Cabling (110kV)
- Watercourse Crossings on the Proposed Grid Connection
- Turbine Delivery Route
- Decommissioning;

2.3.2.1 Temporary Construction Compounds

There are 2 no. temporary construction compound proposed for the Site. 1 no temporary construction compound is located in the eastern section of the Proposed Wind Farm site, and measures approximately 4,030m^2, as shown in Figure 4-2 in Chapter 4 of this EIAR. The second temporary construction compound is located centre/east of the Proposed Wind Farm site, alongside the proposed 110kV substation. The second temporary construction compound measures approximately 2,600m^2, as shown on Figure 4-2 of Chapter 4 of the EIAR.

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

Construction materials and turbine components will be brought directly to the proposed use and turbine locations following their delivery to the Proposed Wind Farm site.

The temporary construction compounds will be constructed as follows:

- The area to be used as the compound will be marked out at the corners using ranging rods or timber posts. Drainage runs and associated settlement ponds will be installed around the perimeter;

- The compound platform will be established using a similar technique as the construction of the substation platform as discussed in Section 4.3.2.3 in Chapter 4 of this EIAR;
- 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 compound will be constructed as site roads and used as vehicle hardstanding areas during deliveries and for parking;
- A bunded containment area will be provided within the compound for the storage of lubricants, oils and site generators etc;
- A waste storage area will be provided within the compound;
- The compound will be fenced and secured with locked gates if necessary; and,
- Upon completion of the construction phase of the Proposed Project, the temporary construction compound will be decommissioned and allowed to vegetate naturally.

2.3.2.2 Temporary Security Cabin

A temporary security cabin will be located on a layby off the new proposed access road, just inside the Proposed Wind Farm site entrance off the L61461 Local Road. The layout and detail of the security cabin is shown on Figure 4-13. This site entrance will be gated (Figure 4-14), and the cabin will serve as the check in and check out point for staff and visitors during the construction phase. The security cabin will be a prefabricated structure measuring approximately 7.2 metres by 2.5 metres and 2.9 metres in height. The temporary cabin will be removed following completion of construction works of the Proposed Wind Farm.

2.3.2.3 Hedgerow Removal and Replanting

There will be a loss of approx. 1800m of linear habitat (hedgerow/treeline) to accommodate the footprint of the Proposed Project, including turbines and associated bat buffers, wind farm roads and other key infrastructure. This will be offset through the replanting of 3600m of hedgerow habitat within the Proposed Project site which will provide a 100% net gain of linear habitat. The hedgerows will be replanted within the suitable areas depicted in Figure 3-1 of Chapter 3 of this EIAR subject to landowner agreement.

2.3.2.3.1 *Replanting*

As noted above, approximately 1800m of linear habitat (hedgerow/treeline) will be lost in order to facilitate the footprint of the Proposed Project. The methods by which this loss will be offset through 100% net gain is laid out below.

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The below listed species, which were identified as being locally present during the detailed habitat surveys undertaken or identified as being suitable native species found within the wider local area, will be used in the species composition. The species selected will maximise flowering times throughout the year as well as berry availability later in the year as detailed in Table 3-1.

- Hawthorn (Crataegus monogyna)
  - Proportion of hedgerow mix: 75%
  - Age class to be planted: combination of whips and advanced nursery stock (10cm – 12 cm girth trees) to increase structure diversity.
- Hazel (Corylus avellana)
- Blackthorn (Prunus spinosa)
- Guelder rose (Viburnum opulus)
- Goat Willow (Salix caprea)

- Proportion of hedgerow mix: 25%
- Age class to be planted: Whips predominantly

Table 2-2 Hedgerow Species Flowering Periods[1]

Species	Blossoming Period
Willow	March - April
Blackthorn	March - April
Whitethorn/Hawthorn	May - June
Guelder Rose	May - July

2.3.2.3.2 *Hedgerow Management*

- Hedgerows to be trimmed on a 2- or 3-year rotation to maximise structural diversity and to prevent over-trimming,
- Hedgerows to reach approx. 2.5m height with an 'A' shape,
- Cut hedgerows between November and January. This will avoid the bird nesting season (March 1st to August 31st) and will avoid impacts on foraging pollinators,
- It is expected that ivy will self-colonise and this will be retained where possible,
- Grassy margins will be retained to preserve flowering ground flora,
- Avoid the use of fertilisers, slurry, herbicides and pesticides.

2.3.2.4 Site Drainage System

The early establishment of the drainage system will manage the risk of effects on watercourses on and adjacent to the Site during construction. In addition, construction operations will adopt best working practices and the development of the site will be phased accordingly.

The EIAR (and appended drawings) includes a drainage design required for the purposes of assessing the potential effects of the Proposed Project. The drainage design will be developed further with a level of construction detail necessary to implement the measures on site. The detailed (construction phase) drainage design will form part of the updated Main Contractor's CEMP and the effective implementation of the detailed drainage design will be audited by the ECOW. Surface water management and drainage design principles are outlined in Section 3.2 below and Section 4.6 of the EIAR.

2.3.2.5 Spoil Management Areas

The total estimated volume of spoil to be managed following excavations during the construction phase of the Proposed Project is circa 70,000m^3 with a 10% contingency. It is proposed to manage any excess overburden generated through construction activities locally within the Site, in spoil management areas, as depicted in Appendix 4-1 of Chapter 4. and as shown in Figure 4-21 in Chapter 4 of this EIAR.

The total capacity of the identified spoil management areas within the Site is approx. 74,000m3 and therefore, there is more than enough capacity to manage the total volume of spoil requiring management for both the Proposed Wind Farm and the Proposed Grid Connection as detailed in Table 4-3 and Table 4-5 in Chapter 4 of the EIAR.

[1] *National Biodiversity Data Series 7 – How-to-Guide – Hedgerows for Pollinators – National Biodiversity Data Centre: ISSN 2009-6852*

The spoil management areas and placement of spoil alongside access roads have been selected based on the locations of spoil generation, areas suitable for spoil management and environmentally constrained areas such as identified site-specific flood modelled zones as detailed in Chapter 9 this EIAR.

The following recommendations/best practice guidelines for the placement of spoil in identified spoil management areas and alongside access roads will be adhered to during the construction of the Proposed Project:

1. *At the identified spoil management areas, the vegetative top-soil layer will be removed to allow for spoil to be placed and upon reaching the recommended height, the vegetative topsoil layer will be reinstated.*
2. *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.*
3. *The placement of spoil will be restricted to a maximum height of 1.0m, subject to confirmation by the Geotechnical Engineer.*
4. *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.*
5. *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.*
6. *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 practices at spoil management areas when periods of heavy rainfall are expected so as to prevent excessive dirty water runoff from being generated.*
7. *An interceptor drain will be installed upslope of the identified spoil management areas to divert any surface water away from these areas.*
8. *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.*
9. *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.*
10. *All the above-mentioned general guidelines and requirements will be confirmed by the Geotechnical Engineer prior to construction.*
11. *The material will be backfilled into the spoil management areas and will be spread evenly across the area.*
12. *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.*

The plan view of the spoil management areas within the Wind Farm Site are shown in Figure 4-21 of Chapter 4 of this EIAR, along with section drawings of the spoil management areas shown in Figure 4-22 of Chapter 4.

As detailed in Table 4-3 of Chapter 4, the spoil volume requiring management for the Grid Connection underground electrical cabling route has been taken into account in the total spoil volume to be managed for the Proposed Project. As detailed above, there is capacity for all spoil to be managed within the proposed spoil management areas. While the spoil management areas have the capacity to take all of the spoil generated from the Proposed Project, some of the spoil from the Proposed Grid Connection will be disposed of at an appropriate licenced facility to avoid unnecessary hauling of spoil back to the site. This is dependent on the road makeup at locations along the underground electrical

cabling route and the distance from the underground electrical cabling route to the Wind Farm Site, the main contractor will determine the appropriate location for management of arisings from the Grid Connection underground electrical cabling route.

2.3.2.6 Access Roads

To facilitate travel within the Site and to connect the various project components together, existing access roads will need to be upgraded and new access roads will need to be constructed. The proposed access roads will be constructed using the following methodologies:

Upgrade of Existing Access Roads or Tracks

It is proposed to utilise existing roads at the Site where possible (approximately 1.5km will be upgraded). These roads will require upgrading which will comprise widening of the roadway to a total running width of approximately five metres, with wider sections at corners and on the approaches to turbine locations and the laying of a new surface dressing on the existing section of roadway where necessary.

The general construction methodology for upgrading of existing sections of excavated roads or tracks is summarised below.

1. *Access road construction shall be to the alignment of the existing road/track.*
2. *Excavation will be required on one or both sides of the existing access track to a competent stratum*
3. *Granular fill to be placed in layers in accordance with the designer's specification and to match the depth of stone on the existing track.*
4. *The upgraded roads will be constructed at the same level as the existing ground levels.*
5. *The surface of the existing/widened access track will be overlaid with up to 300mm of selected granular fill.*
6. *A layer of geogrid/geotextile may be required at the surface of the existing access road and in the widened section of road, where excessive rutting is anticipated (to be confirmed by onsite engineer).*
7. *Where possible, spoil berms will be placed alongside the upgraded access roads.*
8. *Where excavations in spoil are required, side slopes shall be not greater than 1 (v): 2. This slope inclination will be reviewed during construction, as appropriate.*
9. *The finished road width will be approximately 5m.*
10. *If required, interceptor drains will be installed upslope of the access road alignment to divert any surface water away from the construction area. (Typically, interceptor drains preserve existing watercourses as a 'clean water drainage system / network'; see Section 4.6.4.1 of this chapter under Drainage Design for further details.)*
11. *A final surface layer shall be placed over the existing access track, as per design requirements, to provide a suitable road profile and graded to accommodate wind turbine construction and delivery traffic.*

Sections of existing road for upgrade are shown in Figure 4-6 in Chapter 4 of this EIAR.

Construction of New Roads

There are approximately 6.4km of new access roads to be installed at the site. The general construction methodology for proposed new access roads is summarised below:

1. *Excavation will take place to a competent stratum beneath the topsoil (as agreed with the site designer and resident engineer.*

2. *Road construction will be carried out in sections of approximately 50m length i.e., no more than 50m of access road to be excavated without re-placement with stone fill.*
3. *The proposed roads will be constructed at the same level as existing ground levels as those which are already existing.*
4. *Placement of spoil berms along the proposed access roads shall be avoided within the site-specific flood zones.*
5. *The road build-up will be approximately 500mm of selected granular fill. Granular fill to be placed in layers in accordance with the designer's specification.*
6. *Access roads to be finished with a layer of capping material across the full width of the road.*
7. *A layer of geogrid/geotextile may be required at the surface of the competent stratum.*

A section of a new excavated road is shown in Figure 4-7 of Chapter 4 of the EIAR.

2.3.2.7 Turbine Foundations

Each wind turbine is secured to a reinforced concrete foundation that is installed below the finished ground level. The size of the foundation will be dictated by the turbine manufacturer, and the final turbine selection will be the subject of a competitive tender process. Different turbine manufacturers use different shaped turbines foundations, ranging from circular to hexagonal and square, depending on the requirements of the final turbine supplier. The turbine foundation transmits any load on the wind turbine into the ground. The maximum horizontal and vertical extent of the turbine foundation will be 22.5m and 3 to 3.5m respectively, which has been assessed in 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:

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

Standard excavated reinforced concrete bases will be completed as follows:

1. *A layer of lean-mix blinding will be laid approximately 75mm thick directly on top of the newly exposed formation, tamped and finished with a screed board to leave a flat level surface. The concrete should be protected from rainfall during curing and all surface water runoff from the curing concrete should be prevented from entering surface water drainage directly;*

2. *High tensile steel reinforcement will be fixed in accordance with the designer's drawings & schedules. The foundation anchorage system will be installed, levelled and secured to the blinding using steel box section stools;*
3. *Ductwork will be installed as required, and formwork erected around the steel cage and propped from the backside as required;*
4. *The foundation anchorage system will be checked both for level and line prior to the concrete being installed in the base. These checks will be passed to turbine manufacturer for their approval;*
5. *Concrete will be placed using a concrete pump and compacted when in the forms using vibrating pokers to the levels and profile indicated on the drawings. Upon completion of the concreting works the foundation base will be covered and allowed to cure;*
6. *Steel shutters will be used to pour the circular chimney section;*
7. *Earth wires will be placed around the base;*
8. *The foundation will be backfilled with a cohesive material, where possible using the material arising during the excavation or imported material and landscaped using the soil set aside during the excavation; and,*
9. *Any excess overburden excavated during construction shall be managed in line with the recommendations/ best practice guidelines outlined in Section 4.3.3 of Chapter 4 of the EIAR.*

2.3.2.8 Meteorological Mast Foundation

One metrological (met) mast is proposed as part of the Wind Farm Site. The met mast will be equipped with wind monitoring equipment at various heights. The proposed met mast will be located at E536128 N743508 (ITM) as shown on the Proposed Wind Farm Site layout drawing in Figure 4-2 in Chapter 4 of this EIAR. The meteorological (met) mast is a free-standing structure which will be constructed on a hardstanding area sufficiently large enough to accommodate the equipment that will be used to erect the mast. It is anticipated that the formation level of the met mast foundations will be on the lower mineral subsoil or bedrock. They will be formed at a suitable level directed by the Geotechnical Engineer/Designer. The foundations will be constructed as follows:

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

The met mast foundation will then be installed using the standard excavated reinforced concrete bases methodology as detailed above in Section 2.3.2.8.

2.3.2.9 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, position of the Proposed Wind Farm site access road, the proposed turbine position and the turbine supplier's exact requirements.

2.3.2.10 Underground Electrical (33kV) and Communication Cabling

Each turbine will be connected to the on-site electricity substation (part of the Proposed Grid Connection) via underground 33 kV (kilovolt) electricity cabling. Fibre-optic cables will also connect each wind turbine and the met mast to the on-site substation. The electricity and fibre-optic cabling connecting to the on-site substation compound will be run in cable ducts approximately 1.2 metres beneath ground level, along the sides of roadways or under the roadways. The route of the cable ducts 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 ducting may vary within the cabling trench. Figure 4-12 below shows two variations of a typical 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 and/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.

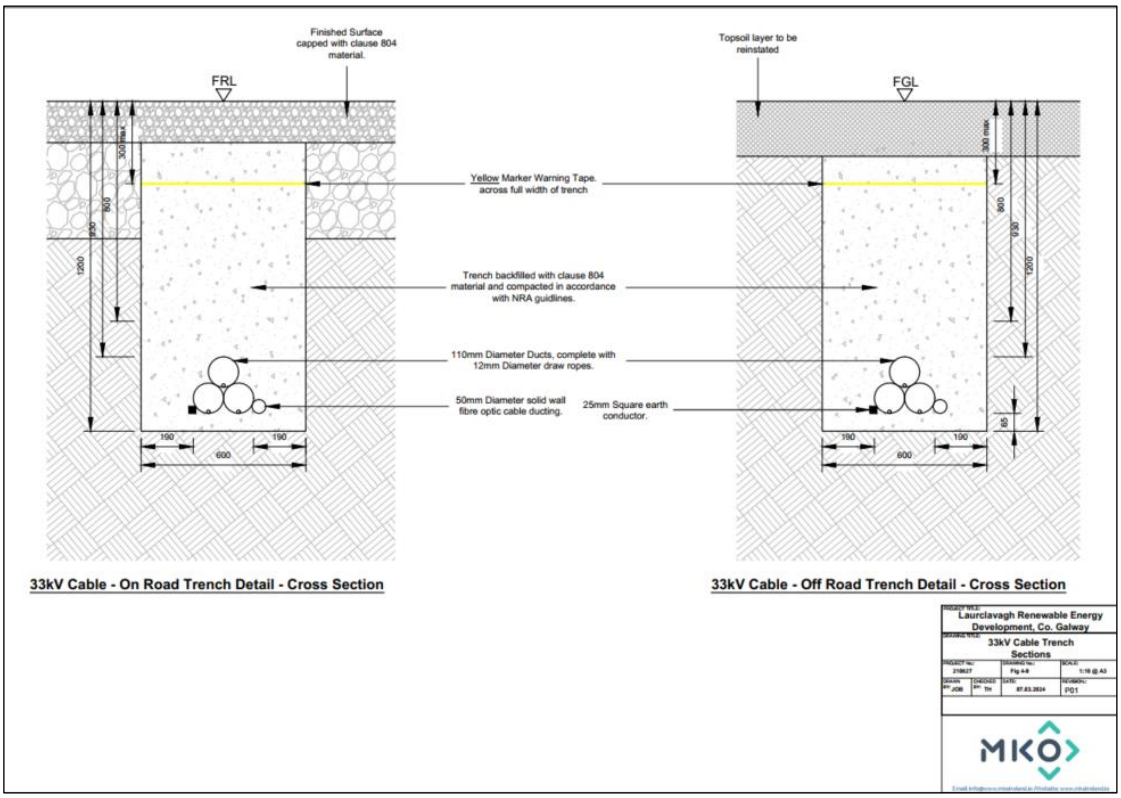

Figure 2-3 Cable trench cross section detail

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 Wind Farm site should sufficient volumes of suitable material not be encountered during the excavation phase of the proposed infrastructure.

Plate 2-1 Typical Cable Trench View

2.3.2.11 Onsite 110 kV Substation and Control Buildings

A new 110 kV electricity substation along with ancillary control building is proposed to be constructed in the centre of the Proposed Wind Farm site, as shown in Figure 2-1. The proposed onsite 110kV substation is located within agricultural land and will be accessed via the Proposed Wind Farm access roads. The layouts and elevations of the proposed onsite 110kV substation are shown on Figure 4-13 and 4-14 of Chapter 4 of this EIAR. The construction and exact layout of electrical equipment in the onsite 110kV substation will be to EirGrid / ESB Networks specifications.

Two wind farm control buildings will be located within the substation compound. Layout and elevation drawings of the control buildings are included in Figure 4-15 and Figure 4-16 of Chapter 4 of this EIAR.

The works will consist of construction of onsite 110kV substation, 2 no. control buildings, perimeter fencing, electrical plant and apparatus, and associated site works. The substation will be constructed using the following methodology:

1. *No material will be removed from site and the temporary placement areas will be stripped of vegetation prior to stockpiling within the identified spoil management areas.*
2. *The dimensions of the onsite substation area have been designed to meet the requirements of the EirGrid and the necessary equipment to safely and efficiently operate the Proposed Project.*
3. *2 no. control buildings will be built within the onsite substation compound;*
4. *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;*
5. *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;*
6. *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;*
7. *The roof slabs will be lifted into position using an adequately sized mobile crane;*

8. *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.*
9. *The substation plinths, transformer bund and oil interceptor will be shuttered and poured with reinforced concrete. An anti-bleeding admixture will be included in the concrete mix;*
10. *The electrical equipment will be installed on the concrete plinths and commissioned;*
11. *Underground cabling connecting the substation to the turbines will also be installed using standard methodology.*
12. *Lightning poles will be erected at appropriate locations adjacent to the substation. All lightning poles will be appropriately earthed.*
13. *Perimeter fencing will be erected around the substation and control buildings compound area.*
14. *The construction and components of the substation are to EirGrid specifications.*
15. *All drainage measures prescribed in the detailed drainage design for the Proposed Project will be implemented around the works area;*
16. *The wind farm control buildings will be set out by an engineer within the substation compound;*
17. *All wastewater from the staff welfare facilities in the control buildings will pass to a sealed storage tank. This tank will be fitted with an automated alarm system that will provide sufficient notice that the tank required emptying. The wastewater will be transported off site by a waste management contractor holding valid waste collection permits under the Waste Management (Collection Permit) Regulations, 2007 (as amended).*
18. *The construction and components of the substation will be to EirGrid specifications.*
19. *All excavations will be observed by a suitable qualified archaeologist.*

2.3.2.12 Underground Cabling (110kV)

The underground cabling works will consist of the installation of ducts in an excavated trench to accommodate power cables, and a fibre communications cables to allow communications between the proposed 110kV onsite substation and the existing 110kV Cloon substation. Further details are included in Appendix 4-8: Grid Connection Infrastructure.

The underground electrical cabling will be laid beneath the surface of the Proposed Wind Farm and the public road using the following methodology:

1. *Before works commence, updated surveying will take place along the proposed cable route, with all existing culverts identified. All relevant bodies i.e. ESB, Galway County Council, etc. will be contacted and all up to date drawings for all existing services sought.*
2. *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.*
3. *A tracked 360-degree excavator will then proceed to dig out the proposed trench, typically to a depth of 1315mm, within which the ducts will be laid.*
4. *The cable ducts will be concrete surrounded where they pass under the public road and under drains or culverts.*
5. *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.*
6. *Once the trench has been excavated, a base-layer will be laid and compacted, comprising Clause 804, or 15 Newton CBM4 concrete as required.*

7. *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.*
8. *As the works progress, the as-built location of the ducting will be recorded using a total station or GPS.*
9. *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.*
10. *Spacers will be used to ensure that the correct cover is achieved at both sides of the ducting.*
11. *The remainder of the trench will be backfilled in two compacted layers with approved engineer's specified material.*
12. *Yellow marker warning tape will be installed across the width of the trench, at 300mm depth,*
13. *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.*
14. *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.*

2.3.2.12.1 Existing Underground Services

Any underground services encountered along the cable route will be surveyed for level and the ducting will pass over or under the service provided adequate cover is available. In deeper excavations an additional layer of marker tape will be installed between the communications duct and top level yellow marker tape. If the required separation distances cannot be achieved then a number of alternative options are available such as using steel plates laid across the width of the trench and using 35N concrete surrounding the proposed ducting, with marker tape on the side of the trench. Back fill around any utility services will be with dead sand/pea shingle where appropriate, as detailed in Appendix 4-8: Grid Connection Infrastructure.

2.3.2.12.2 Joint Bays

Joint bays are typically pre-cast concrete chambers where lengths of cable will be joined to form one continuous cable. They will be located at various points along the proposed cable route, generally at intervals of 600 to 800 metres or as otherwise required by ESB/EirGrid and electrical requirements. Joint Bays are typically 2.5m x 6m x 1.75m pre-cast concrete structures installed below finished ground level.

Where possible, joint bays will be located in areas where there is a natural widening/wide grass margin on the road in order to accommodate easier construction, cable installation and create less traffic congestion. 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. 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. Once the cabling is installed the joint bays will be permanently backfilled with the existing surface re-instated and there will be no discernible evidence of the joint bay on the ground.

In association with Joint Bays, Communication Chambers are required at every joint bay location to facilitate communication links between the onsite 110kV substation and the existing 110kV Cloon substation. Earth Sheath Link Chambers are also required approximately every second joint bay along the cable route. 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 in

close proximity to Joint Bays. Earth Sheath Link Chambers and Communication Chambers will be pre-cast concrete structures with an access cover at finished surface level. The locations of the joint bays and chambers are shown on the Grid Connection Infrastructure in Appendix 4-8.

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

2.3.2.13 Watercourse Crossings on the Proposed Grid Connection and Connector Cable Route

The Proposed Wind Farm component of the Proposed Project will not require the crossing of any existing streams or watercourses. However, a total of 4 no. existing watercourse crossings and 1 no. Motorway crossing will be traversed along the N83 National Road and the L6141 to cater for the proposed 110kV cabling towards the existing Cloon 110 kV substation. The locations of the watercourse and motorway crossings are shown on Figure 4-15 and details of each crossing are show in Figures 4-26 – 4-29 in Chapter 4 of this EIAR. The watercourse crossing methodologies for the provision of the underground Proposed Grid Connection component of the Proposed Project at these locations is set out below with the most appropriated option being selected for each crossing. Instream works are not required at any watercourse crossing along the proposed IPP cable route or Proposed Grid Connection route.

Should an alternative methodology option listed below be required for individual crossings during the construction process this will be agreed with the relevant authorities including Galway County Council prior to works commencing.

2.3.2.13.1 *Crossing Using Standard Trefoil Formation – Type A*

Watercourses will not be directly impacted upon since no instream works or bridge/culvert alterations are proposed. Where adequate cover exists above a bridge/culvert or where a new bottomless box culvert or clear-span structure has been installed, the standard EirGrid approved trefoil arrangement will be used where the cable ducts pass over a culvert without any contact with the existing culvert or water course. The cable trench will pass over the culvert in a standard trench.

2.3.2.13.2 *Flatbed Formation Under Culverts – Type B*

Where cable ducts are to be installed under an existing culvert crossing where sufficient cover cannot be achieved by installing the ducts in a trefoil arrangement, the ducts will be laid in a much shallower trench the depth of which will be determined by the location of the bottom of the culvert. The ducts will be laid in this trench in a flatbed formation under the existing culvert and will be encased in 6mm thick steel galvanized plate with a 35N concrete surround as per EirGrid specification.

Any addition of a new pavement will be tied back into the existing road pavement at grade. After the crossing under the culvert has been achieved, the ducts will resume to the trefoil arrangement within a standard trench.

2.3.2.13.3 *Flatbed Formation over Bridges/Culverts – Type C*

Where cable ducts are to be installed over an existing bridge/culvert crossing where sufficient cover cannot be achieved by installing the ducts in a trefoil arrangement, the ducts will be laid in a much shallower trench the depth of which will be determined by the location of the top of the culvert or the depth of excavatable material over a bridge. The ducts will be laid in this trench in a flatbed formation over the existing culvert and will be encased in 6mm thick steel galvanized plate with a 35N concrete surround as per EirGrid specification.

Where a bridge or culvert has insufficient cover depth to fully accommodate the required trench, the ducts can be laid in a flatbed formation partially within the existing road surface. Where this option is to be employed, the ducts will also be encased in steel with a concrete surround as per EirGrid and/or ESB Networks specifications. In order to achieve cover over these ducts and restore the carriageway of the road, it may be necessary to raise the pavement level locally to fully cover the ducts. The increased road level will be achieved by overlaying the existing pavement with a new wearing course as required. Any addition of a new pavement will be tied back into the existing road pavement at grade. After the crossing over the culvert has been achieved, the ducts will resume to the trefoil arrangement within a standard trench.

2.3.2.13.4 *Horizontal Directional Drilling – Type D*

Horizontal Directional Drilling (HDD) will be utilised at the following locations:

- WC2 – Bridge Crossing over River Clare
- Crossing under M17 Motorway

The horizontal directional drilling method of duct installation is carried out using Vermeer D36 x 50 Directional Drill (approximately 22 tonnes), or similar plant. The launch and reception pits will be approximately 2.5mm wide, 2.5m long and 2.0m deep. The pits will be excavated with a suitably sized excavator. The drilling rig will be securely anchored to the ground by means of anchor pins which will be attached to the front of the machine. The drill head will then be secured to the first drill rod and the operator will commence to drill into the launch pit to a suitable angle which will enable him to obtain the depths and pitch required to the line and level of the required profile. Drilling of the pilot bore will continue with the addition of 3.0m long drill rods, mechanically loaded and connected into position.

During the drilling process, a mixture of a natural, inert and fully biodegradable drilling fluid such as Clear Bore™ and water is pumped through the centre of the drill rods to the reamer head and is forced in to void and enables the annulus which has been created to support the surrounding subsoil and thus prevent collapse of the reamed length. Depending on the prevalent ground conditions, it may be necessary to repeat the drilling process by incrementally increasing the size of the reamers. When the reamer enters the launch pit, it is removed from the drill rods which are then passed back up the bore to the reception pit and the next size reamer is attached to the drill rods and the process is repeated until the required bore with the allowable tolerance is achieved.

The use of a natural, inert and biodegradable drilling fluid such as Clear Bore™ is intended to negate any adverse impacts arising from the use of other, traditional polymer-based drilling fluids and will be used sparingly as part of the drilling operations. It will be appropriately stored prior to use and deployed in the required amounts to avoid surplus. Should any excess drilling fluid accumulate in the reception or drilling pits, it will be contained and removed from the site in the same manner as other subsoil materials associated with the drilling process to a licensed recovery facility.

Backfilling of launch & reception pits will be conducted in accordance with the normal specification for backfilling excavated trenches. Sufficient controls and monitoring, as listed below, will be put in place during drilling to prevent frack-out, such as the installation of casing at entry points where reduced cover and bearing pressure exits.

- The area around the Clear Bore™ batching, pumping and recycling plants shall be bunded using terram and sandbags in order to contain any spillages;
- One or more lines of silt fences shall be placed between the works area and adjacent rivers and streams on both banks;
- Accidental spillage of fluids shall be cleaned up immediately and transported off site for disposal at a licensed facility; and,
- Adequately sized skips will be used for temporary storage of drilling arisings during directional drilling works. This will ensure containment of drilling arisings and drilling flush.

2.3.2.14 Turbine Delivery Route

It is proposed that large wind turbine components will be delivered to the Proposed Wind Farm site, from Galway Port, north through Galway city via the Lough Atalia Road, the R339 Wellpark Road, northwest onto the R336 Tuam Road, and north again onto the N83 Galway – Tuam National Road for approximately 19.2km. In order to access the Proposed Wind Farm site from the N83, turbine component loads will access the site via a new temporary road to the west of the N83, south of the junction to the existing L61461 Local Road. The temporary road will be constructed as per the methodologies outlined in Section 2.3.2.6 above. The temporary road will join the existing L61461 Local Road approximately 60m west of the junction, , which will be upgraded as part of the Proposed Project.

A swept path analysis was undertaken using Autotrack for the blade and tower transporter vehicles, and while traffic lights and street furniture will require to be removed during the delivery of the large plant, the assessment indicates that the large turbine delivery vehicles will be accommodated at these locations. No permanent accommodation works are required along the turbine delivery route.

2.3.2.15 Decommissioning

The wind turbines proposed as part of the Proposed Wind Farm site are expected to have a lifespan of approximately 30 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 site may be decommissioned fully.

Upon decommissioning of the Proposed Wind Farm site, 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 components will be separated and removed offsite The turbine materials will be transferred to a suitable recycling or recovery facility. 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. 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.

Site roadways could be in use for purposes other than the operation of the Proposed Project 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 serve as agricultural roads for local landowners.

The Proposed Grid Connection underground electrical cabling route and onsite substation will remain in place as it will be under the ownership and control of the ESB and EirGrid.

A Decommissioning Plan has been prepared (Appendix 4-7) 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 agreed 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 Project, 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 principles, dust and noise control measures and a waste management plan for the site.

3.2 Protecting Water Quality

3.2.1 Good Environmental Management During Construction

Timing of works can strongly influence the potential for damaging the freshwater environment. Operations during wetter periods of the year pose a significantly greater risk of causing erosion and siltation, which can be particularly severe following major rainfall or snowmelt events. Traditionally, wind farm construction undertaken during the drier summer months will 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 could potentially be impacted.

3.2.2 Site Drainage Principles

The site drainage features have been outlined in Chapter 4, Section 4.5 of the EIAR in addition to the drainage design and management for the Proposed Project. The protection of the watercourses within and surrounding the Site, and downstream catchments that they feed is of utmost importance in considering the most appropriate drainage proposals for the site of the Proposed Project. The Proposed Project's drainage design has therefore been proposed specifically with the intention of having no negative impact on the water quality of the site and its associated rivers and lakes, and consequently no impact on downstream catchments and ecological ecosystems.

Drainage water from any works areas of the site of the Proposed Project will not be directed to any natural watercourses within the Site. Two distinct methods will be employed to manage drainage water within the Site. The first method involves keeping clean water clean by avoiding disturbance to natural drainage features, minimising any works in or around artificial drainage features, and diverting clean surface water flow around excavations and construction areas. The second method involves collecting any drainage waters from works areas within the Site that might carry silt or sediment, to allow attenuation and settlement prior to controlled diffuse release via recharge.

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

The drainage design has been prepared based on experience of the project team on other renewable energy sites in limestone bedrock environments, and in accordance with a number of best practice guidance documents.

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

- Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Department of Environment, Heritage and Local Government (2006): Wind Energy Development Guidelines for Planning Authorities;
- Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- Forestry Commission (2011): Forests and Water UK Forestry Standard Guidelines, Fifth Edition. Publ. Forestry Commission, Edinburgh;
- Coillte (2009): Forest Operations & Water Protection Guidelines;
- Forest Service (Draft): Forestry and Freshwater Pearl Mussel Requirements – Site Assessment and Mitigation Measures;
- Forest Service (2000): Forestry and Water Quality Guidelines. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford;
- Forest Service, (2000): Code of Best Forest Practice – Ireland. Forest Service, DAF, Johnstown Castle Estate, Co. Wexford;
- COFORD (2004): Forest Road Manual – Guidelines for the design, construction and management of forest roads;
- MacCulloch (2006): Guidelines for risk management of peat slips on the construction of low volume low cost roads over peat (Frank MacCulloch Forestry Civil Engineering Forestry Commission, Scotland);
- National Roads Authority (2005): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Wind Farm Development Guidelines for Planning Authorities (September 1996);
- Eastern Regional Fisheries Board: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites;
- Inland Fisheries Ireland (2016): Guidelines on Protection of Fisheries During Construction Works Adjacent to Waters;
- Scottish Natural Heritage, 2010: Good Practice During Wind Farm Construction;
- PPG1 - General Guide to Prevention of Pollution (UK Guidance Note);
- PPG5 – Works or Maintenance in or Near Water Courses (UK Guidance Note);
- CIRIA Report No. C648 (2006): CIRIA (Construction Industry Research and Information Association) guidance on 'Control of Water Pollution from Linear Construction Projects';
- CIRIA Report Number C532 (2001): Control of water pollution from construction sites - Guidance for consultants and contractors.; and,
- Control of water pollution from linear construction projects -Technical guidance. CIRIA C648 London, 2006.

3.2.3 Site Drainage Design and Management

The proposed site drainage features for this site are outlined in Section 4.5 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.

3.2.3.1 Pre-Construction Drainage

Prior to commencement of works in sub-catchments across the Site, main drainage inspections will be completed to ensure ditches 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.

As indicated on the Drainage Design Drawings (included as Appendix 4-6 to this EIAR), there are no natural watercourses within the Proposed Wind Farm site. The Proposed Grid Connection underground cabling route is proposed to cross 4 no. watercourses. There will be no direct discharges to natural watercourses. All discharges from the proposed works areas or from interceptor drains will be made over vegetated ground at an appropriate distance from natural watercourse and lakes.

There are no artificial drains identified within the Proposed Wind Farm site, and so no pre-construction measures are needed to manage these.

3.2.3.2 Construction Phase Drainage

The key principles of drainage design that will be implemented and adhered to as part of the Proposed Project are as follows:

- Keep clean water clean by intercepting it where possible, upgradient of works areas, and divert it around the works areas for discharge as diffuse overland flow or for rewetting of land.
- Collect potentially silt-laden runoff from works areas via downgradient collector drains and manage via series of avoidance, source, in-line, treatment and outfall controls prior to controlled diffuse release as overland flow or for rewetting of land.
- No direct hydraulic connectivity from construction areas to watercourses or drains connecting to watercourses.
- No alteration of natural watercourses.
- Maintain the existing hydrology of the Site.
- Blocking of existing manmade drainage as appropriate.
- Daily inspection and recording of surface water management system by on-site Environmental Clerk of Works and immediate remedial measures to be carried out as required and works temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the Site.
- Use of siltbuster or equivalent system if required.

Runoff control and drainage management are key elements in terms of mitigation against effects on surface and groundwater bodies. Two distinct methods will be employed to manage drainage water within Site. The first method involves 'keeping clean water clean' by avoiding disturbance to natural drainage features, minimising any works in or around artificial drainage features, and diverting clean surface water flow around excavations, construction areas and temporary storage areas. The second method involves collecting any drainage waters from works areas within the Site that might carry silt or sediment, and nutrients, to route them towards settlement ponds (or stilling ponds) prior to controlled diffuse release over vegetated surfaces. There will be no direct discharges to surface waters. During the

construction phase all runoff from works areas (i.e. dirty water) will be attenuated and treated to a high quality prior to being released. The Proposed Drainage Design is included as Appendix 4-5 of the EIAR.

The Project Hydrologist will complete a detailed drainage design and maintenance plan before construction commences and will attend the site to set out and assist with micro-siting of proposed drainage controls as outlined in Section 4.5 of the EIAR. The drainage system will be excavated and constructed in conjunction with the road and hard standing construction. Drains will be excavated, and stilling ponds constructed to eliminate any suspended solids within surface water running off the site. Drainage measures, consisting of the following measures will be employed at the Site:

- Source controls:
  - Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sand bags, oyster bags filled with gravel, filter fabrics, and other similar/equivalent or appropriate systems.
  - Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures.
- In-Line controls:
  - Interceptor drains, erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems.
- Treatment systems:
  - Silt-buster system or equivalent.

Silt fencing will be emplaced downgradient of turbines, to prevent any runoff of sediment laden water. Silt fences are effective at removing heavy settleable solids. Inspection and maintenance of these structures will be carried out during construction phase. They will remain in place throughout the entire construction phase.

Silt fences will also be emplaced where the Proposed Grid Connection is near sensitive areas (*i.e.* watercourse crossing over River Clare).

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, most of the sediment is retained by the geotextile fabric allowing filtered water to pass through. The discharge from the silt bags will be directed to the settlement ponds, where the water will be allowed to naturally infiltrate to ground.

All of the above works will be supervised by the Environmental Clerk of Works (ECoW) supported by the Project Hydrologist.

Best practice and practical experience on other similar projects suggests that in addition to the drainage plans that are included in the EIAR, there are additional site-based decisions and plans 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 4.1 of this CEMP.

In relation to decisions that are made on site it is important to stress that these will be implemented in line with the associated drainage controls and mitigation measures outlined in Section 8 below, and to ensure protection of all watercourses.

The Project Hydrologist/Design Engineer will complete a site drainage and maintenance plan before construction commences and will attend the site to set out and assist with micro-siting of proposed drainage controls as outlined in Chapter 4, Section 4.6 of the EIAR. The drainage system will be

excavated and constructed in conjunction with the road and hard standing construction. Drains will be excavated, and stilling ponds constructed to eliminate any suspended solids within surface water running off the site.

Best practice and practical experience on other similar projects suggests that in addition to the drainage plans that are included in the EIAR, there are additional site-based decisions and plans 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 4.6 of this CEMP.

In relation to decisions that are made on site it is important to stress that these will be implemented in line with the associated drainage controls and mitigation measures outlined in Section 8 below, and to ensure protection of all watercourses.

3.2.3.3 Operational Phase Drainage

The Project Hydrologist will inspect and review the drainage system after construction has been completed to provide guidance on the requirements of an operational phase drainage system. This operational phase drainage system will have been installed during the construction phase in conjunction with the road and hardstanding construction work as described above and in Section 4.6 of the EIAR.

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

The drainage system will not be altered upon decommissioning. Measures which will be implemented to ensure no impacts upon the drainage system during decommissioning will be outlined within the Decommissioning Plan (Appendix 4-7) and fully agreed with the local authority prior to any decommissioning works.

3.2.3.4 Preparative Site Drainage Management

The detailed drainage design will specify all materials and equipment necessary to implement the drainage measures effectively, which 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 detailed drainage design measures as necessary. The detailed drainage measures will be installed prior to, or at the same time as the works they are intended to drain.

3.2.3.5 Pre-emptive Site Drainage Management

The works programme for the groundworks part of the construction phase of the Proposed Project will also take account of weather forecasts and predicted rainfall in particular. The Site Construction Manager is responsible for making the decision to postpone or abandon works. Large excavations and movements of overburden or large-scale overburden or soil stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast.

3.2.3.6 Reactive Site Drainage Management

In line with the requirements of the EIAR, the final drainage design prepared for the Proposed Project prior to commencement of construction will provide for reactive management of drainage measures. The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat silt-laden water from the works areas, will be monitored continuously by the ECoW or supervising hydrologist on-site. The contractor is solely responsible for the implementation of the detailed drainage design on site. The ECoW is responsible for monitoring the effectiveness of the

drainage design as it is implemented on-site. The ECoW or supervising hydrologist will respond to changing weather, ground or drainage conditions on the ground as the Proposed Project proceeds, to ensure the effectiveness of the drainage design is maintained in so far as is possible. This may require the installation of additional check dams, interceptor drains or swales as deemed necessary on-site. The drainage design may have to be modified on the ground as necessary, and the modifications will draw on the various features outlined above in whatever combinations are deemed to be most appropriate to situation on the ground as a particular time.

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

3.2.3.7 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 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 underground electrical cabling route.

On steeper slopes, silt fences, as detailed in Section 4.5 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.

3.2.3.8 Rainfall Forecasting and Monitoring

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

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

https://www.yr.no/en/forecast/daily-table/2-2966248/Ireland/Connacht/County%20Galway/Belclare

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

Actual rainfall will be monitored on site, ideally via an automated rain gauge with regular recording intervals recommended by the Project Hydrologist and a means of alerting the construction personnel of rainfall trigger levels. The recorded rainfall data should be available on site at all times for review by the ECoW, Project Hydrologist or any regulatory authorities. The appointed contractor will be required to outline their proposed means of recording rainfall on site to the satisfaction of the ECoW and the Project Hydrologist prior to commencement of work.

3.2.4 Refuelling, Fuel and Hazardous Materials

Wherever possible, vehicles will be refuelled off-site, particularly for regular road-going vehicles. On-site refuelling of machinery will be carried out at designated refuelling areas at various locations throughout the Site. Heavy plant and machinery will be refuelled on-site by a fuel truck that will come to the Site as required on a scheduled and organised basis. Other refuelling will be carried out using mobile double skinned fuel bowser. The fuel bowser will be parked on a level area on-site when not in use. All refuelling will be carried out outside designated watercourse buffer zones. 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 used during refuelling operations as required. All plant and machinery will be equipped with fuel absorbent material and pads to deal with any event of accidental spillage.

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:

- Road-going vehicles will be refuelled off site wherever possible;
- Fuels volumes stored on site should be minimised. Any fuel storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor;
- The electrical substation compound will be bunded appropriately to the volume of oils likely to be stored, and to prevent leakage to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor;
- Oils or fuels stored in turbines will be placed within an appropriately sized bunded unit to prevent leakage to groundwater or surface water;
- The plant used will be regularly inspected for leaks and fitness for purpose; and,
- An emergency plan for the construction phase to deal with accidental spillages will be developed (refer to Section 6 of this Plan) Spill kits will be available to deal with and accidental spillage in and outside the refuelling area.
- A programme for the regular inspection of plant and equipment for leaks and fitness for purpose will be developed at the outset of the construction phase.

3.2.5 Hedgerow Removal and Replanting

There will be a loss of approx. 1800m of linear habitat (hedgerow/treeline) to accommodate the footprint of the Proposed Project, including turbines and associated bat buffers, wind farm roads and other key infrastructure. This will be offset through the replanting of 3600m of hedgerow habitat within the Proposed Project site which will provide a 100% net gain of linear habitat. The hedgerows will be replanted within the suitable areas subject to landowner agreement.

3.2.6 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 Site:

- No batching of wet-cement products will occur on the Proposed Wind Farm site, the Proposed Grid Connection underground cabling route works, or near other ancillary construction activities.

- Ready-mixed supply of wet concrete products and where possible, emplacement of pre-cast elements, will take place;
- Where possible, pre-cast elements for concrete works will be used;
- No washing out of any plant used in concrete transport pr concreting operationa will be allowed on-site;
- Where concrete is delivered on Site, only the chute will need to be cleaned, using the smallest volume of water possible. No discharge of cement contaminated wates to the construction phase drainage system or directly to any artificial drain or watercourse will be permitted. Chute cleaning water is to be directed into a dedicated concrete wash-out pit. Decommissioning of this pit will occur at the end of the construction phase and water and solids will be tinkered and removed from the site to a suitable, non-polluting, discharge location;
- All concrete will be placed 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;
- Ensure pour site is free of standing water and plastic covers will be ready in case of sudden rainfall event;
- 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, and,
- 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 small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area, or a Siltbuster-type concrete wash unit or equivalent. This type of Siltbuster unit catches the solid concrete and filters and holds wash liquid for pH adjustment and further solids separation. The residual liquids and solids will be removed off-site by an appropriately authorised waste collector for disposal at an authorised waste facility. Where temporary lined impermeable containment areas are used, such containment areas are typically built using straw bales and lined with an impermeable membrane. Two examples are shown in Plates 3-1 and 3-2 below.

Plate 3-1 Concrete Washout Area

Plate 3-2 Concrete Washout Area

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.

One potential previously unrecorded archaeological monument was noted within the Site during the walk-over survey. It comprises a possible enclosure located c. 390m east of T8 and c. 60m east of the proposed new road to T8. The possible monument is not indicated on the available historic mapping. A photographic record of the Proposed Project is presented in Appendix 13-1 of this EIAR. A 30m buffer zone will be established around the newly recorded possible enclosure. During the Construction phase, the physical buffer will comprise durable temporary fencing with 'keep out' signage. The requirement for the buffer zone and associated signage should be included in the CEMP. No ground works or storage of materials or tracking of machinery will take place within the buffer zone.

Twenty recorded monuments are located within the Proposed Wind Farm site. The monuments are not, however, located in proximity to the Proposed Wind Farm infrastructure footprint. No direct effects to recorded monuments resulting from the Proposed Wind Farm are therefore identified.

Thirteen recorded monuments are located within 100m of the Proposed Grid Connection underground electrical cabling route, while none are located in the immediate vicinity of the proposed onsite 110kV substation or associated temporary construction compound. The Proposed Grid Connection underground electrical cabling route extends through the Zone of Notification for a number of recorded monuments and therefore mitigation measures will be implemented during construction works in order to avoid any negative effects arising during construction.

The Proposed Grid Connection underground electrical cabling route extends along the public road past ringfort GA043-088—. The public road would appear to cut the east side of the monument therefore mitigation is recommended in order to avoid any potential direct impacts to sub-surface elements of the monument which may survive beneath the public road.

- Pre-development archaeological testing of the proposed infrastructure in previously undisturbed greenfield areas of the 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).

- A report on the testing will be compiled on completion of the work and submitted to the NMS and the Planning Authority.
- The Proposed Grid Connection underground electrical cabling route will extend along the east side of the public road, where possible, where it extends past ringfort GA043-088— in order to avoid potential direct impacts to sub-surface archaeological elements of the monument or associated features which may exist in this area, Archaeological monitoring of all groundworks during the construction stage of the Proposed Project by a licensed archaeologist.
- A report on the monitoring will be compiled on completion of the work and submitted to the NMS and the Planning Authority.
- Further mitigation such as preservation in situ (avoidance), preservation by record (excavation), buffer zones may be required depending on the results of the monitoring.

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

3.4.1 Turbine and Materials Transport Route

3.4.1.1 Proposed Wind Farm

Galway Harbour in Galway City is the proposed point of arrival for the large turbine components for the Proposed Project.

The proposed TDR is as follows;

- From Galway Harbour the route travels northeast on Lough Atalia Road and the R339 for approximately 2.4kms to the signalised junction adjacent to Thermo King.
- The route continues left at this junction to travel north for approximately 0.3 kms to the junction adjacent to the Trappers Inn.
- At this point the route turns right onto the R336 to travel approximately 0.3 kms to the junction between the R336 / the N6 Bothar na dTreabh / N83.
- From this point the route travels straight through the R336 / the N6 Bothar na dTreabh / N83 junction onto the N83 and continues for approximately 19.4 kms through the village of Claregalway to the existing junction with the L-61461.
- At a point approximately 80m south of the L-61461 the TDR turns left where it is proposed that the abnormally sized loads will be accommodated on a new temporary access road of approximately 70m in length, before it connects into the L-61461 at a point approximately 70m to the west of the existing N83 / L-61461 junction.
- From this point the route travels west on the L-61461 for approximately 300m to the location of a new junction on the north side of the L-61461 that will provide access to the Proposed Wind Farm site.

3.4.1.2 Proposed Grid Connection

A description of the Proposed Grid Connection is provided in Section 4.3.2 of Chapter 4 of this EIAR. It is proposed that the 110kV onsite electrical substation in the townland of Laurclavagh is connected

by means of an underground 110kV electricity cable to the existing Cloon 110kV substation, located in the townland of Cloonascragh, Co. Galway. The Proposed Grid Connection underground cabling route is approximately 14.3km in length and runs through a combination of Proposed Wind Farm site roads, local roads and a national road. Please see Appendix 4-8 for section and plan detail.

Deliveries of materials for the construction of the Proposed Grid Connection infrastructure and underground cabling route will be via the public road network along the identified route. The proposed works will be rolling in nature; approximately 100-200m will be constructed along the L61461, N83 and L6141 at any one time. As the proposed underground grid route connection is located primarily within the public road corridor, it is estimated that a total of 118 days will be required to complete the laying of the underground grid connection cable in the public roads and undertake directional drilling works at the River Clare and the M17 Motorway crossing.

With respect to the traffic volumes that will be generated during the construction of the underground cabling route, it is estimated that there will be approximately 14 daily return trips made by a truck transporting materials and construction staff to and from the site. By its nature the impacts of these additional trips will therefore be temporary and slight.

The construction methodology of providing a Proposed Grid Connection underground cabling route under and along local road networks is well established and accepted nationwide. 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.

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

- **Traffic Management Coordinator** – a competent Traffic Management 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 Galway County Council and other relevant authorities in advance of deliveries of turbine components to the Site.
- **Information to locals** – Locals in the area will be informed of any upcoming traffic related matters e.g. delivery of turbine components at night, via letter drops and posters in public places. Information will include the contact details of the Contract Project 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 15.2.9 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 Site**– While the assessment above has assumed the worst case that construction workers will drive to the Site, the construction company will be required to provide a travel plan for construction staff, which will include the identification of a routes to / from the site and identification of an area for parking
- **Temporary traffic signs** – As part of the traffic management measures temporary traffic signs will be put in place at all key junctions, including the access junctions on the N83 and L61461. All measures will be in accordance with the *"Traffic Signs Manual, Section 8 – Temporary Traffic Measures and Signs for Road Works"* (DoT now DoTT&S) and "Guidance for the Control and Management of Traffic at Roadworks" (DoTT&S). A member of construction staff (flagman) will be present at key junctions during peak delivery times.
- **Delivery times of large turbine components** - The management plan will include the delivery of large wind turbine plant components at night in order to minimise disruption to general traffic during the construction stage.
- **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 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, etc. and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Construction traffic movements also have the potential to generate dust as they travel along the haul route.

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

Proposed measures to control dust include:

- Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff.
- All plant and materials vehicles shall be stored in dedicated areas within the Site.

- Turbines and construction vehicles will be transported to the site on specified haul routes only.
- Proposed Grid Connection infrastructure will be transported to the site on specified haul routes only.
- Construction materials for the Proposed Grid Connection and a small volume for the Proposed Wind Farm will be sourced locally from licenced quarries.
- The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as necessary.
- The roads adjacent to the site entrances will be checked weekly or damage/potholes and repaired as necessary.
- The transport of construction materials around the Site from the nearby quarry facilities will be covered by tarpaulin where necessary.
- Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Site to reduce the amount of emissions associated with vehicle movements.

When necessary, sections of the haul route will be swept using a truck mounted vacuum sweeper. It is not anticipated that vehicle or wheel washing facilities will be required as part of the construction phase of the Proposed Project because site roads will be formed before road-going trucks begin to make regular or frequent deliveries to the site (e.g. with steel or concrete). The site roads will be well finished with compacted hardcore, and so the public road-going vehicles will not be travelling over soft or muddy ground where they might pick up mud or dirt. A road sweeper will be available if any section of the public roads requires cleaning due to construction traffic associated with the Proposed Project.

3.6 Noise Control

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

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

- Diesel generators will be enclosed in sound proofed containers to minimise the potential for noise impacts;
- Plant and machinery with low inherent potential for generation of noise and/or vibration will be selected. All construction plant and equipment to be used on-site will be modern equipment and will comply with the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations;
- Regular maintenance of plant will be carried out in order to minimise noise emissions. Particular attention will be paid to the lubrication of bearings and the integrity of silencers;
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the works;
- Compressors will be of the “sound reduced” models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers;
- Machines, which are used intermittently, will be shut down during those periods when they are not in use;
- Training will be provided by the ECoW to drivers to ensure smooth machinery operation/driving, and to minimise unnecessary noise generation; and,
- Local areas of the haul route will be condition monitored and maintained, if necessary.

Section 8 of BS5228-1:2009+A1:2014 as outlined in Chapter 12 of the EIAR: Noise and Vibration, further 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 on site, including maintenance related to noise emissions;
- Vehicles will be loaded carefully to ensure minimal drop heights so as to minimise noise during this operation; and
- All ancillary plant such as generators and pumps will be positioned so as to cause minimum noise disturbance and if necessary, temporary acoustic screens or enclosures will be provided.

Where the BS5228 threshold levels are anticipated to be exceeded due to directional drilling activities along the underground electrical cabling route, the following are examples of measures that will be considered, where necessary, to mitigate noise emissions from these activities are as follows:

- Temporary boarding alongside the drilling rig or use of 'acoustic blanket panels' to hang from heras fencing or similar. Installation will be as close to the drilling rig as is practicable and fitted so as to interrupt any direct line of site between the drilling rig and the closest residential receptors.
- Examples of appropriate products include Echo Noise Defender and Soundex DeciBloc. It is anticipated that this will be required should directional drilling be used for the water crossings along the proposed underground grid connection cable route.

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

- Fit suitably designed muffler or sound reduction equipment to the rock breaking tool to reduce noise without impairing machine efficiency;
- Ensure all leaks in air lines are sealed;
- Erect acoustic screen between compressor or generator and noise sensitive area;
- When possible, line of sight between top of machine and reception point needs to be obscured;
- Enclose breaker or rock drill in portable or fixed acoustic enclosure with suitable ventilation;
- Air overpressure from a blast is difficult to control because of its variability, however, much can be done to reduce the effect. A reduction in the amount of primer cord used, together with the adequate burial of any that is above the ground, can give dramatic reduction to air overpressure intensities especially in the audible frequency range. Most complaints are likely to be received from an area downwind of the blast site, and therefore, if air blast complaints are a continual problem, it would be advisable to postpone blasting during unfavourable weather conditions if possible. As air blast intensity is a function of total charge weight, then a reduction in the total amount of explosives used can also reduce the air overpressure value;

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

If blasting is undertaken as part of the Proposed Project, a detailed assessment will be undertaken by a specialist blast design engineer to determine the blast design parameters; all mitigation measures specified by the blast design engineer to keep vibration values within the criteria in Section **Error! Reference source not found.** will be implemented.

Air overpressure from a blast is difficult to control, however, because of its variability much can be done to reduce the effect. A reduction in the amount of primer cord used, together with the adequate burial of any that is above the ground, can give dramatic reduction to air overpressure intensities especially in the audible frequency range. Should complaints arise, they are likely to be received from an area downwind of the blast site, and therefore, blasting will be postponed during unfavourable weather conditions. Furthermore, as air blast intensity is a function of total charge weight, then a reduction in the total amount of explosives used can also reduce the air overpressure value.

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

The methods used to minimise complaints could consist of some or all of the following:

- Restriction of hours within which blasting can be conducted (e.g. 09:00 – 18:00hrs).
- Notification to nearby residents before blasting starts (e.g. 24-hour written notification).
- The firing of blasts at similar times to reduce the 'startle' effect.
- On-going circulars informing people of the progress of the works.
- The implementation of an onsite documented complaints procedure.
- The use of independent monitoring by external bodies for verification of results.
- Trial blasts in less sensitive areas to assist in blast designs and identify potential zones of influence.

To ameliorate any potential noise impacts that may be present during the construction phase, a schedule of noise control measures has been formulated in accordance with best practice guidance. These are outlined in the Construction and Environmental Management Plan (CEMP) that has been prepared for the Proposed Project.

3.7 Invasive Species Management

A baseline invasive species survey was carried out at the site to identify the presence and location of any invasive species (listed under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) by a suitably qualified ecologist. As outlined in Chapter 6 of the EIAR, no invasive species was recorded from various areas within the EIAR Site Boundary.

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. This Invasive Species Management Plan will set out the best practice control methods which are summarised in the following sections. The Invasive Species Management Plan would be updated during construction.

3.7.1 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.

3.7.2 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:

- 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.

3.8 Waste Management

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

3.8.1 Legislation

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

The Act requires that any waste related activity has to have all necessary licenses and authorisations. It will be the duty of the Waste Manager on the site 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 for the Preparation of Resource and Waste Management Plans for Construction and Demolition Projects'* (2021[2]). 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.

3.8.2 Waste Management Hierarchy

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

Prevention and Minimisation:

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

Reuse of Waste:

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

Recycling of Waste:

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

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

3.8.3 Construction Phase Waste Management

3.8.3.1 Description of the Works

The construction of the development will involve:

- The 'Proposed Wind Farm' refers to the 8 no. turbines and supporting infrastructure which is the subject of this Section 37E application.

[2] *EPA (2021)* https://www.epa.ie/publications/circular-economy/resources/CDWasteGuidelines.pdf

- The 'Proposed Grid Connection' refers to the 110kV substation and supporting infrastructure which will be the subject of a separate Section 182A application.
- The 'Proposed Project' comprises the Proposed Wind Farm and the Proposed Grid Connection, all of which are located within the EIAR Site Boundary (the 'Site') and assessed together within this EIAR.

The turbines and met mast will be manufactured off site and delivered to the Proposed Wind Farm site where on site erection will occur.

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

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

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

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

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

Hazardous wastes that may occur on site during the construction phase of the development may include oil, diesel fuel, chemicals, paints, preservatives etc. All hazardous wastes will be stored in bunded containers/areas before being collected by an authorised waste contractor and brought to an EPA licensed waste facility. As mentioned above, hazardous wastes will be kept separate from non-hazardous wastes so that contamination does not occur.

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

Construction waste will arise on the project mainly from excavation and unavoidable construction waste including material surpluses and damaged materials and packaging waste.

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

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

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

3.8.3.3 Waste Arising from Construction Activities

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

The expected waste volumes generated on site are unlikely to be large enough to warrant source segregation at the wind farm site. Therefore, all wastes streams generated on site will be deposited into a single waste skip. This waste material will be transferred to a 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.

3.8.3.4 Waste Arising from Decommissioning

The design life of the proposed renewable energy development is 30 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 33 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
Lubricating Oils/Fluids	Oils used within wind turbines	13 02 04

3.8.3.5 Reuse

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

- Concrete will be reused as aggregate for roads cable trench backfilling material.
- Plastic packaging etc. will be 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.

3.8.3.6 Recycling

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

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

3.8.4 Implementation

3.8.4.1.1 *Roles and Responsibilities for Waste Management*

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

3.8.4.1.2 *Training*

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

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

3.8.4.1.3 *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.

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

- Consignment Reference Number
- Material Type(s) and EWC Code(s)
- Company Name and Address of Site of Origin
- Trade Name and Collection Permit Ref. of Waste Carrier
- Trade Name and Licence Ref. of Destination Facility
- Date and Time of Waste Dispatch
- Registration no. of Waste Carrier vehicle
- Weight of Material
- Signature of Confirmation of Dispatch detail
- Date and Time of Waste Arrival at Destination
- Site Address of Destination Facility

3.8.4.2 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 will always be employed when designing the plan to ensure that the least possible amount of waste is produced during the construction phase. Reuse of certain types of construction wastes will cut down on the cost and requirement of raw materials therefore further minimising waste levels.

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

4. ENVIRONMENTAL MANAGEMENT IMPLEMENTATION

The 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 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.

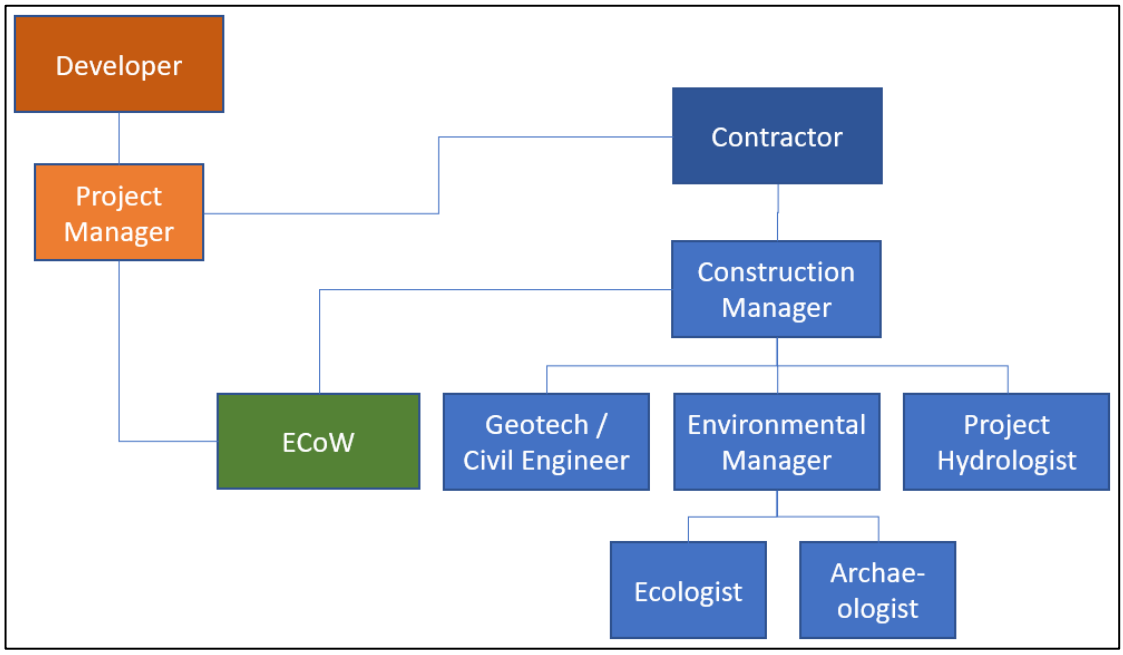

Figure 4-1Proposed Project Organogram

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

4.1.1 Site Supervisor/Construction Manager

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

- Implement all Proposed Project design requirements to minimise environmental risk;
- Implement all CEMP requirements and measures to minimise environmental risk;
- Ensure any site personnel responsible for directing works on site are familiar with all requirements of the CEMP;
- Propose revisions to the Proposed Project's CEMP for approval of the Project Developer, project design team and ECoW, only where any such revisions meet or exceed the standards and requirements set out in this document;
- Ensure that all environmental standards are achieved during the construction phase of the Proposed Project;
- Promptly implement any remedial action required to rectify and close-out any non-compliant items identified by 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:

- 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.

4.1.5 Project Hydrologist

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

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

- Assist in compiling/Preparation of 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 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 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.

4.1.7 Project Archaeologist

The Project Archaeologist will report to the Environmental Manager/ECoW and is responsible for archaeological monitoring of the site during the construction phase. This will include monitoring of site

investigations and excavation works as well as the monitoring and metal detection of spoil during construction.

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

4.2 Water Quality and Monitoring

4.2.1 Pre-Construction Baseline Monitoring

Baseline water quality field testing and laboratory analysis will be undertaken where required prior to commencement of construction at the site.

Analysis will be for a range of parameters with relevant regulatory limits along with Environmental Quality Standards (EQSs) and sampling will be undertaken at designated locations as outlined in Figure 9-5 of the EIAR.

Baseline sampling will be completed on at least two occasions, and these should ideally coincide with low flow and high flow stream conditions. The high flow sampling event will be undertaken after a period of sustained rainfall, and the low flow event will be undertaken after a dry spell.

4.2.2 Construction Phase Monitoring

4.2.2.1 Daily Visual Inspections

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

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

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

The following periodic inspection regime will be implemented:

- Daily general visual inspections of site operations and inspections of all drainage infrastructure within the Site and in the surrounding area by the ECoW or a suitably qualified and competent person as delegated by the ECoW;

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

4.2.2.2 Continuous Turbidity Monitoring

Turbidity monitors or sondes can be installed where required at locations surrounding the Site. The sondes will provide continuous readings for turbidity levels in the watercourse. This equipment will be supplemented by daily visual monitoring at their locations as outlined in the sections below.

4.2.2.3 Laboratory Analysis

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

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

4.2.2.4 Field Monitoring

Field chemistry measurements of unstable parameters, (pH, conductivity, temperature) will be taken at the surface water monitoring locations, as per water monitoring programme for the Proposed Project and each primary watercourse along the Proposed Grid Connection underground cable route. These analyses will be carried out by either the ECoW or the Project Hydrologist. In-situ field monitoring will also be completed after major rainfall events, i.e. after events of >25mm rainfall in any 24-hour period. The Project Hydrologist will monitor and advise on the readings collected by in-situ field monitoring.

4.2.2.5 Monitoring Parameters

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

- pH (field measured)

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

4.2.3 Construction Phase Drainage Inspections & Maintenance

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

Regular inspections of all existing and installed drainage measures should be undertaken by the Project Contractor, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water within the system. The contractor will devise a system of recording the findings of these inspections. Any excess build-up of silt levels at check dams, the settlement ponds, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. For this reason, the drainage measures installed on-site should be inspected at least weekly by the contractor and maintained as required during the construction phase of the Proposed Project to ensure good performance.

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

4.2.4 Surface Water Monitoring Reporting

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

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

Reports on water quality will consider all field monitoring and visual inspections, and results of laboratory analysis completed for that period. Reports will describe how the results compare with baseline data as well as previous reports on water quality. The reports will also describe whether any deterioration or improvement in water quality has been observed, whether any effects are attributable

to construction activities and what remedial measures, or corrective actions have been implemented. Any proposed alteration to sampling frequency will be agreed with the Planning Authority in advance.

4.3 Environmental Awareness and Training

4.3.1 Environmental Induction

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

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

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

4.3.2 Toolbox Talks

Toolbox talks would be held by the ECoW or Construction Manager at the commencement of each day, or at the commencement of new activities. The aims of the toolbox talks are to identify the specific work activities that are scheduled for that day or phase of work. In addition, the necessary work method statements and sub plans would be identified and discussed prior to the commencement of the day's activities. The toolbox talks will include training and awareness on topics including:

- On-site Ecological Sensitivities;
- Buffers to be upheld – watercourses, archaeology, ecology;
- Sediment and Erosion Control;
- Good site practice;
- On-site Traffic Routes and Rules;
- Keeping to tracks – vehicle rules;
- Strictly adhering to the development footprint;
- Fuel Storage;
- Materials and waste procedures;

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

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

5. HEALTH AND SAFETY

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

- Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005);
- Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2016 (S.I. No. 36 of 2016);
- S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021 and
- 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 risk 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. Safe Pass registration cards are required for all construction, delivery and security staff. Construction operatives will hold a valid Construction Skills Certificate Scheme card where required. The developer is required to ensure a competent contractor is appointed to carry out the construction works. The contractor will be responsible for the implementation of procedures outlined in the Safety and Health Plan. Public safety will be addressed by restricting Site access during construction. Fencing will be erected in areas of the Site where uncontrolled access is not permitted.

- Goal posts will be established under the existing 38kV overhead line, located along the N83, for the entirety of the construction phase of the Proposed Project.
- The suitability of machinery and equipment for use near power lines will be risk assessed.
- All staff will be trained on operating voltages of overhead electricity lines running the Site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the Site are made aware of the location of lines before they come on to Site.
- Barriers will run parallel to the overhead line at a minimum horizontal distance of 6 metres on plan from the nearest overhead line conductor wire.
- When activities must be carried out beneath overhead lines, e.g., component delivery or substation construction, a Site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are required.
- Information on safe clearances will be provided to all staff and visitors.
- Signage indicating locations and health and safety measures regarding overhead lines will be erected in canteens and on Site.
- All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the

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

The scale and scope of the project necessitates that a Project Supervisor Design Process (PSDP) and Project Supervisor Construction Stage (PSCS) are required to be appointed in accordance with the provisions of the Health & Safety Authority's '*Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013'*. 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

An Emergency Response Plan (ERP) is presented in this section of the CEMP. It provides details of procedures to be adopted in the event of an emergency in terms of site health and safety and environmental protection.

6.1 Emergency Response Procedure

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 them 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 5-1. This will be updated throughout the various stages of the Proposed Project.

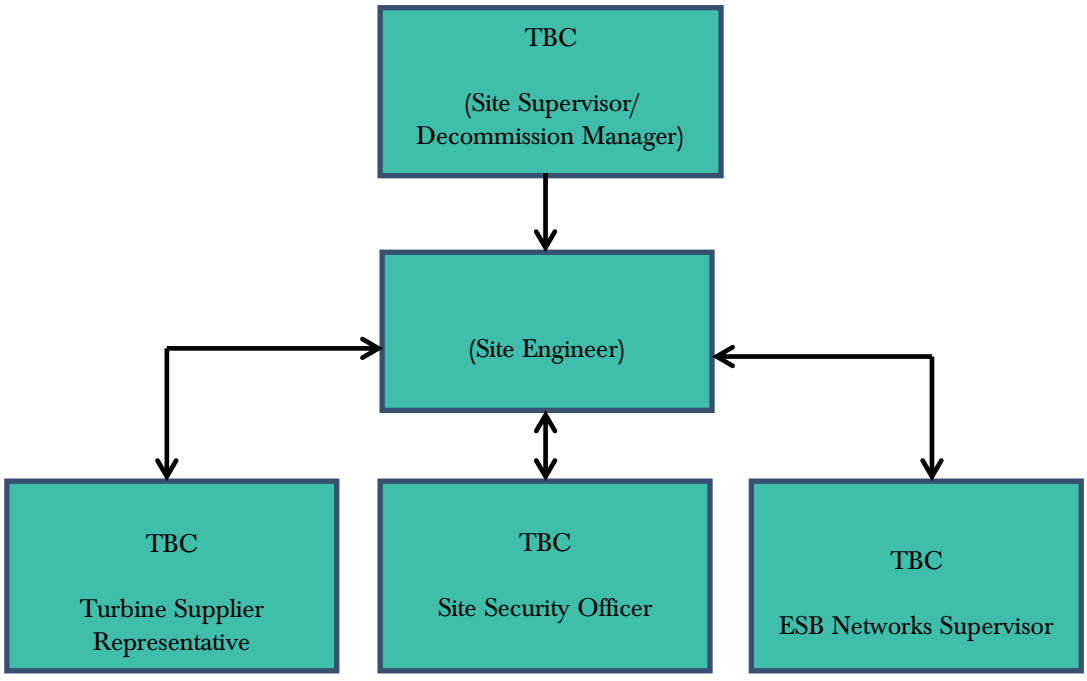

Figure 6-1 Emergency Response Procedure Chain of Command

6.1.2 Initial Step

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 causing 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 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 5.1.3.
- Make safe the area if possible and ensure that there is no identifiable risk exists with regard to dealing with the situation e.g. if a machine has turned over, ensure that it is in a safe position so as not to endanger others before assisting the injured.
- Contact the required emergency services or delegate the task to someone. If delegating the task, ensure that the procedures for contacting the emergency services as set out in Section 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 6.3.1.
- 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 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 Galway County Council, the Environmental Protection Agency (EPA), Inland Fisheries Ireland (IFI), National Parks and Wildlife Services (NPWS) etc. if deemed necessary.

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

6.3 Contacting the Emergency Services

6.3.1 Emergency Communications Procedure

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

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

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

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

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

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

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

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

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

Due to the remoteness of the site it may be necessary to liaise with the emergency services on the ground in terms of locating the site. This may involve providing an escort from a designated meeting point that may be located more easily by the emergency services. This should form part of the site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable.

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 – Gilligan House	076 106 4350
Hospital – University Hospital Galway	091 524 222
ESB Emergency Services	1850 372 999
Gas Networks Ireland Emergency	1850 20 50 50
Gardaí – Corofin Garda Station	093 41 422
Health and Safety Co-ordinator - Health & Safety Services	TBC
Health and Safety Authority	1890 289 389
Inland Fisheries Ireland (IFI)	1890 347 424
Project Supervisor Construction Stage (PSCS): TBC	TBC
Project Supervisor Design Stage (PSDS): TBC	TBC
Client: Laurclavagh Ltd.	021 7336034

6.4 Procedure for Personnel Tracking

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

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

6.5 Induction Checklist

Table 6-3 provides a list of items highlighted in this ERP which must be included or obtained during the mandatory site induction of all personnel that will work on the site. This will be updated throughout the various stages of the 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 remoteness of the Site it may be necessary to liaise with and assist the emergency services on the ground in terms of locating the Site. This may involve providing an escort from a designated meeting point that may be located more easily by the emergency services. This should form part of the Site induction to make new personnel and sub-contractors aware of any such arrangement or requirement if applicable.	
All operatives on site without any exception will have undergo a site induction where they will be required to provide personal contact details which will include contact information for the next of kin.	

7. MITIGATION PROPOSALS

All mitigation measures relating to the pre-commencement, 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 Galway County Council.

This section of the CEMP groups together all of the mitigation measures presented in the EIAR and its appendices. The Mitigation Measures are presented in the following pages.

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

Table 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-Construction Phase					
MM1	Environmental Management	EIAR Chapter 4	All proposed activities on the site of the Proposed Project will be provided for in an environmental management plan. A Construction and Environmental Management Plan (CEMP) has been prepared for the Proposed Project and is included in Appendix 4-5 of this EIAR. The CEMP sets out the key environmental considerations to be managed by the contractor during construction of the Proposed Project. The CEMP includes details of drainage, spoil management and waste management, and outlines clearly 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 all elements of 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	CEMP Section 4	› 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 onsite. › The Environmental Clerk of Works (ECoW) will be nominated by the Project Developer to oversee the Project Contractor's effective implementation of the Proposed Projects environmental requirements and obligations, as captured in the CEMP and provide on-site		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			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 all parties prior to commencement of construction, and may be further adjusted as required during the course of the Proposed Project.		
MM3	Surface Water Quality	CEMP Section 4	› Baseline water quality field testing and laboratory analysis will be undertaken where required prior to commencement of construction at the site. › Analysis will be for a range of parameters with relevant regulatory limits along with Environmental Quality Standards (EQSs) and sampling will be undertaken at designated locations as outlined in Figure 9-5 of the EIAR. › Baseline sampling will be completed on at least two occasions, and these should ideally coincide with low flow and high flow stream conditions. The high flow sampling event will be undertaken after a period of sustained rainfall, and the low flow event will be undertaken after a dry spell.		
MM4	Concrete Deliveries	EIAR Chapter 4 CEMP Section 3	› The arrangements for concrete deliveries to the site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site washout of trucks and discussing emergency procedures. › Only ready-mixed concrete will be used during the construction phase, with all concrete being delivered from local batching plants in concrete delivery trucks. The use of ready-mixed concrete deliveries will eliminate any potential environmental risks of on-site batching.		
MM5	Site Drainage Plan	EIAR Chapter 4, 9	The key principles of drainage design that will be implemented and adhered to as part of the Proposed Project are as follows:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		CEMP Section 4	› Keep clean water clean by intercepting it where possible, upgradient of works areas, and divert it around the works areas for discharge as diffuse overland flow or for rewetting of land. › Collect potentially silt-laden runoff from works areas via downgradient collector drains and manage via series of avoidance, source, in-line, treatment and outfall controls prior to controlled diffuse release as overland flow or for rewetting of land. › No direct hydraulic connectivity from construction areas to watercourses or drains connecting to watercourses. › No alteration of natural watercourses. › Maintain the existing hydrology of the Site. › Blocking of existing manmade drainage as appropriate. › Daily inspection and recording of surface water management system by on-site Environmental Clerk of Works and immediate remedial measures to be carried out as required and works temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the Site. › Use of siltbuster or equivalent system if required. ›		
MM6	Waste Management	EIAR Chapter 4 CEMP Section 3	› 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 Waste Management Plan, ensuring that all hired waste contractors have the necessary authorisations and that the waste management hierarchy is adhered to.		
MM7	Preparative Site Drainage Management	EIAR Chapter 4 CEMP Section 4	› The Project Hydrologist will complete a detailed drainage design and maintenance plan before construction commences and will attend the site to set out and assist with micro-siting of proposed drainage controls as outlined in Section 4.5 of the EIAR. › An adequate quantity of straw bales, clean stone, terram, stakes, etc. will be kept on site at all times to implement the detailed drainage design measures as necessary. The detailed		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			drainage measures will be installed prior to, or at the same time as the works they are intended to drain. › 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. › Silt fencing will be emplaced downgradient of turbines, to prevent any runoff of sediment laden water. Silt fences are effective at removing heavy settleable solids. Inspection and maintenance of these structures will be carried out during construction phase. They will remain in place throughout the entire construction phase. › Silt fences will also be emplaced where the Proposed Grid Connection is near sensitive areas (i.e. watercourse crossing over River Clare). › 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, most of the sediment is retained by the geotextile fabric allowing filtered water to pass through. The discharge from the silt bags will be directed to the settlement ponds, where the water will be allowed to naturally infiltrate to ground.		
MM8	Drainage Inspection	EIAR Chapter 4 CEMP Section 3	› Prior to commencement of works in sub-catchments across the Site, main drainage inspections will be completed to ensure ditches 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.		
MM9	Drainage Maintenance	EIAR Chapter 4 CEMP Section 4	› An inspection and maintenance plan for the on-site drainage system will be prepared in advance of commencement of any works. Daily visual inspections of drains and outfalls will also be performed during the construction period to ensure suspended solids are not entering streams and rivers on site, to identify any obstructions to channels and to allow appropriate maintenance of the drainage regime. Should the suspended solids levels		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			measured during construction be higher than the existing levels, the source will be identified, and additional mitigation measures implemented. Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed.		
MM10	Earthworks	CEMP Section 3	› 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.		
MM11	Traffic Management	EIAR Chapter 4, 15	› Prior to the Traffic Management Plan being finalised, a full dry run of the transport operation along the potential route will be completed using vehicles with attachments to simulate the dimensions of the wind turbine transportation vehicles. › When the Proposed Grid Connection 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.		
MM12	Spoil Management	EIAR Chapter 4 CEMP Section 3	› An interceptor drain will first 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. › All the recommended general guidelines and requirements for the placement of spoil in identified spoil management areas and alongside access roads will be confirmed by the Geotechnical Engineer prior to construction		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM13	Grid Connection Underground Cabling works	EIAR Chapter 4	› Before works commence, updated surveying will take place along the proposed cable route, with all existing culverts identified. All relevant bodies i.e. ESB, Galway County Council, etc. will be contacted and all up to date drawings for all existing services sought.		
			Construction Phase		
MM14	Refuelling	EIAR Chapter 4, 8, 9 CEMP Section 3	› Wherever possible, vehicles will be refuelled off-site, particularly for regular road-going vehicles. › On-site refuelling of machinery will be carried out at designated refuelling areas at various locations throughout the Site. › Heavy plant and machinery will be refuelled on-site by a fuel truck that will come to the Site as required on a scheduled and organised basis. › Other refuelling will be carried out using mobile double skinned fuel bowser. The fuel bowser will be parked on a level area on-site when not in use. All refuelling will be carried out outside designated watercourse buffer zones. › 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 used during refuelling operations as required. › All plant and machinery will be equipped with fuel absorbent material and pads to deal with any event of accidental spillage		
MM15	Concrete Deliveries and Management	EIAR Chapter 4 CEMP Section 3	› Only ready-mixed concrete will be used during the construction phase, with all concrete being delivered from local batching plants in concrete delivery trucks. The use of ready-mixed concrete deliveries will eliminate any potential environmental risks of on-site batching. › Before leaving the Site, washing of the delivery truck will be minimised and restricted to designated wash out areas. Wash out will be restricted to the concrete lorry's chute only.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Concrete lorries will be washed out fully at the off-site batching plant, where facilities are already in place. › The small volume of water that will be generated from washing of the concrete lorry's chute will be directed into a temporary lined impermeable containment area, or a Siltbuster-type concrete wash unit or equivalent. This type of Siltbuster (or similar) unit catches the solid concrete and filters and holds wash liquid for pH adjustment and further solids separation. The residual liquids and solids will be removed off-site by an appropriately authorised waste collector for disposal at an authorised waste facility. Where temporary lined impermeable containment areas are used, such containment areas are typically built using straw bales and lined with an impermeable membrane. › Site roads will initially be constructed with a subgrade and compacted with the use of a roller to allow concrete delivery trucks access all areas where the concrete will be needed. The final wearing course for the roads will not be provided until all turbine foundations 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 foundations will be pumped directly into the shuttered formwork from the delivery truck. If this is not practical, the concrete will be pumped from the delivery truck into a hydraulic concrete pump or into the bucket of an excavator, which will transfer the concrete to the location where it is needed. › The arrangements for concrete deliveries to the Site will be discussed with suppliers before work starts, agreeing routes, prohibiting on-site washout and discussing emergency procedures. › Clearly visible signage will be placed in prominent locations close to concrete pour areas specifically stating washout of concrete lorries is not permitted on the Site.		
MM16	Road Cleanliness	EIAR Chapter 4 CEMP Section 3	› The site roads will be well finished with compacted hardcore, and so the public road-going vehicles will not be travelling over soft or muddy ground where they might pick up mud or dirt. › A road sweeper will be available if any section of the public roads requires cleaning due to construction traffic associated with the Proposed Project.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› When necessary, sections of the haul route will be swept using a truck mounted vacuum sweeper.		
MM17	Watercourse Buffers	EIAR Chapter 4, 9 CEMP Section 3	› Drainage water from any works areas of the Site will not be directed to any natural watercourses within the Site. Two distinct methods will be employed to manage drainage water within the Site. The first method involves keeping clean water clean by avoiding disturbance to natural drainage features, minimising any works in or around artificial drainage features, and diverting clean surface water flow around excavations and construction areas. The second method involves collecting any drainage waters from works areas within the Site that might carry silt or sediment, to allow attenuation and settlement prior to controlled diffuse release via recharge.		
MM18	Wastewater Management	EIAR Chapter 4 CEMP Section 2	› The construction compound will consist of a bunded refuelling and containment area for the storage of lubricants, oils and site generators etc, and full retention oil interceptor, waste storage area, temporary site offices, staff facilities and car-parking areas for staff and visitors. Temporary port-a-loo toilets and toilets located within a staff portacabin will be used during the construction phase. Wastewater from staff toilets will be directed to a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to wastewater treatment plants. There will also be a water supply on site for hygiene purposes, by way of a temporary storage tank.		
MM19	Water Discharge	EIAR Chapter 4 CEMP Section 3	› Runoff control and drainage management are key elements in terms of mitigation against effects on surface and groundwater bodies. Two distinct methods will be employed to manage drainage water within Site. The first method involves 'keeping clean water clean' by avoiding disturbance to natural drainage features, minimising any works in or around artificial drainage features, and diverting clean surface water flow around excavations, construction areas and temporary storage areas. The second method involves collecting any drainage waters from works areas within the Site that might carry silt or sediment, and nutrients, to route them towards settlement ponds (or stilling ponds) prior to controlled diffuse release over vegetated surfaces. There will be no direct discharges to surface		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			waters. During the construction phase all runoff from works areas (i.e. dirty water) will be attenuated and treated to a high quality prior to being released. The Proposed Drainage Design is included as Appendix 4-5 of the EIAR.		
MM20	Drainage Measures	EIAR Chapter 4 CEMP Section 3	Drains will be excavated, and stilling ponds constructed to eliminate any suspended solids within surface water running off the site. Drainage measures, consisting of the following measures will be employed at the Site: Source controls: › Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sand bags, oyster bags filled with gravel, filter fabrics, and other similar/equivalent or appropriate systems. › Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures. In-Line controls: › Interceptor drains, erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems. Treatment systems: › Silt-buster system or equivalent.		
MM21	Interceptor Drains	EIAR Chapter 4	› Interceptor drains will be predominantly installed horizontally across slopes to run in parallel with the natural contour line of the slope. Intercepted water will travel along the interceptor drains, pass through piped drains, and onto areas downgradient of works areas where the drain will terminate at a level spreader. Across the entire length of the		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		CEMP Section 4	interceptor drains, the design elevation of the water surface along the route of the drains will not be lower than the design elevation of the water surface in the outlet at the level spreader.		
MM22	Collector/Infiltration Drains	EIAR Chapter 4 CEMP Section 4	› Collector/Infiltration drains are drains that will be used to intercept and collect runoff from construction areas of the site during the construction phase. These swales will remain in place to collect runoff from roads and hardstanding areas of the Proposed Wind Farm site during the operational phase. A collector drain is an excavated drainage channel located along the downgradient perimeter of construction areas, used to collect and carry any sediment-laden runoff to a sediment-trapping facility and stabilised outlet. They are similar in design to interceptor drains described above. › Collector/Infiltration drains will be installed in advance of any main construction works commencing. The material excavated to make the drain will be compacted on the downslope edge of the drain to form a diversion dike. All water collected within the drain will ultimately recharge to ground.		
MM23.	Infiltration Areas	EIAR Chapter 4 CEMP Section 4	› An infiltration area 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 infiltration areas will be located downgradient of any proposed works areas where possible in locations where they are not likely to contribute further to water ingress to construction areas of the site. › The water carried in interceptor drains will not have come in contact with works areas of the site, and therefore should be free of silt and sediment. The infiltration area will distribute clean drainage water onto vegetated areas where the water will infiltrate to ground. The discharge point will be on level or only very gently sloping ground rather than on a steep slope so as to prevent erosion.		
MM24	Check Dams	EIAR Chapter 4	› The velocity of flow in the interceptor drains and drainage swales, particularly on sloped sections of the channel, will be controlled by check dams, which will be installed at regular intervals along the drains to ensure flow in the drain is non-erosive.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		CEMP Section 4	› Check dams will restrict flow velocity, minimise channel erosion and promote sedimentation behind the dam. The check dams will be installed as the interceptor drains are being excavated. › 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.		
MM25	Culverts	EIAR Chapter 4 CEMP Section 4	› No surface watercourses have been mapped within the site. Modelling of potential surface waterflow-paths has been completed based on topography of the site which has identified potential flow-paths which surface water could take. Where these locations cross proposed or upgraded access roads, culverts have been incorporated into the design. › Where existing culverts are to be upgraded or extended, the works will be carried out to follow a method statement to be prepared in consultation with Inland Fisheries Ireland; › Where new culverts are proposed within the drainage measures presented in Appendix 4-6, these will be constructed in line with best practice guidance.		
MM26	Silt Bags	EIAR Chapter 4 CEMP Section 3	› 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, most of the sediment is retained by the geotextile fabric allowing filtered water to pass through. The discharge from the silt bags will be directed to the settlement ponds, where the water will be allowed to naturally infiltrate to ground.		
MM27	Siltbuster	EIAR Chapter 4 CEMP Section 4	› Siltbusters 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. They are specifically designed for use on construction sites.		
MM28	Silt Fences	EIAR Chapter 4	› Silt fencing will be emplaced downgradient of turbines, to prevent any runoff of sediment laden water. Silt fences are effective at removing heavy settleable solids. Inspection and		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		CEMP Section 3	maintenance of these structures will be carried out during construction phase. They will remain in place throughout the entire construction phase. › Silt fences will also be emplaced where the Proposed Grid Connection is near sensitive areas (i.e. watercourse crossing over River Clare).		
MM29	Oil Interceptor	CEMP Section 4	› Fuels volumes stored on site should be minimised. Any fuel storage areas will be bunded appropriately for the fuel storage volume for the time period of the construction and fitted with a storm drainage system and an appropriate oil interceptor; ›		
MM30	Water Discharges	EIAR Chapter 4 CEMP Section 3	› There will be no direct discharges to surface waters. During the construction phase all runoff from works areas (i.e. dirty water) will be attenuated and treated to a high quality prior to being released. › All groundwater and surface water arising from excavations will be pumped to the dirty water system prior to discharge from the works area; › 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.		
MM31	Excavations	EIAR Chapter 4 CEMP Section 4	› The extent of the excavation will be marked out and will include an allowance for trimming the sides of the excavation to provide a safe working area and slope batter; › Where excavations in spoil are required, side slopes shall be not greater than 1 (v): 2. This slope inclination will be reviewed during construction, as appropriate. › Where practical, the soil will be stripped over the area of the excavation and stored locally for reuse, the subsoil will be excavated and stored to one side for reuse during the landscaping around the finished turbine; › No material will be removed from site with excavated spoil being transported and stored in the identified spoil management areas within the Site. › All groundwater and surface water arising from turbine base excavation will be pumped to the dirty water system prior to discharge from the works area;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Soil excavation shall be observed by a qualified archaeologist in accordance with a scheme of archaeological monitoring to identify any significant remains as they come to light; The foundations excavation will be raised to formation level by compacted layers of well graded granular material will be spread and compacted to provide a hard area for the turbine foundation; › Where underground services are to be traversed during the construction of new roads throughout the Proposed Wind Farm site, roads will be constructed taking in line with the methodologies detailed in Chapter 4. ›		
MM32	Spoil Management	EIAR Chapter 4	› At the identified spoil management areas, the vegetative top-soil 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 is 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. › 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. › 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) for linear berms.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› 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 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 where necessary. › 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. ›		
MM33	Archaeological Conservation	EIAR Chapter 4, 13	› A 30m buffer zone will be established around the newly recorded possible enclosure. The buffer should comprise durable temporary fencing with 'keep out' signage. The requirement for the buffer zone and associated signage should be included in the CEMP. No ground works or storage of materials or tracking of machinery will take place within the buffer zone.		
MM34	Hedgerow Removal and Replanting	EIAR Chapter 4 CEMP Section 2	› There will be a loss of approx. 1800m of linear habitat (hedgerow/treeline) to accommodate the footprint of the Proposed Project, including turbines and associated bat buffers, wind farm roads and other key infrastructure. Approximately 3600m linear metres of new replacement hedgerow planting will be carried out along selected boundaries of fields within the Site. The replanting areas will be selected from the potential replanting areas presented in Figure 2-1 of the BMEP (Appendix 6-4), in consultation with the landowners who are supportive of the proposal. This will result in a 100% net gain in this habitat within the Site. Species planted in these locations will be of a similar composition to those occurring on site, namely, hawthorn and hazel, and will be of local provenance.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Further details with regard to species, planting location, and management is contained within the BMEP.		
			Operational Phase		
MM35	Wastewater Management	EIAR Chapter 4	› 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 site's 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 substation underground storage tank		
MM36	Electrical Substation	EIAR Chapter 4 CEMP Section 3	› It is not proposed to treat wastewater on site. Wastewater from the staff welfare facilities in the control buildings will be managed by means of a sealed storage tank, with all wastewater being tankered off site by permitted waste collector to a licenced wastewater treatment plant. › The electrical substation compound will be bunded appropriately to the volume of oils likely to be stored, and to prevent leakage to groundwater or surface water. The bunded area will be fitted with a storm drainage system and an appropriate oil interceptor; › Perimeter fencing will be erected around the substation and control buildings compound area.		
MM37	Drainage Maintenance	EIAR Chapter 4 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. This operational phase drainage system will have been installed during the construction phase in conjunction with the road and hardstanding construction work as described above and in Section 4.6 of the EIAR.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› The drainage system will be monitored in the operational phase until such a time that all areas that have been reinstated become re-vegetated and the natural drainage regime has been restored.		
MM38	Collector/Infiltration Drains	EIAR Chapter 4 CEMP Section 3	› Collector/Infiltration drains are drains that will be used to intercept and collect runoff from construction areas of the site during the construction phase. These swales will remain in place to collect runoff from roads and hardstanding areas of the Proposed Wind Farm site during the operational phase. A collector drain is an excavated drainage channel located along the downgradient perimeter of construction areas, used to collect and carry any sediment-laden runoff to a sediment-trapping facility and stabilised outlet. › Collector/Infiltration drains will be installed in advance of any main construction works commencing. The material excavated to make the drain will be compacted on the downslope edge of the drain to form a diversion dike. All water collected within the drain will ultimately recharge to ground.		
Decommissioning Phase					
MM39	Decommissioning	EIAR Chapter 4	› Prior to the end of the operational period the Decommissioning Plan (Appendix 4-7 of the EIAR) will be updated in line with decommissioning methodologies that may exist at the time and will agree with the competent authority at that time.		
MM40	Decommissioning	EIAR Chapter 4 Decommissioning Plan Section 2	› Upon decommissioning of the Site, all above ground turbine components will be separated and removed offsite. The turbine materials will be transferred to a suitable recycling or recovery facility. Turbine foundations will remain in place underground and will be covered with earth and reseeded as appropriate. › The foundations of the 8 no. turbine and met mast will be backfilled and covered, following the dismantling and removal of the wind turbines, with soil material. If there is usable soil or overburden material on the Site after construction, this material will be used. Alternatively, where material is not readily available on site, soil will be sourced locally and imported to site on heavy good vehicles (HGVs). The imported soil will be spread		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			and graded over the foundation using a tracked excavator and revegetation enhanced by spreading of an appropriate seed mix to assist in revegetation and accelerate the resumption of the natural drainage management that will have existed prior to any construction. › The underground cabling route connecting the turbines to the on-site substation will be removed from the cable ducts. 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.		
MM41	Decommissioning	EIAR Chapter 4 DP Section 3	The following mitigation measures are proposed to avoid release of hydrocarbons at the Proposed Wind Farm site: › Wherever possible, vehicles will be refuelled off-site, particularly for regular road-going vehicles. › On-site refuelling of machinery will be carried out at designated refuelling areas at various locations throughout the Site. › Heavy plant and machinery will be refuelled on-site by a fuel truck that will come to the Site as required on a scheduled and organised basis. › Other refuelling will be carried out using mobile double skinned fuel bowser. The fuel bowser will be parked on a level area on-site when not in use. All refuelling will be carried out outside designated watercourse buffer zones. › 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 used during refuelling operations as required. › All plant and machinery will be equipped with fuel absorbent material and pads to deal with any event of accidental spillage		
Chapter 5: Population and Human Health					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM42	Human Health	EIAR Chapter 5	Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made known. Local access to properties will also be maintained throughout any construction works and local residents will be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum.		
Construction Phase					
MM43	Land Use Patterns	EIAR Chapter 5	Current land use on the Proposed Wind Farm comprises small scale agriculture. Current use along the Proposed Grid Connection underground cabling route comprises of public road corridor, discontinuous urban fabric and agriculture. The predominant surrounding land use within the Population Study Area is also farmland and one-off rural housing. › The construction of the Proposed Grid Connection underground cabling route through the L-61461 local road, N83 National Road, and L6141 Local Road will be undertaken in a rolling construction method with 100m to 200m of cabling installed and back filled each day providing access in the evenings and night hours along the route. › A Traffic Management Plan, agreed with the Local Authority, will be in place for the construction phase of the Proposed Grid Connection underground cabling route. The Traffic Management Plan is included as Appendix 15-2 to this EIAR. › Local access for residents living along the Proposed Grid Connection underground cabling route will not be closed for the construction phase along the N83 National Road, as the road carriageway is wide enough to have access solutions in place, and there are also alternative access roads into the area.		
MM44	Residential Amenity	EIAR Chapter 5, 11, 12, 15	› All mitigation as outlined and in the corresponding chapters: Chapter 11 Air Quality, Chapter 12 Noise and Vibration, and Chapter 15 Material Assets will be implemented in order to reduce insofar as possible, impacts on residential amenity at properties located in the vicinity of Proposed Project construction works.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM45	Human Health	EIAR Chapter 5	› 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). › 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. › The suitability of machinery and equipment for use near power lines will be risk assessed. › All staff will be trained on operating voltages of overhead electricity lines running the Site. All staff will be trained to be aware of the risks associated with underground cables. All contractors that may visit the Site are made aware of the location of lines before they come on to Site.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› When activities must be carried out beneath overhead lines, e.g., component delivery or substation construction, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. › Information on safe clearances will be provided to all staff and visitors. › Signage indicating locations and health and safety measures regarding electrical cables will be erected in canteens and on Site. › All staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the Site Health and Safety Plan. › The suitability of machinery and equipment for use near power lines will be risk assessed. › All staff will be trained on operating voltages of electricity cables running the Site. All staff will be trained to be aware of the risks associated with overhead lines. All contractors that may visit the Site are made aware of the location of lines before they come on to Site. › When activities must be carried out beneath overhead lines, e.g., component delivery, a site-specific risk assessment will be undertaken prior to any works. The risk assessment must take into account the maximum potential height that can be reached by the plant or equipment that will be used prior to any works. Overhead line proximity detection equipment will be fitted to machinery when such works are requiredThe scale and scope of the project requires that a Project Supervisor Design Process (PSDP) and Project Supervisor Construction Stage (PSCS) are required to be appointed in accordance with the provisions of the Health & Safety Authority's '*Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013*'.		

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

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ 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.		
MM46	Human Health	EIAR Chapter 5, 10	› Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff. › All plant and materials vehicles shall be stored in dedicated areas within the Site. › Turbines and construction vehicles will be transported to the Site on specified haul routes only. › Construction materials for the Proposed Wind Farm and Proposed Grid Connection will be sourced locally from licenced quarries and transported on specified haul routes only. › The agreed haul route roads adjacent to the Site will be regularly inspected for cleanliness and cleaned as necessary. › The roads adjacent to the Site entrances will be checked weekly or damage/potholes and repaired as necessary. › Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Site to reduce the amount of emissions associated with vehicle movements.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-5). ›		
MM47	Human Health	Chapter 5, 9	› A bespoke drainage design which includes but is not limited to interceptor drains, check dams, swales and ponds will be implemented on the Site. › Chapter 9 of the EIAR details all best practice and mitigation measures to minimise the potential for entrainment of suspended sediment or potential hydrocarbon leak		
MM48	Human Health	Chapter 5, 12	› No plant used on Site will be permitted to cause an on-going public nuisance due to noise. › The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on Site operations. › All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract. › Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers. › Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use. › Any plant, such as generators or pumps, which is required to operate outside of general construction hours will be surrounded by an acoustic enclosure or portable screen. › During the course of the construction programme, supervision of the works will include ensuring compliance with the limits detailed in Chapter 12 using methods outlined in British Standard BS 5228-1:2014+A1:2019 Code of practice for noise and vibration control on construction and open Sites – Noise. › The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Saturday. However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (i.e., concrete pours, large		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			turbine component delivery, rotor/blade lifting) it could occasionally be necessary to work out of these hours.		
MM49	Human Health	EIAR Chapter 5, 15	› A complete Traffic and Transport Assessment (TTA) of the Proposed Project has been carried out by Alan Lipscombe Traffic and Transport Consultants. The full results of the TTA are presented in Section 15.1 of Chapter 15: Material Assets. › A Traffic Management Plan has also been developed in order to minimise any potential effect on the local population during the construction phase of the Proposed Project due to traffic. The plan will be developed and implemented to ensure any effect is short term in duration and slight in significance during the construction of the Proposed Project. › Prior to commencement of any works, the occupants of dwellings in the vicinity of the proposed works will be contacted and the scheduling of works will be made known. Local access to properties will also be maintained throughout any construction works and local residents will be supplied with the number of the works supervisor in order to ensure that disruption will be kept to a minimum.		
Operational Phase					
MM50	Human Health	EIAR Chapter 5	› There are no turbines proposed within 740m (4 x tip height) of any sensitive receptors. › All mitigation measures outlined in Chapter 12 (Noise), shadow flicker (Section 5.9 of Chapter 5 of this EIAR) and visual (Chapter 14) in this EIAR will be implemented in order to reduce insofar as possible, impacts on residential amenity at properties located within the in the vicinity of the Proposed Project. › A 2.6m high palisade fence will be erected around the substation which will be painted RAL 6005 (green) to help blend the substation infrastructure in with the surrounding rural landscape. Please see Chapter 14 for residential amenity pertaining to visual effects.		
MM51	Human Health	EIAR Chapter 5	› The Proposed Project will be operated in accordance with all relevant Health and Safety Legislation, including: ○ Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005);		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ 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).		
MM52	Human Health	EAIR Chapter 5	› Access to the turbines is through a door at the base of the structure, which will be locked at all times outside maintenance visits. The doors will only be unlocked as required for entry by authorised personnel and will be locked again following their exit. › Staff associated with the project will conduct frequent visits, which will include inspections to establish whether any signs have been defaced, removed, faded, or are becoming hidden by vegetation or foliage, with prompt action taken as necessary. › Signs will also be erected at suitable locations across the Site as required for the ease and safety of operation of the wind farm. These signs include: ○ Buried cable route markers at 50m (maximum) intervals and change of cable route direction; ○ Directions to relevant turbines at junctions; ○ “No access to Unauthorised Personnel” at appropriate locations; ○ Speed limits signs at Site entrance and junctions; ○ “Warning these Premises are alarmed” at appropriate locations; ○ “Danger HV” at appropriate locations; ○ “Warning – Keep clear of structures during electrical storms, high winds or ice conditions” at Site entrance; ○ “No unauthorised vehicles beyond this point” at specific Site entrances; and ○ Other operational signage required as per Site-specific hazards. › The Substation, which will be operated by Eirgrid 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		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			remotely using a SCADA system, with the aid of computers connected via a telephone modem link. › Periodic service and maintenance work which include some vehicle movement. › 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: ○ Six-month service – three-week visit ○ Annual service – six-week visit ○ Weekly visits as required.		
MM53	Human Health	EIAR Chapter 5	› 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. Access for emergency services will be available at all times. › The components of a wind turbine are designed to last up to 30-35 years and are equipped with a number of safety devices to ensure safe operation during their lifetime. During the operation of the wind farm regular maintenance of the turbines will be carried out by the turbine manufacturer or appointed service company. A project or task specific Health and Safety Plan will be developed for these works in accordance with the Site's health and safety requirements.		
MM54	Human Health	EIAR Chapter 5, 9	› The mitigation measures detailed in Chapter 9 Hydrology and Hydrogeology will ensure all surface water runoff from upgraded roads and new road surfaces (including hardstand and turbine base areas) will be captured and treated prior to discharge/release. Please see Chapter 9 for details. › The mitigation measures will ensure all surface water runoff from upgraded roads and new road surfaces (including hardstand and turbine base areas) will be captured and treated prior to discharge/release. Settlement ponds, checks dams and buffered outfalls will prevent roads acting as preferential flowpaths by providing attenuation and water quality treatment.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› It is proposed that all rock needed to construct the Proposed Project will be imported into the Site from local quarries. This rock will be used to construct the sub-base layer of proposed upgraded and new access roads, hardstand areas and turbine base areas. Once installed the subbase layer will be overlain by a clean capping layer of high-grade stone material which will be sourced from local quarries.		
MM55	Shadow Flicker	EIAR Chapter 5	Where daily or annual shadow flicker exceedances are predicted at any inhabitable or third-party dwelling of the identified 91 no. sensitive receptors, a site visit will be undertaken firstly to determine the presence of existing screening and window orientation at each potentially affected property. This will determine if the receptor has an actual line of sight to any turbine and actual potential for shadow flicker to occur. Once this exercise is completed and all of the potentially affected properties, the following measures will be employed. **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: › 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**		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			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 Supervisory Control and Data Acquisition (SCADA) system to change a particular turbine's operating mode during certain conditions or times, or even turn the turbine off if necessary. All predicted incidents of shadow flicker can be pre-programmed into the wind farm's control software. The wind farm's SCADA control system can be programmed to shut down any particular turbine at any particular time on any given day to avoid excessive shadow flicker occurrences at properties which are not naturally screened or cannot be screened with measures outlined above. Where such wind turbine control measures are to be utilised, they need only be implemented when the specific combined circumstances occur that are necessary to give rise to the shadow flicker effect in the first instance. Therefore, if the sun is not shining on a particular day that shadow flicker was predicted to occur at a nearby property, there would be no need to shut down the relevant turbines that would have given rise to the shadow flicker at the property. Similarly, if the wind speed was below the cut-in speed that caused the turbine rotor to rotate and give rise to a shadow flicker effect at a nearby property, there would be no need to shut down the relevant turbines that otherwise would have caused shadow flicker. The atmospheric variables that determine whether shadow flicker will occur or not, are continuously monitored at the Proposed Wind Farm and the data fed into the wind farm's SCADA control system. The strength of direct sunlight is measured by way of photocells, and if		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			the sunlight is of sufficient strength to cast a shadow, the shadow flicker control mechanisms come into effect. Wind speed and direction are measured by anemometers and wind vanes on each turbine and on the wind farm's met mast, and similarly, and if wind speed and direction is such that a shadow will be cast, the shadow flicker control mechanisms come into effect. The moving blades of the turbine will require a short period of time to cease rotating and as such there may be a very short period (less than 3 to 5 minutes) during which the blades are slowed to a complete halt. The turbines giving rise to shadow flicker may be turned off on different days to prevent excessive wear and tear on any single turbine. In order to ensure that the model and SCADA system is accurate and working well a site visit will be carried out to verify the system. The shadow flicker prediction data will be used to select dates on which a shadow flicker event could be observed at one or multiple affected properties and the following process will be adhered to. Recording the weather conditions at the time of the site visit, including wind speeds and direction (i.e. blue sky, intermittent clouds, overcast, moderate breeze, light breeze, still etc.). › Recording the house number, time and duration of site visit and the observation point GPS coordinates. › Recording the nature of the sensitive receptor, its orientation, windows, landscaping in the vicinity, any elements of the built environment in the vicinity, vegetation. › In the event of shadow flicker being noted as occurring the details of the duration (times) of the occurrence will be recorded. › The data will then be sent to the wind farm operational team to confirm that the model and SCADA system are working. › Following 12 months of full operation of the Proposed Project a report can be prepared for the Local Authority describing the shadow flicker mitigation measures used at the wind farm and confirming the implementation and successful operation of the system.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			This method of shadow flicker mitigation has been technically well-proven at wind farms in Ireland and also in areas outside Ireland that experience significantly longer periods of direct sunlight. Where a shadow flicker mitigation strategy is to be implemented, it is likely that the control mechanisms would only have to be applied to a turbine to bring the duration of shadow flicker down to the 28-minute post-mitigation shadow flicker target.		
Decommissioning Phase					
MM56	Human Health	EIAR Chapter 5	› Any effect and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent, and the mitigation measures outlined above will be implemented during the Decommissioning Phase. A Decommissioning Plan has been prepared as part of this EIAR and is included as Appendix 4-7. This Decommissioning Plan follows the most up to date Scottish Natural Heritage (SNH) guidance. An updated decommissioning plan will be agreed with the local authorities three months prior to decommissioning the Proposed Project. › The Proposed Project will be decommissioned in accordance with all relevant Health and Safety Legislation, including: ○ Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005); ○ Safety, Health and Welfare at Work (General Application) (Amendment) Regulations 2016 (S.I. No. 36 of 2016); ○ S.I. No. 528/2021 - Safety, Health and Welfare at Work (Construction) (Amendment) Regulations 2021 and ○ Safety, Health and Welfare at Work (Work at Height) Regulations 2006 (S.I. No. 318 of 2006).		
EIAR Chapter 6 Biodiversity					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Pre-construction		
MM57	Invasive Species Management	EIAR Chapter 6 CEMP Section 3	› A baseline invasive species survey will be 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. If the presence of such species is found at or adjacent to the site, 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.		
MM58	Fauna	EIAR Chapter 6	Due to time that can elapse between the original surveys, any future planning consent and construction, a pre-construction badger survey will be carried out in order to assess activity levels at setts and to identify any additional sett entrances that may have been established in the intervening period. All setts within 50m 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. All badger survey work will be undertaken in line with current best practice guidance[Error! Bookmark not defined.]. Taking a precautionary approach, the following measures will be undertaken for the avoidance of disturbance/displacement and will be implemented during the construction phase of the Proposed Wind Farm: › 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. › All works will be undertaken or supervised by an appropriately qualified ecologist in advance of construction.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM59	Bats	EIAR Chapter 6	› In accordance with NatureScot and NIEA Guidance, a minimum 50m buffer to all habitat features used by bats (e.g., hedgerows, tree lines etc.) should be applied to the siting of all wind turbines. However, Eurobats No. 6 guidance and NIEA recommends increased buffers of 100m and 200m around woodland/forestry areas, however, there is no scientific evidence to support these increased buffer distances in the UK. › NatureScot recommends that a distance of 50m between turbine blade tip and nearest woodland (or other key habitat features) is adequate mitigation. This 50m buffer will be implemented from the outset and monitored as per the post-construction monitoring. The success of the buffer mitigation will be assessed as part of post construction monitoring and updated where necessary. The formula provided in Section 6.1.3 of the Bat Report (Appendix 6-2) is presented to provide appropriate mitigation in relation to bats, and the relevant input required from turbine parameters, is the combination of the blade length and hub height. The turbine model to be installed on the Site will have an overall ground-to-blade tip height of 185m, rotor diameter of 163m, and hub height of 103.5m. The minimum bat buffer required for the Site is therefore 87.12m from the centre of the turbine. › This mitigation measure has been applied and no woodland felling is required within the Site. There will be a requirement to remove some linear vegetation i.e. treelines/hedgerows, to facilitate the required bat buffers. These vegetation-free areas will be maintained during the operational life of the Proposed Wind Farm		
MM60	Habitats	EIAR Chapter 6	› The Proposed Project has been deliberately designed to avoid loss of limestone pavements and associated habitats as identified during the constraints identification stage of the project, by siting all proposed infrastructure within Improved agricultural grassland (GA1). The areas of Annex I habitat within the study area have been avoided in the design of the development.		
Construction Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM61	Linear Vegetation	EIAR Chapter 6 Appendix 6-4	› There will be a loss of approx. 1800m of linear habitat (hedgerow/treeline) to accommodate the footprint of the Proposed Project, including turbines and associated bat buffers, wind farm roads and other key infrastructure. › Approximately 3600m linear metres of new hedgerow planting will be carried out along selected boundaries of fields within the Site. The replanting areas will be selected from the potential replanting areas presented in Figure 2-1 of the BMEP (Appendix 6-4), in consultation with the landowners who are supportive of the proposal. This will result in a 100% net gain in this habitat within the Site. Species planted in these locations will be of a similar composition to those occurring on site, namely, hawthorn and hazel, and will be of local provenance. Further details with regard to species, planting location, and management is contained within the BMEP. › In addition, in order to ensure that existing hedgerows to be retained are not impacted by the construction works, such as existing hedgerows along proposed new roads, the following measures will be in place: › Trimming and maintenance of the hedgerows to avoid any weak overhanging limbs being damaged. › A minimum set back of 2 meters will be maintained between existing trees and permanent and temporary construction areas. › This area will be roped off from the works area › There will be no access to the exclusion zone around the trees and no storage of materials within these zones		
MM62	Habitats	EIAR Chapter 6	The Proposed Project has been deliberately designed to avoid loss of limestone pavements and associated habitats as identified during the constraints identification stage of the project, by siting all proposed infrastructure within Improved agricultural grassland (GA1). The areas of Annex I habitat within the study area have been avoided in the design of the development. However, due to the proximity of construction areas to Annex I habitat areas, the following mitigation measures will be in place:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Prior to any site clearance/enabling works, the required works area, will be marked out using post and rope by the project engineer and project ecologist, › Annex I habitat areas will be marked out and will be securely fenced or roped off from potential access by machinery or construction personnel with clear signage erected, › In addition, areas of oak-ash-hazel woodland located in close proximity to works areas will be roped off, › There will be no access by construction personnel or machinery to areas of limestone pavement, calcareous dry heath or calcareous grassland, › There will be no temporary storage of materials within areas of limestone pavement, calcareous dry heath or calcareous grassland, › Any materials imported to the Site will be certified to be free of invasive species, › Any transport of materials with potential to give rise to dust will be transported to the Site in a tarpaulin-covered vehicle, and › Hardstanding areas/site roads with the potential to give rise to dust will be regularly watered during dry and/or windy conditions. › Prior to any site clearance/enabling works, the required works area, will be marked out using post and rope by the project engineer and project ecologist, The Proposed Project provides for the additional creation of calcareous grassland habitat through the provision of a Biodiversity Management and Enhancement Plan. This Plan has been developed to convert areas of improved or semi-improved agricultural grassland to vegetation communities similar to those occurring within adjacent areas of Annex I grassland habitat. The Plan has been agreed to by the subject landowners who will implement the necessary actions in consultation with the project ecologist. The management actions are fully described in a site-specific Biodiversity Management and Enhancement Plan (BMEP), provided in Appendix 6-4 of the EIAR. The BMEP aims to ensure that there will be a net gain in species rich semi-natural dry grassland habitat associated with the Proposed Project and will link up existing species rich areas of the Site.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM62	Groundwater	EIAR Chapter 4, 6, 9	› A detailed drainage maintenance plan for the Proposed Project is provided in Section 4.6 of this EIAR. This plan provides details of how water quality will be protected during the construction of the Proposed Project. In addition to this, specific mitigation is provided in relation to groundwater quality and flow rates in Chapter 9: 'Water' of this EIAR, see Section 9.4. These mitigations relate to earthworks, groundwater flows and levels due to alteration of recharge, potential effects on groundwater levels during excavations, potential release of hydrocarbons during construction and storage, contamination from wastewater disposal, and release of cement-based products. › Specifically, mitigations are also provided in Chapter 9 with regard to nearby undesignated turloughs which include: ○ Site drainage management will be put in place in order to prevent any surface water runoff from leaving the Site and ensuring that all surface waters infiltrate to ground following short flowpaths (10's of metres) and, ○ Mitigation measures relating to hydrocarbons, cementitious materials and wastewater disposal (as described in Sections 9.4.2.5, 9.4.2.6 and 9.4.2.7 of Chapter 9) will provide adequate protection to groundwater and surface water quality and ensure that groundwater quality will not be impacted, thus protecting the groundwater quality of any hydraulically downgradient turloughs.		
MM63	Surface Water	EIAR Chapter 4, 6, 9	› A drainage design for the Proposed Project is provided in Section 4.5 of this EIAR. This plan provides details of how water quality will be protected during the construction of the Proposed Project, in particular the Proposed Grid Connection. In addition to this, specific mitigation is provided in relation to protection of surface water quality is provided in Chapter 9: 'Water' of this EIAR, see Section 9.4. These mitigations relate to earthworks, potential release of hydrocarbons during construction and storage, contamination from wastewater disposal, and release of cement-based products.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM64	Fauna	EIAR Chapter 6 Appendix 6-4	› Whilst no significant effects on bat species have been identified, the following potential positive effects are noted. A replanting plan has been developed to mitigate the loss of bat foraging/commuting habitat associated with the Proposed Project. The proposed planting design will ensure habitat connectivity is maintained and enhanced around the Site. 3600m of linear hedgerow planting is proposed along select field boundaries within the Site, which will result in a net gain in linear habitat features within the Site. Linear vegetation removal will result in a short-term effect, with connectivity re-established within approximately 2-5 years. No permanent loss of, or damage to, commuting or foraging habitats is anticipated as a result of the Proposed Project. The proposed replanting is shown and discussed in Appendix 6-4, BMEP. › In addition, the following construction best practice measures will be employed to minimise general noise and disturbance potential: ○ 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). ○ The proposed lighting around the Site shall be designed in accordance with the Institute of Lighting Professionals Guidance Note 08/23 Bats and artificial lighting in the UK (ILP, 2023). › In addition, the applicant commits to the use of lights during construction (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
MM65	Fauna	EIAR Chapter 4, 6, 9	Chapter 4 of this EIAR describes the installation options for the Proposed Grid Connection underground cabling route. The Proposed Wind Farm will not require the crossing of any existing streams or watercourses. However, a total of 4 no. existing watercourse crossings will be traversed along the N83 National Road and the L6141 to cater for the Proposed Grid Connection underground cabling towards the existing Cloon 110 kV substation. Instream works are not required at any watercourse crossing along the Proposed Grid Connection underground cabling route. Watercourses will not be directly impacted upon since no instream works or bridge/culvert alterations are proposed. › Specific mitigation is provided in relation to water quality in Chapter 9: "Water" of this EIAR and is summarised in Sections 6.5.2.1.3 and 6.5.2.1.4 above.		
Operational Phase					
MM66	Habitats	EIAR Chapter 6 Appendix 6-4	The operation of the Proposed Project will not result in any additional land take or loss of habitats and as such there is no potential for any significant effects in this regard. Existing habitats on the Site are not considered to be a KER in the context of the operation of the Proposed Project. The implementation of the Biodiversity Management and Enhancement Plan will ensure that any treeline or hedgerow habitats lost to facilitate the proposed infrastructure will be replaced within the Site. The Biodiversity Management and Enhancement Plan also includes for the management and reversion of improved agricultural grassland back to a species-rich dry grassland community. The farm plan will commence during the construction phase of the Proposed Project and will be maintained for the operational lifetime of the Proposed Project.		
MM67	Groundwaters and Surface Waters	EIAR Chapter 6	**Increased hard-standing/run-off** Mitigation by design:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Proposed Wind Farm Site The operational phase drainage system of the Proposed Wind Farm site will be installed and constructed in conjunction with the road and hardstanding construction work as described below: › Interceptor drains will be installed up-gradient of proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be slowly re-distributed over the ground surface and infiltrate through the soil and subsoils; › Swales/road side drains will be used to collect runoff from access roads and turbine hardstanding areas of the Proposed Wind Farm site, likely to have entrained suspended sediment, and channel it to infiltration areas for sediment settling; and, › Check dams will be used along sections of access road drains to attenuate flows and intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock. *Proposed Grid Connection* The trench associated with the Proposed Grid Connection underground cabling route will be backfilled and reinstated following the laying of the cable. As such, the permeability of the ground will remain unchanged. **Hydrogeological impacts:** As outlined above, the potential for effects during the operational phase of the Proposed Wind Farm is reduced as there are no further construction activities along with the associated potential sources such as hydrocarbons/cement/ exposure of subsoils/bedrock.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM68	Fauna	EIAR Chapter 6 Appendix 6-4	› The operation of the Proposed Project will not result in any additional habitat loss or deterioration, nor will it result in a significant increase in anthropogenic activity (relative to current agricultural management practices) due to its location and scale. › The Biodiversity Management and Enhancement Plan measures described in Appendix 6-4 will result in the establishment of habitats of higher value for local faunal species. As such, the operation of the Proposed Project will not result in a significant effect at any geographic scale. Such measures will have positive effects for fauna at the Site of the Proposed Project. Additional species rich grassland areas will provide greater foraging opportunities for pollinators within the Site. There will be a net gain in hedgerow habitat with the replanting plan for the Site, which will also provide more foraging opportunities for fauna, as well as additional shelter for birds and mammals, and commuting links for bats. There is no potential for significant negative effects on non-volant terrestrial fauna including otter or badger that were identified as KERs during the construction phase of the development.		
MM69	Bats	EIAR Chapter 6	A monitoring and mitigation strategy has been devised for the Proposed Wind Farm, in line with the case study example provided in Appendix 5 of the NatureScot 2021 Guidance and based on the site-specific data. After year 1 monitoring, if a curtailment requirement is identified (i.e. significant bat fatalities encountered), a curtailment programme, in line with relevant guidelines, will be devised around key activity periods and weather parameters, as well as a potential increase in buffers. **Bat Vegetation buffer** In accordance with NatureScot and NIEA Guidance, a minimum 50m buffer to all habitat features used by bats (e.g., hedgerows, tree lines etc.) should be applied to the siting of all wind turbines. However, Eurobats No. 6 guidance and NIEA recommends increased buffers of 100m		

			and 200m around woodland/forestry areas, however, there is no scientific evidence to support these increased buffer distances in the UK. NatureScot recommends that a distance of 50m between turbine blade tip and nearest woodland (or other key habitat features) is adequate mitigation. This 50m buffer will be implemented from the outset and monitored as per the post-construction monitoring. The success of the buffer mitigation will be assessed as part of post construction monitoring and updated where necessary. The formula provided in Section 6.1.3 of the Bat Report (Appendix 6-2) is presented to provide appropriate mitigation in relation to bats, and the relevant input required from turbine parameters, is the combination of the blade length and hub height. The turbine model to be installed on the Site will have an overall ground-to-blade tip height of 185m, rotor diameter of 163m, and hub height of 103.5m. The minimum bat buffer required for the Site is therefore 87.12m from the centre of the turbine. This mitigation measure has been applied and no woodland felling is required within the Site. There will be a requirement to remove some linear vegetation i.e. treelines/hedgerows, to facilitate the required bat buffers. These vegetation-free areas will be maintained during the operational life of the Proposed Wind Farm. **Blade feathering** 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. **Lighting**		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			With regard to the potential for lighting to increase collision risk, it is noted that there will be limited illumination of the turbines in the form of aviation lighting. Post construction monitoring will be carried out (as outlined below) to assess any potential changes in bat activity patterns and collision risk. Significant effects as a result of lighting are not anticipated; however, if in the course of this monitoring, any potential for significant effects on bats is identified, the site-specific mitigation measures will be reviewed and any changes necessary will be implemented to avoid any such impacts.		
Decommissioning Phase					
MM70	Decomissioning Phase	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. It can be concluded that following the implementation of preventative mitigation, there is no potential for the decommissioning of the Proposed Project to result in significant effects on biodiversity.		
MM71	Decomissioning Phase	EIAR Chapter 6 Appendix 4-7	› Any soil material that will be imported to the Proposed Wind Farm site as part of the foundation reinstatement will be free 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). The Site Manager will take steps to ensure the sourcing of suitably clean soil material and verify the quality of the material by having it inspected prior to bringing it to site by a suitably qualified ecologist. Prior to decommissioning, a suitably qualified ecologist will complete an invasive species survey of the Site to identify invasive species where any minor excavation will be required. If present in these areas, the ecologist will propose suitable management measures.		
EIAR Chapter 7 Ornithology					
Pre-Construction Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM72			› Taking a precautionary approach, it is proposed that construction works will commence outside the bird breeding season (1st of March to 31st of August inclusive). Pre-commencement surveys will be undertaken prior to the initiation of works at the wind farm. Any requirement for construction works to run into the subsequent breeding seasons following commencement will be subject to further bird surveys, once per month (April to July), to confirm the absence of breeding birds of conservation concern. › Monitoring will be undertaken by a suitably qualified ornithologist. The survey will include a thorough walkover survey to a 500m radius of the development footprint and/or all works areas, where access allows. If winter roosts or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the construction phase. If the roost/nest is found to be active during the construction phase survey no works shall be undertaken within a species-specific buffer (as per Forestry Commission Scotland, 2006; Ruddock and Whitfield, 2007; Goodship and Furness, 2022) in line with best practice. No works within the buffer zone shall be permitted until it can be demonstrated that that birds of conservation concern are no longer reliant on the roost/nest site.		
MM73	Birds	EIAR Chapter 7	The project design has followed the basic principles outlined below to avoid the potential for significant effects on avian receptors: › The Proposed Project avoids wildlife refuge sites (e.g. waterbodies) › Hard standing areas have been designed to the minimum size necessary to accommodate the turbine model that is selected. › The Proposed Grid Connection underground cabling route has been selected to utilise built infrastructure for the majority of its length (i.e. cables to be laid within public roads). Cables will be laid underground to avoid effects on roadside hedgerows and disturbance to nesting birds.		
Construction Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM74	Birds	EIAR Chapter 7	A Construction and Environmental Management Plan (CEMP) has been prepared and will be in place prior to the start of the construction phase. Full details of the CEMP are available Appendix 4-2 to Chapter 4 of this EIAR, while details pertinent to birds are summarised below. Note that these measures are proposed as industry best practice rather than to mitigate any identified significant effect and will be updated as required to address any conditions of a grant of permission or findings of any pre-construction survey results. › Works will commence outside the bird nesting season (1st of March to 31st of August inclusive). Any requirement for construction works to run into the subsequent breeding season following commencement will be informed by further bird surveys to identify any potential breeding activity of birds of conservation concern once per month during the breeding season (April to July). › The removal of woody vegetation will be undertaken in full compliance with Section 40 of the Wildlife Act 1976 – 2022. There are no tree removal works along the turbine delivery route, however where sections of vegetation are removed within the Proposed Wind Farm, these will be replaced with suitable hedge/tree species which are common in the local context. Further details can be found in Chapter 6 of this EIAR. › 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. › An Environmental Clerk of Works (ECoW) and Project Ecologist will be appointed. Duties will include: ○ Organise the undertaking of a pre-construction walkover bird survey by a suitably qualified ornithologist to ensure that significant effects on birds will be avoided. Further details are provided in Section 7.7 below.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Wind Farm. ○ 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.		
MM75	Birds	EIAR Chapter 7	› 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					
MM76	Birds	EIAR Chapter 7	› No significant operational phase impacts requiring mitigation were identified. However, monitoring in line with best practice is proposed.		
MM77	Birds	EIAR Chapter 7	› A detailed operational Bird Monitoring Programme has been prepared for the operational phase of the Proposed Project (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 project. Surveys will be scheduled to coincide with Years 1, 2, 3, 5, 10 and 15 of the lifetime of the wind farm. Monitoring measures are broadly based on guidelines issued by SNH (2009). The following individual components are proposed: ○ Monthly flight activity surveys: vantage point surveys. ○ Breeding bird surveys: adapted Brown and Shepard		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Targeted bird collision surveys (corpse searches) will be undertaken with trained dogs. The surveys will include detection and scavenger trials, to correct for these two biases and ensure the resulting data is robust. › The proposed programme of monitoring was not proposed in response to any identified significant effect but rather as a best practice measure (SNH, 2009). The monitoring is comprehensive and considered entirely adequate in this regard. The results of this monitoring will be reported to the Planning Authority following each monitoring year and will include recommendations that may inform additional mitigation or adaptation if required.		
Decomissioning Phase					
MM78	Decomissioning Phase	EIAR Chapter 7	› During the decommissioning phase, disturbance limitation measures will be as per the construction phase described in Chapter 7 of this EIAR.		
MM79	Decomissioning Phase	EIAR Chapter 7	› Decommissioning monitoring surveys will be undertaken prior to works associated with decommissioning at the wind farm. Survey methodology and timing will be the same as that outlined for construction phase surveys in Chapter 7 off this EIAR. The survey will include a thorough walkover survey to a 500m radius of the development 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 decommissioning phase. If it is found to be active during the decommissioning phase, no works shall be undertaken within a species-specific 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.		
EIAR Chapter 8 Land, Soils and Geology					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
Pre-Construction Phase					
MM80	Design	EIAR Chapter 8	› An iterative design process involving multiple stages of ground investigations, followed by turbine and infrastructure design has been completed to ensure the areas with optimum ground conditions have been selected.		
Construction Phase					
MM81	Earthworks	EIAR Chapter 8	*Proposed Wind Farm* › Placement of turbines and associated infrastructure in areas with suitable ground conditions (based on detailed site investigation data); › At the identified spoil management areas, the vegetative top-soil 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;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› 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 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 where necessary.; › 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; › Spoil management will take place within a minimal distance of each turbine to avoid excessive transport of materials within the Site. *Proposed Grid Connection*		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› 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. › 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. › Materials that are unsuitable for backfilling will be sent to a Materials Recovery Facility (MRF). › › The tarmacadam road surface will be replaced with the same design standard as the surrounding carriageway		
MM82	Contamination of Soils	EIAR Chapter 8	› Wherever possible, vehicles will be refuelled off-site, particularly for regular road-going vehicles. › On-site refuelling of machinery will be carried out at designated refuelling areas at various locations throughout the Site. › Heavy plant and machinery will be refuelled on-site by a fuel truck that will come to the Site as required on a scheduled and organised basis. › Other refuelling will be carried out using mobile double skinned fuel bowser. The fuel bowser will be parked on a level area on-site when not in use. All refuelling will be carried out outside designated watercourse buffer zones. › 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 used during refuelling operations as required. All plant and machinery will be equipped with fuel absorbent material and pads to deal with any event of accidental spillage		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM83	Geotechnical Risk	EIAR Chapter 8	› The following measures which will be implemented during the construction phase of the Proposed Project will assist in the management of the geotechnical risks for this site. › Appointment of experienced and competent contractors; › The site will be supervised by experienced and qualified engineering/geotechnical personnel; › Allocate sufficient time for the project; › Prevent undercutting of slopes and unsupported excavations; › Maintain a managed suitable drainage system; › Ensure construction method statements are followed or where agreed modified/ developed; and, › Revise and amend the Geotechnical Risk Register as construction progresses.		
MM84	Designated Sites	EIAR Chapter 8	The mitigation measures outlined in terms of the land, soils and geology in relation to designated sites are essentially the same as those outlined in Section 9.4.2.2 of Chapter 9, which deals with suspended sediment entrainment from the excavation works. As the designated sites are distal to the Proposed Wind Farm site, there can be no direct effects on the land soils and geology of the designated sites. There is 1 no. SAC near the Proposed Grid Connection underground cabling route, where the route crosses over an existing bridge over the River Clare. Indirect effects are considered and mitigated by: › Avoiding physical damage to watercourses, and associated release of sediment; › Avoiding excavations within close proximity to surface water courses; › Avoiding the entry of suspended sediment from earthworks into watercourses; and, › Avoiding 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. The design measures to achieve these mitigation measures are included in detail within Section 9.4.2.2 of Chapter 9 of this EIAR, but briefly include the use of:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Source controls such as interceptor drains, sandbags and the covering of stockpiles; › Silt bags and silt fences; and, › Pre-emptive site drainage management such as the use of general weather forecasts and rainfall radar images to plan and coordinate site works.		
MM85	Human Health	EIAR Chapter 8	Potential health effects arise mainly through the potential for soil and ground contamination. A wind farm is not a recognized source of pollution and so the potential for effects during the operational phase are negligible. Hydrocarbons will be used onsite during construction however the volumes will be small in the context of the scale of the Proposed Project and will be handled and stored in accordance with best practice mitigation measures. The potential residual effects associated with soil or ground contamination and subsequent health effects are imperceptible.		
Operational Phase					
MM86	Soils and Geology	EIAR Chapter 8	Mitigation measures for soils and geology during the operational stage include; › The use of aggregate from authorised quarries for use in road and hardstand maintenance. › Oil used in transformers (at the substation and within each turbine) and storage of oils in tanks at the substation could leak during the operational phase and impact on ground/soil/subsoils and groundwater or surface water quality. › The substation transformer will be situated in a concrete bunded capable of holding 110% of the stored oil volume. Turbine transformers are located within the turbines, so any leaks would be contained within the turbine.		
Decommissioning Phase					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM87	Decomissioning Phase	EIAR Chapter 8	The potential effects associated with decommissioning of the Proposed Project will be similar to those associated with construction but of reduced magnitude (i.e., soil/subsoil/bedrock excavation; Contamination by Leakage/Spillages). Mitigation measures applied during decommissioning activities will be similar to those applied during construction where relevant (i.e., mitigation outlined at Sections 8.5.2.2 and 8.5.2.3). Some of the effects will be avoided by leaving elements of the Proposed Project in place where appropriate i.e the 110 kV substation and underground cabling. 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 and Hydrogeology					
Pre-Construction Phase					
MM88	Hydrology and Hydrogeology	EIAR Chapter 9	**Mitigation by Avoidance:** A key mitigation measure adopted during the design phase is the avoidance of infrastructure close to surface water features across the Proposed Wind Farm site. The Proposed Wind Farm site is significantly distal from any surface water course, the nearest being the Ballinduff stream located 2.1km west of the site. The Proposed Grid Connection underground cabling route crosses over 4 no. watercourses. Additional control measures, which are outlined further on in this section, will be undertaken at these locations. The large setback distance from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures 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 to watercourses, and associated release of sediment; › Avoid excavations within close proximity to surface watercourses (again, absent from the Proposed Wind Farm site); › 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, by allowing all surface water/recent rainfall to infiltrate to ground at the Proposed Wind Farm site (refer to Appendix 4-6, Drainage Design drawings).		
			Construction Phase		
MM89	Earthworks	EIAR Chapter 9	**Proposed Wind Farm site** The key mitigation measures typically employed during the construction phase of Wind Farms is the avoidance of sensitive aquatic areas where possible, by application of suitable buffer zones (i.e. 50m to main watercourses, and 10m to main drains). At the Proposed Wind Farm site, the nearest surface watercourse is situated 2.6km away. Therefore, self-imposed buffer zones are not required at the site. Spoil management areas for excess soil/subsoil will be localised to 4 no. spoil management areas and will be designed and constructed with the minimal amount of surface area exposed. In these spoil management areas, the vegetative top-soil layer will be removed and re-instated or reseeded directly after construction, allowing for re-vegetation which will mitigate against erosion. **Grid Connection underground cabling route.**		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› More than 95% of the underground electrical cabling connection route is >50m from any nearby watercourse, sections within 50m of the route are confined to existing watercourse crossings at bridges. 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. › No in-stream works are required at any of these crossings, however due to the proximity of the streams to the construction work at the crossing locations, there is a potential for surface water quality impacts during trench excavation work. Mitigation measures are outlined below. › A constraint/buffer zone will be maintained for all crossing locations where possible. In addition, measures which are outlined below will be implemented to ensure that silt laden or contaminated surface water runoff from the excavation work does not discharge directly to the watercourse. › 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 to watercourses, and associated release of sediment; › Avoid excavations within close proximity to surface watercourses; and, › Avoid the entry of suspended sediment from earthworks into watercourses.		
MM90	Drainage Design	EIAR Chapter 9	**Mitigation by Design:** › Source controls: ○ Interceptor drains, vee-drains, diversion drains, flume pipes, erosion and velocity control measures such as use of sand bags, oyster bags filled with gravel, filter fabrics, and other similar/equivalent or appropriate systems.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			○ Small working areas, covering stockpiles, weathering off stockpiles, cessation of works in certain areas or other similar/equivalent or appropriate measures. › In-Line controls: ○ Interceptor drains, erosion and velocity control measures such as check dams, sand bags, oyster bags, straw bales, flow limiters, weirs, baffles, silt bags, silt fences, sedimats, filter fabrics, and collection sumps, temporary sumps/attenuation lagoons, sediment traps, pumping systems, settlement ponds, temporary pumping chambers, or other similar/equivalent or appropriate systems. › Treatment systems: ○ Silt-buster system or equivalent. **Silt Fences** Silt fencing will be emplaced downgradient of turbines, to prevent any runoff of sediment laden water. Silt fences are effective at removing heavy settleable solids. Inspection and maintenance of these structures will be carried out during construction phase. They will remain in place throughout the entire construction phase. Silt fences will also be emplaced where the Proposed Grid Connection is near sensitive areas (*i.e.* watercourse crossing over River Clare). **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, most of the sediment is retained by the		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			geotextile fabric allowing filtered water to pass through. The discharge from the silt bags will be directed to the settlement ponds, where the water will be allowed to naturally infiltrate to ground. **Pre-emptive Site Drainage Management** The works programme for the initial construction stage of the Proposed Wind Farm site will also take account of weather forecasts and predicted rainfall in particular. Large excavations and movements of subsoil or vegetation stripping will be suspended or scaled back if heavy rain is forecast. The extent to which works will be scaled back or suspended will relate directly to the amount of rainfall forecast. The following forecasting systems are available and will be used on a daily basis at the Site to direct proposed construction activities: › General Forecasts: Available on a national, regional and county level from the Met Eireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates; › MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale; › 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events; › Rainfall Radar Images: Images covering the entire country are freely available from the Met Eireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and, › Consultancy Service: Met Eireann provide a 24-hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Using the safe threshold rainfall values will allow work to be safely controlled (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event. Works should 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 should be completed: › Secure all open excavations; › Provide temporary or emergency drainage to prevent back-up of surface runoff; and, › Avoid working during heavy rainfall and for up to 24 hours after heavy events to ensure drainage systems are not overloaded. **Management of Runoff from Spoil Management Areas** It is proposed that excavated subsoil will be used for landscaping throughout the Site and any excess will be accommodated at 4 no. spoil management areas across the Proposed Wind Farm site. Proposed surface water quality protection measures regarding the spoil storage areas are as follows: › During the initial emplacement of spoil at the storage area, silt fences, straw bales and biodegradable matting will be used to control surface water runoff from the enclosure. › Drainage from the storage areas will be directed to settlement ponds as required or will overflow through controlled overflow pipes.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Discharge from the storage areas will be intermittent and will depend on preceding rainfall amounts. › Once the storage areas have been seeded and vegetation is established the risk to downstream surface water is significantly reduced. Therefore, at each stage of the spoil storage area development the above mitigation measures will be deployed to ensure protection of downstream water quality. **Timing of Site Construction Works** Construction of the 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. 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.		
MM91	Groundwater	EIAR Chapter 9	**Mitigation by Avoidance - Groundwater Flows:** **Proposed Wind Farm site** The construction of the turbines, met mast, access roads and other ancillary features of the Proposed Project could impact groundwater flows within the Proposed Wind Farm site, if a particular pathway *e.g.* karst conduit, existed near the development, however based on all the available site investigation data no reasonable pathways have been identified. The identification and avoidance of any potential karst features has been a key aim of the intrusive and extrusive site investigations, through iterative geophysical surveys, drilling and trial pit excavations and is considered to be the most rational method of mitigating against effecting flow paths, by avoiding any potential karst areas.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			The Site data outlined within Section Chapter 9 of this EIAR and outlined in more detail within Chapter 8 provides sufficient scientific data to say, with a high degree of certainty, that the construction of the turbine foundations, met mast, site access roads, substation and other relatively near surface constructs, will not interact with or alter the existing groundwater recharge, and underlying groundwater flow, regimes. **Proposed Grid Connection** The Proposed Grid Connection underground cabling route will be routed along an existing road carriageway. The trench will be excavated to a depth of c.1.3m and reinstated.. As such there will be no significant change in the permeability of the lands occupied by the Proposed Grid Connection underground cabling route. **Mitigation by Design - Groundwater Levels:** The critical driver of groundwater levels and the potential to affect them is through groundwater recharge. The drainage design of the Proposed Wind Farm site has been designed to mimic the existing hydrological regime within the Site, whereby surface water runoff pathways are generally short and rainfall readily percolates to ground and level spreaders to allow water to infiltrate to ground. The net effect of the drainage design will be that all rainfall falling within the Proposed Wind Farm site will remain on the Site and infiltrate to ground and will not exit the Site as runoff to surface watercourses.		
MM92	Surface Water	EIAR Chapter 9	**Mitigation by Avoidance:** The primary mitigating factor in relation to downgradient surface water bodies is the distinct lack of surface water courses across the Proposed Wind Farm site and the surrounding area.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			The rainfall falling on the Proposed Wind Farm site recharges to the underlying groundwater aquifer. The closest mapped watercourse, the Ballinduff stream is situated 2.1 km west of the Proposed Wind Farm site. Along the Proposed Grid Connection underground cabling route, the cabling will be emplaced within existing road carriageways and existing bridges. The utilisation of the existing roadways and bridges avoids any in-stream works. **Mitigation by Design:** Proposed Wind Farm- To ensure the continuation of the existing hydrological regime, whereby rainfall percolates to ground and does not discharge as surface water runoff, the drainage design has incorporated natural attenuation of flows and allows for collected rainwater to be recharged back into the underlying aquifer rather than leaving the Site through man-made drains. The drainage design also includes mitigation measures to ensure that any collected surface water is treated prior to discharge/recharge back into the ground, and therefore will not contain suspended sediment. The drainage design which was developed for the Proposed Wind Farm site is included in Appendix 9-7 and summarised in Chapter 9 of this EIAR. Proposed Grid Connection – The mitigation measures outlined in Section 9 of Chapter 9 of this EIAR will ensure that surface water leaving the site will be of a high quality and control measures such as double silt fencing at watercourse crossings will protect downgradient surface water bodies.		
MM93	Potential Release of Hydrocarbons	EIAR Chapter 9 CEMP Section 3	› Wherever possible, vehicles will be refuelled off-site, particularly for regular road-going vehicles. › On-site refuelling of machinery will be carried out at designated refuelling areas at various locations throughout the Site. › Heavy plant and machinery will be refuelled on-site by a fuel truck that will come to the Site as required on a scheduled and organised basis.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Other refuelling will be carried out using mobile double skinned fuel bowser. The fuel bowser will be parked on a level area on-site when not in use. All refuelling will be carried out outside designated watercourse buffer zones. › 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 used during refuelling operations as required. All plant and machinery will be equipped with fuel absorbent material and pads to deal with any event of accidental spillage		
MM94	Wastewater Disposal	EIAR Chapter 9	**Proposed Mitigation by Avoidance:** › A self-contained port-a-loo system with an integrated wastewater holding tank will be used at the Site compound, 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 for sanitation purposes will be sourced on the Site or discharged to the Site.		
MM95	Release of Cement Based Products	EIAR Chapter 9	**Proposed Mitigation by Avoidance:** The following mitigation measures are proposed for the Proposed Wind Farm site and the Proposed Grid Connection underground cabling route: › No batching of wet-cement products will occur on site. Ready-mixed supply of wet concrete products and emplacement of pre-cast elements, will take place; › 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 cement washout ponds;		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Weather forecasting will be used to plan dry days for pouring concrete; › The pour site will be kept free of standing water and plastic covers will be ready in case of sudden rainfall event; and, › Sand blinding, DPM and concrete blinding are to be provided at turbine formation level to create a vertical cut-off barrier and to mitigate the risk of concrete leakage into the ground below the turbine foundations. **Proposed Mitigation by Design:** The following mitigation measures are proposed: › No in-stream excavation works are proposed and therefore there will be no impact on the stream at the proposed crossing locations; › Where the proposed underground cabling route crosses a natural surface watercourse, the cable will pass over or below the existing culvert within the access road; › Any guidance/mitigation measures proposed by the OPW or the Inland Fisheries Ireland will be incorporated into the design of the proposed crossings; › As a further precaution, near stream construction work, will only be carried out during the period permitted by Inland Fisheries Ireland for in-stream works according to the Eastern Regional Fisheries Board (2004) guidance document "Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites", i.e., May to September inclusive. This time period coincides with the period of lowest expected rainfall, and therefore minimum runoff rates. This will minimise the risk of entrainment of suspended sediment in surface water runoff, and transport via this pathway to surface watercourses (any deviation from this will be done in discussion with the IFI); and › During the near stream construction work double row silt fences will be emplaced immediately down-gradient of the construction area for the duration of the construction phase.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM96	Turloughs	EIAR Chapter 9	The following mitigation measures are proposed: › Proposed Wind Farm site drainage management will be put in place (as outlined in Chapter 9 of this EIAR) in order to prevent any surface water runoff from leaving the Site and ensuring that all surface waters infiltrate to ground following short flowpaths (10's of metres) and, › Mitigation measures relating to hydrocarbons, cementitious materials and wastewater disposal, as outlined in Chapter 9 of this EIAR will provide adequate protection to groundwater and surface water quality and ensure that groundwater quality will not be impacted, thus protecting the groundwater quality of any hydraulically downgradient turloughs.		
MM97	Surface Water Dependant SACs, SPAs, pNHAs	EIAR Chapter 9	**Mitigation by Design:** *Proposed Wind Farm site* There will be no net change in runoff from the Proposed Wind Farm site due to the drainage design. All water will recharge to ground. Any "dirty" surface water generated on site will be collected within a downstream collector drain, be attenuated with the collector drain and allowed to infiltrate to the ground along the collector drain and within an end of drain infiltration area. *Proposed Grid Connection* The mitigation measures outlined relating to earthworks along the Proposed Grid Connection underground cabling route will ensure that surface water quality within the River Clare (part of the Lough Corrib SAC) remains unchanged.		
MM98	Public Water supplies	EIAR Chapter 9	*Proposed Wind Farm site*		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			The Source Protection Areas (SPA's) to the nearby GWS wells have been mapped. There are no areas of the Biggeramore GWS, Caherlea GWS, Claretuam Belclare GWS, Balrobuckbeg, Kilcoona Caherlistrane or Anbally GWS SPA's situated within the Site. There are small areas of the Cahermorris Glenreevagh and Cluide Cahermorris GWS SPA's situated within the Proposed Wind Farm site. The area of the Proposed Wind Farm site which includes the Cluide Cahermorris GWS SPA includes a short section of proposed access track (190m). The access track consists of the emplacement of new access track and the upgrade/widening of the existing farm roadway. Surface water mitigation measures will be put in place as outlined in Chapter 9 which will ensure that any surface water in this area during the construction process will be attenuated and will be of a high quality before being allowed to recharge to ground within a short distance (10's of metres). The quantity and quality of recharge to the groundwater system will be maintained. The area of the Proposed Wind Farm site which includes the Cahermorris Glenreevagh GWS includes the proposed turbine T1 and a 270m section of proposed access road. The access track consists of the emplacement of new roadway to turbine T1. Surface water mitigation measures will be put in place as outlined in Chapter 9 which will ensure that any surface water in this area during the construction process of the roadway will be attenuated and will be of a high quality before being allowed to recharge to ground within a short distance (10's of metres). The quantity and quality of recharge to the groundwater system will be maintained. The primary risk to the GWS SPA is therefore considered to be surface waters arising during the construction phase, before recharging to ground. During the construction phase, mitigation measures outlined in Chapter 9 such as interceptor drains, silt fences, swales and settlement ponds will ensure that the recharge to the underlying groundwater aquifer remains at a high standard. *Proposed Grid Connection*		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			In terms of the Proposed Grid Connection underground cabling route, a small area of the Rusheens GWS Source Protection Area, overlaps with the underground cabling route, within a 0.07km^2 area, which contains ~320m of roadway. Excavation work can lead to sediment laden runoff from the excavation, following rainfall events. Typically, surface water effects are the primary concern during the Proposed Grid Connection underground cabling route works, rather than groundwater effects. However, as there are few nearby surface watercourses to drain towards, all surface water is expected to infiltrate to ground and to the underlying aquifer. The management of sediment from runoff along the construction areas is detailed in Chapter 9 which will be implemented along the Proposed Grid Connection underground cabling route. Hydrocarbon controls and controls on cement-based products will also be implemented to ensure any surface water along the Proposed Grid Connection underground cabling route is of a high quality, before it recharges to ground.		
MM99	Domestic Water Supplies	EIAR Chapter 9	› Surface water mitigation measures will be put in place as outlined in Chapter 9 of this EIAR which will ensure that any surface water arising at the Site during the construction process of the Proposed Project will be attenuated and will be of a high quality before being allowed to recharge to ground within a short distance (10's of metres). The quantity and quality of recharge to the groundwater system will be maintained. Measures to protect the water environment from cement based products and hydrocarbons will ensure that the water recharging to ground is of a high quality. › The Limestone bedrock underlying the proposed turbine locations is competent Limestone without any signs of karstification. The primary risk to unmapped domestic wells is therefore considered to be surface waters arising during the construction phase, before recharging to ground. During the construction phase, mitigation measures outlined such as interceptor drains, silt fences, swales and settlement ponds along with mitigation measures to protect against effects from hydrocarbons and cement based products will ensure that the recharge to the underlying groundwater aquifer remains at a high standard. › Based on the separation distances involved, the detailed site investigation data detailing competent (not karstified) Limestone underlying the turbines at the Proposed Wind Farm		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			site, the proposed mitigation measures in relation to suspended sediment, hydrocarbons and cement based products, as well as the information gathered on the hydrogeological regimen including groundwater flow directions and groundwater levels, the residual effect on unmapped domestic wells is considered to be – Indirect, negative, imperceptible, medium term, very unlikely impact on groundwater quality and quantity.		
MM100	WFD Status	EIAR Chapter 9	› The mitigation measures outlined in Chapter 9 of this EIAR including avoidance of surface watercourses, along with source controls (interceptor drains, sandbags, silt fences), amongst others, will ensure that any surface water generated at the Proposed Wind Farm, will be of a high quality in terms of suspended sediments, while it is noted that runoff from the Proposed Wind Farm will not occur as surface water will infiltrate to ground. › In terms of cement-based materials, the mitigation measures outlined in Chapter 9 of this EIAR relating to cement products will be implemented and will break the pathway between the source and receptor. › Mitigation measures in relation to the use of hydrocarbons including off-site refuelling, hydrocarbon interceptors and an emergency plan to deal with accidental spillages are outlined in Chapter 9 of this EIAR.		
Operational Phase					
MM101	Surface Water Runoff	EIAR Chapter 4, 9	The drainage design for the Proposed Wind Farm includes for the release of any surface water captured within the interceptor drains to recharge back to ground, with a very nominal spatial diversion of the water (10's of metres). In doing so, all rainfall which falls on the Site will still infiltrate to ground. There will be no net increase in runoff from the Proposed Wind Farm site or along the Proposed Grid Connection underground cabling route. **Proposed Mitigation by Design:** *Proposed Wind Farm site*		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			The operational phase drainage system of the Proposed Wind Farm site will be installed and constructed in conjunction with the road and hardstanding construction work as described below: › Interceptor drains will be installed up-gradient of proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it can be slowly re-distributed over the ground surface and infiltrate through the soil and subsoils; › Swales/road side drains will be used to collect runoff from access roads and turbine hardstanding areas of the Proposed Wind Farm site, likely to have entrained suspended sediment, and channel it to infiltration areas for sediment settling; and, › Check dams will be used along sections of access road drains to attenuate flows and intercept silts at source. Check dams will be constructed from a 4/40mm non-friable crushed rock. *Proposed Grid Connection* The trench associated with the Proposed Grid Connection underground cabling route will be backfilled and reinstated following the laying of the cable. As such, the permeability of the ground will remain unchanged.		
MM102	Turloughs	EIAR Chapter 9	During the operational phase of the Proposed Project, the only plant which will be required on site will be maintenance/inspection vehicles (Light Goods vehicles). These will be refuelled off site, thus reducing the potential for effects due to hydrocarbon spills. There will be no discharge of wastewater during the operational phase. Mitigation measures relating to hydrocarbons, cementitious materials and wastewater disposal, will continue to provide adequate protection to groundwater and surface water quality during the operational phase and ensure that groundwater quality will not be impacted, thus protecting the groundwater quality of any hydraulically downgradient turloughs.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM103	Designated Sites	EIAR Chapter 9	Mitigation measures to protect designated sites during the operational phase of the Proposed Project include: › Regular maintenance of the on-site drainage system. The maintenance schedule will be reduced once natural vegetation is re-established, which will provide consistent filtration through the soil/subsoil; › The use of fuel storage bunds for any hydrocarbons (fuel/oils) and the ongoing maintenance of the bund structures; and, › Any maintenance works which may involve soil movement (such as the removal of sediment from the settlement ponds) will take place during the dry months of the year (May - September).		
MM104	WFD Status	EIAR Chapter 9	The operational phase drainage system of the Proposed Wind Farm site will be installed and constructed in conjunction with the road and hardstanding construction work as described below: › Interceptor drains will be installed up-gradient of all proposed infrastructure to collect clean surface runoff, in order to minimise the amount of runoff reaching areas where suspended sediment could become entrained. It will then be directed to areas where it 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 Proposed Wind Farm site, likely to have entrained suspended sediment, and channel it to infiltration areas for sediment settling and recharge to ground; › 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; and, › Infiltration areas, emplaced downstream of road swale sections and at end of the downstream collector drains, will buffer volumes of runoff discharging from the drainage system during periods of high rainfall and allow the rainfall to recharge to ground effectively.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› The mitigation measures to protect against poor quality runoff during the operational phase of the Proposed Project are the same as those outlined in the Construction Stage. › Mitigation measures for oils and fuels during the operational phase of the Proposed Project are the same as those outlined in the Construction Stage.		
Decomissioning Phase					
MM105	Decomissioning Phase	EIAR Chapter 9 Appendix 4-5	› Potential effects will be similar to the construction phase but to a lesser degree. There may be increased trafficking and an increased risk of disturbance to underlying soils at the Proposed Wind Farm site, during the decommissioning phase. Any such potential effects will be less than during the construction stage as the drainage system will be fully mature and will provide additional filtration of runoff. Any diesel or fuel oils stored on site will be bunded.		
EIAR Chapter 10 Air					
Construction Phase					
MM106	Exhaust Emissions: Construction	EIAR Chapter 10 Appendix 4-5	› Proposed Project Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required. › All plant and materials vehicles shall be stored in dedicated areas (on-site). 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Aggregate materials for the construction of site access tracks and all associated infrastructure will all be locally sourced, where possible, which will further reduce potential emissions. › 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 facility will be local to the Site to reduce the emissions associated with vehicle movements. › A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-5). ›		
MM107	Exhaust Emissions: Transport	EIAR Chapter 10 Appendix 4-5	› Aggregate materials for the construction of site access tracks and all associated infrastructure will all be locally sourced, where possible, which will further reduce potential emissions. › Turbines and construction materials will be transported to the site on specified haul routes only. › Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Site to reduce the amount of emissions associated with vehicle movements. › A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-5).		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM108	Dust Emissions: Construction	EIAR Chapter 10 Appendix 4-5	› Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff. › All plant and materials vehicles shall be stored in dedicated areas within the Site. › Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction. › Turbines and construction traffic will be transported to the site on specified haul routes only. › The agreed haul route road adjacent to the Site will be regularly inspected for cleanliness and cleaned as necessary. › The roads adjacent to the site entrances will be checked weekly or damage/potholes and repaired as necessary. › If necessary, excavated material will be dampened prior to transport to the spoil management areas. › A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-5). The CEMP includes dust suppression measures		
MM109	Dust Emissions: Transport	EIAR Chapter 10 Appendix 4-5	› Sporadic wetting of loose stone surface will be carried out during the construction phase to minimise movement of dust particles to the air. In periods of extended dry weather, dust suppression may be necessary along haul roads to ensure dust does not cause a nuisance. Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff. › All plant and materials vehicles shall be stored in dedicated areas within the Site. › Turbines and construction vehicles will be transported to the site on specified haul routes only. › Proposed Grid Connection infrastructure will be transported to the site on specified haul routes only.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Construction materials for the Proposed Grid Connection and a small volume for the Proposed Wind Farm will be sourced locally from licenced quarries. › The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as necessary. › The roads adjacent to the site entrances will be checked weekly for damage/potholes and repaired as necessary. › The transport of construction materials around the Site from the nearby quarry facilities will be covered by tarpaulin where necessary. › Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Site to reduce the amount of emissions associated with vehicle movements › A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-5).		
Operational Phase					
MM110	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. › Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Site to reduce the emissions associated with vehicle movements.		
MM111	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		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			waste streams for recycling, recovery or disposal. The MRF facility will be local to the Site to reduce the emissions associated with vehicle movements.		
			Decomissioning Phase		
MM112	Decomissioning Phase	EIAR Chapter 10 Appendix 4-7	Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, be it of less effect. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential effects.		
			EIAR Chapter 11 Climate		
			Construction Phase		
MM113	Greenhouse Gas Emissions	EIAR Chapter 11 Appendix 4-5	› Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required. › All 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› 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 facility will be local to the Site to reduce the emissions associated with vehicle movements. › A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-5). › Aggregate materials for the construction of the Proposed Project will be obtained from nearby licensed quarries. This will reduce journey distances of the delivery 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					
MM114	Greenhouse Gas Emissions	EIAR Chapter 11	› 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. › Waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Site to reduce the emissions associated with vehicle movements.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Operational personnel will be instructed at induction that under no circumstances can waste be disposed of on-site. It will also be made clear that the burning of waste material on-site is forbidden. › As detailed in Appendix 6-4 a Biodiversity Management and Enhancement Plan for the Proposed Wind Farm has identified enhancement activities such as the planting of native woodland and hedgerows and improvement of grassland habitats.		
			Decomissioning Phase		
MM115	Decomissioning Phase	EIAR Chapter 11	Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, be it of less impact. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential impacts.		
			EIAR Chapter 12 Noise		
			Construction Phase		
MM116	Construction Noise	EIAR Chapter 12	Due to the potential for significant construction noise impact effects at receptors within 25m of the existing road upgrades and Proposed Grid Connection underground cabling route, specific mitigation measures are provided in Section **Error! Reference source not found.** and **Error! Reference source not found.**. For all other elements of the construction phase the assessment of potential impacts has demonstrated that the Proposed Project is expected to comply with the criteria and therefore no specific mitigation measures are required. Although there was no specific mitigation measures required, the following best practice mitigation measures from BS5528-1 standard will be implemented for the duration of the construction phase:		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› limiting the hours during which site activities likely to create high levels of noise or vibration are permitted; › establishing channels of communication between the contractor/developer, Local Authority and residents; › appointing a site representative responsible for matters relating to noise and vibration; › monitoring typical levels of noise and vibration during critical periods and at sensitive locations; › keeping site access roads even to mitigate the potential for vibration from lorries. Furthermore, a variety of practicable noise control measures will be employed. These include: › selection of plant with low inherent potential for generation of noise and/ or vibration; › placing of noise generating / vibratory plant as far away from sensitive receptors as possible within the site constraints, and; › regular maintenance and servicing of plant items. The contract documents will clearly specify that the Contractor undertaking the construction of the works will be obliged to take specific noise abatement measures and comply with the recommendations of British Standard BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Noise.* The following list of measures will be implemented on site, to ensure compliance with the relevant construction noise criteria: › No plant used on site will be permitted to cause an on-going public nuisance due to noise. › The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. › All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers. › Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use. › Any plant, such as generators or pumps, which is required to operate close to NSL's outside of general construction hours will be surrounded by an acoustic enclosure or portable screen. › During the course of the construction programme, supervision of the works will include ensuring compliance with the limits detailed in Section **Error! Reference source not found.** using methods outlined in British Standard BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Noise*. › The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Saturday. However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (i.e. concrete pours, rotor/tower deliveries) it will be necessary on occasion to work outside of these hours. Where rock breaking is employed, the following are examples of measures that will be considered, where necessary, to mitigate noise emissions from these activities: › Fit suitably designed muffler or sound reduction equipment to the rock breaking tool to reduce noise without impairing machine efficiency. › Ensure all leaks in air lines are sealed. › Erect acoustic screen between compressor or generator and noise sensitive area. When possible, line of sight between top of machine and reception point needs to be obscured. › Enclose breaker or rock drill in portable or fixed acoustic enclosure with suitable ventilation.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			If blasting is undertaken as part of the Proposed Project, a detailed assessment will be undertaken by a specialist blast design engineer to determine the blast design parameters; all mitigation measures specified by the blast design engineer to keep vibration values within the criteria in Section **Error! Reference source not found.** will be implemented. Air overpressure from a blast is difficult to control, however, because of its variability much can be done to reduce the effect. A reduction in the amount of primer cord used, together with the adequate burial of any that is above the ground, can give dramatic reduction to air overpressure intensities especially in the audible frequency range. Should complaints arise, they are likely to be received from an area downwind of the blast site, and therefore, blasting will be postponed during unfavourable weather conditions. Furthermore, as air blast intensity is a function of total charge weight, then a reduction in the total amount of explosives used can also reduce the air overpressure value. Further guidance will be obtained from the recommendations contained within BS 5228: Part 1 and the European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations 1988 in relation to blasting operations. The methods used to minimise complaints could consist of some or all of the following: › Restriction of hours within which blasting can be conducted (e.g. 09:00 – 18:00hrs). › Notification to nearby residents before blasting starts (e.g. 24-hour written notification). › The firing of blasts at similar times to reduce the 'startle' effect. › On-going circulars informing people of the progress of the works. › The implementation of an onsite documented complaints procedure. › The use of independent monitoring by external bodies for verification of results.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Trial blasts in less sensitive areas to assist in blast designs and identify potential zones of influence. To ameliorate any potential noise impacts that may be present during the construction phase, a schedule of noise control measures has been formulated in accordance with best practice guidance. These are outlined in the Construction and Environmental Management Plan (CEMP) that has been prepared for the Proposed Project. The contract documents will specify that the Contractor undertaking the construction works will be obliged to take specific noise abatement measures and comply with the recommendations of British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise. To ameliorate any potential noise impacts that may be present during the construction phase, a schedule of noise control measures has been formulated in accordance with best practice guidance. These are outlined in the Construction and Environmental Management Plan (CEMP) that has been prepared for the Proposed Project. › Good site practices will be implemented to minimise the likely effects. Section 8 of BS5228-1:2009+A1:2014 recommends a number of simple control measures as summarised below that will be employed onsite: › 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; › No plant used on site will be permitted to cause an on-going public nuisance due to noise. › The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations. › All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers. › Machinery that is used intermittently will be shut down during periods when not in use. › Any plant, such as generators or pumps, which is required to operate close to NSL's outside of general construction hours will be surrounded by an acoustic enclosure or portable screen. › During the course of the construction programme, supervision of the works will include ensuring compliance with the limits detailed in Section 12.3.2.1 using methods outlined in British Standard BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise. › The hours of construction activity will be limited to avoid unsociable hours where possible. Construction operations shall generally be restricted to between 7:00hrs and 19:00hrs Monday to Saturday. However, to ensure that optimal use is made of good weather periods or at critical periods within the programme (i.e. concrete pours, rotor/tower deliveries) it will be necessary on occasion to work outside of these hours. **Grid Connection underground cabling route** Similarly, in respect of the construction of the underground cabling route, part of which is shared with the existing road upgrade, the contractor will utilise screening in order to reduce noise impacts on nearby sensitive receptors when the works take place proximate to residences along the proposed route. Mitigation measures in respect of the existing road upgrades will also be applied in respect of the underground cabling route.		
Operational Phase					
MM117	Operational Noise	EIAR Chapter 12	In the event that a complaint which indicates potential Amplitude Modulation (AM) associated with turbine operation, the operator will employ a qualified acoustic consultant to assess the level of AM in accordance with the methods outlined in the Institute of Acoustics IOA Noise		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Working Group (Wind Turbine Noise) Amplitude Modulation Working Group Final Report: A Method for Rating Amplitude Modulation in Wind Turbine Noise (9 August 2016) or subsequent revisions. These mitigation measures, if required, will consist of the implementation of operational controls for the relevant turbine type, which will include turbine curtailment and/or stopping turbines under specific operational conditions as advised by the acoustic consultant.		
MM118	Operational Noise	EIAR Chapter 12	An operational noise survey will be undertaken to ensure compliance with any noise conditions applied to the development. It is common practice to commence surveys within six months of the Proposed Wind Farm being commissioned. If an exceedance of the noise criteria is identified as part of the commissioning assessment, the guidance outlined in the IOA GPG, specifically Supplementary Guidance Note 5: *Post Completion Measurements* (July 2014) will be followed, and relevant corrective actions taken. For example, implementation of noise reduced operational modes resulting in curtailment of turbine operation can be implemented for specific turbines in specific wind conditions to ensure predicted noise levels are within the relevant noise criterion curves/planning conditions limits. Such curtailment can be applied using the wind farm SCADA system without undue effect on the wind turbine performance. Following implementation of these measures, noise surveys will be repeated to confirm compliance with the noise criteria.		
Decomissioning Phase					
MM119	Decomissioning Phase	EIAR Chapter 12	No specific mitigation measures are required for decommissioning. To ameliorate any potential noise impacts that may present during the decommissioning phase, a schedule of noise control measures has been formulated in accordance with best practice guidance. These are outlined in the Construction and Environmental Management Plan (CEMP) that has been prepared for the Proposed Project.		
EIAR Chapter 13 Cultural Heritage					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Pre-Construction Phase		
MM120	Sub-Surface Archaeological Potential	EIAR Chapter 13	› Pre-development archaeological testing of the proposed infrastructure in previously undisturbed greenfield areas of the 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). › A report on the testing will be compiled on completion of the work and submitted to the NMS and the Planning Authority. › Further mitigation such as preservation in situ (avoidance), preservation by record (excavation), buffer zones may be required depending on the results of the testing.		
			Construction Phase		
MM121	Recorded Monuments	EIAR Chapter 13	**Proposed Grid Connection** Thirteen recorded monuments are located within 100m of the proposed underground electrical cabling route, while none are located in the immediate vicinity of the proposed onsite 110kV substation or associated temporary construction compound. › The Proposed Grid Connection underground electrical cabling route will extend along the east side of the public road, where possible, as it extends past ringfort GA043-088— in order to avoid potential direct impacts to sub-surface archaeological elements of the monument or associated features which may exist in this area. › Archaeological monitoring will be carried out under licence from the National Monuments Service (NMS) along the relevant sections of the Proposed Grid Connection underground cabling route where the latter extends through the ZoN for monuments GA043-088—, GA057-134— and GA057-102—.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› A report on the monitoring will be compiled on completion of the work and submitted to the NMS and the Planning Authority. › Further mitigation such as preservation in situ (avoidance), preservation by record (excavation) may be required depending on the results of the monitoring.		
MM122	Sub-Surface Archaeological potential	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 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.		
MM123	Newly Recorded Monuments	EIAR Chapter 13	One potential archaeological monument was noted within the Proposed Wind Farm during the walk-over survey. Mitigation measures are recommended in order to prevent any accidental damage occurring during the construction stage of the Proposed Wind Farm. › A 30m buffer zone will be established around the newly recorded possible enclosure. During the Construction phase, the physical buffer will comprise durable temporary fencing with 'keep out' signage. The requirement for the buffer zone and associated signage should be included in the CEMP. › No ground works or storage of materials or tracking of machinery will take place within the buffer zone.		
Decomissioning Phase					
MM124	Decomissioning Phase	EIAR Chapter 13	Any potential direct impacts effects will already have been resolved through mitigation measures during the construction phase.		
EIAR Chapter 14 Landscape and Visual					

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Pre-Construction Phase		
MM125			**Mitigation by Design** Through the iterative project design process, informed by early-stage impact assessment work, landscape modelling, ZTV mapping and photomontage preparation, every effort has been made to bring forward the optimum design for the Proposed Project with respect to landscape and visual factors. The Proposed Wind Farm layout that is the subject of this LVIA, already incorporates the following landscape and visual design considerations for good wind farm design, with a particular focus on site selection: › Siting of proposed turbines adheres to the minimum 500 metre set back distance in the Guidelines and also the 4 times tip height set-back distance explicitly set out for residential visual amenity prescribed by the Draft Guidelines. › The proposed turbines are strategically sited within a modified working landscape where there is limited visibility (or large set back distances) from large population centres and designated landscape. › The proposed turbines are located within a 'Low' Landscape Sensitivity area as designated within the GCDP 2022-28. › Siting of the proposed turbines in a landscape setting (The LVIA Study Area to 20km) which has a very limited number of designated sensitive landscape and visual receptors in local planning policy (There are no landscape or visual impacts on the three designated scenic views within the LVIA Study Area). › The turbines have been located within a landscape defined by agricultural fields bordered by mature hedgerows and treelines which provide screening effects, particularly when the turbines are viewed from locations in medium to long distance from the proposed turbines. Impacts on the landscape and visual receptors are thus localised.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› The proposed turbines are located in a relatively flat landscape with the proposed turbines at a similar base elevation relative to receptors which reduces their visual prominence over the wider landscape. › The substation is the only overground element of the Proposed Grid connection, and it is contained within the site. The proposed 30m meteorological mast is also a tall vertical structure; therefore, it is included in the photomontage booklet and is fully considered throughout the LVIA chapter. However, it will be substantially less visible than any turbine given its shorter and slender lattice form. Other components of the Proposed Project are not deemed to be as visually prominent as the proposed turbines, however, they have the potential to give rise to localised landscape and visual effects. Although not the primary focus of the LVIA, these elements are given full consideration throughout this chapter. › The internal site road layout makes use of the existing roads/ tracks wherever possible, to minimise the requirement for new tracks within the Site and where possible retain the integrity of existent field boundary walls, hedgerows and trees. › To minimise cut and fill activities required to construct the proposed turbines, the proposed access roads, and other infrastructure such as hard stands have been designed to align with the existing terrain within the landscape of the Site. › In all circumstances, excavation depths and volumes will be minimised, and excavated material will be re-used where possible. › During initial vegetation stripping, all topsoil material will be temporarily stored on Site and used for landscaping the edges of the development infrastructure during reinstatement/regrading. The stripped topsoil will contain a natural seed source of local provenance and result in the establishment of a species rich grassland.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			The following measures should be implemented to mitigate effects during the construction phase and operational phase of the Proposed Grid Connection underground electrical cabling route: › Where the cable trench is to be located in the road verge, subsoil should be piled on site and re-used after cabling works. Should any medium planting be removed, it should be replaced with the same or similar species whenever it is not possible to salvage and reinstate. New topsoil should be provided should the existing topsoil not be of sufficient standard (to comply with BS 3882:2015). › 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.		
Construction Phase					
MM126	Landscape	EIAR Chapter 14	The following measures should be implemented to mitigate effects during the construction phase of the Proposed Grid Connection underground cabling route: › Where the cable trench is to be located in the road verge, subsoil should be piled on site and re-used after cabling works. Should any medium planting be removed, it should be replaced with the same or similar species whenever it is not possible to salvage and reinstate. New topsoil should be provided should the existing topsoil not be of sufficient standard (to comply with BS 3882:2015). › 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. The construction works will be temporary/short-term in nature and completed as soon as practically possible. All construction activities will follow best practice methods to reduce impacts upon the environment and landscape of the Proposed Project. Further details are contained in the Construction and Environmental Management Plan (CEMP).		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Operational Phase		
MM127	Landscape	EIAR Chapter 14	The following measures have been included in the Proposed Project design in order to avoid or reduce direct effects on landscape receptors of the Proposed Wind Farm site: › The internal site road layout makes use of the existing roads/ tracks wherever possible, to minimise the requirement for new tracks within the Proposed Wind Farm site and where possible retain the integrity of existent field boundary walls, hedgerows and trees. › During initial vegetation stripping, all topsoil material will be temporarily stored on Proposed Wind Farm site and used for landscaping the edges of the development infrastructure during reinstatement/regrading. The stripped topsoil will contain a natural seed source of local provenance and result in the establishment of a species rich grassland.		
			EIAR Chapter 15 Material Assets		
			Material Assets - Traffic		
			Pre-Construction Phase		
MM128	Traffic	EIAR Chapter 15	**Mitigation by Design** Mitigation by design measures include the following: › Selection of the most appropriate delivery route to transport the wind turbine components, requiring the minimum remedial works to accommodate the vehicles as set out in Chapter 15.		
			Construction Phase		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM129	Traffic	EIAR Chapter 15 Appendix 15–2	While the details of the traffic management measures will be developed in detail and submitted for agreement with Galway County Council prior to the construction of the Proposed Project, they will include the following measures, › An application to Galway County Council for the temporary reduction of the speed limit on the N83 from 100 km/h to 80 km/h during the construction phase of the Proposed Project, as discussed in principle with Galway County Council during pre-planning discussions. › Similar in relation to the section of the L-61461 between the N83 and the proposed site access junction approximately 280m to the west for a temporary reduction in the speed limit from 80 km/h to 60 km/h (the default speed limit for this road could already be reduced from 80kmh to 60kmh under proposed government guidelines). › Introduction of signage on northbound and southbound approached to the existing L-61461 and the temporary link of warning of approaching construction site (TMS Traffic Signs WK001). › Signage on the N83 northbound indicating the temporary construction access approaching on the left (TMS traffic Sign WK052) and similar on southbound lane indication the temporary link approaching on the right (TMS Traffic Signs WK053). › Signage on the N83 northbound and southbound approaches to temporary access of Flagmen (TMS traffic Sign WK061). › It is also proposed that temporary signage indicating the overtaking is not permitted during the construction phase (TMS traffic Sign RUS 014). These may be introduced with temporary bollards on the centreline of the N83. › It is proposed that the temporary speed limit of 80 km/h is indicated on this section of the N83 using Variable Message Signs in order to maximise conspicuity. › Similarly, temporary signage will be introduced on the L-61461, including signage on eastbound and westbound approaches to the proposed temporary link (TMS Traffic Signs WK001), signage indicating the temporary construction access approaching on the L-61461		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			(TMS traffic Signs WK052 and WK053), signage on the L-61461 warning of the presence of Flagmen (TMS traffic Sign WK061). › A temporary 60 km/h speed limit signs will also be introduced on the L-61461 (if not already established as the default speed limit). A detailed **Traffic Management Plan (TMP)**, included as Appendix 15-3 of this EIAR, will be finalised and confirmatory detailed provisions in respect of traffic management agreed with the roads authority and An Garda Síochána prior to construction works commencing. The detailed TMP will include the following: › **Traffic Management Coordinator –** a competent Traffic Management Co-ordinator will be appointed for the duration of the construction of the Proposed Project and this person will be the main point of contact for all matters relating to traffic management. › **Delivery Programme –** a programme of deliveries will be submitted to Galway County Council and other relevant authorities in advance of deliveries of turbine components to the Proposed Wind Farm site. › **Information to locals** – Locals in the area will be informed of any upcoming traffic related matters e.g. delivery of turbine components at night, via letter drops and posters in public places. Information will include the contact details of the Contract Project Co-ordinator, who will be the main point of contact for all queries from the public or local authority during normal working hours. An "out of hours" emergency number will also be provided. › **A Pre and Post Construction Condition Survey –** A pre-condition survey of roads associated with the Proposed Project will be carried out prior to construction commencement to record the condition of the road. A post construction survey will be carried out after works are completed. Where required the timing of these surveys will be agreed with the local authority. › **Liaison with the relevant local authorities** - Liaison with the relevant local authorities including the roads sections of local authorities that the delivery routes traverse, and An Garda Siochana, during the delivery phase of the large turbine vehicles, when an escort for all convoys will be required.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			› **Implementation of temporary alterations to road network at critical junctions** – At locations where required highlighted in Section 15.1.9. › **Identification of delivery routes** – These routes will be agreed and adhered to by all contractors. › **Travel plan for construction workers to Site–** A travel plan for construction staff, which will include the identification of a routes to / from the site and identification of parking areas will be implemented by the main contractor. › **Temporary traffic signs** – As part of the traffic management measures temporary traffic signs will be put in place at all key junctions, including the temporary access linking the N83 and L-61461 and the access junction on the L-61461. 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 Cabling Route –** As set out in Section 15.1.7 of this EIAR. › **Additional measures** - Various additional measures will be put in place in order to minimise the effects of the development traffic on the surrounding road network including sweeping / cleaning of local roads as required. › **Re-instatement works** - All road surfaces and boundaries will be re-instated to pre-development condition, as agreed with the local authority engineers.		
Decomissioning Phase					
MM130	Decommissioning Phase	EIAR Chapter 15	In the event that the Proposed Project is decommissioned after the 30 years of operation, a decommissioning plan, will be prepared for agreement with the local authority, as described in Chapter 4 and Appendix 4-7 Decommissioning Plan. This plan will include a material recycling		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
		Appendix 15-2	/ disposal and traffic management plan will be prepared for agreement with the local authority prior to decommissioning, in accordance with Scottish Natural Heritage report (SNH) *Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms* (SNH, 2013).		
Material Assets - Other					
Pre-Constructions Phase					
MM131	Public Services and Water Supply	EIAR Chapter 3, 15	› Proposed Wind Farm and Proposed Grid Connection infrastructure have been designed to avoid identified services and utilities. Prior to commencement of construction of the Proposed Project the surveys will be repeated and updated, to ensure any new services and utilities will not be impacted by the Proposed Project.		
Construction Phase					
MM132	Public Services and Water Supply	EIAR Chapter 15	To ensure that the construction of the Proposed Project will not have effect on underground electrical cables and built services at the Site. The mitigation measures include the following: › Any area where excavations are planned will be surveyed and all existing services will be identified prior to commencement of any works. › Liaison will be had with the relevant sections of the Local Authority including all the relevant area engineers to ensure all services are identified. › Excavation permits will be completed, and all plant operators and general operatives will be inducted and informed as to the location of any services. › The contractor must comply with and standard construction codes of practice in relation to working around electricity, gas, water, sewage and telecommunications networks.		
MM133	Telecommunications	EIAR Chapter 3, 15	In the event of interference occurring to telecommunications, the Guidelines acknowledge that '*electromagnetic interference can be overcome*' by the use of divertor relay links out of line with the wind farm.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
MM134	Aviation	EIAR Chapter 15	The scoping responses received from both IAA and the Department of Defence set out lighting requirements and obstacle avoidance strategies as set out above. These requirements will be complied with for the Proposed Project and any further details will be agreed in advance of construction with the IAA, i.e. crane erection. The coordinates and elevations for the as-built turbines will be supplied to the IAA, as is standard practice for wind farm developments.		
MM135	Gas Networks	EIAR Chapter 3, 15	› The Gas Networks Ireland underground gas pipline travels from north to south through the Proposed Wind Farm site. It was confirmed in a scoping response from Bord Gais Networks that a minimum setback distance relating to deep intrusive groundworks of 2 no. turbine hub heights should be achieved. › A designated 207m setback distance relating to deep intrusive groundworks has been applied to this underground pipeline. The Applicant has been able to achieve a 284m setback from the closest turbines (T5) which exceeds the requirements requested by the operator. There are no turbines located within this designated setback distance. › In addition, telecom lines were laid alongside the gas line to avoid the need for additional trenching works. The Applicant achieved setback distance also alows for avoidance during construction.		
MM136	Waste Management	EIAR Chapter 15 Appendix 4-5	All waste generated on Site will be contained in waste skip at a waste storage area on Site. This waste storage area will be kept tidy with skips clearly labelled to indicate the allowable material to be disposed of therein. The expected waste volumes generated on Site are unlikely to be large enough to warrant source segregation at the Site. Therefore, all waste streams generated on site will be deposited into a single waste skip. The waste material will be transferred to a Materials Recovery Facility (MRF) by a fully licenced waste contractor where the waste will be sorted into individual waste stream for recycling, recovery or disposal. Site personnel will be instructed at induction that under no circumstances can waste be brought on 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.		

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Audit Result	Action Required
			Operational Phase		
MM137	Telecommunications	EIAR Chapter 15	› An Operator required buffer has been incorporated into the design for the link that passes through the Site, therefore no further mitigation measures during the operational phase are required. › A signed protocol agreement between 2rn and the Developer can be found in Appendix 15-4. The protocol document ensures that in the event of any interference occurring to television or radio reception due to operation of the wind farm, the required measures, as set out in the document, will be carried out by the Developer to rectify this. The Protocol Document ensures that the appropriate mitigation is carried out in the event of unanticipated broadcast interference arising to television or radio reception as a result of the Proposed Wind Farm.		
MM138	Aviation	EIAR Chapter 15	The scoping responses received from both IAA and the Department of Defence set out lighting requirements and obstacle avoidance strategies as set out above. These requirements will be complied with for the Proposed Project and any further details will be agreed in advance of construction with the IAA, i.e. crane erection. The coordinates and elevations for the as-built turbines will be supplied to the IAA, as is standard practice for wind farm developments.		
			Decomissioning Phase		
MM139	Decomissioning Phase	EIAR Chapter 15	The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential impacts.		

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 Enhancement Plan prepared as part of the planning permission application to An Bord Pleanála.

This section of the Construction and Environment Management Plan groups together all of the monitoring proposals presented in the EIAR. The monitoring proposals are presented in the following pages.

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

Table 8-1 Monitoring Measures

Ref. No.	Reference Heading	Reference Location	Mitigation Measure	Frequency	Reporting Period	Responsibility
			Pre-Construction Phase			
MX1	Drainage Maintenance	EIAR Chapter 4 CEMP Section 4	› An inspection and maintenance plan for the on-site drainage system will be prepared in advance of commencement of any works. › Daily visual inspections of drains and outfalls will also be performed during the construction period to ensure suspended solids are not entering streams and rivers on site, to identify any obstructions to channels and to allow appropriate maintenance of the drainage regime. Should the suspended solids levels measured during construction be higher than the existing levels, the source will be identified, and additional mitigation measures implemented. › Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. › Daily inspection and recording of surface water management system by on-site clerk of works and immediate remedial measures to be carried out as required and works temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the Site.	On going	Monthly	Project Hydrologist
MX2	Water Quality and Monitoring	EIAR Chapter 9 CEMP Section 4	› Baseline water quality field testing and laboratory analysis will be undertaken where required prior to commencement of construction at the site. › Analysis will be for a range of parameters with relevant regulatory limits along with Environmental Quality Standards	Once	As Required	Project Hydrologist

			(EQSs) and sampling will be undertaken at designated locations as outlined in Figure 9-5 of the EIAR. › Baseline sampling will be completed on at least two occasions, and these should ideally coincide with low flow and high flow stream conditions. The high flow sampling event will be undertaken after a period of sustained rainfall, and the low flow event will be undertaken after a dry spell.			
MX3	Flora and Fauna	EIAR chapter 6	All setts within 50m 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. All badger survey work will be undertaken in line with current best practice guidance.	Once	As Required	Project Ecologist
MX4	Ornithology	EIAR Chapter 7 Appendix 7-7	› It is proposed that construction works will commence outside the bird breeding season (1st of March to 31st of August inclusive). Pre-commencement surveys will be undertaken prior to the initiation of works at the wind farm. Any requirement for construction works to run into the subsequent breeding seasons following commencement will be subject to further bird surveys, once per month (April to July), to confirm the absence of breeding birds of conservation concern. › Monitoring will be undertaken by a suitably qualified ornithologist. The survey will include a thorough walkover survey to a 500m radius of the development footprint and/or all works areas, where access allows. If winter roosts or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the construction phase. If the roost/nest is found to be active during the construction phase survey no works shall be undertaken within a species-specific buffer (as per Forestry Commission Scotland, 2006; Ruddock and Whitfield, 2007; Goodship and	Once	As Required	Project Ornithologist

			Furness, 2022) in line with best practice. No works within the buffer zone shall be permitted until it can be demonstrated that that birds of conservation concern are no longer reliant on the roost/nest site.			
MX5	Sub-Surface Archaeology	EIAR Chapter 13 CEMP Section 4	› Pre-development archaeological testing of the proposed infrastructure in previously undisturbed greenfield areas of the 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). › A report on the testing will be compiled on completion of the work and submitted to the NMS and the Planning Authority.	Once	As Required	Project Archaeologist
Construction Phase						
MX6	Spoil Management	EIAR Chapter 4 CEMP Section 4	› 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 practices at spoil management areas when periods of heavy rainfall are expected so as to prevent excessive dirty water runoff from being generated.	As Required	As Required	Geotechnical Engineer
MX7	Drainage Design	EIAR Chapter 4 CEMP Section 4	› Daily inspection and recording of surface water management system by on-site clerk of works and immediate remedial measures to be carried out as required and works temporarily ceased if a retained stormwater/sediment load is identified to have the potential to migrate from the Site. › Check dams are designed to reduce velocity and control erosion and are not specifically designed or intended to trap sediment, although sediment is likely to build up. If necessary, any excess	Daily As Required	As Required As Required	ECoW

			sediment build up behind the dams will be removed. For this reason, check dams will be inspected and maintained regularly to insure adequate performance. Maintenance checks will also ensure the centre elevation of the dam remains lower than the sides of the dam. › Piped drains will be inspected weekly and following rainfall events. Inlet and outlets will be checked for sediment accumulation and blockage.	Weekly	As Required	
MX8	Dust Suppression	EIAR Chapter 4 Appendix 4-5	› 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 stilling/settlement ponds in the Proposed Wind Farm site's drainage system and will be pumped into a bowser or water spreader to dampen down haul roads and temporary construction compounds to prevent the generation of dust. Silty or oily water will not be used for dust suppression, because this would transfer the pollutants to the haul roads and generate polluted runoff or more dust. Water bowser movements will be carefully monitored, as the application of too much water may lead to increased runoff.	As Required	As Required	PSCS
MX9	Health and Safety	EIAR Chapter 5 CEMP Section 5	› The PSCS shall 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.	Daily	Daily	PSCS
MX10	Biodiversity	EIAR Chapter 6 CEMP Section 4	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.	As Required	As Required	Project Ecologist

			› 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.			
MX11	Ornithology	EIAR Chapter 7 Appendix 7-7	› Any requirement for construction works to run into the subsequent breeding seasons following commencement will be subject to further bird surveys, once per month (April to July), to confirm the absence of breeding birds of conservation concern. › Monitoring will be undertaken by a suitably qualified ornithologist. The survey will include a thorough walkover survey to a 500m radius of the development footprint and/or all works areas, where access allows. If winter roosts or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the construction phase. If the roost/nest is found to be active during the construction phase survey no works shall be undertaken within a species-specific buffer (as per Forestry Commission Scotland, 2006; Ruddock and Whitfield, 2007; Goodship and Furness, 2022) in line with best practice. No works within the buffer zone shall be permitted until it can be demonstrated that that birds of conservation concern are no longer reliant on the roost/nest site.	Once	As Required	Project Ornithologist
MX12	Groundworks	EIAR Chapter 8	Ongoing inspection and monitoring of the development, particularly in temporary stockpile areas, through all phases of construction (including pre, during and post construction) and ensure construction	Monthly	As Required	Project Geotechnical Engineer

		CEMP Section 4	is carried out as specified in the EIAR, NIS and in relevant planning conditions.			
MX13	Drainage Inspections	EIAR Chapter 9 CEMP Section 4	An inspection and maintenance plan for the on-site drainage system will be prepared in advance of commencement of any works. Daily visual inspections of drains and outfalls will also be performed during the construction period to ensure suspended solids are not entering streams and rivers on site, to identify any obstructions to channels and to allow appropriate maintenance of the drainage regime. Should the suspended solids levels measured during construction be higher than the existing levels, the source will be identified, and additional mitigation measures implemented. Any excess build-up of silt levels at dams, the settlement pond, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs should be undertaken for each primary watercourse and specifically following heavy rainfall events (i.e. weekly, monthly and event based). Inspection sheets and photographic records will be kept on site. Inspection points will include the in-situ field monitoring point locations and the laboratory analysis sampling points. Inspection points will depend on works being completed within the catchment upstream of the identified monitoring locations. Visual inspections will also be completed after major rainfall events, i.e. after events of >25mm rainfall in any 24-hour period and data including photographs will be collected by visual inspections and independently assessed by the Project Hydrologist who will monitor and advise on the records being received.	Daily	Daily	Project Hydrologist

MX14	Water Quality Monitoring	EIAR Chapter 9 CEMP Section 4	The following periodic inspection regime will be implemented: › Daily general visual inspections of site operations and inspections of all watercourses drainage infrastructure within the Site and in the surrounding area by the ECoW or a suitably qualified and competent person as delegated by the ECoW; › Inspections to include all elements of drainage infrastructure to ensure the system is operating correctly and to identify and maintenance that is required. Any changes, such as discolouration, odour, oily sheen or litter will be noted and corrective action will be implemented. High risk locations such as settlement ponds will be inspected daily. Daily inspections checks will be completed on plant and equipment, and whether materials such as straw bales or oil absorbent materials need replacement; › Event based inspections by the ECoW as follows: ○ >10 mm/hr (i.e. high intensity localised rainfall event); ○ >25 mm in a 24-hour period (heavy frontal rainfall lasting most of the day); or, ○ Rainfall depth greater than monthly average in 7 days (prolonged heavy rainfall over a week). › Monthly site inspections by the Project Hydrologist/ ECoW during construction phase; › Quarterly site inspections by the Project Hydrologist/ ECoW after construction for a period of one year following the construction phase; and, › A written record will be maintained or available on-site within this Construction Environmental Management Plan (CEMP) which will be maintained on-site during the construction phase.	Daily/As Required	Daily/As Required	Project Hydrologist
MX15	Turbidity Monitoring	EIAR Chapter 9	Turbidity monitors or sondes can be installed where required at locations surrounding the Site. The sondes will provide continuous	Daily	Daily	ECoW

		CEMP Section 4	readings for turbidity levels in the watercourse. This equipment will be supplemented by daily visual monitoring at identified locations.			
MX16	Water Quality Monitoring	EIAR Chapter 9 CEMP Section 4	› During the construction phase field testing and laboratory analysis of a range of parameters with relevant regulatory limits and EQSs should be undertaken for each primary watercourse, and specifically following heavy rainfall events (i.e. weekly, monthly and event based). › Field chemistry measurements of unstable parameters, (pH, conductivity, temperature) will be taken at the surface water monitoring locations, as per water monitoring programme for the Proposed Project and each primary watercourse along the Proposed Grid Connection underground cabling route. These analyses will be carried out by either the ECoW or the Project Hydrologist. In-situ field monitoring will also be completed after major rainfall events, i.e. after events of >25mm rainfall in any 24-hour period. The Project Hydrologist will monitor and advise on the readings collected by in-situ field monitoring.	As Required	As Required	ECoW
MX17	Pre-Emptive Site Drainage Management	EIAR Chapter 9 CEMP Section 4	The works programme for the initial construction stage of the Proposed Wind Farm site will also take account of weather forecasts and predicted rainfall in particular. Large excavations and movements of 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	Daily	As Required	Project Hydrologist

			including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates; › MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale; › 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events; › Rainfall Radar Images: Images covering the entire country are freely available from the Met Eireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive; and, › Consultancy Service: Met Eireann provide a 24-hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest. Using the safe threshold rainfall values will allow work to be safely controlled (from a water quality perspective) in the event of forecasting of an impending high rainfall intensity event. Works should 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 should be completed: › Secure all open excavations; › Provide temporary or emergency drainage to prevent back-up of surface runoff; and, › Avoid working during heavy rainfall and for up to 24 hours after heavy events to ensure drainage systems are not overloaded.			
MX18	Reactive Site Drainage Management	CEMP Section 3	› In line with the requirements of the EIAR, the final drainage design prepared for the Proposed Project prior to commencement of construction will provide for reactive management of drainage measures. The effectiveness of drainage measures designed to minimise runoff entering works areas and capture and treat silt-laden water from the works areas, will be monitored continuously by the ECoW or supervising hydrologist on-site. The contractor is solely responsible for the implementation of the detailed drainage design on site. The ECoW is responsible for monitoring the effectiveness of the drainage design as it is implemented on-site. The ECoW or supervising hydrologist will respond to changing weather, ground or drainage conditions on the ground as the Proposed Project proceeds, to ensure the effectiveness of the drainage design is maintained in so far as is possible. This may require the installation of additional check dams, interceptor drains or swales as deemed necessary on-site. The drainage design may have to be modified on the ground as necessary, and the modifications will draw on the various features outlined above in whatever combinations are deemed to be most appropriate to situation on the ground as a particular time. › In the event that works are giving rise to siltation of watercourses, the ECoW or supervising hydrologist will stop all	As Required	As Required	ECoW

			works in the immediate area around where the siltation is evident. The source of the siltation will be identified and additional drainage measures such as those outlined above will be installed in advance of works recommencing.			
MX19	Rainfall Monitoring	CEMP Section 3	› Accurate forecasting and monitoring of rainfall is critical to the successful pre-emptive and reactive site drainage management as outlined in the subsections above. › Rainfall forecasts will be obtained for the nearest forecast reference point available via the www.yr.no weather forecasting website. The reference location will be that of Belclare, Co. Galway. › Construction personnel will be required to check the forecasted rainfall for the days ahead and plan for or suspend planned works accordingly. The forecasted rainfall should be recorded for reference and comparison with the rainfall levels to be recorded on-site. › Actual rainfall will be monitored on site, ideally via an automated rain gauge with regular recording intervals recommended by the Project Hydrologist and a means of alerting the construction personnel of rainfall trigger levels. The recorded rainfall data should be available on site at all times for review by the ECoW, Project Hydrologist or any regulatory authorities. The appointed contractor will be required to outline their proposed means of recording rainfall on site to the satisfaction of the ECoW and the Project Hydrologist prior to commencement of work.	Daily	Daily	PSCS
MX20	Drainage	EIAR Chapter 9 CEMP Section 4	› Regular inspections of all existing and installed drainage measures should be undertaken by the Project Contractor, especially after heavy rainfall, to check for blockages, and ensure there is no build-up of standing water within the system. The contractor will devise a system of recording the findings of	Monthly	Monthly	ECoW

			these inspections. Any excess build-up of silt levels at check dams, the settlement ponds, or any other drainage features that may decrease the effectiveness of the drainage feature, will be removed. For this reason, the drainage measures installed on-site should be inspected at least weekly by the contractor and maintained as required during the construction phase of the Proposed Project to ensure good performance. › The ECoW will monitor the effectiveness of the on-site drainage during changing weather, ground or drainage conditions encountered on site, through their regular visual inspections of on-site watercourses and water monitoring programme. Where it appears that additional drainage measures will be required to ensure the drainage system remains effective, the ECoW will notify the contractor, the developer and project design team including the Project Hydrologist. The ECoW's role in this regard does not replace the need for the weekly (at least) inspections of the drainage system's measures by the Project Contractor.			
MX21	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
MX22	Noise and Vibration	EIAR Chapter 12	Due to the potential for significant construction noise impact effects at sensitive receptors within 25m of the existing road upgrades and Proposed Grid Connection underground cabling route, specific monitoring measures are provided. This included the implementation of monitoring typical levels of noise and vibration during critical periods and at sensitive locations.			

MX23	Traffic and Transport	CEMP Section 3	› The designated public roads outside the Site and along the main transport routes to the Site will be regularly inspected by the ECoW for cleanliness, and cleaned as necessary	Daily	Monthly	ECoW
MX24	Archaeology	EIAR Chapter 13 CEMP Section 4	› Archaeological monitoring will be carried out under licence from the National Monuments Service (NMS) along the relevant sections of the Proposed Grid Connection underground cabling route where the latter extends through the ZoN for monuments GA043-088—, GA057-134— and GA057-102—. › A report on the monitoring will be compiled on completion of the work and submitted to the NMS and the Planning Authority. › Further mitigation such as preservation in situ (avoidance), preservation by record (excavation) may be required depending on the results of the monitoring. › Any archaeological sites/features, if detected, during archaeological monitoring will be preserved by record (archaeologically excavated) or preserved in-situ (avoidance) and therefore a full record made of same.	As Required	As Required	Project Archaeologist
Operational Phase						
MX25	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. This operational phase drainage system will have been installed during the construction phase in conjunction with the road and hardstanding construction work as described in Section 4.6 of the EIAR. The drainage system will be monitored in the operational phase until such a time that all areas that have been reinstated become re-vegetated and the natural drainage regime has been restored.	Monthly	Monthly	Project Hydrologist

MX26	Water Monitoring	EIAR Chapter 4 CEMP Section 4	› Monthly water sampling and laboratory analysis will be undertaken for the first six months following completion of construction works. › Quarterly site inspections by the Project Hydrologist/ ECoW for a period of one year during the operational phase.	Monthly for month 1-6	Monthly for month 1-6	Project Hydrologist
MX27	Bats	EIAR Chapter 6 Appendix 6-2	In accordance with NatureScot and NIEA Guidance, a minimum 50m buffer to all habitat features used by bats (e.g., hedgerows, tree lines etc.) should be applied to the siting of all wind turbines. However, Eurobats No. 6 guidance and NIEA recommends increased buffers of 100m and 200m around woodland/forestry areas, however, there is no scientific evidence to support these increased buffer distances in the UK. NatureScot recommends that a distance of 50m between turbine blade tip and nearest woodland (or other key habitat features) is adequate mitigation. This 50m buffer will be implemented from the outset and monitored as per the post-construction monitoring. The success of the buffer mitigation will be assessed as part of post construction monitoring and updated where necessary. The formula provided in Section 6.1.3 of the Bat Report (Appendix 6-2) is presented to provide appropriate mitigation in relation to bats, and the relevant input required from turbine parameters, is the combination of the blade length and hub height. The turbine model to be installed on the Site will have an overall ground-to-blade tip height of 185m, rotor diameter of 163m, and hub height of 103.5m. The minimum bat buffer required for the Site is therefore 87.12m from the centre of the turbine.	1 year Post Construction	After 1 year of Post construction Monitoring	Project Ecologist
MX28	Bats	EIAR Chapter 6	› To assess the effects of the Proposed Wind Farm on bat activity, at least 3 years of post-construction monitoring is proposed. Post-construction monitoring will include static detector surveys,	Years 1,2,3	Annually	Project Ecologist

		Appendix 6-2	walked survey transects and corpse searching to record any bat fatalities resulting from collision. › The results of post-construction monitoring shall be utilised to assess any potential changes in bat activity patterns and to monitor the implementation of the mitigation strategy. At the end of Year 1, and if a curtailment requirement is identified (i.e. significant bat fatalities encountered), a curtailment programme, in line with relevant guidelines, will be devised around key activity periods and weather parameters, as well as a potential increase in buffers. › At the end of each year, the efficacy of the mitigation and monitoring plan will be reviewed, and any identified efficiencies incorporated into the programme. This approach allows for an evidence-based review of the potential for bat fatalities at the Site, post construction, to ensure that the necessary measures, based on a new baseline post-construction, are implemented for the protection of bat species locally. The effectiveness of any mitigation/curtailment needs to be monitored in order to determine (a) whether it is working effectively (i.e. the level of bat mortality is incidental), and (b) whether the curtailment regime can be refined such that turbine down-time can be minimised whilst ensuring that it remains effective at preventing casualties. › Section 6.2.1 of the Bat Report (Appendix 2) provides detail with regard to the monitoring to be carried out in years 1,2 and 3 and includes bat activity surveys and carcass searches. **Lighting** › With regard to the potential for lighting to increase collision risk, it is noted that there will be limited illumination of the turbines in the form of aviation lighting. Post construction monitoring will be carried out to assess any potential changes in bat activity			

			patterns and collision risk. Significant effects as a result of lighting are not anticipated; however, if in the course of this monitoring, any potential for significant effects on bats is identified, the site-specific mitigation measures will be reviewed and any changes necessary will be implemented to avoid any such impacts.			
MX29	Biodiversity	EIAR Chapter 6 Appendix 6-4	› A site-specific monitoring and evaluation programme is necessary to ensure that the success of the habitat creation remains long-term. It may also assist in situations where the grassland creation has not been successful by providing evidence of shortcomings, allowing a revised management plan to be formulated. › Monitoring will be carried out once per year during Year 1, Year 2 and Year 3 of implementation of this Plan, which will include the species-rich grassland establishment phase set out in Appendix 6-4. › Monitoring will be carried out on a yearly basis until the grassland has been sufficiently established and has given consistent results for 3 consecutive years after the establishment phase. Once the grassland has been successfully established, monitoring can be carried out every other year (years 5, 7 and 10 post-establishment). During this time the Project Ecologist will ascertain whether the establishment methodology needs to be adapted, for example through additional green hay transfer or seed harvesting. › The enhancement plan will be regularly updated and amended where necessary to improve the efficacy of the enhancement work. The number of monitoring plots may change depending on the results of the initial surveys.	Year 1, 2, 3, 5, 7, 10	Annually	Project Ecologist

MX30	Ornithology	EIAR Chapter 7 Appendix 7-	Operational monitoring will be undertaken in Years 1, 2, 3, 5, 10 and 15 of the lifetime of the wind farm, following SNH (2009) guidance. The surveys that will be undertaken are: › Flight activity surveys: vantage point surveys › Breeding bird surveys: Adapted Brown & Shepherd › Targeted bird collision surveys (corpse searches) will be undertaken by a trained dog and handler. The surveys will include detection and scavenger trials, to correct for these two biases and ensure the resulting data is robust. **Vantage Point Surveys** Vantage point surveys will be undertaken monthly during operational years 1, 2, 3, 5, 10 and 15 of the lifetime of the Proposed Wind Farm. The methodology for vantage point watches will follow guidelines issued by the NatureSot (SNH, 2009) and NatureScot (SNH, 2017). The proposed vantage point watches will adhere to a minimum of 36 hours/VP per season as per guidelines issued by NatureScot. During monitoring years, monthly visits will be undertaken for twelve months commencing at the beginning of breeding or non-breeding season: depending on which comes first. During each visit, six-hour vantage point watches (with a 30-minute break after the first three hours) will be undertaken from each fixed vantage point location that offers an uninterrupted view of the study area. Vantage points will be undertaken from the same locations as pre-planning surveys which informed the EIAR (i.e., VPs 1 and 2). The adequacy of the vantage point viewsheds will be monitored throughout the lifetime of the wind farm. Vantage point surveys will be timed to provide a spread over the full daylight period including	Years 1, 2, 3, 5, 10 and 15	Years 1, 2, 3, 5, 10 and 15	Project Ornithologist

			dawn and dusk watches to coincide with the highest period of bird activity. Behavioural categories for the observation of bird interactions with operational wind farms will be in line with the terminology outlined by Meredith *et al.*, (2002). **Distribution and Abundance Surveys** › Breeding Walkover Survey During monitoring years, post-construction breeding walkover surveys will follow the adapted Brown & Shepard survey methods. The survey methodology will be similar to methods employed for baseline EIAR surveys which will allow a comparison of data to be made for each monitoring year. The timing of visits will follow the recommendations of Calladine *et al.* (2009). Transects should ensure all areas of suitable breeding/ foraging habitat are approached to within 100m. Target species will include waders, raptors, waterbirds, gulls and other birds of conservation concern. Along with target species, all additional species observed will be recorded to inform the evaluation of supporting habitat. These surveys will follow the same routes that were followed during pre-planning surveys. A total of four site visits will be undertaken during the breeding season for each monitoring year and timed to coincide with the core breeding period of April - July. Notes will be recorded on nesting and territorial behaviour and breeding signs using standard BTO codes. Non-breeding behaviour such as birds flying over the site will also be recorded. › Collision Monitoring			

			Carcass searches for bird casualties as a result of collision with turbines will follow survey methods broadly based on guidelines issued by the NatureScot (SNH, 2009) and search methods adopted by Duffy and Steward (2008). The Proposed Wind Farm will be visited once per month during operational Years 1, 2, 3, 5, 10 and 15 of the lifetime of the wind farm. It is proposed to undertake a minimum of one visit per month during each survey year by a trained dog and handler. During each visit, searches will be undertaken at each operating turbine location by a trained dog and handler. Edkins (2014) “Impacts of Wind Energy Developments on Birds and Bats: Looking into The Problem”, recommends the "search width should be equal to the maximum rotor tip height”. Given a turbine rotor tip height of 185 meters the search area surrounding the base of the turbine would be taken as a diameter of 185 meters centred on the turbine base. This area will be the subject of target searches for bird casualties. Searches will incorporate the use of transects spaced at 10m intervals apart with the observer covering 5m on either side for each transect. Locations and coordinates of transect routes will be confirmed using a portable GPS recording device. Recording sheets will be used to document bird carcasses encountered in the field. If a bird carcass is found, the following details will be recorded: GPS location of each bird carcass, photographic record, carcass condition (intact - carcass that is completely intact or not badly composed); scavenged (evidence that the carcass was fed upon by a scavenger/predator); or feather spot (ten or more feathers indicating predation or scavenging or two or more primary feathers must be present to consider the carcass a casualty), distance from the turbine, date, time, etc..			

			Carcass removal trials and searcher efficiency trials will be undertaken to account for the ability of the dog team to find bird carcasses and the likelihood of scavenging of corpses by animals. This is done to ensure a more accurate estimation of the total number of collision victims. During carcass removal trials, a carcass is placed in a study area periodically and is monitored for a set number of days or until scavengers remove the carcass (this can be done with the use of a trail camera). A determination on carcass removal is made when no body parts containing flesh or bone or >10 disarticulated feathers can be found. During searcher efficiency trials, a number of carcasses are placed in a study area by one worker, then searched for by another worker with the dog. These may be conducted on the same day as surveys are carried out to avoid flooding the area with carcasses and increasing scavenger activity. The result of these trials provides a correction factor that can be applied to the results of the carcass searches.			
MX31	Noise and Vibration	EIAR Chapter 12 CEMP Section 4	An operational noise survey will be undertaken to ensure compliance with any noise conditions applied to the development. It is common practice to commence surveys within six months of the Proposed Wind Farm being commissioned. If an exceedance of the noise criteria is identified as part of the commissioning assessment, the guidance outlined in the IOA GPG, specifically Supplementary Guidance Note 5: *Post Completion Measurements* (July 2014) will be followed, and relevant corrective actions taken. For example, implementation of noise reduced operational modes resulting in curtailment of turbine operation can be implemented for specific turbines in specific wind conditions to ensure predicted noise levels are within the relevant noise criterion curves/planning conditions limits. Such curtailment can be applied using the wind farm SCADA	Once within six months	As Required	Noise Consultant

			system without undue effect on the wind turbine performance. Following implementation of these measures, noise surveys will be repeated to confirm compliance with the noise criteria.			
Decommissioning Phase						
MX32	Decommissioning	DP Section 1	As noted in the Scottish Natural Heritage report (SNH) *Research and Guidance on Restoration and Decommissioning of Onshore Wind Farms* (SNH, 2013) reinstatement proposals for a wind farm are made approximately 30 years in advance, so within the lifespan of the wind farm, technological advances and preferred approaches to reinstatement are likely to change. According to the SNH guidance, it is therefore: *"best practice not to limit options too far in advance of actual decommissioning but to maintain informed flexibility until close to the end-of-life of the wind farm".* In this regard, the Decommissioning Plan (DP) will be reviewed and updated prior to commencement of decommissioning works to take account of the relevant conditions of the planning permission and current health and safety standards at the time of decommissioning. The DP will be agreed in writing with the Planning Authority prior to the commencement of the decommissioning phase.	End of Operational Life	As Required	Developer Appointed/ Contractor
MX33	Decommissioning	DP Section 3	The ECoW will maintain responsibility for monitoring the decommissioning works and Contractors/Sub-contractors from an environmental perspective. The ECoW will act as the regulatory interface on environmental matters. The Site Manager will be responsible for reporting to and liaising with Galway County Council and other statutory bodies as required.	End of Operational Life	As Required	Site Manager/ ECoW

MX34	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.	End of Operational Life	As Required	Site Manager/ ECoW
MX35	Decommissioning	DP Section 3	The Site Manager will take steps to ensure the sourcing of suitably clean soil material and verify the quality of the material by having it inspected prior to bringing it to site by a suitably qualified ecologist. Prior to decommissioning, a suitably qualified ecologist will complete an invasive species survey of the Site to identify invasive species where any minor excavation will be required. If present in these areas, the ecologist will propose suitable management measures.	End of Operational Life	As Required	Project Ecologist
MX36	Health and Safety	DP Section 4	› 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.	End of Operational Life	As Required	PSCS
MX37	Birds	EIAR Chapter 7	Decommissioning surveys will be undertaken prior to the initiation of decommissioning works at the Proposed Wind Farm site. The survey will aim to identify sensitive sites (e.g. nests or roosts). Any requirement for decommissioning works to run into the subsequent breeding season following commencement will be subject to a repeat of the pre-commencement bird surveys to confirm the absence of breeding birds of conservation concern once per month during the breeding season (April to July). The survey will aim to identify sensitive sites e.g., nests or roosts depending on the season in question. Any requirement for decommissioning works to run into	End of Operational Life	As Required	Project Ornithologist

			subsequent winter seasons following the commencement of works will be subject to a repeat of the decommissioning bird surveys. Monitoring will be undertaken by a suitably qualified ornithologist. The survey will include a thorough walkover survey to a 500m radius of the development footprint and/or all works areas. If winter roosts or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the construction phase. If the roost/nest is found to be active during the construction phase no works shall be undertaken, works will cease within a species-specific buffer of this location (Forestry Commission Scotland, 2006; Goodship and Furness, 2022; Ruddock and Whitfield, 2007) in line with best practice. No works shall be permitted within the buffer until it can be demonstrated that the roost or nest is no longer occupied.			

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.

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

Works during the construction phase of the development, including delivery of construction materials will generally take place between 7 a.m. and 7 p.m. daily Monday to 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 of the main construction task items are outlined in Figure 8-1 below, where 1st January has been selected as an arbitrary start date for construction activities.

			Year 1				Year 2			
ID	Task Name	Task Description	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
1	Site Health and Safty									
2	Grid Connection	Construct grid connection to Athlone 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	Constuction substation, underground cabling between turbines								
6	Turbine Hardstands	Excavate/pile for turbine bases where required								
7	Turbine Foundations	Fix reinforcing steel and anchorage system, erect shuttering, concrete pour								
8	Backfilling and Landscaping									
9	Turbine Delivery and Erection									
10	Substation Commissoning									
11	Turbine Commisioning									

Figure 9-1 Indicative Construction Schedule

10. COMPLIANCE AND REVIEW

10.1 Site Inspections and Environmental Audits

Routine inspections of construction activities will be carried out on a daily and weekly basis by the ECoW and the Site Supervisor/Construction Manager to ensure all controls to prevent environmental 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 mitigation measures. Further environmental audits will be carried on a monthly basis during the construction phase of the Proposed Project and again after the commissioning of the wind turbines and substation.

In contrast to monitoring and inspection activities, audits are designed to shed light on the underlying causes of non-compliance, and not merely detect the non-compliance itself. In addition, audits are the main means by which system and performance improvement opportunities may be identified. Environmental audits will be carried out by the 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 Galway County Council on request.

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

10.3 Environmental Compliance

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